

**BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW  
DELHI  
PETITION NO. \_\_\_\_\_/MP/2023**

**IN THE MATTER OF:**

Petition under Regulation 22 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 ("**Tariff Regulations 2019**") read with Regulation 9 (4) of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (Second Amendment) Regulations, 2021 ("**Second Amendment 2021**") seeking condonation of delay of 22.5 months in declaring Commercial Operation Date of Talaipalli Coal Mine and approval of input price of coal supplied from Talaipalli Coal Mine to end use generating station i.e., Lara STPS for the period from Commercial Operation Date i.e., 01.10.2023 to 31.03.2024.

**AND IN THE MATTER OF:**

NTPC Limited ...Petitioner

Versus

Madhya Pradesh Power Management Company Limited & Ors. ...Respondents

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Place: New Delhi

Date: 24.11.2023

**BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION,  
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**AND IN THE MATTER OF:**

NTPC Limited ...Petitioner

Versus

Madhya Pradesh Power Management Company Limited & Ors. ...Respondents

**MEMO OF PARTIES**

**IN THE MATTER OF:**

NTPC Limited  
Through its Authorized Representative,  
NTPC Bhawan, SCOPE Complex,  
Institutional Area, Lodhi Road,  
New Delhi - 110003 ...Petitioner

Versus

1. Madhya Pradesh Power Management Company Limited  
Through its Authorized Representative  
Block No. 11, 1st Floor, Shakti Bhawan,  
Rampur, Jabalpur, Madhya Pradesh-482008

2. Maharashtra State Electricity Distribution Company Limited  
Through its Authorized Representative  
Prakashgad, Plot No. G-9, Anant Kanekar Marg,  
Bandra East, Mumbai, Maharashtra-400051
3. Gujarat Urja Vikas Nigam Ltd.  
Through its Authorized Representative  
Commerce Department, 2nd Floor,  
Sardar Patel Vidyut Bhavan,  
Race Course, Vadodara, Gujarat-390007
4. Chhattisgarh State Power Distribution Company Limited  
Through its Authorized Representative  
Office of Executive Director (Commercial), CSPDCL,  
4<sup>th</sup> Floor, Vidyut Sewa Bhawan, Daganiya,  
Raipur, Chhattisgarh-492013
5. Electricity Department, Government of Goa  
Through its Authorized Representative  
3<sup>rd</sup> floor, Vidhyut Bhavan, Electricity Department,  
Government of Goa, Panaji, Goa-403001
6. Dadra and Nagar Haveli and Daman and Diu Power Distribution  
Corporation Limited  
Through its Authorized Representative  
1<sup>st</sup> & 2<sup>nd</sup> Floor, Vidyut Bhavan,  
Silvassa, Dadra & Nagar Haveli-396230

...Respondents

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...Respondents

**MOST RESPECTFULLY SHOWETH:**

**I. CONSPECTUS**

1. The present Petition has been filed by NTPC Limited ("**Petitioner/NTPC**") under Regulation 22 of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 ("**Tariff Regulations 2019**") read with Regulation 9 (4) of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (Second Amendment) Regulations, 2021 ("**Second Amendment 2021**") seeking the following: -

- (a) Condone the delay of 22.5 months in declaring Commercial Operation Date (“**COD**”) of Talaipalli Coal Mine on account of reasons beyond the control of the Petitioner; and
  - (b) Approval of input price of coal supplied from Talaipalli Coal Mine to the end use generating station i.e., Lara STPS for the period from COD i.e., 01.10.2023 to 31.03.2024;
2. It is submitted that Talaipalli Coal Mine is located in Raigarh district of Chhattisgarh, which has been allocated to the Petitioner for specified end use for Lara Super Thermal Power Station 4000 MW (5X800 MW) (“**Lara STPS**”).
3. In terms of Regulation 5 (3) (c) of the Second Amendment 2021, the COD of the Talaipalli Coal Mine comes out to be 16.11.2021. Notably, the Petitioner has not been able to achieve the COD by 16.11.2021 on account of delay caused due to discrepancies in the Approved Mining Plan, its revision and delay in obtaining approval on the revised mining plan.
4. Pertinently, Regulation 9(4) of the Second Amendment 2021 provides that the Petition should be filed not later than 60 days from the COD of the integrated mine(s) or from the date of notification of these regulations, whichever is later. In the present case, Talaipalli Coal Mine achieved its COD on 01.10.2023.
5. Accordingly, the present Petition is being filed within the prescribed limitation, seeking appropriate reliefs and directions from this Hon’ble Commission.

## II. DESCRIPTION OF PARTIES

6. NTPC Limited (“**Petitioner**”/“**NTPC**”) is a Government Company within the meaning of the Companies Act, 1956 and a Generating Company within the purview of Section 2(28) of the Act. The Petitioner, *vide* Ministry of Coal (“**MoC**”) letter dated 25.01.2006, has been allocated Talaipalli Coal Mine for meeting coal requirement of proposed 4000 MW Lara STPS.
- 6.1. Madhya Pradesh Power Management Company Limited (“**Respondent No.1**” / “**MPPMCL**”) is a government company and an unbundled entity of the erstwhile Madhya Pradesh State Electricity Board. MPPMCL is a trading licensee, authorized to undertake transaction of sale and purchase of electricity. *Vide* Notification dated 10.04.2012, MPPMCL has been made the holding company of all distribution licensees within the state of Madhya Pradesh.
- 6.2. Maharashtra State Electricity Distribution Company Limited (“**Respondent No. 2/MSEDCL**”) is a wholly owned corporate entity under the Maharashtra government and was incorporated to distribute electricity from the end point of transmission to the end consumers in the State of Maharashtra.
- 6.3. Gujarat Urja Vikas Nigam Ltd. (“**Respondent No. 3/GUVNL**”) is engaged in the business of bulk purchase and sale of electricity, supervision, co-ordination and facilitation of the activities of its six subsidiary companies.
- 6.4. Chhattisgarh State Power Distribution Company Limited (“**Respondent No. 4/CSPDCL**”) came into existence w.e.f. 01.01.2009. CSPDCL provides electricity to consumers across the state of Chhattisgarh.

- 6.5. Electricity Department, Government of Goa ("**Respondent No. 5**") is the only licensee in the State of Goa for transmission and distribution of electrical energy.
- 6.6. Dadra and Nagar Haveli and Daman and Diu Power Distribution Corporation Limited ("**Respondent No. 6**" / "**DNHDDPDCL**") is a Special Purpose Vehicle, which started its operations as a distribution licensee from 01.04.2022. DNHDDPDCL was created to undertake the power distribution functions in the UT of Dadra and Nagar Haveli and Daman and Diu, wherein Torrent Power Limited is having 51% stake and remaining 49% stake vests with the Hon'ble Administrator of UT.

### **III. FACTUAL BACKGROUND**

7. The relevant factual background that led to the filing of the present petition is detailed below: -
- 7.1 The Petitioner is a company incorporated under provisions of the Company Act, 1956 and a Government Company as defined under Section 2(45) of the Companies Act, 2013. Further, NTPC is a 'Generating Company' as defined under Section 2(28) of the Electricity Act, 2003 ("**the Act**").
- 7.2 It is submitted that various integrated coal mines have been allocated to the Petitioner for specified end use generating stations, whose tariff is determined by this Hon'ble Commission under Section 62 of the Act. In the present case, Talaipalli is one such coal mine which has been allocated to the Petitioner for supply of coal or lignite to Lara STPS 4000 MW (5X800 MW) out of which Lara-I (2X800 MW) has already been commissioned.

Talaipalli coal mine is located in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh.

- 7.3 On 25.01.2006, the Ministry of Coal, Government of India (“**MoC**”) *vide* its letter conveyed its in-principle consent to the Petitioner for allocation of Talaipalli coal block under the Revised Coal Mining Policy for meeting coal requirement of proposed 4000 MW Lara Integrated Power Project. As per the said allocation letter, the Petitioner had to achieve certain milestones and the same are as follows:-

S.No.	Event
1.	Allocation
2.	Purchase of Geological Report (“ <b>GR</b> ”)
3.	Bank Guarantee
4.	Mining Lease Application
5.	Mining Plan Submission
6.	Previous approval application
7.	Previous approval
8.	Forest Clearance application
9.	Forest Clearance
10.	Environmental Clearance Application
11.	Environmental Clearance
12.	Mining lease grant
13.	Land Acquisition begin
14.	Land Acquisition
15.	Opening permission application
16.	Opening permission grant
17.	Production

A true copy of the letter dated 25.01.2006 issued by MoC is annexed

herewith and marked as **ANNEXURE P/1**.

- 7.4 In compliance of the allocation letter, on 12.06.2006, the Petitioner signed a Memorandum of Understanding (“**MoU**”) with Mineral Exploration Coal Limited (“**MECL**”) for carrying out detailed exploration and preparation of Geological Report (GR) of the coal block. It is submitted that on 29.09.2008, MECL in consonance with the MoU provided GR to the Petitioner. A true copy of the Letter dated 29.09.2008 issued by MECL to the Petitioner and GR is annexed herewith and marked as **ANNEXURE P/2 (COLLY)**.
- 7.5 On receipt of GR, the Petitioner issued a tender for the purpose of inviting bids through competitive bidding route to prepare a Mining Plan and Feasibility Report (“**FR**”). Notably, Advance Coal Management & Marketing Pvt. Ltd., New Delhi (“**ACMM**”) was selected as a successful bidder to prepare the mining plan and FR of the Talaipalli Coal Mine.
- 7.6 On 24.06.2009, the Petitioner issued a Letter of Award (“**LoA**”) to Advance Coal Management & Marketing Pvt. Ltd., New Delhi (“**ACMM**”) for the purposes of preparing the mining plan and FR. As per Mineral Concession Rule,1960, MoC grants recognition to a person to prepare Mine Plan. As per the rule, no mining plan shall be approved unless it is prepared by a qualified person recognized by the Central Government, or duly authorized officer. Hence, Mr. B.S Nag was recognized by MoC as a competent person under Rule 22(c) of Mineral Concession Rule,1960 to prepare Mine Plan for Coal/Lignite block. As a result, Mr. B.S Nag, an accredited Recognized Qualified Person (“**RQP**”) (RQP NO. 34011/(39)/2006-CPAM) of ACMM was appointed to prepare the mining



plan for the Talaipalli Coal Mine. A true copy of the LoA dated 24.06.2009 and recognition of Mr B.S Nag as RQP by MoC letter dated 26.06.2006 are annexed herewith and marked as **ANNEXURE P/3 (COLLY)**.

7.7 Thereafter, the mine plan was prepared by RQP and accordingly, on 10.11.2009, the mine plan was submitted to MoC for its approval. In response to the submission made, on 20.01.2010, MoC issued a letter requesting the Petitioner to incorporate the suggestions of the Technical Members of the Standing Committee and thereafter re-submit the mining plan duly signed by RQP for approval of MoC. A true copy of the Letter dated 20.01.2010 issued by MoC is annexed herewith and marked as **ANNEXURE P/4**.

7.8 On 05.02.2010, the Petitioner issued a letter to MoC responding to the suggestions made by the Technical Members of the Standing Committee and submitted the mining plan after incorporating the suggestions. *Vide* the said letter, the Petitioner further requested approval on the Mining Plan by the MoC. A true copy of the Letter dated 05.02.2010 issued by the Petitioner to MoC is annexed herewith and marked as **ANNEXURE P/5**.

7.9 On 31.03.2010, the MoC *vide* its letter accorded approval to the Mining Plan submitted by the Petitioner in respect of Talaipalli Coal Block. A true copy of the Letter dated 31.03.2010 issued by MoC to the Petitioner and the mining plan are annexed herewith and marked as **ANNEXURE P/6 (COLLY)**.

7.10 Thereafter, on 30.09.2010, FR prepared by ACMM was submitted. Subsequently, on 12.11.2010, the NTPC Board in its 360<sup>th</sup> meeting

recommended formulation of standard guidelines & methodology for preparation of FR estimates. Accordingly, the Project Cost Estimate (“PCE”) prepared by consultants was revised and updated in consonance with the approved mining plan. Thereafter, on 25.02.2013, FR of the block, updated to 1<sup>st</sup> quarter of 2012-13 was approved by the Project sub-committee of Board of Directors of the Petitioner.

- 7.11 Subsequent to the letter dated 30.03.2011 issued by the Petitioner requesting Environmental Clearance for the Talaipalli Coal Mine, on 02.01.2013, the Ministry of Environmental, Forest & Climate Change (“MoEF&CC”) *vide* its letter granted Environmental Clearance to the Petitioner for Talaipalli Coal Mine (Opencast at 18 MTPA and Underground Coalmine at 0.72 MTPA capacity of a total project area of 2349.35 ha). A true copy of the letter dated 02.01.2013 issued by MoEF&CC to the Petitioner is annexed herewith and marked as **ANNEXURE P/7**.
- 7.12 On the basis of the approved Mining Plan, on 05.11.2012 & 29.01.2014, the MoEF&CC *vide* its letters granted forest clearance to the Petitioner for Stage-I & II. A true copy of the Letters dated 05.11.2012 and 29.01.2014 issued by MoEF&CC are annexed herewith and marked as **ANNEXURE P/8 (COLLY)**.
- 7.13 However, on 24.09.2014, the Hon’ble Supreme Court of India *vide* its judgment titled as *Manohar Lal Sharma vs. The Principle Secretary & Ors.*, cancelled the allocation of Talaipalli coal block to NTPC by GoI along with other 204 coal blocks in the entire country.
- 7.14 Thereafter, on 18.12.2014, the Central Government issued an Order under

Rule 8(2) of the Coal Mines (Special Provisions) Rules, 2014 (“**Rules**”) to the President of India for allotment of the Coal Mine pursuant to Section 5 of the Coal Mines (Special Provisions) Ordinance, 2014 read with Coal Mines (Special Provision) Second Ordinance, 2014 (collectively referred to as ‘**Ordinance**’. In such order, generation of power was the “**Specified End Use**” with respect to the Coal Mine.

7.15 Pursuant to an allotment process conducted in accordance with the Ordinance, the Rules, the Allotment Document dated 18.02.2015 and receipt of a direction from the Central Government under Rule 11(9) of the Rules, the Petitioner has become entitled to enter into an agreement with the President of India pursuant to Rule 13(5) of the Rules with respect to allocation of the Coal Mine to the Petitioner for use in the Specified End Use Plant.

7.16 Accordingly, on 27.03.2015, an allotment agreement was executed between the President of India and the Petitioner with respect to matters related to allocation of the Coal Mine, including without limitation development of the Coal Mine and production and utilization of coal from the Coal Mine. It is apposite to mention herein that as per Schedule E of the Allotment Agreement, the Petitioner had to achieve certain milestones within the stipulated time frame. A true copy of the Allotment Agreement dated 27.03.2015 is annexed herewith and marked as **ANNEXURE P/9**.

7.17 Thereafter, on 07.09.2015, the aforesaid Allotment Agreement was amended whereby the Efficiency Parameters envisaged under the Schedule E were revised and the same are as follows: -

**SCHEDULE E- EFFICIENCY PARAMETERS**

<b>S.No.</b>	<b>Milestone</b>	<b>Time Limit in Months (From the date of the Allotment Order/Zero date)</b>	<b>Weightage for calculating deduction of Performance Security (in case of failure/delay in achieving milestone)</b>
1	Prospecting License	0	5
2	Completion of Exploration and Preparation of Geological Report (GR)	0	
	<b>Events after preparation of GR</b>		
3	Mining Lease Application	3	7
4	Submission of Mining Plan	6	8
5	Mining Plan Approval	11	8
6	Previous Approval Application	12	6
7	Previous Approval	13	5
8	Forest Clearance Application	11	8
9	Forest Clearance	21	5
10	Environment Clearance Application	11	8
11	Environmental Clearance	21	5
12	Grant of Mining Lease	24	5
13	Land Acquisition (To reach rated capacity)	36/42 (in case of forest land)	5
14	Opening of Escrow Account	37/43(in case of forest land)	8
15	Application for Opening Permission	37/43(in case of forest land)	2
16	Grant of Opening	38/44 (in case	2

	Permission	of forest land)	
17	Schedule of Production/Reaching Rated Capacity	As per approved Mining Plan	8
18	EUP Synchronisation	As per approved Mining Plan	5

A true copy of the Amendment Agreement dated 07.09.2015 is annexed herewith and marked as **ANNEXURE P/10**.

7.18 On 08.09.2015, the MoC *vide* its Order re-allotted the Talaipalli Coal Mine to the Petitioner. A true copy of the allotment order dated 08.09.2015 is annexed herewith and marked as **ANNEXURE P/11**.

7.19 Subsequent to the reallocation of the Talaipalli Coal Mine, on 28.10.2015, the MoEF&CC *vide* its letter granted Environmental Clearance to the Petitioner for Talaipalli Coal Mine. A true copy of the Environmental Clearance letter dated 28.10.2015 issued by MoEF&CC is annexed herewith and marked as **ANNEXURE P/12**.

7.20 In compliance of the Allotment Agreement, on 01.10.2015, the Petitioner *vide* its letter submitted the Commencement Plan for Talaipalli Coal block to the MoC. *Vide* the said letter, the Petitioner intimated that the "Schedule of Production" shall be completed by November, 2019. A true copy of the Letter dated 01.10.2015 issued by the Petitioner to MoC is annexed herewith and marked as **ANNEXURE P/13**.

7.21 It is submitted that the Petitioner planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator ("**MDO**") having scope of work of overburden removal, extraction of coal, construction of CHP & other fixed mine infrastructures, compliance of

statutory obligations and other associated activities.

- 7.22 Hence, on 31.12.2015, the Petitioner floated a tender for selection of MDO. Notably, the stipulated time frame for bid opening was extended by the Petitioner on multiple occasions due to poor response and request from the prospective bidders. The bids were finally opened on 09.05.2016 and reverse auction was held on 27.12.2016. Thereafter, in January, 2017, the technical evaluation of bids were approved.
- 7.23 On 22.03.2017, 444<sup>th</sup> meeting was held whereby the Petitioner's Board of Directors accorded Investment Approval for Talaipalli Coal Mine at a project cost of Rs. 3004.00 Crores (Three Thousand and Four Crores) as of price level of 3<sup>rd</sup> Quarter of 2016 and estimated completion cost of Rs. 3318.39 Crores (Three Thousand Three Hundred and Eighteen Crores). A true copy of the MoM dated 30.03.2017 for the meeting held on 22.03.2017 is annexed herewith and marked as **ANNEXURE P/14**.
- 7.24 It is pertinent to mention herein that the Revised Cost Estimate (RCE) which is about Rs. 3996 Crore is pending before the Petitioner's Board of Directors for its consideration and approval and the copy of the same shall be provided once the same is approved by the Board of Directors.
- 7.25 The RCE has become mandatory as MGR system has been transferred from Talaipalli to Lara STPS as brought out in great detail in the amended petition as filed for Lara (Petition no. 145/GT/2019). The hearing of Lara petition has been concluded on 06.04.2023 and the order is reserved wherein all these details have been provided in detail and are not being repeated here for the sake of brevity. Further, CHP has been shifted from

the scope of MDO to the scope of NTPC and there are some minor other changes in the approved cost, which necessitated RCE for the Talaipalli Coal Mine. At present, though RCE is under approval but since there are major changes in the scope and approved cost as mentioned above, RCE needs to be considered at this stage itself so that the tariff so determined is cost reflective to balance the interest of both the generator and the beneficiaries to avoid any tariff surprise in future.

- 7.26 This will further ensure that the instant petition is reflecting the figures that are being considered by the NTPC Board and in case there is some variation in the figures so approved finally, the same shall be incorporated in our petition through additional submissions. The same may please be permitted and taken into cognizance by this Hon'ble Commission accordingly.
- 7.27 It is further submitted that in case of Hydro Station Tariff and in case of Transmission Tariff, this Hon'ble Commission is using Revised Cost Estimates to compare Capital Cost escalation.
- 7.28 It is respectfully submitted that the RCE should be used as the reference point for determination of capital cost. The issue had arisen before the Hon'ble Appellate Tribunal for Electricity as far back as in 2013 by way of Appeal No. 165 of 2012 filed by Power Grid Corporation of India Limited (PGCIL). In the said appeal, PGCIL had contended that despite it not submitting the RCE, this Hon'ble Commission ought to have allowed the higher apportioned capital cost of concerned transmission assets. While rejecting the contention, the Hon'ble Appellate Tribunal vide Judgment

dated 28.11.2013 had decided as under –

*“27. The Appellant has contended that since overall cost of the project has reduced from the approved cost, it was not required to obtain the approval of its’ own Board for Revised Cost Estimates for Raipur ICT III. The appellant has placed reliance on a Notification dated 30.3.1992 issued by the Government of India under section 43A of the Electricity (Supply) Act, 1948 stating that where the actual expenditure exceeds the approved project cost, the excess expenditure as approved by the Central Electricity Authority shall be deemed to be the actual expenditure.*

*28. Both the contention as well as the reliance of Appellant on 1992 notification are misplaced. The 1992 notification was issued in the context when the schemes of the Appellant were required to be approved by the Central Electricity Authority under Section 30 of the Electricity (Supply) Act, 1948. The 1948 Act has since been repealed and the Appellant is not required to get the approval of the CEA under the 2003 Act. Therefore, the 1992 notification has no relevance in the present matter.*

*29. The Central Commission has been mandated to determine the transmission tariff for the Appellant. The Central Commission has every right to ask ant relevant details from the Appellant for carrying out the prudence check on the expenditure of the Appellant.*

*30. The conduct of the Appellant is surprising. The Appellant is a Nava Public Sector Company of the Central Government. Its Board is empowered to approve its projects including the cost estimates for such projects. The Central Commission also accepts the cost approved by the Board of the Appellant. Under such circumstances, the Appellant could have approached its own Board for approval of the Revised Cost Estimates as desired by the Central Commission. Instead of going to its own Board, the Appellant preferred to approach this Tribunal in Appeal. Such an attitude is not proper.*

*Accordingly, the issue is decided against the Appellant.”*

7.29 The obvious corollary being followed by this Hon’ble Commission in all its Orders passed after the above Judgment is that wherever the RCE is available, the cost is compared to the same and when the RCE is not available, this Hon’ble Commission goes by the initially approved cost in the Investment Approval.



7.30 This Hon'ble Commission has settled this principle in the following cases –

- (a) Order dated 05.04.2019 passed in Petition No. 7/GT/2017 titled as  
*NHPC Ltd v PSPCL & Ors*

*“16. We have examined the matter. As stated, the provisions of Regulation 7 of the 2009 Tariff Regulations and the guidelines for vetting of capital cost issued by the Commission provide that the Commission may consider the capital cost as vetted by the DIA, while determining the tariff of the hydro generating companies. It is noticed that DIA has vetted the capital cost of ₹232316.18 lakh as against the claim of the petitioner for ₹244014.74 lakh as on COD of the station and DIA in its report has not vetted the balance additional capital expenditure from COD of the station till cut-off date i.e. completion cost. However, in the present case, it is noticed that the RCE i.e. completion cost of ₹261185.00 lakh as submitted by the petitioner was examined in detail and vetted by MOP, GOI through its nodal agency i.e. the CEA in association with CWC and thereafter, the RCE of ₹253975.00 lakh has been approved by MOP, GOI. In other words, MOP, GOI after having considered the various aspects relating to time and cost overrun and after taking into account various reports and recommendations of CEA and CWC had approved the RCE of the project. Since the RCE had undergone such process and been approved after a detailed review by competent technical bodies, we are inclined to consider the approved RCE cost of ₹253975.00 lakh as the completion cost of the project.”*

- (b) Order dated 28.09.2017 passed in Petition Nos. 30/RP/2017 &  
31/RP/2017 –

*“3. We have considered the submissions of PGCIL. The apportioned cost of Asset-1 in Petition No. 562/TT/2014 and of Assets I and II in Petition No.313/TT/2015 was restricted approved apportioned cost in the FR. With the approval of RCE in both the transmission schemes, the completion cost of the above said assets is within the RCE approved apportioned cost. In the RCE, the expenditure legitimately incurred is included after the payments are settled by PGCIL. Therefore, needs to be considered to recover the actual cost incurred in tariff since the beneficiaries have enjoyed the benefits of the said assets. Accordingly, we are of the view that the capital cost allowed*

*for Asset-1 in Petition No. 562/TT/2014 and Assets I and II in Petition No.313/TT/2015 are required to be revised so that PGCIL is able to recover its cost.*

*4. We notice that there has been considerable delay in filing these review petitions. PGCIL has submitted that the delay has occurred due to the time taken by the Board of Directors of PGCIL for approving the RCE. We are not satisfied with the reasons given for condonation of delay. Since RCE would have been otherwise considered at the time of truing up, we condone the delay in the filing of the review petitions as an exception.*

*5. The capital cost of the assets covered in the instant petition will be considered for revision at the time of truing up of the 2014-19 tariff on the basis RCE approved apportioned cost subject to prudence check and after taking into account the justification for the increase in the capital cost.*

*6. Accordingly, Petition No. 30/RP/2017 and 31/RP/2017 are disposed at the stage of admission.”*

- (c) Order dated 31.05.2018 passed in Petition 15/RP/2018 titled as PGCIL vs. KPTCL & Ors.

*“10. In the order dated 24.2.2016, the submission of the Review Petitioner in its affidavit dated 5.2.2016 was clearly recorded that the RCE was under consideration of its Board and would be submitted shortly. The Appellate Tribunal for Electricity in its judgment dated 5.3.2017 in Appeal No. 127 of 2015 (Power Grid Corporation of India Ltd. v. Central Electricity Regulatory Commission & Ors) has observed that if the Petitioner has not placed on record any documents before the Commission, then it must be given one chance to put up its case with complete facts and supporting documents. In the present case, no time limit was fixed for the Review Petitioner to submit the RCE, even after taking note of the submission of the Review Petitioner that RCE was under consideration of its Board for its approval. It is pertinent to mention that the RCE was approved on 11.3.2016 i.e. within 17 days of the issue of the order dated 24.2.2016. The Review Petitioner submitted the RCE in Petition No.98/TT/2017. However, the petition was rejected on the ground that there was laxity on the part of the Review Petitioner to get the RCE approved and the petition*

*cannot be reopened on the basis of subsequent developments. In our considered view, the grounds for rejection of the claims of the Review Petitioner in the impugned order have lost sight of the requirement of the fair procedure that the Review Petitioner should have been given an opportunity to submit the RCE which was under consideration of its Board for its approval as on the date of issue of the order dated 24.2.2016. Further, the observation in the impugned order that a petition cannot be reopened on the basis of the subsequent development is not the correct legal position as the tariff determination is a continuous process and pendency of the RCE before the Board of PGCIL for approval was in the knowledge of the Commission and was clearly noted in the order dated 24.2.2016 and therefore, in such cases, tariff revision is necessary to enable the Review Petitioner to recover its investment through tariff.*

- (d) Order dated 20.9.2019 passed in Petition No. 360/TT/2018 titled as *PGCIL Vs BHPCL*

*“19. The Petitioner has submitted the apportioned approved cost as per Investment Approval as well as per RCE. The Petitioner vide affidavit dated 15.3.2019 submitted the Auditor certificates along with revised tariff forms for Asset-I and Asset-II. The details of claimed apportioned cost, capital cost as on COD and estimated additional capital expenditure incurred or projected to be incurred during 2018-19, 2019-20 and 2020-21 along with estimated completion cost for the assets covered in the petition are as under:*

**(₹ in lakh)**

Asset	Apportioned Approved Cost (FR)	Apportioned Approved Cost (RCE)	Cost up to COD	Projected Expenditure			Estimated completion Cost
				2018-19	2019-20	2020-21	
Asset-I	167013.38	213899.19	198075.75	7341.54	5000.00	5000.00	215417.29
Asset-II	78113.54	97600.37	84056.82	5477.29	2858.55	765.44	93158.10
<b>Total</b>	<b>245126.92</b>	<b>311499.56</b>	<b>282132.57</b>	<b>12818.83</b>	<b>7858.55</b>	<b>5765.44</b>	<b>308575.39</b>

**Cost Over-run**

1. It is seen from the above table that the overall estimated completion cost of the instant assets is ₹ 308575.39 lakh which is within the Apportioned Approved Cost as per RCE of ₹ 311499.56 lakh.

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Further, It is seen that in respect of Asset-I, the estimated completion cost, as claimed in the petition, is ₹215417.29 lakh against the estimated completion cost, as per Form-5, is ₹209557.07 lakh indicating a gap of ₹5858.22 lakh, which remain to be justified by the Petitioner. However, the cost claimed upto 31.3.2019 in the control period of 2014-19 is within the RCE. Hence, the same is allowed with the direction to the Petitioner to furnish Form-5 with justification for the balance amount of estimated completion cost claimed in the petition at the time of true up.

- (e) Order dated 23.04.2019 passed in Petition No. 6/GT/2017 titled as NHPC Ltd v PSPCL & Ors:-

*“17. The capital cost allowed as on COD of the generating station (6.6.2014) is `253863.16 lakh, which includes the Normative IDC of `16544.90 lakh. The capital cost for works within the original scope as on 6.6.2014 is ₹237318.26 lakh (253863.16-16544.90) **whereas, the ceiling capital cost of the project is ₹253975 lakh (approved RCE)**. Accordingly, an amount of ₹16656.74 lakh (253975- 237318.26) is available for consideration in respect to the balance works/assets under the original scope of work of the project. In view of this, we restrict the additional capital expenditure claimed by the Petitioner to ₹16656.74 lakh for assets/works under the original scope of the project. We now examine the claims of the petitioner for additional capital expenditure during the respective years of the tariff period, based on prudence check, as under:...”*

- 7.31 In light of the above, it is submitted that this Hon’ble Commission has consistently taken a view to consider RCE cost as a ceiling cost.
- 7.32 Further, it is submitted that the original Investment Approval contains

approved cost at current cost and completed cost. It is submitted that the completed cost in Original Investment is a hypothetical cost which was derived at the time of investment approval in March 2017 based on price level of 3rd quarter of 2016. Whereas, the Revised Cost Estimates is based on scope change, time and cost over runs due to multiple uncontrollable factors, considering actual awarded cost factoring in site specific actual conditions, exchange rate variations, escalation close to actual in the specific etc. Since the cost arrived through competitive bidding process as taken in RCE, is true reflection of the project cost, RCE needs to be used instead of Completed Cost as mentioned in Original Investment approval.

- 7.33 In compliance of the Allotment Agreement, on 23.05.2017, the MoEF&CC *vide* its letter granted Forest Clearance to the Petitioner for Talaipalli Coal mine. A true copy of the Forest Clearance letter dated 23.05.2017 issued by MoEF&CC is annexed herewith and marked as **ANNEXURE P/15**.
- 7.34 The consortium comprising of M/s. NCC Limited and M/s. BGR Mining & Infra Private Limited ("**NCC-BGR**") was declared as MDO through competitive bidding route. On 13.11.2017, the Petitioner issued LoA to NCC-BGR for development and operation of Talaipalli Coal mining Block.
- 7.35 On 07.03.2019, this Hon'ble Commission notified the Tariff Regulations, 2019.
- 7.36 However, on 04.07.2019, the contract entered into between the Petitioner and NCC-BGR Consortium was terminated on account of FIR being registered by CBI against one of the Directors of NCC-BGR. A true copy of the Termination Letter dated 04.07.2019 issued by the Petitioner to NCC-

BGR is annexed herewith and marked as **ANNEXURE P/16**.

- 7.37 After the termination of NCC-BGR, the process of selection and appointment of another MDO was started without any delay and second tender for appointment of another MDO for a period of 25 years (for 404.5MMT of coal extraction with a stripping ratio of 4.30 Cum/t as per approved Mine Plan) was issued on 19.08.2019.
- 7.38 It is apposite to mention herein that as the contract of NCC-BGR was terminated, the Petitioner had to replan and think of alternative measures to achieve coal production as per the schedule prescribed in the Commencement Plan i.e., by November, 2019. As the process of appointment of new MDO was in progress, the Petitioner made all efforts to achieve the target of coal production by awarding small contracts to mining agencies.
- 7.39 Accordingly, on 19.06.2019, the Petitioner awarded a contract to M/s SS Chhatwal and company through competitive bidding route to commence mining operation, overburden removal, coal extraction and other associated works from south pit of Talaipalli Coal Mine., The scope of the contract was restricted to the south pit (as East & West pit were under the scope of NCC-BGR) and as such was not adequate to meet the subsequent years annual production targets as per the mine plan.
- 7.40 On 01.11.2019, the Petitioner issued a letter to MoC intimating that the mining operations have commenced from the south pit of Talaipalli Coal Mine from 15.10.2019. A true copy of the Letter dated 01.11.2019 issued by the Petitioner to MoC is annexed herewith and marked as **ANNEXURE**

**P/17.**

- 7.41 On 19.11.2019, the Petitioner issued a letter to MoC intimating that the coal extraction has commenced in the block with effect from 16.11.2019. It is submitted that no delay has been caused in achieving the coal production schedule on account of termination of the first MDO (i.e., NCC-BGR). A true copy of the letter dated 19.11.2019 issued by the Petitioner to MoC is annexed herewith and marked as **ANNEXURE P/18**.
- 7.42 On 19.02.2021, this Hon'ble Commission notified Second Amendment, 2021. *Vide*, the said Regulation, a new clause has been added namely Regulation 5(3) which provides that the date of commercial operation in case of integrated mine(s) shall mean the earliest of:-
- (a) The first date of the year succeeding the year in which 25% of the Peak Rated Capacity as per the Mining Plan is achieved; or
  - (b) The first date of the year succeeding the year in which the value of production estimated in accordance with Regulation 7A of these regulations, exceeds total expenditure in that year; or
  - (c) **The date of two years from the date of commencement of production.**
- 7.43 In light of the above Regulation, it is submitted that the date of commercial operation for the Talaipalli Coal Mine would be 16.11.2021 i.e., two years from the date of commencement of production.
- 7.44 However, it is submitted that the commercial operation of Talaipalli Coal Mine got delayed on account of reasons not attributable to the Petitioner and the reasons for the same are as follows: -

***Re. Delay on account of discrepancy in the Approved Mining Plan and consequent approval of the Revised Mining Plan.***

- 7.45 As highlighted above, the Petitioner after termination of the contract with NCC-BGR had invited bids in the month of August 2019 for the development and operation of the Talaipalli Coal Mine.
- 7.46 Subsequent to the bids issued, M/s Thriveni Earthmovers Pvt. Ltd. (“**TEMPL**”) was selected and appointed as new MDO through competitive bidding process. Accordingly, on 26.08.2020, the Petitioner issued LoA to TEMPL for development and operation of Talaipalli Coal Mine.
- 7.47 On 27.08.2020, TEMPL *vide* its letter acknowledged and accepted the LoA for the Development and Operation of the Talaipalli Coal Mine. A true copy of the Letter dated 27.08.2020 issued by TEMPL to the Petitioner is annexed herewith and marked as **ANNEXURE P/19**.
- 7.48 Eventually, on 23.09.2020, the Petitioner and TEMPL executed a Project Agreement for the development and operation of the Talaipalli Coal Mine Block.
- 7.49 Subsequent to the execution of the Project Agreement, on 25.10.2020, TEMPL mobilized its men and material for development of the mine. The activities undertaken by TEMPL and the work progress status is as follows:-

<b>S. No.</b>	<b>Activity</b>	<b>Work progress status</b>
1	Camp/Mobilization	Established TEMPL’s camp on 25.10.2020 and started mobilization of man and material



2	Geo-technical & Infill drilling	Started Geo-technical and Infill drilling from 26.10.2020
3	Physical possession of Land	Started Tree Felling work in East pit area of Mine from 02.11.2020
4	Internal Approach Road	Started internal Approach Road from Raikera to East Pit on 21.11.2020
5	Explosive Magazine	Started construction work on 07.12.2020 for 2 nos. out of 4 nos. of Explosive Magazines
6	Submission of Draft Operation Plan within 60 days from the date of LOA	Submitted Draft Operation Plan on 25.10.2020 within 60 days from LOA
7	Submission of Project Design Memorandum (PDM) for CHP & Infrastructure	Submitted on 27.09.2020

- 7.50 From the above, it is evident that the Petitioner and TEMPL were making good progress towards the Project.
- 7.51 On 23.11.2020, the Petitioner issued a letter to TEMPL intimating that the Draft Operational Plan submitted by TEMPL is in variance with the Approved Mining Plan and it was requested to submit the Draft Operation Plan in line with the Approved Mining Plan. A true copy of the Letter dated 23.11.2020 issued by the Petitioner to TEMPL is annexed herewith and marked as **ANNEXURE P/20**.
- 7.52 Surprisingly, on 27.11.2020, TEMPL issued a letter to the Petitioner pointing out discrepancies in the Coal and Overburden (“**OB**”) quantities

between TEMPL'S field studies/designs and volumes and that as indicated in the Approved Mining Plan by MoC. A true copy of the Letter dated 27.11.2020 issued by TEMPL to the Petitioner is annexed herewith and marked as **ANNEXURE P/21**.

7.53 In response, on 05.12.2020, the Petitioner issued a letter to TEMPL intimating that the GR as well as the Mining Plan approved by MoC were provided to TEMPL and thereafter only TEMPL submitted its "Bid Proposal with no deviation". *Vide*, the said letter NTPC further intimated that if there is any variation in the quantity of OB, the same shall be dealt as per the provisions of Project Agreement and requested TEMPL to submit the revised draft operational plan and interim production plan in-line with the Approved Mining Plan. A true copy of the Letter dated 05.12.2020 issued by the Petitioner to TEMPL is annexed herewith and marked as **ANNEXURE P/22**.

7.54 Thereafter, from January 2021 to March 2021, multiple rounds of discussions and meetings were held between TEMPL and the Petitioner wherein issues of Stripping ratio, space for OB dump, change in the scheme of CHP, etc., were discussed. However, during these meetings it was conveyed to TEMPL that the issues raised by them shall be addressed within the ambit of provisions of the Project Agreement. A true copy of the MoM held on 01.02.2021 and 02.02.2021 is annexed herewith and marked as **ANNEXURE P/23**.

7.55 In fact, on 11.03.2021, the Petitioner issued a letter requesting TEMPL to carry out mining operations and proceed as per the provisions of the

Project Agreement. *Vide* the said letter, it was further intimated that if there is any subsequent delay in the development and mining, the delay shall be accountable to TEMPL.

- 7.56 Later, the matter was again discussed on 16.04.2021 and 30.04.2021 and TEMPL was asked to submit feasible options for the start of mine operation within the ambit of Project Agreement provisions. However, till 04.05.2021, TEMPL did not submit the feasible options as requested by the Petitioner.
- 7.57 On 04.05.2021, TEMPL issued a letter to the Petitioner intimating that Project Agreement as presented during the bidding process is unworkable and impossible to perform as there are certain discrepancies in the MoC Approved Mine Plan. In view thereof, TEMPL is constrained to exercise its legal rights by rescinding the Project Agreement and requested for return of Performance BG of Rs 83.91 Cr. alongwith the compensation for losses suffered. A true copy of the Letter dated 04.05.2021 issued by TEMPL to the Petitioner is annexed herewith and marked as **ANNEXURE P/24**.
- 7.58 It is pertinent to mention herein that Stripping Ratio and all other parameters were as per the Mine Plan, which was prepared by RQP and approved by MoC as explained above. Therefore, there was nothing that the Petitioner could do about it. In fact, during Pre- Bid queries, no bidders including TEMPL ever raised any objection/query regarding the initial approved Mine Plan including Stripping Ratio, OB volume, lead & lift etc.
- 7.59 Subsequently, TEMPL filed a Commercial Civil Suit having No. 219 of 2021 before the Hon'ble High Court of Delhi seeking declaration of the Project

Agreement as void, return of Bank Guarantee and payment for the losses incurred by TEMPL.

7.60 On 10.05.2021, the Hon'ble High Court of Delhi *vide* its Order proposed both the parties to make an endeavor to amicably resolve the matter and, in the meantime, the TEMPL letter dated 04.05.2021 would be kept in abeyance/suspension till the settlement talks are continuing. A true copy of the Order dated 10.05.2021 passed by the Hon'ble High Court of Delhi in CS (COMM) No.219/2021 is annexed herewith and marked as **ANNEXURE P/25**.

7.61 Thereafter, on 14.05.2021, a meeting was held between the representatives of the Petitioner and TEMPL wherein the following was discussed: -

- (a) TEMPL raised a submission that both the parties must consult CMPDIL for resolution of technical issue.
- (b) The Petitioner raised a concern that Lara STPS would be adversely impacted with no coal supplies.
- (c) The Petitioner requested TEMPL to continue the works including works under progress like (a) Environment Monitoring, (b) Diversion of road crossing MGR.

A true copy of the MoM for the meeting held on 14.05.2021 is annexed herewith and marked as **ANNEXURE P/26**.

7.62 On 23.07.2021, the Petitioner issued a Service Purchase Order engaging CMPDIL as an Independent consultant for preparation of report on Technical Feasibility of Mining of Talaipalli Coal Mine. A true copy of the

Service Purchase Order dated 23.07.2021 is annexed herewith and marked as **ANNEXURE P/27**.

7.63 Pursuant to the Service Order dated 23.07.2021, on 07.09.2021, CMPDIL submitted its Technical Feasibility Report wherein it was recommended by CMPDIL that the mine operation as per Approved Mining Plan (AMP) is not feasible and if executed then it will cease to operate in 5th year and beyond. This is because of the fact that the designated dumping space in the Mining Plan for the temporary external dump is not adequate and there would be no space for dumping OB in 5th year of operation. In view thereof, it was recommended to make certain changes in the AMP in terms of the proposed options given in its Report and to get the necessary approval from the MoC. A true copy of the Technical Feasibility Report dated 07.09.2021 is annexed herewith and marked as **ANNEXURE P/28**.

7.64 On 04.10.2021, a meeting was convened by MoC to review the status of production from coal mines allocated by the MoC. In respect of the Talaipalli Coal Mine, it was observed that:

- (a) Only about 0.28 MT of coal has been produced till August 2021.
- (b) Coal production is stuck on account of disputes with TEMPL. The matter was jointly referred to CMPDIL for verification and CMPDIL has advised to revise the Mining Plan.

A true copy of the OM dated 07.10.2021 for the meeting held on 04.10.2021 is annexed herewith and marked as **ANNEXURE P/29**.

7.65 On 06.10.2021, the Petitioner issued a letter to MoP intimating that CMPDIL *vide* its report has recommended that the mine operation as per

Approved Mining Plan is not feasible and if executed then it will cease to operate in 5th year and beyond. A true copy of the Letter dated 06.10.2021 issued by the Petitioner to MoP is annexed herewith and marked as **ANNEXURE P/30**.

- 7.66 Based on the outcome of CMPDIL's technical feasibility note, on 09.10.2021, the Petitioner scheduled a meeting with TEMPL for start of mining operation as per CMPDIL's report.
- 7.67 On 18.10.2021, TEMPL *vide* its letter intimated to the Petitioner that subsequent to the recommendations given by CMPDIL *vide* its Report, new parameters need to be incorporated into a new mine which will have to be approved by the regulatory authorities. A true copy of the Letter dated 18.10.2021 issued by TEMPL to the Petitioner is annexed herewith and marked as **ANNEXURE P/31**.
- 7.68 On 26.10.2021, the Petitioner issued a letter to MoC intimating about the observations of CMPDIL regarding the approved Mine Plan. A true copy of the Letter dated 26.10.2021 issued by the Petitioner to MoC is annexed herewith and marked as **ANNEXURE P/32**.
- 7.69 On 19.11.2021, the Petitioner issued a Service Purchase Order engaging M/s IIT-ISM for the expert advice and technical vetting of CMPDIL's Technical Feasibility Report along with a high-level review of the Approved Mine Plan (AMP) and the findings of M/s TEMPL. A true copy of the Service Purchase Order dated 19.11.2021 issued by the Petitioner to M/s IIT-ISM is annexed herewith and marked as **ANNEXURE P/33**.
- 7.70 Thereafter, the Board of Directors of the Petitioner scheduled a meeting on

30.11.2021 to discuss the status of the Talaipalli Coal Mine and advised that necessary action be taken to achieve COD by November 2021. A true copy of the MoM for the meeting held on dated 30.11.2021 is annexed herewith and marked as **ANNEXURE P/34**.

7.71 On 13.01.2022, M/s IIT-ISM submitted its final report wherein an observation was given that *“the examination of the AMP by CMPDIL has thus led to the conclusion that overall AMP’s mining plan strategies are not workable unless it is further modified/optimized from excavation and dumping point of view. The errors have been found in the estimation of coal and overburden quantities, internal and external dump quantities etc. which can make the implementation of AMP un-feasible. IIT-ISM agrees with the findings of CMPDIL report that there will be a bottleneck in implementing the AMP unless the AMP is modified to address the above issues.”* A true copy of the report dated 13.01.2022 is annexed herewith and marked as **ANNEXURE P/35**.

7.72 As highlighted above, it is evident that the earlier Approved Mine Plan by MOC had serious shortcomings/faults rendering it unworkable, hence, it was needed to be revised as pointed out by CMPDIL and report endorsed by M/s IIT-ISM.

7.73 It is submitted that since the Petitioner and TEMPL could not find any amicable solution for implementation as per the Approved Mine Plan and the things were getting delayed, the Petitioner decided to move ahead to revive the project. Accordingly, on 18.01.2022, the Petitioner issued a letter requesting TEMPL to start the work at Talaipalli Coal Mine within 14 days

of receipt of the letter or else it shall be treated as “Mine Operators Event of Default”. A true copy of the Letter dated 18.01.2022 issued by the Petitioner to TEMPL is annexed herewith and marked as **ANNEXURE P/36**.

7.74 In response, on 28.01.2022, TEMPL issued a letter to the Petitioner intimating that CMPDIL’s scrutiny and rejection of the Approved Mine Plan makes the project unworkable on the present technical parameters. *Vide* the said letter, TEMPL requested the Petitioner to withdraw the letter dated 18.01.2022. A true copy of the Letter dated 28.01.2022 issued by TEMPL to the Petitioner is annexed herewith and marked as **ANNEXURE P/37**.

7.75 Since TEMPL failed to start the work within the stipulated time frame as envisaged *vide* letter dated 18.01.2022, accordingly, on 08.03.2022, the Petitioner issued a letter to TEMPL intimating that the Project Agreement stands terminated. A true copy of the Letter dated 08.03.2022 issued by the Petitioner to TEMPL is annexed herewith and marked as **ANNEXURE P/38**.

7.76 Subsequently, on 06.05.2022, the Petitioner awarded the work to CMPDIL for consultancy service, preparation of Conceptual Plan, Mine Plan and Feasibility Report for Talaipalli Coal Mine. A true copy of the Service Purchase Order dated 06.05.2022 is annexed herewith and marked as **ANNEXURE P/39**.

7.77 On 17.06.2022, a meeting was scheduled and chaired by MoC to review coal supply to power sector from allocated coal blocks. During the meeting, it was observed that only 3.402 MT coal has been produced against the pro-rata target of 4.308 MT till 15.06.2022. Furthermore, it was observed that



the shortage in coal production was mainly from Talaipalli Coal Mine and Pakri Barwadih Coal Mine. Given the situation, the MoC directed the Chairman of the Petitioner that the annual target for coal production of the Petitioner must be increased from 26 MT to 28 MT in the current year and mine-wise commitment to that extent must be finalized. A true copy of the MoM for the meeting held on 17.06.2022 is annexed herewith and marked as **ANNEXURE P/40**.

- 7.78 It is submitted that due to this ongoing dispute with TEMPL, things were getting delayed, therefore, the Petitioner undertook all the necessary steps to expedite the mining operation and appointed mining agencies i.e., M/s PC Patel Infra Private Limited (“**PCPIPL**”) for removal of overburden and extraction of coal from west pit (14.68 MMT for 05 years) and M/s Kalinga Commercial Corporation Ltd. (“**KCCL**”) for removal of overburden and extraction of coal from south pit extension (6.04 MMT for 03 years) respectively through competitive bidding route.
- 7.79 Further, it is submitted that the Coal production started from these pits w.e.f. 09.11.2022 (south pit extension) and 10.12.2022 (west pit). Accordingly, coal dispatch to Lara STPS through MGR commenced from 21.11.2022.
- 7.80 On 30.11.2022, CMPDIL submitted its final draft of revised Mining Plan and it was put up for approval under Single Window Portal of MoC on 03.01.2023. Since, the approval of revised mine plan was pending, the Petitioner issued various letters to MoC requesting for approval of revised mine plan. A true copy of the Revised mine plan dated 30.11.2022 and

online correspondences issued to MoC are annexed herewith and marked as **ANNEXURE P/41**.

- 7.81 Further, the contract award process for appointment of MDO for East pit (111.31 MMT Coal for 10 years) as per revised Mine Plan was started. Reverse auction was completed on 06.09.2023 and M/s VPR Mining Infrastructure Private Limited emerged as L1 bidder.
- 7.82 On 11.09.2023, the Petitioner issued a notice to the beneficiaries of Lara STPS intimating that the date of commercial operation of the Talaipalli Coal Mine is proposed w.e.f. 01.10.2023. A true copy of the Notice dated 11.09.2023 issued by the Petitioner is annexed herewith and marked as **ANNEXURE P/42**.
- 7.83 On 26.09.2023, the MoC issued a letter to the Petitioner intimating approval of mining plan and mine closure plan for Talaipalli Coal Mine. A true copy of the Letter dated 26.09.2023 and approved Mine Plan issued by MoC to the Petitioner are annexed herewith and marked as **ANNEXURE P/43 (COLLY)**.
- 7.84 On 16.10.2023, the Petitioner issued LoA to M/s VPR Mining Infrastructure Private Limited. As per the LoA, the new MDO i.e. M/s VPR Mining Infrastructure Private Limited shall plan, design, engineer, finance, construct, develop, operate and maintain the East pit of Talaipalli Coal Mine to deliver coal of specified quantity and quality to the Petitioner. It includes excavation of overburden/ inter burden by mechanized means, loading, transportation, dumping, dozing, levelling at OB dumping site to ensure progressive mine closure, rehandling of dump, etc. and mining of coal by

mechanized means, loading, transportation, and supply of coal of (-) 100 mm size at delivery point, etc. The mine development shall inter alia involve land acquisition and R&R related activities such as interaction with PAPs, State Government and other agencies, physical possession of land, etc. and development of infrastructures facilities for its own use like equipment workshop, electrical substations, pumping arrangements, haul road maintenance, diversion of nala, strengthening & widening of nala, diversion of power lines, construction of internal roads, mine illumination, fencing, construction of toe wall, ETP etc., and compliance to all statutory rules, regulations and laws as applicable. A true copy of the Relevant extracts of LoA dated 16.10.2023 issued by Petitioner to M/s VPR Mining Infrastructure is annexed herewith and marked as **ANNEXURE P/44**.

7.85 It is apposite to mention herein that the revised Mine Plan prepared by CMPDIL takes care of the issues with the earlier approved Mine Plan. A brief comparison of earlier approved mining plan and revised Approved Mining plan is placed below:

<b>Parameters</b>	<b>Earlier Approved Mining Plan</b>	<b>Revised Approved Mining Plan (1<sup>st</sup> Revision)</b>
Extractable Reserves	843.68 Mt	631.56 Mt
Strip Ratio	4.48 cum/t	4.33 cum/t
Peak Rated Capacity	18 MTPA	25 MTPA
Mine Life	52 Years	31 Years
Vol. External OB Dump	264.52 MBCM	533.53 MBCM

Ext. Dumping Period	8 years	13 years (internal dump from 4 <sup>th</sup> year)
Lead Dist. Coal	2 – 3 kms	3.5 to 4 kms [Initial years – 2.5 to 3 Km]
Lead Dist. To Ext. Dump	2 – 3 kms	3.5 to 4 kms [Initial 10 years: 5 – 6 Km (Ext Dump), 3.5-4 Km (Int. dump & Rehandling - ~ 3.5 km)]
Height of Ext. Dump	60 m above OGL	120 m above OGL
Height of Internal Dump	60 m above OGL	120 m above OGL

7.86 In view of the aforesaid background, it is submitted that there has been a delay of 22.5 months in achieving the date of commercial operation of the Talaipalli Coal Mine from the date of Coal production i.e., from 16.11.2021 to 01.10.2023 on account of discrepancies in the Approved Mining Plan, its revision and delay in obtaining approval on the revised Mining Plan from MOC. It is submitted that the said delay has been caused on account of reasons beyond the control of the Petitioner. Accordingly, it is requested before this Hon'ble Commission to condone the delay of 22.5 months in terms of Regulation 3(45) and Regulation 22 of the Tariff Regulations, 2019.

#### IV. SUBMISSIONS

8. Before delving into the submissions, it would be relevant to consider certain Regulations of the Tariff Regulations, 2019 and its amendment which are reproduced below:-

***“2. Scope and extent of application.***

*(1a) These regulations shall apply in all cases where a generating company has the arrangement for supply of coal or lignite from the integrated mine(s) allocated to it, for one or more of its specified end*

use generating stations, whose tariff is required to be determined by the Commission under section 62 of the Act read with section 79 thereof.”

**3. Definitions-** In these regulations, unless the context otherwise requires:-

**(25) ‘Force Majeure’** for the purpose of these regulations means the events or circumstances or combination of events or circumstances including those stated below which partly or fully prevents the generating company or transmission licensee to complete the project within the time specified in the Investment Approval, and only if such events or circumstances are not within the control of the generating company or transmission licensee and could not have been avoided, had the generating company or transmission licensee taken reasonable care or complied with prudent utility practices:

(a) Act of God including lightning, drought, fire and explosion, earthquake, volcanic eruption, landslide, flood, cyclone, typhoon, tornado, geological surprises, or exceptionally adverse weather conditions which are in excess of the statistical measures for the last hundred years; or

(b) Any act of war, invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, terrorist or military action; or

(c) Industry wide strikes and labour disturbances having a nationwide impact in India; or

(d) Delay in obtaining statutory approval for the project except where the delay is attributable to project developer;

**(44) ‘New Project’** means the generating station or unit thereof and the transmission system or element thereof achieving its commercial operation on or after 1.4.2019;

**(50) ‘Project’** means:

i) in case of thermal generating station, all components of the thermal generating station **and includes integrated coal mine, biomass pellet handling system, pollution control system, effluent treatment plan, as may be required;**

ii) in case of hydro generating station, all components of the hydro generating station and includes dam, intake water conductor system, power generating station, as apportioned to power generation; and

iii) in case of transmission, all components of the transmission

system including communication system;

**5. Date of Commercial Operation:** (1) *The date of commercial operation of a generating station or unit thereof or a transmission system or element thereof and associated communication system shall be determined in accordance with the provisions of the Grid Code.*

(2) *In case the transmission system or element thereof executed by a transmission licensee is ready for commercial operation but the interconnected generating station or the transmission system of other transmission licensee as per the agreed project implementation schedule is not ready for commercial operation, the transmission licensee may file petition before the Commission for approval of the date of commercial operation of such transmission system or element thereof:*

*Provided that the transmission licensee seeking the approval of the date of commercial operation under this clause shall give prior notice of at least one month, to the generating company or the other transmission licensee and the long term customers of its transmission system, as the case may be, regarding the date of commercial operation:*

*Provided further that the transmission licensee seeking the approval of the date of commercial operation of the transmission system under this clause shall be required to submit the following documents along with the petition:*

(a) *Energisation certificate issued by the Regional Electrical Inspector under Central Electricity Authority;*

(b) *Trial operation certificate issued by the concerned RLDC for charging element with or without electrical load;*

(c) *Implementation Agreement, if any, executed by the parties;*

(d) *Minutes of the coordination meetings or related correspondences regarding the monitoring of the progress of the generating station and transmission systems;*

(e) *Notice issued by the transmission licensee as per the first proviso under this clause and the response;*

(f) *Certificate of the CEO or MD of the company regarding the completion of the transmission system including associated communication system in all respects.*

**(3) The date of commercial operation in case of integrated mine(s), shall mean the earliest of –**

a. *the first date of the year succeeding the year in which 25% of the Peak Rated Capacity as per the Mining Plan is achieved; or*

b. *the first date of the year succeeding the year in which the value of production estimated in accordance with Regulation 7A of these regulations, exceeds total*

*expenditure in that year; or*

**c. *the date of two years from the date of commencement of production:***

*Provided that on earliest occurrence of any of the events under subclauses (a) to (c) of Clause (3) of this Regulation, the generating company shall declare the date of commercial operation of the integrated mine(s) under the relevant sub-clause with one week prior intimation to the beneficiaries of the end-use or associated generating station(s);*

*Provided further that in case the integrated mine(s) is ready for commercial operation but is prevented from declaration of the date of commercial operation for reasons not attributable to the generating company or its suppliers or contractors or the Mine Developer and Operator, the Commission, on an application made by the generating company, may approve such other date as the date of commercial operation as may be considered appropriate after considering the relevant reasons that prevented the declaration of the date of commercial operation under any of the sub-clauses of Clause (3) of this Regulation;*

*Provided also that the generating company seeking the approval of the date of commercial operation under the preceding proviso shall give prior notice of one month to the beneficiaries of the end-use or associated generating station(s) of the integrated mine(s) regarding the date of commercial operation.*

**22. *Controllable and Uncontrollable factors:*** *The following shall be considered as controllable and uncontrollable factors for deciding time over-run, cost escalation, IDC and IEDC of the new projects:*

*(1) The “controllable factors” shall include but shall not be limited to the following:*

- a. Efficiency in the implementation of the new projects not involving approved change in scope of such new projects, change in statutory levies or change in law or force majeure events; and*
- b. Delay in execution of the new projects on account of contractor or supplier or agency of the generating company or transmission licensee.*

*(2) The “uncontrollable factors” shall include but shall not be limited to the following:*

- a. Force Majeure events;*
- b. Change in law; and*
- c. Land acquisition except where the delay is attributable to the generating company or the transmission licensee.*

***[Emphasis Supplied]***

8.1 From the perusal of the above quoted Regulations, the following emerges for consideration: -

- (a) A reading of Regulation 3(25) demonstrates that the ambit of the said Regulation is not restricted to events and circumstances elucidated in the said clause. Regulation 3(25) is couched in a manner to be inclusive in nature and provides that '*events or circumstances*' or '*combination of events or circumstances including those stated below*' which are beyond the reasonable control of the affected party, preventing the said party to complete the Project within the specific time, would qualify as a *force majeure* event.
- (b) Therefore, it is evident that Regulation 3(25) is to be read in two parts wherein in the 1<sup>st</sup> part events or circumstances, if beyond the control of the affected party, impairs it complete the Project would constitute as *force majeure*. Further, the 2<sup>nd</sup> Part uses the phrase '*combination of events or circumstances including those stated below*' thereby reaffirming that the list of events or circumstances detailed in Regulation 3(25) are in addition and not in derogation to the 1<sup>st</sup> part of Regulation 3(25).
- (c) Further, it may be noted that the word "including" appearing in 2<sup>nd</sup> part of the Regulation further clarifies that the list of events mentioned in the said clause are not exhaustive. Therefore, to sum up, it is submitted that if any event of circumstance prevents the affected party to complete the Project, which is beyond its control, the same would constitute *force majeure*.



- (d) As per Regulation 3(25)(d), the force majeure includes the delay in obtaining statutory approval for the Project.
- (e) As per Regulation 3(50), Project means all components of the thermal generating station **and includes integrated coal mine.**
- (f) As per Regulation 5(3)(c), the date of commercial operation in case of integrated coal mine shall mean the date of two years from the date of commencement of production.
- (g) As per Regulation 22, the controllable and uncontrollable factors shall be considered for deciding the time over-run, cost escalation, IDC and IEDC of the new projects.
- (h) As per Regulation 22(2), Force Majeure event falls under the head of Uncontrollable parameters.

8.2 As brought out above in the factual background, it is submitted that though the coal production at Talaipalli coal mining project commenced w.e.f. 16.11.2019, however, COD could not be declared in 2 years i.e., by 16.11.2021 because by the time COD was due, issue of fault in initial Approved Mine Plan had already been raised by TEMPL and CMPDIL had also reported on non-workability of earlier approved Mine Plan. Therefore, it became impossible for the Petitioner to declare COD in the light of a faulty Mine Plan as reported by CMPDIL and vetted by IIT-ISM. It would also not have been prudent on part of the Petitioner to declare COD without conclusively resolving the issues, which were beyond the control of the Petitioner.

8.3 Therefore, the Petitioner was left with no other choice but to approach

other agencies i.e., CMPDIL in the present case as elaborated above and to wait for the approval of MoC on the revised Mine Plan. As evident from the facts stated above, the Petitioner has made efforts to get all the clearances and meet all statutory compliances like Environment Impact Assessment (“EIA”), Environmental Clearance (“EC”), Public Hearing, Forest Clearance (“FR”), Geological Survey of mine block, R&R plan approval from Govt. of Chhattisgarh, Groundwater clearance, Consent to Establish (“CTE”), Consent to Operate (“CTO”), Directorate General of Mine Safety (“DGMS”) Permission, Seam Opening Permission from CCO etc. well within the timeline of the project schedule.

- 8.4 Further, it is submitted that Land for mine block was successfully acquired by the Petitioner and more than 90 % of land required for the project was also acquired and moreover, the process is underway to acquire the remaining land. Resettlement and Rehabilitation for the Project Affected Persons was also done successfully and without any major issues, which endorses the efforts put in by the Petitioner. It clearly depicts that the delay caused due to the critical defects in the initial approved mine plan, its subsequent revision and delay in obtaining approval on the revised mine plan were beyond the control of the Petitioner.
- 8.5 In light of the above, it is submitted that the Petitioner through the present Petition is seeking a condonation of time overrun of **22.5 months** from the date of Coal production i.e., from 16.11.2021 to 01.10.2023 on account of the reasons stated above. It is submitted that the said delay has been caused on account of reasons beyond the control of the Petitioner. Accordingly, it

is requested before this Hon'ble Commission to condone the delay of 22.5 months in terms of Regulation 3(25) and Regulation 22 of the Tariff Regulations, 2019.

- 8.6 In light of the submissions made above, it is requested before this Hon'ble Commission to consider the submissions of the Petitioner and allow the condonation of time overrun.

**Re: Calculation of Input Price by the Petitioner for FY 2019-24**

9. In so far as the calculation of the Input Price is concerned, it is submitted that this Hon'ble Commission has been vested with the function of determination of tariff of generating companies under clauses (a), (b) and (d) of sub-section (1) of Section 79 of the Act.
10. Further, on 01.04.2019, the Tariff Regulations 2019 were notified, which specified the terms and conditions and methodology of tariff determination for the period 01.04.2019 to 31.03.2024.
11. Before proceeding any further, it may be noted that, Regulation 9(4) of the Tariff Regulations 2019 provides as follows: -

***“(4) Where the generating company has the arrangement for supply of coal or lignite from an integrated mine(s) to one or more of its generating stations, the generating company shall file a petition for determination of the input price for determining the energy charge along with the tariff petitions for one or more generating stations in accordance with the provision of Chapter 9 of these regulations.”***

**[Emphasis Supplied]**

12. Pertinently, the Petitioner has filed the present Petition in terms of the above Regulation, basis which this Hon'ble Commission is vested with power to determine the input price for determining the energy charge.

13. Thereafter, on 13.09.2021, this Hon'ble Commission notified Second Amendment 2021, which introduced Regulation 2(1a) with regard to input price of coal and lignite to revise the scope of regulations to cover all cases where a generating company has the arrangement for supply of coal or lignite from the integrated mine(s) to one or more of its specified end-use generating stations, whose tariff is required to be determined by the Commission under section 62 read with section 79 of the Act.
14. In this regard, Regulation 2(1a) of Second Amendment 2021 has been reproduced hereinbelow: -
- “(1a) These regulations shall apply in all cases where a generating company has the arrangement for supply of coal or lignite from the integrated mine(s) allocated to it, for one or more of its specified end use generating stations, whose tariff is required to be determined by the Commission under section 62 of the Act read with section 79 thereof.”*
15. It is submitted that based on the actual capital expenditure, the opening capital cost of Talaipalli as on CoD of 01.10.2023 comes out to be Rs. 2071.07 Cr on cash basis and liabilities of Rs. 294.92 Cr.
16. It is submitted that the Petitioner has calculated the input price based on the parameters provided in the Tariff Regulations 2019 and the Second Amendment 2021 as depicted below for the ease of reference of this Hon'ble Commission:-
- (a) **Debt: Equity Ratio** - 70:30
- (b) **Base Rate of Return on Equity** –In terms of Regulation 36G (3) of Second Amendment 2021, the base rate of return on equity shall be considered at 14%.

- (c) **Normative Loan and Notional IDC** - In terms of Regulation 3(9) of the Second Amendment 2021 read with Regulation 19(2)(b) of the Tariff Regulations 2019, equity deployed in excess of 30% of the fund deployed has been considered as normative loan and notional IDC of Rs. 34.42 Cr up to 30.09.2023 has been considered as part of the capital cost of the. Moreover, the Notional IDC, if any, up to the peak rated capacity shall be claimed based on audited financial statements upon achieving the peak rated capacity of the mine.
- (d) **FERV** – During the construction period, in the erstwhile IGAAP as per Para 46A of AS-11, FERV on loan was to be capitalized and accordingly the same was claimed as part of capital cost. However, as per IndAS, FERV on Foreign currency loans drawn after 01.04.2016 shall not form part of Gross Block and shall be charged to the statement of Profit & Loss as Borrowing cost/FERV. Further, as per Clause 19(2)(C) of Tariff Regulations 2019, any gain or loss on account of foreign exchange risk variation pertaining to the loan availed during the construction period shall form part of capital cost.
- (e) Accordingly, the petitioner has considered the FERV (incurred during construction period) on foreign currency loan drawn after 01.04.2016 charged to P&L in the capital cost. ERV loss of Rs 404.70 Lakh as Loan FERV and short term ERV after 01.04.2016 transferred to profit & loss account up to 01.10.2023 and the same has been adjusted with capital cost of the project.
- (f) **Unamortized Finance Charges** - In the erstwhile IGAAP, loan issue

expenses paid upfront were accounted as and when incurred and the same were used to be claimed as a part of IDC during construction period. Under Ind-AS the upfront expenditure pertaining to bond issue expenses is to be amortised over the tenure of the loan resulting in part capitalization as IDC till construction period. Since actual cash expenditure is to be included in capital cost, petitioner may be allowed to include the unamortized part of bond issue expenses of Rs. 497.15 Lakh in the capital cost as on COD of Coal Mine (01.10.2023) and accordingly the same has been claimed.

- (g) **Rate of Interest on Loan** – In terms of Regulation 36G (5) of the Second Amendment 2021, the interest on loan shall be considered based on actual weighted average rate of interest of the project.
- (h) **Depreciation** – In terms of Regulation 36H of the Second Amendment 2021, the depreciation is computed as per the straight line method as per the life of assets provided in Appendix IA of Second Amendment 2021.
- (i) **O&M Expenses** – In terms of Regulation 36I (a) of the Second Amendment 2021, the O&M expenses shall be allowed based on the projected O&M expenses for each year of the tariff period, subject to prudence check by this Hon'ble Commission. Notably, the O&M expenses are subject to truing up based on actual expenses for the tariff period ending on 31.03.2024. In this regard, the O&M expenses have been claimed based on the proposed O&M expenses for the

year 2023-24 (01.10.2023 to 31.03.2024).

- (j) **Statutory Charges** – In terms of Regulation 36A (2) of the Second Amendment 2021, the statutory charges shall form a part of the input price of coal. In this regard, the following statutory charges are applicable as on date and are payable by NTPC for the mine. It is respectfully submitted that any increase or decrease in statutory charges shall be submitted at the time of truing up. Further, GST @ 5% will be applicable along with GST Cess @ Rs. 400/- per ton, if the coal is supplied to a station having different GST number.
- (k) **Mining Charge** – Regulation 36B of the Second Amendment 2021 provides that mining fee of MDO or Mining agencies or expenditure from MDO/ Mining agencies towards carrying out mining operations shall be allowed as part of input price of coal. Mining fee has been claimed as per the Letter of Award issued to MDOs i.e. all the 3 mining agencies (i.e. M/s PCPIPL, M/s KCCL & M/s VPR) in this regard. In terms of the agreement signed with these 3 MDOs, mining fee or cost for mining operation are subject to escalation on quarterly or monthly basis based on prices of input materials of MDO and other mining agencies like heavy machinery parts, fuel, explosives, power, tyres, salaries & wages etc as per the formula provided in the MDO agreement. True copies of the relevant extracts of Service Purchase Orders and LOAs are annexed herewith and marked as **ANNEXURE P/45 (COLLY.)**.

(i) In view of the above, the actual rate of escalation paid to M/s PCPIPL in terms of the agreement is as follows:

<b>Mining Fee -West Pit</b>									
	Q1 (FY 23-24) actual	Q2 (FY 23-24) Actual	Q3 (FY 23-24) forecasted	Q4 (FY 23-24) Forecasted	Weighted Avg forecasted	Q1 (FY 24-25) forecasted	Q2 (FY 24-25) forecasted	Weighted Avg forecasted	
Base MF	630	630	630	630	630	630	630	630	Assumption for Forecasting figures i.e. for Q3, Q4 of FY 23-24 & Q1,Q2 of FY 24-25: Average of Q1,Q2 (FY23-24)
Escalated MF	650.74	651.44	651.09	651.09	651.09	651.09	651.09	651.09	
Escalation Factor	1.0329	1.0340	1.03348	1.03348	1.03348	1.03	1.03348	1.03348	





- (iii) In view of the above, the actual rate of escalation paid to M/s VPR in terms of the agreement is as follows:
- (iv) Further, the mining rate in case of M/s. KCCL in terms of the agreement is as follows:-

<b>KCCL rate for South pit extension (Based on actual data of past 06 months of 2023-24)</b>			
<b>Month</b>	<b>COAL (MT)</b>	<b>Total Amount</b>	<b>Rs/Tonne</b>
<b>Apr-23</b>	270154.8	264472279.1	978.97
<b>May-23</b>	248253.3	258724314.7	1042.18
<b>Jun-23</b>	253561.9	25,62,00,614.21	1010.41
<b>Jul-23</b>	226745.3	71638096.19	315.94
<b>Aug-23</b>	228756.3	180076477.3	787.20
<b>Sep-23</b>	205728.3	138444887.4	672.95
		<b>Wtd. Avg.</b>	<b>816.046</b>

- (v) It is submitted that the mining charge in the instant Petition has been claimed based on base mining charge along with the escalation paid to MDO. It is further submitted that for future period, this Hon'ble Commission may be pleased to allow to bill the input price of coal based on quarterly escalated price of MDO to avoid any accumulation of arrears. In this regard, the detailed calculation for escalation of MDO price shall be submitted before this Hon'ble Commission at the time of truing up.

- (vi) It is further submitted that the Second Amendment 2021 provides for adjustment of input price of coal based on Annual Stripping ratio. Similarly, the agreement signed with MDO also contains the provisions for adjustment of mining fee based on Annual Stripping ratio. However, in terms of Regulation 36N of the Second Amendment 2021, any shortfall in overburden removal may be adjusted against excess overburden removal in subsequent three years. Therefore, adjustment of input price of coal due to shortfall in overburden removal shall be submitted before this Hon'ble Commission at the time of truing up.
- (vii) In addition to the above, it is submitted that Regulation 7A of the Second Amendment 2021 provides that any amount received from sale of coal prior to date of commercial operation shall be adjusted in the capital cost of the project. In this regard, it may be noted that the input price of coal prior to CoD has been received as per the notified price of Coal India Limited for the corresponding grade of coal supplied to the power sector as the same was lower than the estimated price available in the investment approval. In this regard, the Regulation 7A of the Second Amendment 2021 has been reproduced hereinbelow:-

*"7A. Supply of Coal or Lignite prior to the Date of Commercial Operation of Integrated Mine:*

*The input price for supply of coal or lignite from the integrated mine(s) prior to their date of commercial operation shall be: (a) in case of coal, the estimated price available in the investment approval, or the notified price of Coal India Limited for the corresponding grade of coal supplied to the power sector, whichever is lower;*

*....*

*Provided that any revenue earned from supply of coal or lignite prior to the date of commercial operation of the integrated mine(s) shall be applied in adjusting the capital cost of the said integrated mine(s)."*

**Re: Mine Closure Expenses**

17. It is submitted that Regulation 36K of the Second Amendment 2021 provides that if the mine closure is undertaken by the generating company i.e., the Petitioner, the amount deposited in the Escrow account as per the Mining Plan, after adjusting interest earned, if any, on the said deposits shall be admitted as Mine Closure Expenses. In this regard, the Regulation 36K of Second Amendment 2021 is reproduced hereinbelow:-

*“(1) Where the mine closure is undertaken by the generating company, the amount deposited in the Escrow account as per the Mining Plan, after adjusting interest earned, if any, on the said deposits shall be admitted as Mine Closure Expenses:*

*Provided that,*

- a) the amount deposited in the Escrow account as per the Mining Plan prior to the Date of Commercial Operation of the integrated mine(s) shall be indicated separately and shall be recovered over the useful life of the integrated mine(s) in the form of annuity linked to the borrowing rate;*
- b) the amount deposited in the Escrow account as per the Mining Plan or any expenditure incurred towards mine closure shall be excluded from the capital cost for computing input price;*
- c) where the expenditure incurred towards mine closure falls short of or is in excess of the reimbursement received from the Escrow account during the tariff period 2019-24, the shortfall or excess shall*

*be carried forward to the subsequent years for adjustments.*

*(2) The amount towards mine closure shall be deposited in the Escrow account as per the Mining Plan and shall be recovered as part of input price irrespective of the expenditure incurred towards mine closure during any of the years of the tariff period.*

*(3) Where mine closure is within the scope of Mine Developer and Operator engaged by the generating company and mine closure expenses are part of the Mining Charge of Mine Developer and Operator, the mine closure expenses shall be met out of the Mining Charge and no mine closure expenses shall be admissible to the generating company separately:*

*Provided that,*

*a) the amount deposited in the Escrow account by the Mine Developer and Operator or by the generating company and any amount received from the Escrow Account against expenditure incurred towards mine closure shall not be considered for computing input price; and*

*b) the difference between the borrowing cost, arrived at by considering the weighted average rate of interest calculated on the basis of actual loan portfolio in accordance with the methodology specified in Regulation 32 of these regulations, and the amount deposited in Escrow account and the interest received from Escrow account in a year shall be adjusted in the input price of coal or lignite of the respective year, as part of mine closure expenses, on case to case basis;*

*(4) Where the mine closure is within the scope of Mine Developer and Operator engaged by the generating company only for a part of useful life of the integrated mine(s) and the generating company undertakes the mine closure for the balance useful life, the treatment of mine closure during the period undertaken by the generating company shall be in accordance with Clause(1) of this Regulation and mine closure during the period undertaken by the Mine Developer and Operator shall be in accordance with Clause (3) of this Regulation:*

*Provided that the treatment of mine closure at the end of useful life of the integrated mine(s) shall be decided by the Commission on case to case basis."*

18. It is submitted that mine closure involves planning effectively for the after-mining landscape i.e., all activities required before, during, and after the operating life of a mine that are needed to produce an acceptable landscape

economically. It may be noted that the mine closure activities can be broadly divided in following two categories:

- (a) Progressive or Concurrent Mine Closure, and
- (b) Final Mine Closure.

19. It may be noted that progressive mine closure includes various land use activities to be done continuously and sequentially during the entire period of the mining operations. On the contrary, final mine closure activities would start towards the end of mine life. It shall continue after the reserves are exhausted and mining is discontinued till the mining area is restored to an acceptable level.
20. It is submitted that in case of Talaipalli mine of the Petitioner, which is an MDO operated mine, progressive mine closure is in the scope of MDO and expenses towards progressive mine closure have been built up in MDO mining fee. However, the final mine closure activities are to be carried out by the Petitioner and expenses thereof are to be borne by the Petitioner only.
21. It may be noted that even though progressive closure is in the scope of MDO, the total estimated amount towards mine closure activities i.e., the amount towards progressive mine closure as well as final mine closure, is required to be deposited into the escrow account by the Petitioner. In this regard, true copy of relevant extracts of Project Agreement is annexed herewith and marked attached as **ANNEXURE P/46**.
22. It is further submitted that the works of progressive mine closure shall be carried out by the MDO during operational life of the mine and the details

of expenditure towards progressive mine closure shall be submitted to the Coal Controller/ any other competent authority.

23. Consequently, the competent authority, after verification of completion of works as per mine plan, shall allow reimbursement of progressive mine closure expenses from escrow account, up to specified percentage of the amount deposited in escrow account, after every five years. As per the Office Memorandum dated 29.05.2020, issued by Ministry of Coal, Government of India, only 50% of amount deposited can be withdrawn during operational life of mine after every five years. A true copy of the Office Memorandum dated 29.05.2020 is attached herewith and marked as **ANNEXURE P/47**.
24. In view of the above, it is evident that 50% of amount submitted in escrow account is towards progressive mine closure and balance is towards final mine closure expenses. As the progressive mine closure is in the scope of MDO, the cost of activities corresponding to progressive mine closure is included in MDO fee. Therefore, treatment of 50% of amount submitted in escrow account may be allowed as per Regulation 36K (3) of the Second Amendment 2021, whereby, the difference between borrowing cost of 50% of amount deposited in escrow account *qua* the progressive mine closure along with the interest received from escrow account in a year corresponding to 50% of amount submitted in escrow account shall be allowed as mine closure expenses.
25. It is further submitted that activities corresponding to balance amount submitted in escrow account are corresponding to final mine closure and

are in the scope of the Petitioner i.e., NTPC. Therefore, treatment of balance amount deposited in escrow account should be as per Regulation 36K (1) of the Second Amendment 2021, whereby, 50% of amount deposited in escrow account may be allowed as part of input price of coal without adjusting interest earned as the generating company shall be receiving no interest from escrow account during operating life of mine.

26. The Petitioner has accordingly calculated the input price of coal for FY 2019-24 period based on the above and the same is enclosed as part of Appendix-I to the present Petition.

**Re: *Provisional billing of input price of coal as per this petition***

27. It is submitted that the Petitioner is presently billing input price of coal from Talaipalli coal mine at the notified price of Coal India Limited (CIL) for the corresponding grade of coal being supplied to power sector in terms of the Second Amendment 2021. The claim of input price in the instant petition is in variance with the billed input price of coal. Considering that the input price determination may take time, it is prayed that this Hon'ble Commission may allow the Petitioner to provisionally bill input price of coal as per the present Petition till the time input price is determined and this petition is disposed off.

**Re: *Filing Fee***

28. It is submitted that Regulation 70 (1) of Tariff Regulations 2019 provides that the application fee and publication expenses may be allowed to be recovered directly from the beneficiaries at the discretion of this Hon'ble Commission. Accordingly, it is prayed that this Hon'ble Commission may be



pleased to allow recovery of filing fee directly from the beneficiaries.

29. It is submitted that the Petitioner has already paid the requisite filing fee through SAUDAMINI portal as per the provisions of the CERC (Payment of Fees) Regulations, 2012 as amended.
30. It is submitted the Petitioner has served the copy of the Petition to the Respondents mentioned herein above and has uploaded the Petition on the company website i.e., [www.ntpc.co.in](http://www.ntpc.co.in).
31. The Petitioner undertakes to submit any further information or clarification which may be required by this Hon'ble Commission for adjudication of the present petition.

**V. PRAYER**

32. In light of the submissions made above, the Petitioner prays that this Hon'ble Commission may be pleased to: -
  - (a) Condone the delay of 22.5 Months in declaration of COD of Talaipalli Coal Mine.
  - (b) Approve input price of coal of Talaipalli mine for the period from 01.10.2023 to 31.03.2024.
  - (c) Allow mine closure expenses as submitted in the petition.
  - (d) Allow the Petitioner to provisionally bill input price of coal as per this petition till the time the present petition is disposed of with permission for retrospective adjustment.
  - (e) Allow the reimbursement of expenditure towards filing fees and any other expenditure incurred by the Petitioner in relation to filing the

present petition before the Hon'ble Commission in terms of the Tariff regulation 2019 as amended from the beneficiaries.

- (f) Condone any error/omission in the petition and to grant an opportunity to the Petitioner to rectify the same.
- (g) Permit the Petitioner to make such further submission(s), addition(s) and alteration(s) to this Petition as may be necessary from time to time.
- (h) Pass any other order as it may deem fit in the circumstances mentioned above.

**FILED BY**



**SKV LAW OFFICES**

Advocates for the Petitioner

B-50, Defence Colony, New Delhi-110024

Phone: 011-47099999

Email: [lawyers@skvlawoffices.com](mailto:lawyers@skvlawoffices.com)

Place: New Delhi

Date: 24.11.2023

BEFORE THE HONBLE CENTRAL ELECTRICITY REGULATORY COMMISSION,

AT NEW DELHI

PETITION NO. \_\_\_\_\_/MP/2023



IN THE MATTER OF

NTPC Limited

Versus

Madhya Pradesh Power Management Company Limited & Ors

Respondents

**AFFIDAVIT**

I, Suman Kumar Aggarwal, S/o. late Shri H.K. Aggarwal, aged about 50 years, having his office at NTPC Ltd. Engineering Office Complex, Sector-24, Noida-201301, Uttar Pradesh, do hereby solemnly affirm and state as under:

1. That I am the Authorized Representative of NTPC Limited, the Petitioner in the above matter, and I am competent to affirm this Affidavit on its behalf. I say that the facts stated herein are based on records of the Petitioner maintained in the ordinary course of business and believed to be true.
  2. That I have read the accompanying Petition being submitted on behalf of Petitioner and have understood the contents thereof and that the contents therein are true and correct to the best of my knowledge and belief as derived from official records and information.
- That the Annexures filed along with the accompanying Petition are true copies of their respective originals.



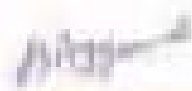
*(Signature)*

9. That the facts stated in the above affidavit are true and correct to my knowledge as derived from official records and information. No part of the same is false and nothing material has been concealed therefrom.

**VERIFICATION**

I, the above named deponent do hereby verify that the contents of this affidavit are true and correct to the best of my knowledge and belief, no part of it is false and nothing material has been concealed therefrom.


Verified at NOIDA on this 24th day of November, 2023.

  
**DR. RAJESH KUMAR AGGARWAL**  
Advocate (Retired)  
27, D. B. Road, Sector-19, Gurgaon-122 002 (H.P.)

  
**DEPONENT**

**DR. RAJESH KUMAR AGGARWAL**  
Advocate (Retired)  
27, D. B. Road, Sector-19, Gurgaon-122 002 (H.P.)



**ATTESTED**  
  
GULSHAN KUMAR GUPTA  
Advocate (Retired)  
B. No. 1127  
GATEWAY ROAD, GURGAON (H.P.)  
**24 NOV 2023**

<b>Appendix-I</b>		
<b>Checklist of Main Tariff Forms and other information for tariff filing for</b>		
<b>Integrated Mine</b>		
<b>Form No.</b>	<b>Title of Tariff Filing Forms (Integrated Mine)</b>	<b>Tick</b>
FORM- 1	Summary of Input Price	✓
FORM -1A	Summary of ROM Cost	✓
FORM -1B	Summary of Additional Charges	N/A
FORM -1C *	Summary of Mining Charges	✓
FORM-2	Statement showing claimed Capital Cost	✓
FORM-2A	Statement showing claimed Return on Equity	✓
FORM-2B	Statement showing claimed O&M cost	✓
FORM- 3	Mine Characteristics/Important Details as per Mine Plan	✓
FORM- 3A	Normative Parameters considered for Input Price computation	✓
FORM- 4	Details of Foreign loans	N/A
FORM- 4A	Details of Foreign Equity	N/A
FORM-5	Abstract of Admitted Capital Cost for the existing Integrated Mine	N/A
FORM- 6	Financial Package up to date of commercial operation & up to Peak rated capacity	✓
FORM- 7	Details of Integrated Mine Specific Loans	N/A
FORM- 8	Details of Allocation of corporate loans to Integrated Mine	✓
FORM-9	Year wise Statement of Additional Capitalization after date of commercial operation up to/ beyond achieving Peak rated Capacity	✓
FORM- 10	Financing of Additional Capitalization	**
FORM- 11	Calculation of Depreciation	✓
FORM- 12	Statement of Depreciation	✓
FORM- 13	Calculation of Weighted Average Rate of Interest on Actual Loans	✓
FORM- 14	Draw Down Schedule for Calculation of IDC & Financing Charges	✓
FORM- 15	Non-Tariff Income	**
FORM- 16	Details of Applicable Statutory Charges	✓
FORM-17	Details of Mine Closure expenses	✓
FORM- 18	Details for GCV Adjustment	**
** Shall be provided at the time of truing up.		
* Additional Form		

## PART-IV

**List of Supporting Forms / documents for tariff filing for Integrated Mine**

Form No.	Title of Tariff Filing Forms (Integrated Mine)	Tick
FORM-A	Abstract of Capital Cost Estimates and cost on date of commercial operation of the Integrated Mine	✓
FORM-B	Break-up of Capital Cost for New Integrated Mine	✓
FORM-C	Break-up of Construction/Supply/Service Packages	✓
FORM -D	Details of Assets De-capitalized during the period	**
FORM -E	Reconciliation of Capitalization claimed vis-à-vis books of accounts	✓
FORM -F	Statement showing details of items/assets/works claimed under Exclusions	**
FORM-G	Statement of Capital cost	✓
FORM-H	Statement of Capital Woks in Progress	✓
FORM-I	Calculation of Interest on Normative Loan	✓
FORM-J	Calculation of Interest on Working Capital	✓
FORM-K	Incidental Expenditure up to date of commencement of Production and up to Actual/anticipated date of commercial operation	✓
FORM-M	Actual cash expenditure	✓
FORM-N	Statement of Liability flow	✓
FORM-W *	ERV Charged to Revenue	✓
FORM-X *	Finance Charges - Unamortised Bond Expenses	✓
FORM-Y *	IDC Details	✓
FORM-Z *	FERV Summary	✓

\* Additional Forms

**List of supporting documents for tariff filing for Integrated Mine**

S. No.	Information / Document	Tick
1	Certificate of incorporation, Certificate for Commencement of Business, Memorandum of Association, & Articles of Association ( For New Integrated Mine setup by a company making application for the first time to CERC)	N/A
2	A. Mine wise and Corporate audited Balance Sheet and Profit & Loss Accounts with all the Schedules & annexures on date of commercial operation of the Mine for the new mine & for the relevant years. B. Mine wise and Corporate audited Balance Sheet and Profit & Loss Accounts with all the Schedules & annexures for the existing mine for relevant years.	✓
3	Copies of relevant loan Agreements	N/A
4	Copies of the approval of Competent Authority for the Capital Cost and Financial package.	✓
5	Copies of the Equity participation agreements and necessary approval for the foreign equity.	N/A
6	List of End use generating plant to whom supplies made/to be made and quantity supplied/to be supplied	N/A
7	Integrated Mine shall submit copy of Cost Audit Report along with cost accounting records, cost details, statements, schedules etc. for the Integrated Mine and subsequently consolidated at Company level as submitted to the Govt. of India from the date of commencement of production in case of a new mine or first two years i.e. 2019-20 and 2020-21 at the time of mid-term true-up in 2021-22 and for balance period of tariff period 2019-24 at the time of final true-up in 2024-25. In case of initial tariff filing the latest available Cost Audit Report should be furnished.	**
8	Any other relevant information, (Please specify)	N/A
9	Reconciliation with Balance sheet of any actual capitalization or additional capitalization year on year basis duly audited	✓
10.	Integrated mine is maintaining the records to be submitted frequently to the Coal Controller Office. Copy of Same should be furnished to the Commission at the time of submission to CCO. Forms may be suitably modified to furnish relevant important information for input price determination	

\*\* To be provided at the time of trueing up

<u>Summary of Input Price</u>								PART-IV FORM- 1
Name of the Petitioner: <b>NTPC Ltd</b>								
Name of the Integrated Mine: <b>Talaipalli</b>								
Place (Region/District/State): <b>WR/ Raigarh/ Chhattisgarh</b>								
S. No.	Particulars	Unit	Existing 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
1	2	3	4	5	6	7	8	9
1.1	ROM Cost as per Form-1A	Rs/Tonne	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	1902.34
1.2	Additional Charge as per Form-1B	Rs/Tonne						1902.34
	<b>Input Price</b>	Rs/Tonne						502.21
1.3	Statutory Charges as per Form-16	Rs/Tonne						2404.54
1.4	Total input price	Rs/Tonne						2404.54
1.5	GST @ 5%							
	Total input price	Rs/Tonne	<b>2404.54</b>					
<b>(Petitioner)</b>								

Note: GST @5% and GST cess @Rs 400 per Ton shall be applicable in case coal is transferred to station having different GSTN.

**Summary of ROM Cost****PART-IV  
FORM- 1A**

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Place (Region/District/State): WR/ Raigarh/ Chhattisgarh

S. No.	Particulars	Unit	Form Ref.	Existing 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
1	2	3		4	5	6	7	8	9
1.1	Depreciation	Rs Lakh	Form-12	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	9,140.50
1.2	Interest on Loan	Rs Lakh	Form-I						9,989.69
1.3	Return on Equity	Rs Lakh	Form-2A						10,803.58
1.4	Interest on Working Capital	Rs Lakh	Form-J						427.07
1.5	O&M Expenses excluding mining charge	Rs Lakh	Form-2B						8,354.37
1.6	Mine closure expense	Rs Lakh	Form-17						80.05
1.0	<b>Total Annual Extraction Cost (Sum of above 1.1 to 1.6)</b>	Rs Lakh							38,795.25
2.0	Annual Target Quantity (ATQ) as per mine plan	Tonne	Form-3	35,00,000					
3.0	Annual Extraction cost per tonne (1.0 in Rs/2.0)	Rs/Tonne		1108.44					
4.0	Mining Charge	Rs/Tonne	Form-1C *	793.90					
5.0	ROM cost (3.0+4.0+5.0)	Rs/Tonne		1,902.34					

**(Petitioner)**

\* Additional Form



## Summary of Mining Charges

**PART-IV  
FORM- 1C**

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

Place (Region/District/State): WR/ Raigarh/ Chhattisgarh

### Weighted average Mining Fee for Quarter 2 and Quarter 4 (2023-24)

Name of Pit	South Pit (M/s KCCL)		West Pit (M/s PC Patel)		East Pit (M/s VPR)	
	Planned Coal Prodcution (Metric Tonnes)	Mining Fee (Rupee per Tonne)	Planned Coal Prodcution (Metric Tonnes)	Mining Fee (Rupee per Tonne)	Planned Coal Prodcution (Metric Tonnes)	Mining Fee (Rupee per Tonne)
Month						
Oct-23	279936	816.05	344672	650.17		
Nov-23	246000	816.05	373000	650.17		
Dec-23	250000	816.05	400000	650.17		
Jan-24	260000	816.05	400000	650.17	300000	1091.24
Feb-24	280000	816.05	400000	650.17	300000	1091.24
Mar-24	300000	816.05	400000	650.17	400000	1091.24
<b>Total</b>	<b>1615936</b>		<b>2317672</b>		<b>1000000</b>	

Weighted Average Mining Fee for Talaipalli Coal Mine for Q3 and Q4

**793.903**

**Petitioner**

<b>Statement showing claimed capital cost</b>						<b>PART-IV FORM-2</b>
Name of the Petitioner: NTPC Ltd						
Name of the Integrated Mine: Talaipalli						
<b>Amount in Rs Lakhs</b>						
S. No.	Particulars	2019-20	2020-21	2021-22	2022-23	2023-24 (01.10.2023- 31.03.2024)
1	2	3	4	5	6	7
1	Capital Cost					2,02,763.18
a	Notional IDC					3,441.56
b	ERV charged to revenue					404.70
c	Unamortized bond issue expense					497.16
1d	Opening Capital Cost					2,07,106.60
2	Add: Addition during the year/period	Not Applicable	Not Applicable	Not Applicable	Not Applicable	10,355.73
3	Less: De-capitalization during the year/period					-
4	Add: Discharges of Liability during the year/ period					-
5	<b>Closing Capital Cost (1+2-3+4)</b>					2,17,462.33
6	<b>Average Capital Cost</b>					2,12,284.47
<b>(Petitioner)</b>						

**Statement showing claimed Return on Equity****PART- IV  
FORM-2A**

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

**Amount in Rs Lakhs**

<b>Sr</b>	<b>Particulars</b>	<b>2019-20</b>	<b>2020-21</b>	<b>2021-22</b>	<b>2022-23</b>	<b>2023-24</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Return on Equity</b>						
1	Opening Equity					62,131.98
2	Add: Increase in equity due to addition during the year / period					3,106.72
3	Less: Decrease due to De-capitalization during the year / period					-
4	Add: Increase due to discharges during the year / period					-
5	<b>Closing Equity (1+2-3+4)</b>	Not Applicable	Not Applicable	Not Applicable	Not Applicable	65,238.70
6	Average Equity					63,685.34
7	Rate of ROE (Pre Tax)					16.964
8	Total ROE					10,803.58

**(Petitioner)**

<b><u>Statement showing claimed O&amp;M cost</u></b>						<b>PART-IV FORM-2B</b>
Name of the Petitioner: NTPC Ltd						
Name of the Integrated Mine: Talaipalli						
						<b>Amount in Rs Lakhs</b>
S.No	Particulars	2019-20	2020-21	2021-22	2022-23	2023-24
1	2	3	4	5		7
1	Opening Capital Cost	Not Applicable	Not Applicable	Not Applicable	Not Applicable	
2	Add: Addition during the year/period					
3	Less: De-capitalization during the year/period					
4	Add: Discharges of Liability during the year/period					
5	<b>Closing Capital Cost (1+2-3+4)</b>					
6	Average Capital Cost					
7	Projected annual O&M in terms of Regulation 36I					6,574.34
8	Annual Charge of Agency(ies) Other Than MDO* :					-
	- Loading cost					1,053.15
	- CIMFR sampling cost	726.88				
9	Total projected annual O&M	8,354.37				
						<b>(Petitioner)</b>

\* Consists of sampling charges by CIMFR and loading charges in lieu of non completion of loading facilities.  
Projected O&M expenditure is based on actuals for 2022-23 with 3.5% escalation in subsequent years.

Mine Characteristics/Important Details as per Approved Mine Plan dated (26/09/2023)		PART- IV FORM-3	
Name of the Petitioner: NTPC Ltd			
Name of the Integrated Mine: Talaipalli			
Sr No	Parameters	Values	
1	Mining plan/Mine closure plan Revision number and date of revision, if any	1st Modification/26.09.2023	
2	Peak rated Capacity	25 MTPA	
3	Year in which proposed to be achieved	2037-38	
4	Mineable reserves	631.56 MMT	
5	Mining area land - Acquired/ Leased	2119.4 Ha	
6	If Leased - Period and terms of lease	Till Mine life	
7	Mining Block Area	2119.4 Ha	
8	Type of Mining	Opencast	
9	Method of Mining	Drilling & Blasting, Shovel - Dumper for Overburden and Surface Miner for Coal	
10	Mine life in Years	31	
11	Scheduled date of commercial operation as per Investment approval	Not mentioned	
12	Distance of Loading Point from mine end	Loading through Silo into Dedicated MGR system within mine	
13	Gross Calorific value (GCV in Kcal/Kg) of coal as per Geological Report, Range ,Mean	Range : 2034 to 7198 Kcal/Kg (UG to G1) Average : 4548 Kcal/Kg (G10)	
14	Specific gravity of coal (Avg)	1.62	
15	Main Equipments	<b>Overburden :</b> a) Hyd Backhoe or Shovel - 20 cum b) Hyd Backhoe or Shovel - 10 cum c) Rear Dumper - 200 T d) Rear Dumper - 100 T <b>Coal :</b> a) Surface Miner - 3SM b) FE Loader - 6 cum c) Coalbody Dumper - 60 T	
16	Other Important Parameters as deemed necessary	NA	
<b>CALENDER PRODUCTION PROGRAMME DURING THIS TARIFF PERIOD</b>			
Production Year/s	Coal Production (Mt)	OB Removal (Mm <sup>3</sup> )	Stripping Ratio (m <sup>3</sup> /t)
2019-20	1.5	7.65	5.10
2020-21	4	19.00	4.75
2021-22	8	34.00	4.25
2022-23	13	55.75	4.29
2023-24	3.50	21.10	6.03
<b>ACTUAL PRODUCTION ACHIEVED DURING THIS TARIFF PERIOD</b>			
Production Year/s	Coal Production (Mt)	OB Removal (Mm <sup>3</sup> )	Stripping Ratio (m <sup>3</sup> /t)
2019-20	0.19	2.07	10.89
2020-21	0.81	3.71	4.58
2021-22	0.41	2.45	5.98
2022-23	2	12.21	6.11
2023-24	*Actual production shall be provided at the time of true up		
(Petitioner)			

**Normative parameters considered for Input Price computations****PART- IV  
FORM-3A****Name of the Petitioner : NTPC Ltd****Name of the Integrated Mine : Talaipalli**

Particulars	Unit	Existing 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
1	2	3	4	5	6	7	8
Base Rate of Return on Equity	%	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	14
Effective Tax Rate	%						17.472
Input Cost of Coal for WC	in days						7
Consumption of stores and spares % of O&M	%						15
One Month O&M Expenses	Rs lakh						696.20
Rate of Interest on Working Capital	%						12.00

**(Petitioner)**

<b>Financial Package upto COD</b>								
Name of the Company NTPC Ltd							<b>PART-IV</b>	
Name of the Integrated Coal Mine Talaipalli							<b>FORM-6</b>	
(Amount in Rs Lakh)								
Particulars	Financial Package as Approved		Financial Package as on COD			As Admitted on COD		
	Currency and Amount		Currency and Amount			Currency and Amount		
1	2	3	4	5	8	9		
			Ex Rate	Currency	FC	INR		
1 Axis Bank-II				INR		11,000		
2 Axis Bank-III				INR		5,350		
3 Axis Bank-IV				INR		5,350		
4 Bank of Baroda-II				INR		600		
5 Bank of India-V-A				INR		144		
6 HDFC Bank Limited-V				INR		1,000		
7 HDFC Bank Limited-VII				INR		6,000		
8 HDFC-IX				INR		16,000		
9 HDFC-X				INR		4,100		
10 HDFC Bank Limited-XI				INR		2,000		
11 ICICI-IV				INR		50,000		
12 ICICI-VI				INR		4,900		
13 ICICI Bank-VII				INR		2,000		
14 IndusInd Bank				INR		1,300		
15 Punjab National Bank III				INR		5,000		
16 PNB-IV				INR		50,000		
17 PNB-V				INR		6,000		
18 State Bank of India - IX				INR		5,378		
19 State Bank of India - X				INR		19,000		
20 State Bank of India - XI				INR		7,700		
21 State Bank of India - XII				INR		9,000		
22 SBI-XIII				INR		2,000		
23 UCO Bank-IV				INR		5,394		
24 Vijaya Bank-VI				INR		1,500		
<b>Total</b>						<b>2,20,715.83</b>		
67				INR		4,900		
69				INR		11,500		
73				INR		19,400		
74				INR		4,800		
75				INR		2,160		
76				INR		2,600		
78				INR		856		
<b>Total</b>						<b>46,216.00</b>		
EURO Loan I Drawl I			89.27	EUR	26.64	2,377.96		
EURO Loan I Drawl II			89.27	EUR	85.58	7,639.83		
EURO Loan I Drawl III			89.27	EUR	54.37	4,853.65		
<b>SUB-TOTAL - EURO</b>				<b>EURO</b>	<b>166.59</b>	<b>14,871.44</b>		
USD 750 M Loan Drawl I			<b>83.76</b>	USD	<b>34.14</b>	2,859.35		
USD 750 M Loan Drawl II			<b>83.76</b>	USD	32.55	2,726.48		
USD 750 M Loan Drawl II			<b>83.76</b>	USD	3.68	308.03		
USD 750 M Loan Drawl IV			<b>83.76</b>	USD	19.40	1,625.18		
USD 750 M Loan Drawl V			<b>83.76</b>	USD	8.46	708.66		
USD 750 M Loan Drawl VI			<b>83.76</b>	USD	36.39	3,047.99		
<b>Sub Total USD</b>					<b>134.62</b>	<b>11,275.70</b>		
JPY Equ. \$400 Million Drawl I			0.5636	JPY	2209.67	1,245.37		
JPY Equ. \$400 Million Drawl II			0.5636	JPY	8492.93	4,786.62		
<b>Sub Total JPY</b>					<b>10,702.60</b>	<b>6,031.99</b>		
<b>Total</b>						<b>2,99,110.95</b>		
<b>Less: Repayments upto COD</b>						<b>1,66,005.53</b>		
<b>Net Amount</b>				<b>Total</b>		<b>1,33,105.41</b>		

Petitioner

**Name of the Petitioner** NTPC Limited  
**Name of the Integrated Mine** Talaipalli  
**Commercial Operation Date (COD)** 01.10.2023

(Amount in Rs. Lakh)

Particulars							
<b>Source of Loan - Bonds Series</b>	<b>67</b>	<b>69</b>	<b>73</b>	<b>74</b>	<b>75</b>	<b>76</b>	<b>78</b>
Currency	INR	INR	INR	INR	INR	INR	INR
Amount of Loan sanctioned (In Lakh)	4,00,000	4,30,000	2,50,000	3,99,600	3,00,000	1,17,500	2,00,000
Amount of Gross Loan drawn upto COD (In Lakh)	4,00,000	4,30,000	2,50,000	3,99,600	3,00,000	1,17,500	2,00,000
Interest Type	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Fixed Interest Rate, if applicable	8.30%	7.32%	6.43%	6.87%	6.69%	6.74%	7.44%
Base Rate, if Floating Interest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Margin, if Floating Interest	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Are there any Caps/Floor	No	No	No	No	No	No	No
If above is yes,specify caps/floor	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Moratorium Period (In Years)	10	10	10	15 yrs 1 day	10	10 yrs 3 months 25 days	10
Moratorium effective from*	15-01-2019	17-07-2019	27-01-2021	20-04-2021	13-09-2021	20-12-2021	25-08-2022
Repayment Period	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment
Repayment effective from	15-01-2029	17-07-2029	27-01-2031	21-04-2036	13-09-2031	14-04-2032	25-08-2032
Repayment Frequency	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment	Bullet Repayment
Repayment Instalment (In Lakh)	4,00,000	4,30,000	2,50,000	3,99,600	3,00,000	1,17,500	2,00,000
Base Exchange Rate	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Door to Door Maturity (In Years)	10	10	10	15 yrs 1 day	10	10 yrs 3 months 25 days	10

<b>Name of the Projects</b>	<b>67</b>	<b>69</b>	<b>73</b>	<b>74</b>	<b>75</b>	<b>76</b>	<b>78</b>
Anta Solar 90MW					650.00	200.00	900.00



Particulars							
Auraiya R&M			200.00				
Auraiya Solar 20MW			400.00			425.00	
Auraiya Solar FS 20MW				150.00		2,000.00	586.00
Barauni-II				1,500.00	8,400.00		500.00
BARH I	65,957.14	84,200.00	51,100.00	32,900.00	42,800.00	11,050.00	4,511.00
BARH II	1,000.00	1,400.00					
BONGAIGAON	38,819.64	17,100.00					
CC - Jhabua Power							60,000.00
CC - NEEPCO		1,391.30	18,243.00	56,696.00	48,250.00	24,017.00	10,922.00
CC - THDC		2,608.70	34,207.00	1,06,304.00	90,470.00	45,033.00	20,478.00
CHATTI BARIATU CMB		3,000.00	825.00	200.00	1,350.00	600.00	211.00
DADRI GAS R&M				100.00	200.00		
DARLIPALLI		40,000.00	28,300.00	11,500.00	1,000.00		500.00
Dulanga Coal Mine		5,000.00	2,700.00	3,400.00	4,100.00		
FARAKKA R&M		1,000.00	1,700.00	1,600.00	1,550.00		
Farakka-I , II & III FGD				1,500.00	550.00		
Faridabad R&M			100.00		700.00		
GADARWARA	25,900.00	47,600.00	19,000.00	7,500.00			
Gandhar 20MW				3,750.00	90.00	1,395.00	
KAHALGAON R&M			600.00	1,200.00	2,620.00		
Kahalgaon-I & II FGD				300.00			
Kawas Solar				2,800.00	5,250.00	4,050.00	800.00
Kayamkulam FS ( 22 MW)			170.00	2,000.00	2,195.00		100.00
Kayamkulam FS ( 70 MW)			1,830.00	2,850.00	1,925.00	4,830.00	
KHARGONE	36,500.00	13,500.00	3,000.00	2,000.00			500.00
Kirenderi Coal Mine			7,350.00		165.00	1,400.00	1,900.00
KOLDAM	8,598.21						
KORBA III	2,135.00						
KORBA R&M			2,300.00	1,350.00	4,050.00		2,200.00
Korba-I, II & III FGD				100.00			
KUDGI	10,000.00	21,500.00					
KUDGI-FGD		2,500.00		2,950.00	1,000.00		
LARA	47,812.50	10,600.00	1,700.00	14,000.00			
MAUDA I	715.00	6,000.00		500.00			
MAUDA II		29,000.00		100.00	2,200.00		
Nabinagar							5,664.00
NCPS-FGD		6,500.00			5,600.00		

Particulars							
NCTPP II	1,601.00						
NCTPP R&M				200.00			
Nokh Solar Plot-I(245 MW)							7,500.00
Nokh Solar Plot-II(245 MW)							7,500.00
Nokh Solar Plot-III(245 MW)							7,500.00
NORTH KARANPURA	55,900.00	15,000.00	9,500.00	11,700.00	11,900.00	6,100.00	3,917.00
PAKRI BARWADIH CMB	21,521.00			20,000.00			41,800.00
RAMAGUNDAM R&M				3,300.00			
Ramagundam Floating Solar-100 MW			3,375.00	3,800.00	8,640.00	3,800.00	1,400.00
Ramagundam I & II R&M			4,200.00		8,985.00		1,800.00
RAMAGUNDAM SOLAR		1,000.00					
Ramagundam-I & II FGD					100.00		
Ramagundam-III (1x500 MW)				400.00			
RAMMAM	2,500.00	2,500.00	3,300.00	1,100.00	800.00	1,050.00	311.00
Rihand- I FGD					20.00		
Rihand- II & III FGD					130.00		
RIHAND III	4,270.00						
RIHAND R&M			1,200.00	2,000.00	6,275.00		2,400.00
Rihand Solar (20MW)				300.00	510.00		400.00
Simhadri Floating			1,875.00	3,050.00	525.00	1,350.00	
SIMHADRI II	4,804.00						
SIMHADRI R&M					200.00		
Simhadri-II & I (2x500 MW) & (2x500 MW) FGD				7,600.00	1,150.00		
Singrauli R&M		1,000.00	4,200.00	1,700.00	2,725.00		1,300.00
Singrauli-I & II FGD				8,700.00	150.00		
Sipat-I (3x660 MW) FGD				5,600.00	1,100.00		500.00
SOLAPUR	25,200.00	21,500.00					
Solapur Solar					2,575.00	800.00	200.00
Solapur-FGD				2,700.00	3,450.00		
<b>Talaipali Coal Mine</b>	<b>4,900.00</b>	<b>11,500.00</b>	<b>19,400.00</b>	<b>4,800.00</b>	<b>2,160.00</b>	<b>2,600.00</b>	<b>856.00</b>
TALCHER R&M			500.00				
TANDA II	12,500.00	17,000.00	9,500.00	16,700.00	1,000.00		
Tapovan Vishnugarh	15,062.50	16,600.00	6,200.00	8,000.00	1,500.00		166.00
TELANGANA		37,000.00	9,725.00	20,300.00	9,200.00	6,800.00	8,678.00
TSTPP R&M					640.00		700.00
TSTPS Stage-II & I FGD				9,700.00			
TTPS III	1,000.00						

Particulars							
Unchahar R&M			500.00	900.00	1,050.00		1,500.00
Unchahar-I, II & III-FGD				5,400.00	5,100.00		
UNCHAHAR IV	2,500.00	14,000.00					
Unchahar-IV-FGD				2,750.00	1,200.00		
VINDHYACHAL HYDRO	500.00						
VINDHYACHAL IV	4,804.00						
VINDHYACHAL R&M			2,800.00	1,450.00	2,900.00		1,800.00
VINDHYACHAL V	5,500.00						
Vindhyachal-I &II FGD				200.00	900.00		
<b>Total</b>	<b>4,00,000.00</b>	<b>4,30,000.00</b>	<b>2,50,000.00</b>	<b>3,99,600.00</b>	<b>3,00,000.00</b>	<b>1,17,500.00</b>	<b>2,00,000.00</b>

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\*Moratorium period has been taken as the period from Deemed Date of Allotment till the date of first Redemption.

1. Source of loan means the agency from whom the loan has been taken such as WB, ADB, WMB, PNB, SBI, ICICI, IFC, PFC etc.
2. Currency refers to currency of loan such as US\$, DM, Yen, Indian Rupee etc.
3. Details are to be submitted as on 31.03.2004 for existing assets and as on COD for the remaining assets.
4. Where the loan has been refinanced, details in the Form is to be given for the loan refinanced. However, the details of the original loan is to be given separately in the same form.
5. If the Tariff in the petition is claimed separately for various units, details in the Form is to be given separately for all the units in the same form.
6. Interest type means whether the interest is fixed or floating.
7. Base rate means the base as PLR, LIBOR etc. over which the margin is to be added. Applicable base rate on different dates from the date of drawl may also be enclosed.
8. Margin means the points over and above the floating rate.
9. At times caps/floor are put at which the floating rates are frozen. If such a condition exists, specify the limits.
10. Moratorium period refers to the period during which loan servicing liability is not required.
11. Repayment period means the repayment of loan such as 7 years, 10 years, 25 years etc.
12. Repayment frequency means the interval at which the debt servicing is to be done such as monthly, quarterly, half yearly, annual, etc.
13. Where there is more than one drawal/repayment for a loan, the date & amount of each drawal/repayment and its allocation may also be given separately
14. If the repayment instalment amount and repayment date can not be worked out from the data furnished above, the repayment schedule to be furnished separately.
15. In case of Foreign loan, date of each drawal & repayment alongwith exchange rate at that date may be given.
16. Base exchange rate means the exchange rate prevailing as on 31.03.2004 for existing assets and as on COD for the remaining assets.

PART-IV  
FORM-8Statement Giving Details of Project Financed through a Combination of loan

Form 8

TRANCHE NO

BP NO 5050000762

T00001

D00001

Unsecured Loan From AXIS BANK-II		
Source of Loan :	AXIS BANK-II	
Currency :	INR	
Amount of Loan :	25,00,00,00,000	
Total Drawn amount :	5,00,00,00,000	
Date of Drawl	11.07.2019	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	D00001- 8.30%	
Margin, If Floating Interest :	-	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	11.07.2019	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	9 Yearly Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	11.07.2023	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	50,00,00,000
	GADARWARA	2,96,00,00,000
	NCPS-FGD	24,00,00,000
	BILHAUR SOLAR 140	30,00,00,000
	TALAIPALI	1,00,00,00,000
Total Allocated Amount		5,00,00,00,000

## Form 8

TRANCHE NO

BP NO 5050000762

T00001

D00007

Unsecured Loan From AXIS BANK-II		
Source of Loan :	AXIS BANK-II	
Currency :	INR	
Amount of Loan :	25,00,00,00,000	
Total Drawn amount :	4,00,00,00,000	
Date of Drawl	15.04.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	7.45%	
Margin, If Floating Interest :	-	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	15.04.2020	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	9 Yearly Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	11.07.2023	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BILHAUR SOLAR 140	50,00,00,000
	*TALAIPALI COAL M	10,00,00,000
	KIRENDARI COAL M	3,40,00,00,000
Total Allocated Amount		4,00,00,00,000
Loan Allocated to LARA w.e.f. 01.04.2021		
TRANSFERRED TO LARA I ON 1/7/2021		

Form 8

TRANCHE NO

BP NO 5050001001

T00001

D00001

Unsecured Loan From AXIS BANK-III		
Source of Loan :	AXIS BANK-III	
Currency :	INR	
Amount of Loan :	9,00,00,00,000	
Total Drawn amount :	3,42,00,00,000	
Date of Drawl	24.08.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	6.30%	
Margin, If Floating Interest :	-	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	24.08.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	24.08.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	DARLIPALLI	58,00,00,000.00
	GADARWARA	1,08,00,00,000.00
	TALAIPALI COAL MIN	13,50,00,000.00
	TAPOVAN VISHNUG	32,50,00,000.00
	TELANGANA	1,30,00,00,000.00
Total Allocated Amount		3,42,00,00,000

## Form 8

TRANCHE NO

BP NO 5050001001

T00001

D00002

Unsecured Loan From AXIS BANK-III		
Source of Loan :	AXIS BANK-III	
Currency :	INR	
Amount of Loan :	9,00,00,00,000	
Total Drawn amount :	40,00,00,000	
Date of Drawl	28.09.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	6.30%	
Margin, If Floating Interest :	-	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	28.09.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	24.08.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	TALAIPALI COAL MIN	40,00,00,000.00
Total Allocated Amount		40,00,00,000







Form 8

TRANCHE NO

BP NO 50500001121

T00001

D00002

Unsecured Loan From Bank Of India-V A

Source of Loan :	Bank Of India-V A	
Currency :	INR	
Amount of Loan :	11,89,13,00,000	
Total Drawn amount :	1,44,00,000	
Date of Drawal :	09.08.2021	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	5.65%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	09.08.2021	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	Yearly	
Repayment Type :	AVG	
First Repayment Date :	05.03.2025	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :		
Project Code	Project Name	Amount
	TALLAIPALLI	1,44,00,000.00
Total Allocated Amount		1,44,00,000

Form 8

TRANCHE NO

BP NO 5050000561

T00001

D0009

Unsecured Loan From HDFC Bank Ltd. V		
Source of Loan :	HDFC Bank Ltd. V	
Currency :	INR	
Amount of Loan :	25,00,00,00,000	
Total Drawn amount :	2,20,00,00,000	
Date of drawl	02.07.2018	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	8.10%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	02.07.2018	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	25.09.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	LARA-I	50,00,00,000
	DULANGA COAL MIN	10,00,00,000
	TALAI PALI COAL MIN	10,00,00,000
	NORTH KARANPURA	75,00,00,000
	KHARGONE	75,00,00,000
Total Allocated Amount		2,20,00,00,000

Form 8

TRANCHE NO

BP NO 5050000791

T00001

D00001

Unsecured Loan From HDFC Bank Ltd. VII		
Source of Loan :	HDFC Bank Ltd. VII	
Currency :	INR	
Amount of Loan :	25,00,00,00,000	
Total Drawn amount :	3,85,00,00,000	
Date of drawl	11.06.2019	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	8.40%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	11.06.2019	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	11.06.2026	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BONGAIGAON	1,21,00,00,000
	LARA	28,00,00,000
	TAPOVAN VISHNUG	15,00,00,000
	BARH-I	98,00,00,000
	GADARWARA	20,00,00,000
	CHATTI BARIATU CM	18,00,00,000
	DARLIPALLI	20,00,00,000
	DULANGA CMB	35,00,00,000
	TALAI PALI CMB	30,00,00,000
Total Allocated Amount		3,85,00,00,000

## Form 8

TRANCHE NO

BP NO 5050000791

T00001

D00005

Unsecured Loan From HDFC Bank Ltd. VII		
Source of Loan :	HDFC Bank Ltd. VII	
Currency :	INR	
Amount of Loan :	25,00,00,00,000	
Total Drawn amount :	3,00,00,00,000	
Date of drawl	11.02.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	7.50%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	11.02.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	11.06.2026	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	30,00,00,000
	TAPOVAN VISHNU	20,00,00,000
	NORTH KARANPUR	20,00,00,000
	DARLIPALLI	35,00,00,000
	RAMMAM	20,00,00,000
	BARAUNI-II	1,30,00,00,000
	DULANGA CMB	15,00,00,000
	TALAIPALI CMB	30,00,00,000
Total Allocated Amount		3,00,00,00,000

Form 8

TRANCHE NO

BP NO 5050000981

T00001

D00001

Unsecured Loan From HDFC Bank Ltd. IX		
Source of Loan :	HDFC Bank Ltd. IX	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	3,00,00,00,000	
Date of drawl	30.06.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	6.30%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	30.06.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	30.06.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	67,66,00,000
	TAPOVAN VISHNUG	26,65,00,000
	PAKRI BARWADIH C	49,00,00,000
	LARA-I	25,59,00,000
	GADARWARA	20,25,00,000
	DARLIPALLI	20,00,00,000
	TALAIPALI COAL MIN	15,00,00,000
	BARAUNI-II	20,00,00,000
	BILHAUR SOLAR 140	20,00,00,000
	JETSAR SOLAR	5,00,00,000
	KIRENDARI	15,00,00,000
	CHATTI BARIATU CM	15,85,00,000
Total Allocated Amount		3,00,00,00,000

## Form 8

TRANCHE NO

BP NO 5050000981

T00001

D00003

Unsecured Loan From HDFC Bank Ltd. IX		
Source of Loan :	HDFC Bank Ltd. IX	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	2,50,00,00,000	
Date of drawl	13.08.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	6.30%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	13.08.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	30.06.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH I	70,00,00,000
	GADARWARA	50,00,00,000
	NORTH KARANPURA	45,00,00,000
	TELANGANA	35,00,00,000
	TALAIPALI	50,00,00,000
Total Allocated Amount		2,50,00,00,000

Form 8

TRANCHE NO

BP NO 5050000981

T00001

D00005

Unsecured Loan From HDFC Bank Ltd. IX		
Source of Loan :	HDFC Bank Ltd. IX	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	1,90,00,00,000	
Date of drawl	28.09.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	6.30%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	28.09.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	30.06.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH I	50,00,00,000
	KORBA R&M	20,00,00,000
	RAMAGUNDAM I &	85,00,00,000
	TALAIPALI COAL MIN	20,00,00,000
	KIRENDARI	15,00,00,000
Total Allocated Amount		1,90,00,00,000



## Form 8

TRANCHE NO

BP NO 5050000981

T00001

D00008

Unsecured Loan From HDFC Bank Ltd. IX		
Source of Loan :	HDFC Bank Ltd. IX	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	5,00,00,00,000	
Date of drawl	18.11.2020	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	5.95%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	18.11.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	30.06.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH I	1,75,00,00,000.00
	BARAUNI-II	25,00,00,000.00
	SOLAPUR	20,00,00,000.00
	TTPS R&M	1,00,00,000.00
	SINGRAULI R&M	15,00,00,000.00
	KORBA R&M	15,00,00,000.00
	RAMAGUNDAM I &	43,50,00,000.00
	VINDHYACHAL R&	18,00,00,000.00
	FARAKKA R&M	12,00,00,000.00
	UNCHAHAR R&M	16,00,00,000.00
	RIHAND R&M	16,00,00,000.00
	FARIDABAD R&M	1,50,00,000.00
	DADRI GAS R&M	3,00,00,000.00
	TSTPP R&M	11,50,00,000.00
	KAHALGAON R&M	16,00,00,000.00
	SIMHADRI R&M	1,50,00,000.00
	CHATTI BARIATU C	25,00,00,000.00
	TALAIPALI COAL M	75,00,00,000.00
	KIRENDARI	10,00,00,000.00
Total Allocated Amount		5,00,00,00,000







Form 8

TRANCHE NO

BP NO 50500000451

T00001

0

Unsecured Loan From ICICI-IV		
Source of Loan :	ICICI-IV	
Currency :	INR	
Amount of Loan :	20,00,00,00,000	
Total Drawn amount :	5,00,00,00,000	
Date of Drawal	0	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	D00007-7.90%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	31.03.2017	
Repayment Period (Inc Moratorium) :	15 years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	16.02.2023	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	TALAIPALI COAL M	5,00,00,00,000.00
Total Allocated Amount		5,00,00,00,000.00

## Form 8

TRANCHE NO

BP NO 50500000541

T00001

D00002

Unsecured Loan From ICICI-VI		
Source of Loan :	ICICI-VI	
Currency :	INR	
Amount of Loan :	30,00,00,00,000	
Total Drawn amount :	3,00,00,00,000	
Date of Drawal	25.09.2017	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	7.90%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	25.09.2017	
Repayment Period (Inc Moratorium) :	15 years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	11.09.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	MOUDA-I	7,15,00,000.00
	PAKRI BARWADIH	82,71,00,000.00
	TALAIPALI COAL M	34,00,00,000.00
	KORBA-III	21,35,00,000.00
	NCTPP-II	16,01,00,000.00
	RIHAND-III	42,70,00,000.00
	SIMHADRI-II	48,04,00,000.00
	VSTPP-IV	48,04,00,000.00
	Total Allocated Amount	3,00,00,00,000.00

Form 8

TRANCHE NO

BP NO 50500000541

T00001

D00006

Unsecured Loan From ICICI-VI		
Source of Loan :	ICICI-VI	
Currency :	INR	
Amount of Loan :	30,00,00,00,000	
Total Drawn amount :	1,00,00,00,000	
Date of Drawal	21.12.2017	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	7.85%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	21.12.2017	
Repayment Period (Inc Moratorium) :	15 years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	11.09.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	KOLDAM	5,00,00,000.00
	PAKRI BARWADIH	80,00,00,000.00
	TALAIPALI COAL M	15,00,00,000.00
Total Allocated Amount		1,00,00,00,000.00

## Form 8

TRANCHE NO

BP NO 50500001042

T00001

D00002

Unsecured Loan From ICICI-VII		
Source of Loan :	ICICI-VII	
Currency :	INR	
Amount of Loan :	20,00,00,00,000	
Total Drawn amount :	9,77,21,00,000	
Date of Drawal	05.03.2021	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	6.00%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	05.03.2021	
Repayment Period (Inc Moratorium) :	15 years	
Repayment Frequency :	12 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	30.12.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	THDC	5,06,81,00,000.00
	NEEPCO	2,70,40,00,000.00
	BILHAUR SOLAR 1	25,00,00,000.00
	BILHAUR SOLAR 8	4,00,00,000.00
	AURAIYA SOLAR 2	16,00,00,000.00
	JETSAR SOLAR	5,00,00,000.00
	DEVIKOT SOLAR	23,00,00,000.00
	SAMBHU KI BHUR.	47,00,00,000.00
	KORBA-R&M	5,00,00,000.00
	RAMAGUNDAM-R&	10,00,00,000.00
	VSTPS R&M	20,00,00,000.00
	CHATTI BARIATU	20,00,00,000.00
	DULANGA CMB	5,00,00,000.00
	TALAI PALI	20,00,00,000.00
	Total Allocated Amount	9,77,21,00,000.00
Loan Allocated to LARA w.e.f. 01.04.2021		





## Form 8

TRANCHE NO

BP NO 5050000571

T00001

D00003

Unsecured Loan From Punjab National Bank-III		
Source of Loan :	Punjab National Bank-III	
Currency :	INR	
Amount of Loan :	20,00,00,00,000	
Total Drawn amount :	5,00,00,00,000	
Date of Drawl	13.08.2018	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	8.05%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	13.08.2018	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	01.02.2022	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	30,00,00,000.00
	SOLAPUR	20,00,00,000.00
	TANDA-II	20,00,00,000.00
	TALLAIPELLI	50,00,00,000.00
	SINGRAULI R&M	80,00,00,000.00
	FARAKKA R&M	80,00,00,000.00
	RIHAND R&M	50,00,00,000.00
	DADRI GAS R&M	40,00,00,000.00
	KORBA R&M	40,00,00,000.00
	RAMAGUNDAM R&	40,00,00,000.00
	VINDHAYACHAL R&	30,00,00,000.00
	UNCHAHAHAR R&M	20,00,00,000.00
Total Allocated Amount		5,00,00,00,000.00

Form 8

TRANCHE NO

BP NO 5050000711

T00001

D00001

Unsecured Loan From Punjab National Bank-IV		
Source of Loan :	Punjab National Bank-IV	
Currency :	INR	
Amount of Loan :	20,00,00,00,000	
Total Drawn amount :	20,00,00,00,000	
Date of Drawl	01.01.2019	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	8.60%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	01.01.2019	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	9 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	14.02.2023	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	UNCHA HAR STPP IV	65,00,00,000.00
	TANDA-II	85,00,00,000.00
	NCTPP-II	36,43,00,000.00
	DADRI GAS R&M	56,00,00,000.00
	KORBA-III	15,00,00,000.00
	SIPAT-II	17,14,00,000.00
	FARAKKA-III	8,57,00,000.00
	KAHALGAON-II	17,14,00,000.00
	BARH-I	1,08,57,00,000.00
	BARH-II	8,00,00,000.00
	NORTH KARANPURA	1,09,00,00,000.00
	KOLDAM	6,43,00,000.00
	TAPOVAN VISHNUG	28,57,00,000.00
	PAKRI BARWADIH	1,42,00,00,000.00
	CHATTI BARIATU	10,00,00,000.00
	BONGAIGAON	36,43,00,000.00
	KUDGI	60,00,00,000.00
	LARA	1,23,00,00,000.00
	GADARWARA	2,27,72,00,000.00
	DARLIPALLI	2,73,00,00,000.00
	KHARGONE	50,00,00,000.00
	ANANTPUR SOLAR	17,00,00,000.00
	TALAIPALI COAL MIN	5,00,00,00,000.00
	<b>Total Allocated Amount</b>	<b>20,00,00,00,000.00</b>
Loan Allocated to LARA w.e.f. 01.04.2021		

## Form 8

TRANCHE NO

BP NO 5050000931

T00001

D00004

Unsecured Loan From Punjab National Bank-V		
Source of Loan :	Punjab National Bank-V	
Currency :	INR	
Amount of Loan :	25,20,00,00,000	
Total Drawn amount :	4,00,00,00,000	
Date of Drawl	14.07.2021	
Interest Type :	Floating	
Fixed Interest Rate :		
Base Rate, If Floating Interest	5.70%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	14.07.2021	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Instalment	
Repayment Type :	AVG	
First Repayment Date :	27.03.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	65,00,00,000.00
	TAPOVAN VISHNUG	15,00,00,000.00
	NORTH KARANPURA	1,00,00,00,000.00
	DARLIPALLI	75,00,00,000.00
	RAMMAM	10,00,00,000.00
	TELANGANA	35,00,00,000.00
	BARAUNI-II	40,00,00,000.00
	TALAIPALI COAL MIN	60,00,00,000.00
Total Allocated Amount		4,00,00,00,000.00

## Form 8

TRANCHE NO

BP NO 5050000531

T00001

D0008

Unsecured Loan From SBI-IX		
Source of Loan :	SBI-IX	
Currency :	INR	
Amount of Loan :	30,00,00,00,000	
Total Drawn amount :	5,00,00,00,000	
Date of Drawal:	20.06.2018	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	7.85%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	20.06.2018	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	9 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	31.03.2021	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	80,00,00,000
	TAPOVAN VISHNUG	20,00,00,000
	BONGAIGAON	8,00,00,000
	TANDA II	12,00,00,000
	RAMMAM	20,00,00,000
	TELANGANA	45,00,00,000
	MAUDA-II	1,20,00,00,000
	BHADLA SOALR PY	35,00,00,000
	ROJAML WIND	5,00,00,000
	PAKRI BARWADIH	1,20,00,00,000
	CHATTI BARIATU C	9,00,00,000
	DULANGA COAL M	13,00,00,000
	TALAIPALI COAL M	13,00,00,000
Total Allocated Amount		5,00,00,00,000.00

Form 8

TRANCHE NO

BP NO 5050000531

D0009

Unsecured Loan From SBI-IX		
Source of Loan :	SBI-IX	
Currency :	INR	
Amount of Loan :	30,00,00,00,000	
Total Drawn amount :	40,77,82,894	
Date of Drawal:	20.06.2018	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	8.00%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	20.06.2018	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	6 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	31.03.2021	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	TALAIPALI COAL M	40,77,82,894.00
Total Allocated Amount		40,77,82,894.00

## Form 8

TRANCHE NO

BP NO 5050000551

T00001

D00009

Unsecured Loan From SBI-X		
Source of Loan :	SBI-X	
Currency :	INR	
Amount of Loan :	40,00,00,00,000	
Total Drawn amount :	3,00,00,00,000	
Date of Drawal:	01.05.2018	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	7.85%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	01.05.2018	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	9 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	01.10.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	PAKRI BARWADIH	70,00,00,000
	CHATTI BARIATU C	15,00,00,000
	DULANGA COAL M	25,00,00,000
	TALAIPALI COAL M	1,90,00,00,000
Total Allocated Amount		3,00,00,00,000.00
Loan Allocated to LARA w.e.f. 01.04.2021		

## Form 8

TRANCHE NO

BP NO 5050000661

T00001

D00002

Unsecured Loan From SBI-XI		
Source of Loan :	SBI-XI	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	5,00,00,00,000	
Date of Drawal:	16.10.2018	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	8.30%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	16.10.2018	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	9 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	01.10.2022	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	NORTH KARANPUJ	95,00,00,000
	DARLIPALLI	1,00,00,00,000
	KHARGONE	1,20,00,00,000
	TELANGANA	90,00,00,000
	DULANGA COAL M	25,00,00,000
	TALAIPALI COAL M	70,00,00,000
Total Allocated Amount		5,00,00,00,000.00



## Form 8

TRANCHE NO

BP NO 5050000661

T00001

D00004

Unsecured Loan From SBI-XI		
Source of Loan :	SBI-XI	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	8,00,00,00,000	
Date of Drawal:	22.11.2018	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	8.30%	
Margin, If Floating Interest :	0.00%	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	3 Years	
Moratorium effective from :	22.11.2018	
Repayment Period (Inc Moratorium) :	12 Years	
Repayment Frequency :	9 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	01.10.2022	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	40,00,00,000
	TAPOVAN VISHNU	11,00,00,000
	BONGAIGAON	11,00,00,000
	SOLAPUR	20,00,00,000
	LARA-I	50,00,00,000
	GADARWARA	55,00,00,000
	NORTH KARANPUJ	36,00,00,000
	DARLIPALLI	40,00,00,000
	TANDA-II	10,00,00,000
	KHARGONE	75,00,00,000
	TELANGANA	75,00,00,000
	TALAIPALI COAL M	7,00,00,000
	RAMAGUNDAM I &	36,00,00,000
	VINDHYACHAL R&	14,00,00,000
	FARAKKA R&M	10,00,00,000
	KAHALGAON R&M	10,00,00,000
	KHARGONE	2,00,00,00,000
	TELANGANA	1,00,00,00,000
	Total Allocated Amount	8,00,00,00,000.00

## Form 8

TRANCHE NO

BP NO 5050000741

T00001

D00001

Unsecured Loan From SBI-XII		
Source of Loan :	SBI-XII	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	7,50,00,00,000	
Date of Drawal:	11.02.2019	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	8.35%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	11.02.2019	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	9 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	31.03.2026	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	1,30,00,00,000.00
	TAPOVAN VISHNU	15,00,00,000.00
	BONGAIGAON	65,00,00,000.00
	SOLAPUR	40,00,00,000.00
	GADARWARA	90,00,00,000.00
	DARLIPALLI	60,00,00,000.00
	TANDA-II	50,00,00,000.00
	KHARGONE	90,00,00,000.00
	TELANGANA	70,00,00,000.00
	CHATTI BARIATU	15,00,00,000.00
	DULANGA	20,00,00,000.00
	TALAIPALI	80,00,00,000.00
	NCPS-FGD	25,00,00,000.00
Total Allocated Amount		7,50,00,00,000.00

## Form 8

TRANCHE NO

BP NO 5050000741

T00001

D00003

Unsecured Loan From SBI-XII		
Source of Loan :	SBI-XII	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	5,00,00,00,000	
Date of Drawal:	26.03.2019	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	8.35%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	6 Years	
Moratorium effective from :	26.03.2019	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	9 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	31.03.2026	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BARH-I	40,00,00,000.00
	UNCHAHAH STPP	1,20,00,00,000.00
	LARA	30,00,00,000.00
	NORTH KARANPU	30,00,00,000.00
	GADARWARA	60,00,00,000.00
	DARLIPALLI	41,00,00,000.00
	TANDA-II	30,00,00,000.00
	KHARGONE	60,00,00,000.00
	TELANGANA	60,00,00,000.00
	CHATTI BARIATU	5,00,00,000.00
	DULANGA	10,00,00,000.00
	TALAIPALI	10,00,00,000.00
	NCPS-FGD	4,00,00,000.00
Total Allocated Amount		5,00,00,00,000.00

## Form 8

TRANCHE NO

BP NO 5050000861

T00001

D00001

Unsecured Loan From SBI-XIII		
Source of Loan :	SBI-XIII	
Currency :	INR	
Amount of Loan :	50,00,00,00,000	
Total Drawn amount :	2,00,00,00,000	
Date of Drawal:	24.03.2020	
Interest Type :	Floating	
Fixed Interest Rate :	-----	
Base Rate, If Floating Interest	7.45%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	Monthly	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	4 Years	
Moratorium effective from :	24.03.2020	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	12 Yearly Installments	
Repayment Type :	AVG	
First Repayment Date :	24.03.2024	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	BILHAUR SOLAR 1	25,00,00,000.00
	BILHAUR SOLAR 8	4,00,00,000.00
	AURAIYA SOLAR 2	16,00,00,000.00
	JETSAR SOLAR	5,00,00,000.00
	DEVIKOT SOLAR	23,00,00,000.00
	SAMBHU KI BHUR.	47,00,00,000.00
	KORBA R&M	5,00,00,000.00
	RAMAGUNDAM R&	10,00,00,000.00
	VINDHYACHAL R&	20,00,00,000.00
	CHATTI BARIATU C	20,00,00,000.00
	DULANGA COAL M	5,00,00,000.00
	TALAIPALI COAL M	20,00,00,000.00
	Total Allocated Amount	2,00,00,00,000.00







## Form 8

TRANCHE NO

BP NO 5050000381

T00001

D00004

Unsecured Loan From Vijaya Bank		
Source of Loan :	Vijaya Bank-VI	
Currency :	INR	
Amount of Loan :	2,85,00,00,000	
Total Drawn amount :	85,00,00,000	
Date of Drawl	0	
Interest Type :	Floating	
Fixed Interest Rate :	7.90%	
Base Rate, If Floating Interest	D00004- 7.9%	
Margin, If Floating Interest :	NIL	
Are there any Caps/ Floor :	Y/N	
Frequency of Intt. Payment	MONTHLY	
If Above is yes, specify Caps/ Floor :		
Moratorium Period :	5 Years	
Moratorium effective from :	13.11.2017	
Repayment Period (Inc Moratorium) :	15 Years	
Repayment Frequency :	10 Yearly	
Repayment Type :	Average	
First Repayment Date :	14.03.2020	
Base Exchange Rate :	RUPEE	
Date of Base Exchange Rate :	N.A.	
Project Code	Project Name	Amount
	GADARWARA	20,00,00,000
	UNCHAHAR STPP	20,00,00,000
	DARLIPALLI	20,00,00,000
	VINDHYACHAL-V	10,00,00,000
	TALAIPALI COAL MIN	15,00,00,000.00
Total Allocated Amount		85,00,00,000.00





PART-IV  
FORM-8

Name of the Petitioner NTPC Ltd  
Name of the Integrated Mine Talaipalli CM

Particulars	15	16	17	18	19	20	21			22	23
	Euro Loan I	Euro Loan II	Euro Loan III	USD 750 Million Drawl I	USD 750 Million Drawl II	USD 750 Million Drawl III	USD 750 Million Drawl IV	USD 750 Million Drawl V	USD 750 Million Drawl VI	JPY Equ. \$400 Million Drawl I	JPY Equ. \$400 Million Drawl I
Ramagundam-I & II FGD		0.27193%	0.06844%		0.44445%	1.27%	2.03%	1.27%	2.85%	0.97%	1.90%
Farakka-I, II & III FGD					3.12991%	0.59%	3.09%	2.12%	3.20%	3.39%	0.12%
Kahalgaoon-I & II FGD				0.78779%	0.26291%	0.49%	1.66%	1.33%	0.97%	2.54%	1.47%
TSTPS Stage-II & I FGD	2.1766%	1.90352%	0.34220%	0.39389%	0.71988%	1.18%	1.76%	1.51%	4.85%	1.27%	4.95%
Unchahar-I, II & III-FGD	6.1840%				1.94055%	0.59%	2.21%	2.54%	2.67%	0.36%	2.45%
Darlipalli		17.53954%	2.05321%	4.92366%		1.13%	4.00%	1.21%	2.55%	0.48%	
Tanda II	16.7533%	8.28301%	4.92769%	2.95420%			4.73%	3.02%	2.18%	3.75%	1.22%
	Unchahar-IV	0.6186%				0.37%	0.12%				
Khargone	Khargone		11.22419%	0.91908%		0.25%	1.82%	0.48%	4.00%	10.90%	3.06%
Rammam	Ramman	1.2877%	1.26856%	2.08743%	2.42900%	2.37874%	0.39%	0.36%	1.21%	0.24%	1.45%
Telangana	Telangana	24.2936%	8.67731%	18.27353%	10.04426%	17.02674%	4.02%	4.85%	9.13%	3.88%	13.81%
Barauni-II (2x250MW)	Barauni-II			1.37862%	5.79034%	0.25%	1.58%		2.43%	0.85%	
	Anantpur Solar										
	Mandsaur Solar										
	Badhla Solar										
	Rojmal Wind										
Dulanga Coal Mine	Dulanga Coal Mine	1.7413%	1.53641%	1.84789%	0.91908%	2.12834%	0.98%	0.24%	0.85%	0.24%	
	<b>Talaipali Coal Mine</b>	<b>5.4439%</b>	<b>10.15934%</b>	<b>6.43338%</b>	<b>3.41374%</b>	<b>3.25511%</b>	<b>0.15%</b>	<b>1.94%</b>	<b>0.85%</b>	<b>3.64%</b>	<b>1.63%</b>
Chatti Bariatu CMB	Chatti Bariatu CMB	0.8913%	1.48882%	1.09504%	0.59084%	1.00157%	0.49%	0.49%	2.42%	5.94%	0.85%
Kirendari	Kirendari	7.6297%	1.64382%	1.50568%	3.54503%	3.25511%	2.16%	2.43%	4.47%	3.64%	3.54%
	Pakri Barwadiah CMB										15.28%
Ramagundam- III FGD	Ramagundam- III FGD		0.06844%				0.30%	0.63%	0.42%	0.24%	
Dadri-II FGD	NCPS-FGD		1.08772%	0.20532%		0.25039%	0.10%				
Mouda-I FGD	Mouda-I FGD					0.41941%	0.86%	1.00%	0.36%	0.55%	0.61%
Mouda-II FGD	Mouda-II FGD					0.20657%	0.29%	0.33%		0.24%	0.73%
Rihand-I FGD	Rihand-I FGD					2.87952%		0.67%	0.48%	0.36%	1.70%
	Darlipali (FGD)										
	Unallocated										
Total	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%	100.0000%

## Notes:-

- a) The Interest rate is exclusive of withholding tax currently @ 5.46%( Inclusive of surcharge & education cess)\*  
b) Base exchange rate are the SBI Bill selling rate as on 30.09.2023  
c) Distribution of loan package to various projects is based on utilisation of loan as on 30.09.2023

Year wise Statement of Additional Capitalization after date of Commercial operation up to/beyond achieving Peak rated Capacity							Part-IV Form-9	
Name of the Petitioner : NTPC								
Name of the Integrated Mine : Talaipalli								
Date of Commercial Operation : 01.10.2023								
<b>Financial Year 2023-24</b>								
Amount in Rs Lakhs								
S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 3	Cash basis	IDC included in col. 3			
1	2	3	4	(5 = 3 - 4)	6	7	8	9
1	Land and R&R activities	5,810.05		5,810.05		36E(1)(e)	Expenditure towards land and asset compensation and related R&R activities as envisaged in Investment Approval. Hon'ble commission may be pleased to allow the same.	
2	Construction of Buildings (Adm Building, Service Bulidings township package etc.)	2,719.60		2,719.60		36E(1)(a)	Expenditure required for construction of buildings as envisaged in Mine Plan and Investment Approval. Hon'ble Commission may be pleased to allow the same.	
3	Others (Electrical substations, Infrastructure works, MBOAs etc.)	1,826.08		1,826.08		36E(1)(a)	Expenditure required for construction of Electrical substations, Infrastructure works, MBOAs etc as envisaged in Mine Plan and Investment Approval. Hon'ble Commission may be pleased to allow the same.	
4	CHP					36E(1)(a)	CHP has been shifted from the scope of MDO to NTPC scope as per Revised Cost Estimate (RCE) which is under approval. Expected/Tentative Cost- approx. 1156 Cr likely to come up beyond Mar'24.	

<u>Year wise Statement of Additional Capitalization after date of Commercial operation up to/beyond achieving Peak rated Capacity</u>							Part-IV Form-9	
Name of the Petitioner : NTPC								
Name of the Integrated Mine : Talaipalli								
Date of Commercial Operation : 01.10.2023								
<b>Financial Year 2023-24</b>								
Amount in Rs Lakhs								
S. No.	Head of Work / Equipment	ACE Claimed (Projected)				Regulations under which claimed	Justification	Admitted Cost by the Commission, if any
		Accrual basis	Un-discharged Liability included in column 3	Cash basis	IDC included in col. 3			
1	2	3	4	(5 = 3 - 4)	6	7	8	9
5	ROB on MGR bulb					36E(1)(a)	Expected as per IA/Mine Plan - 24.80 Cr (tentative) beyond Mar'24	
6	Security barrack					36E(1)(a)	Expected as per IA/Mine Plan - 11.00 Cr (tentative) beyond Mar'24	
7	C&D type qtrs in Township					36E(1)(a)	Expected as per IA/Mine Plan - 32.00 Cr (tentative) beyond Mar'24	
8	Township water treatment Plant					36E(1)(a)	Expected as per IA/Mine Plan - 25 Lakhs (tentative) beyond Mar'24	
9	10MW Solar plant in MGR bulb area					36E(1)(a)	Expected as per IA/Mine Plan - 45 Cr (tentative) beyond Mar'24	
<b>Total</b>		<b>10,355.73</b>		<b>10,355.73</b>				
4	Liability Discharge							
<b>Total</b>		<b>10,355.73</b>		<b>10,355.73</b>				

(Petitioner)

Note : Above works from sl no 4 to 9 are indicative works and may not be exhaustive. Any add cap work as per IA/Mine Plan to be done beyond Mar'24 shall be duly incorporated in due course of time.

Calculation of Depreciation

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

(Amount in Rs Lakh)

S. No.	Name of the Assets	Useful Life (Years)	Salvage Value (%)	Gross Block as on 01.10.2023 on Cash Basis	Gross Block as on 01.10.2023	Depreciation Amount (2023-24)
1	2	3A	3	4	4	5 = 4x(100%-3)
1	Free hold Land			1,649.84	1,649.84	-
2	Leasehold Land	30	0.00	436.34	436.34	14.54
3	Coal Bearing Land	31	0.00	76,178.92	1,02,830.07	3,317.10
4	Other Buildings	15	5.00	12,117.32	12,773.72	809.00
5	Temporary erection	1	0.00	36.32	37.12	37.12
6	Plant and machinery	15	5.00	301.23	563.81	35.71
7	Furniture and fixtures	15	5.00	638.90	638.90	40.46
8	Other Office Equipments	15	5.00	353.97	358.76	22.72
9	EDP, WP machines & SATCOM equipment	15	0.00	149.54	151.76	10.12
10	Vehicles including speedboats	10	5.00	-	-	-
11	Electrical installations	15	5.00	5,069.40	5,365.34	339.81
12	Communication equipment	15	5.00	106.64	107.94	6.84
13	Hospital equipment	15	5.00	89.81	90.15	5.71
14	Laboratory and workshop equipment	15	5.00	51.06	53.23	3.37
14	Roads, bridges, culverts, helipads	25	5.00	3,582.01	3,749.68	142.49
15	Computer and Software	3	0.00	151.19	151.70	50.57
16	Mine development expenses	20	0.00	1,01,850.69	1,03,296.63	5,164.83
	<b>TOTAL</b>			<b>2,02,763.19</b>	<b>2,32,254.99</b>	<b>10,000.38</b>
	<b>Weighted Average Rate of Depreciation %</b>					<b>4.31%</b>
<b>(Petitioner)</b>						

**Statement of Depreciation****PART- IV  
FORM- 12**

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24 (01.10.2023- 31.03.2024)
1	2	3	4	5	6	7	8
1.	Opening Capital Cost		Not Applicable	Not Applicable	Not Applicable	Not Applicable	2,07,106.60
2.	Closing Capital Cost						2,17,462.33
3.	<b>Average Capital Cost</b>						2,12,284.47
4.	Freehold land						1,649.84
4A	Assets having zero salvage value						1,78,803.01
5.	Rate of depreciation						4.31%
6.	Depreciable value						2,09,043.05
7.	Balance useful life at the beginning of the period						31
8.	Remaining depreciable value						2,09,043.05
9.	<b>Depreciation (for the period)</b>						4,570.25
10.	<b>Depreciation (annualized)</b>						9,140.50
11.	Cumulative depreciation at the end of the period						4,570.25
12.	Less: Cumulative depreciation adjustment on account of de-capitalization						
13.	Net Cumulative depreciation at the end of the period		4,570.25				

**(Petitioner)**

<u>Calculation of Weighted Average Rate of Interest on Actual Loans</u>		PART- IV FORM- 13
Name of the Petitioner: NTPC Ltd		
Name of the Integrated Mine: Talaipalli		
(Amount in Rs Lakh)		
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	<b>Axis Bank-II</b>	
	Gross Drawl opening	11000
	Cummulative repayment of drawl till prev yr	11000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	8.3000%
	Interest on loan	-
	<b>Axis Bank-III</b>	
	Gross Drawl opening	5350
	Cummulative repayment of drawl till prev yr	5350
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	6.3000%
	Interest on loan	-
<b>1</b>	<b>Axis Bank-IV</b>	
	Gross Drawl opening	5,350.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	5,350.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	5,350.00
	Repayment of loan during the year	535
	Net loan closing	4,815.00
	Average net loan	5,083
	Rate of interest on loan	8.0000%
	Interest on loan	407
<b>2</b>	<b>Bank of Baroda-II</b>	
	Gross Drawl opening	600.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	600.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	600.00
	Repayment of loan during the year	0
	Net loan closing	600.00
	Average net loan	600
	Rate of interest on loan	8.0000%
	Interest on loan	48
<b>3</b>	<b>Bank of India-V-A</b>	
	Gross Drawl opening	144
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	144.00

**Calculation of Weighted Average Rate of Interest on Actual Loans****PART- IV  
FORM- 13**

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

(Amount in Rs Lakh)

S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	144.00
	Repayment of loan during the year	0
	Net loan closing	144.00
	Average net loan	144
	Rate of interest on loan	8.0000%
	Interest on loan	12
<b>1</b>	<b>HDFC Bank Limited-V</b>	
	Gross Drawl opening	1,000.00
	Cummulative repayment of drawl till prev yr	1000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	5.9500%
	Interest on loan	-
<b>4</b>	<b>HDFC Bank Limited-VII</b>	
	Gross Drawl opening	6,000.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	6,000.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	6,000.00
	Repayment of loan during the year	0
	Net loan closing	6,000.00
	Average net loan	6,000
	Rate of interest on loan	7.9500%
	Interest on loan	477
<b>2</b>	<b>HDFC-IX</b>	
	Gross Drawl opening	16,000.00
	Cummulative repayment of drawl till prev yr	16000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	5.9500%
	Interest on loan	-
<b>5</b>	<b>HDFC-X</b>	
	Gross Drawl opening	4,100.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	4,100.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	4,100.00
	Repayment of loan during the year	0
	Net loan closing	4,100.00



<u>Calculation of Weighted Average Rate of Interest on Actual Loans</u>		PART- IV FORM- 13
Name of the Petitioner: NTPC Ltd		
Name of the Integrated Mine: Talaipalli		
		(Amount in Rs Lakh)
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Average net loan	4,100
	Rate of interest on loan	7.9500%
	Interest on loan	326
<b>6</b>	<b>HDFC Bank Limited-XI</b>	
	Gross Drawl opening	2000
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	2,000.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	2,000.00
	Repayment of loan during the year	0
	Net loan closing	2,000.00
	Average net loan	2,000
	Rate of interest on loan	7.8000%
	Interest on loan	156
	<b>ICICI-IV</b>	
	Gross Drawl opening	50000
	Cummulative repayment of drawl till prev yr	50000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	8.6000%
	Interest on loan	-
	<b>ICICI-VI</b>	
	Gross Drawl opening	4900
	Cummulative repayment of drawl till prev yr	4900
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	8.6000%
	Interest on loan	-
	<b>ICICI-VII</b>	
	Gross Drawl opening	2000
	Cummulative repayment of drawl till prev yr	2000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	6.2400%
	Interest on loan	-
<b>7</b>	<b>IndusInd Bank</b>	

<u>Calculation of Weighted Average Rate of Interest on Actual Loans</u>		PART- IV FORM- 13
Name of the Petitioner: NTPC Ltd		
Name of the Integrated Mine: Talaipalli		
(Amount in Rs Lakh)		
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Gross Drawl opening	1,300.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	1,300.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	1,300.00
	Repayment of loan during the year	0
	Net loan closing	1,300.00
	Average net loan	1,300
	Rate of interest on loan	8.0000%
	Interest on loan	104
<b>8</b>	<b>Punjab National Bank III</b>	
	Gross Drawl opening	5,000.00
	Cummulative repayment of drawl till prev yr	1111
	Net Loan opening	3,888.89
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	3,888.89
	Repayment of loan during the year	556
	Net loan closing	3,333.33
	Average net loan	3,611
	Rate of interest on loan	7.9000%
	Interest on loan	285
<b>1</b>	<b>PNB-IV</b>	
	Gross Drawl opening	50,000.00
	Cummulative repayment of drawl till prev yr	50,000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	-
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	6.5000%
	Interest on loan	-
<b>9</b>	<b>PNB-V</b>	
	Gross Drawl opening	6,000.00
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	6,000.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	6,000.00
	Repayment of loan during the year	500
	Net loan closing	5,500.00
	Average net loan	5,750
	Rate of interest on loan	7.9000%
	Interest on loan	454
<b>10</b>	<b>State Bank of India - IX</b>	
	Gross Drawl opening	5,377.83
	Cummulative repayment of drawl till prev yr	433
	Net Loan opening	4,944.50
	Increase decrease due to FERV	
	Increase decrease due to ACE	

<u>Calculation of Weighted Average Rate of Interest on Actual Loans</u>		PART- IV FORM- 13
Name of the Petitioner: NTPC Ltd		
Name of the Integrated Mine: Talaipalli		
		(Amount in Rs Lakh)
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Total	4,944.50
	Repayment of loan during the year	824
	Net loan closing	4,120.42
	Average net loan	4,532
	Rate of interest on loan	8.1500%
	Interest on loan	369
<b>1</b>	<b>State Bank of India - X</b>	
	Gross Drawl opening	19,000.00
	Cummulative repayment of drawl till prev yr	19000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	6.6500%
	Interest on loan	-
<b>11</b>	<b>State Bank of India - XI</b>	
	Gross Drawl opening	7,700.00
	Cummulative repayment of drawl till prev yr	1711
	Net Loan opening	5,988.91
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	5,988.91
	Repayment of loan during the year	0
	Net loan closing	5,988.91
	Average net loan	5,989
	Rate of interest on loan	8.1000%
	Interest on loan	485
<b>12</b>	<b>State Bank of India - XII</b>	
	Gross Drawl opening	9,000.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	9,000.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	9,000.00
	Repayment of loan during the year	0
	Net loan closing	9,000.00
	Average net loan	9,000
	Rate of interest on loan	8.1000%
	Interest on loan	729
<b>1</b>	<b>State Bank of India - XIII</b>	
	Gross Drawl opening	2,000.00
	Cummulative repayment of drawl till prev yr	2000
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	6.6500%

**Calculation of Weighted Average Rate of Interest on Actual Loans**

**PART- IV  
FORM- 13**

Name of the Petitioner: NTPC Ltd

Name of the Integrated Mine: Talaipalli

(Amount in Rs Lakh)

S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Interest on loan	-
<b>13</b>	<b>UCO Bank-IV</b>	
	Gross Drawl opening	5,394
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	5,394.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	5,394.00
	Repayment of loan during the year	0
	Net loan closing	5,394.00
	Average net loan	5,394
	Rate of interest on loan	7.7000%
	Interest on loan	415
	<b>Vijaya Bank-VI</b>	
	Gross Drawl opening	1500
	Cummulative repayment of drawl till prev yr	1500
	Net Loan opening	0.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	0.00
	Repayment of loan during the year	0
	Net loan closing	0.00
	Average net loan	0
	Rate of interest on loan	7.1500%
	Interest on loan	-
	<b>Bonds Series - 67</b>	
	Gross Drawl opening	4,900.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	4,900.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	4,900.00
	Repayment of loan during the year	0
	Net loan closing	4,900.00
	Average net loan	4,900
	Rate of interest on loan	8.3300%
	Interest on loan	408
	<b>Bonds Series - 69</b>	
	Gross Drawl opening	11,500.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	11,500.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	11,500.00
	Repayment of loan during the year	0
	Net loan closing	11,500.00
	Average net loan	11,500
	Rate of interest on loan	7.3500%
	Interest on loan	845
	<b>Bonds Series - 73</b>	
	Gross Drawl opening	19,400.00
	Cummulative repayment of drawl till prev yr	0

<u>Calculation of Weighted Average Rate of Interest on Actual Loans</u>		PART- IV FORM- 13
Name of the Petitioner: NTPC Ltd		
Name of the Integrated Mine: Talaipalli		
		(Amount in Rs Lakh)
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Net Loan opening	19,400.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	19,400.00
	Repayment of loan during the year	0
	Net loan closing	19,400.00
	Average net loan	19,400
	Rate of interest on loan	6.4600%
	Interest on loan	1,253
	<b>Bonds Series - 74</b>	
	Gross Drawl opening	4,800.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	4,800.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	4,800.00
	Repayment of loan during the year	0
	Net loan closing	4,800.00
	Average net loan	4,800
	Rate of interest on loan	6.9000%
	Interest on loan	331
	<b>Bonds Series - 75</b>	
	Gross Drawl opening	2,160.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	2,160.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	2,160.00
	Repayment of loan during the year	0
	Net loan closing	2,160.00
	Average net loan	2,160
	Rate of interest on loan	6.7200%
	Interest on loan	145
	<b>Bonds Series - 76</b>	
	Gross Drawl opening	2,600.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	2,600.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	2,600.00
	Repayment of loan during the year	0
	Net loan closing	2,600.00
	Average net loan	2,600
	Rate of interest on loan	6.7700%
	Interest on loan	176
	<b>Bonds Series - 78</b>	
	Gross Drawl opening	856.00
	Cummulative repayment of drawl till prev yr	0
	Net Loan opening	856.00
	Increase decrease due to FERV	
	Increase decrease due to ACE	
	Total	856.00
	Repayment of loan during the year	0

<u>Calculation of Weighted Average Rate of Interest on Actual Loans</u>		PART- IV FORM- 13
Name of the Petitioner: NTPC Ltd		
Name of the Integrated Mine: Talaipalli		
(Amount in Rs Lakh)		
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Net loan closing	856.00
	Average net loan	856
	Rate of interest on loan	7.4700%
	Interest on loan	64
	<b>Euro Loan I</b>	
	Gross Drawl opening	2,377.96
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	2,377.96
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	2,377.96
	Repayment of loan during the year	-
	Net loan closing	2,377.96
	Average net loan	2,378
	Rate of interest on loan	4.8420%
	Interest on loan	115
	<b>Euro Loan II</b>	
	Gross Drawl opening	7639.827557
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	7,639.83
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	7,639.83
	Repayment of loan during the year	-
	Net loan closing	7,639.83
	Average net loan	7,640
	Rate of interest on loan	4.8404%
	Interest on loan	370
	<b>Euro Loan III</b>	
	Gross Drawl opening	4853.646216
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	4,853.65
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	4,853.65
	Repayment of loan during the year	-
	Net loan closing	4,853.65
	Average net loan	4,854
	Rate of interest on loan	4.8394%
	Interest on loan	235
	<b>USD 750 Million Drawl I</b>	
	Gross Drawl opening	2859.345843
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	2,859.35
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	2,859.35
	Repayment of loan during the year	-
	Net loan closing	2,859.35
	Average net loan	2,859
	Rate of interest on loan	6.4104%
	Interest on loan	183

<b>Calculation of Weighted Average Rate of Interest on Actual Loans</b>		<b>PART- IV FORM- 13</b>
<b>Name of the Petitioner: NTPC Ltd</b>		
<b>Name of the Integrated Mine: Talaipalli</b>		
(Amount in Rs Lakh)		
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	<b>USD 750 Million Drawl II</b>	
	Gross Drawl opening	2726.481428
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	2,726.48
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	2,726.48
	Repayment of loan during the year	-
	Net loan closing	2,726.48
	Average net loan	2,726
	Rate of interest on loan	6.4104%
	Interest on loan	175
	<b>USD 750 Million Drawl III</b>	
	Gross Drawl opening	308.0315853
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	308.03
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	308.03
	Repayment of loan during the year	-
	Net loan closing	308.03
	Average net loan	308
	Rate of interest on loan	6.4104%
	Interest on loan	20
	<b>USD 750 Million Drawl IV</b>	
	Gross Drawl opening	1625.184934
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	1,625.18
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	1,625.18
	Repayment of loan during the year	-
	Net loan closing	1,625.18
	Average net loan	1,625
	Rate of interest on loan	6.4104%
	Interest on loan	104
	<b>USD 750 Million Drawl V</b>	
	Gross Drawl opening	708.6583481
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	708.66
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	708.66
	Repayment of loan during the year	-
	Net loan closing	708.66
	Average net loan	709
	Rate of interest on loan	6.4104%
	Interest on loan	45
	<b>USD 750 Million Drawl VI</b>	
	Gross Drawl opening	3047.993341
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	3,047.99
	Increase decrease due to FERV	-

<u>Calculation of Weighted Average Rate of Interest on Actual Loans</u>		PART- IV FORM- 13
Name of the Petitioner: NTPC Ltd		
Name of the Integrated Mine: Talaipalli		
		(Amount in Rs Lakh)
S.No.	Particulars	2023-24 (01.10.2023 to 31.03.2024)
	Increase decrease due to ACE	-
	Total	3,047.99
	Repayment of loan during the year	-
	Net loan closing	3,047.99
	Average net loan	3,048
	Rate of interest on loan	6.4104%
	Interest on loan	195
	<b>JPY Equ. \$400 Million Drawl I</b>	
	Gross Drawl opening	1245.371928
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	1,245.37
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	1,245.37
	Repayment of loan during the year	-
	Net loan closing	1,245.37
	Average net loan	1,245
	Rate of interest on loan	1.2000%
	Interest on loan	15
	<b>JPY Equ. \$400 Million Drawl II</b>	
	Gross Drawl opening	4786.615143
	Cummulative repayment of drawl till prev yr	-
	Net Loan opening	4,786.62
	Increase decrease due to FERV	-
	Increase decrease due to ACE	-
	Total	4,786.62
	Repayment of loan during the year	-
	Net loan closing	4,786.62
	Average net loan	4,787
	Rate of interest on loan	1.2000%
	Interest on loan	57
	<b>Gross Drawl opening</b>	<b>2,99,110.95</b>
	<b>Cummulative repayment of drawl till prev yr</b>	<b>1,66,005.53</b>
	<b>Net Loan opening</b>	<b>1,33,105.41</b>
	<b>Increase decrease due to FERV</b>	<b>0.00</b>
	<b>Increase decrease due to ACE</b>	<b>0.00</b>
	<b>Total</b>	<b>1,33,105.41</b>
	<b>Repayment of loan during the year</b>	<b>2,414.64</b>
	<b>Net loan closing</b>	<b>1,30,690.78</b>
	<b>Average net loan</b>	<b>1,31,898.10</b>
	<b>Rate of interest on loan</b>	<b>6.83%</b>
	<b>Interest on loan</b>	<b>9,005.43</b>



PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q4 2016-17	2016-17	Q1 2017-18	Q2 2017-18	Q3 2017-18	Q4 2017-18
S NO	Department	Name of the Bank	Description	Q4	Total	Q1	Q2	Q3	Q4
1	Budget								
2	Budget	<b>Axis Bank-II</b>	<b>Drawl Amount</b>		-				
3	Budget		Interest Debit		-				
4	Budget		Interest Credit		-				
5	Budget		Adj. Amount		-				
6	Budget		Net Charges	-	-	-	-	-	-
7	Budget		Financial charges		-				
8	Budget								
9	Budget	<b>Axis Bank-III</b>	<b>Drawl Amount</b>		-				
10	Budget		Interest Debit		-				
11	Budget		Interest Credit		-				
12	Budget		Adj. Amount		-				
13	Budget		Net Charges	-	-	-	-	-	-
14	Budget		Financial charges		-				
15	Budget								
16	Budget	<b>Axis Bank-IV</b>	<b>Drawl Amount</b>						
17	Budget		Interest Debit						
18	Budget		Interest Credit						
19	Budget		Adj. Amount						
20	Budget		Net Charges						
21	Budget		Financial charges						
22	Budget								
23	Budget	<b>BANK OF BARODA II</b>	<b>Drawl Amount</b>		-				
24	Budget		Interest Debit		-				
25	Budget		Interest Credit		-				
26	Budget		Adj. Amount		-				
27	Budget		Net Charges	-	-	-	-	-	-
28	Budget		Financial charges		-				
29	Budget								
30	Budget	<b>Bank of India-V-A</b>	<b>Drawl Amount</b>						
31	Budget		Interest Debit						
32	Budget		Interest Credit						
33	Budget		Adj. Amount						
34	Budget		Net Charges						
35	Budget		Financial charges						
36	Budget								
37	Budget	<b>HDFC Bank Limited-V</b>	<b>Drawl Amount</b>		-				
38	Budget		Interest Debit		-				
39	Budget		Interest Credit		-				
40	Budget		Adj. Amount		-				
41	Budget		Net Charges	-	-	-	-	-	-
42	Budget		Financial charges		-				
43	Budget								
44	Budget	<b>HDFC Bank Limited-VII</b>	<b>Drawl Amount</b>		-				
45	Budget		Interest Debit		-				
46	Budget		Interest Credit		-				
47	Budget		Adj. Amount		-				
48	Budget		Net Charges	-	-	-	-	-	-
49	Budget		Financial charges		-				
50	Budget								
51	Budget	<b>HDFC Bank Limited-IX</b>	<b>Drawl Amount</b>		-				
52	Budget		Interest Debit		-				
53	Budget		Interest Credit		-				
54	Budget		Adj. Amount		-				
55	Budget		Net Charges	-	-	-	-	-	-
56	Budget		Financial charges		-				
57	Budget								

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q4 2016-17	2016-17	Q1 2017-18	Q2 2017-18	Q3 2017-18	Q4 2017-18
S NO	Department	Name of the Bank	Description	Q4	Total	Q1	Q2	Q3	Q4
58 Budget		<b>HDFC Bank Limited-X</b>	<b>Drawl Amount</b>		-				
59 Budget			Interest Debit		-				
60 Budget			Interest Credit		-				
61 Budget			Adj. Amount		-				
62 Budget			Net Charges	-	-	-	-	-	-
63 Budget			Financial charges		-				
64 Budget									
65 Budget		<b>HDFC Bank Limited-XI</b>	<b>Drawl Amount</b>						
66 Budget			Interest Debit						
67 Budget			Interest Credit						
68 Budget			Adj. Amount						
69 Budget			Net Charges						
70 Budget			Financial charges						
71 Budget									
72 Budget		<b>ICICI - IV</b>	<b>Drawl Amount</b>	5,00,00,00,000	<b>5,00,00,00,000</b>				
73 Budget			Interest Debit		-	9,84,79,452	9,95,61,637	9,93,56,171	9,73,97,260
74 Budget			Interest Credit		-				
75 Budget			Adj. Amount		-				
76 Budget			Net Charges	-	-	9,84,79,452	9,95,61,637	9,93,56,171	9,73,97,260
77 Budget			Financial charges		-				
78 Budget									
79 Budget		<b>ICICI - VI</b>	<b>Drawl Amount</b>		-		34,00,00,000	15,00,00,000	
80 Budget			Interest Debit		-		4,41,534	71,15,274	95,26,809
81 Budget			Interest Credit		-				
82 Budget			Adj. Amount		-				
83 Budget			Net Charges	-	-	-	4,41,534	71,15,274	95,26,809
84 Budget			Financial charges		-				
85 Budget									
86 Budget		<b>ICICI - VII</b>	<b>Drawl Amount</b>		-				
87 Budget			Interest Debit		-				
88 Budget			Interest Credit		-				
89 Budget			Adj. Amount		-				
90 Budget			Net Charges	-	-	-	-	-	-
91 Budget			Financial charges		-				
92 Budget									
93 Budget		<b>IndusInd Bank</b>	<b>Drawl Amount</b>		-				
94 Budget			Interest Debit		-				
95 Budget			Interest Credit		-				
96 Budget			Adj. Amount		-				
97 Budget			Net Charges	-	-	-	-	-	-
98 Budget			Financial charges		-				
99 Budget									
100 Budget		<b>PNB-III</b>	<b>Drawl Amount</b>		-				
101 Budget			Interest Debit		-				
102 Budget			Interest Credit		-				
103 Budget			Adj. Amount		-				
104 Budget			Net Charges	-	-	-	-	-	-
105 Budget			Financial charges		-				
106 Budget									
107 Budget		<b>PNB-IV</b>	<b>Drawl Amount</b>		-				
108 Budget			Interest Debit		-				
109 Budget			Interest Credit		-				
110 Budget			Adj. Amount		-				
111 Budget			Net Charges	-	-	-	-	-	-
112 Budget			Financial charges		-				
113 Budget									
114 Budget		<b>PNB-V</b>	<b>Drawl Amount</b>		-				

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q4 2016-17	2016-17	Q1 2017-18	Q2 2017-18	Q3 2017-18	Q4 2017-18
S NO	Department	Name of the Bank	Description	Q4	Total	Q1	Q2	Q3	Q4
115	Budget		Interest Debit		-				
116	Budget		Interest Credit		-				
117	Budget		Adj. Amount		-				
118	Budget		Net Charges	-	-	-	-	-	-
119	Budget		Financial charges		-				
120	Budget								
121	Budget	<b>State Bank of India - IX</b>	<b>Drawl Amount</b>		-				
122	Budget		Interest Debit		-				
123	Budget		Interest Credit		-				
124	Budget		Adj. Amount		-				
125	Budget		Net Charges	-	-	-	-	-	-
126	Budget		Financial charges		-				
127	Budget								
128	Budget	<b>State Bank of India - X</b>	<b>Drawl Amount</b>		-				
129	Budget		Interest Debit		-				
130	Budget		Interest Credit		-				
131	Budget		Adj. Amount		-				
132	Budget		Net Charges	-	-	-	-	-	-
133	Budget		Financial charges		-				
134	Budget								
135	Budget	<b>State Bank of India - XI</b>	<b>Drawl Amount</b>		-				
136	Budget		Interest Debit		-				
137	Budget		Interest Credit		-				
138	Budget		Adj. Amount		-				
139	Budget		Net Charges	-	-	-	-	-	-
140	Budget		Financial charges		-				
141	Budget								
142	Budget	<b>State Bank of India - XII</b>	<b>Drawl Amount</b>		-				
143	Budget		Interest Debit		-				
144	Budget		Interest Credit		-				
145	Budget		Adj. Amount		-				
146	Budget		Net Charges	-	-	-	-	-	-
147	Budget		Financial charges		-				
148	Budget								
149	Budget	<b>State Bank of India - XIII</b>	<b>Drawl Amount</b>		-				
150	Budget		Interest Debit		-				
151	Budget		Interest Credit		-				
152	Budget		Adj. Amount		-				
153	Budget		Net Charges	-	-	-	-	-	-
154	Budget		Financial charges		-				
155	Budget								
156	Budget	<b>UCO Bank-IV</b>	<b>Drawl Amount</b>		-				
157	Budget		Interest Debit		-				
158	Budget		Interest Credit		-				
159	Budget		Adj. Amount		-				
160	Budget		Net Charges		-				
161	Budget		Financial charges		-				
162	Budget								
163	Budget	<b>VIJAYA BANK VI</b>	<b>Drawl Amount</b>		-			15,00,00,000	
164	Budget		Interest Debit		-			15,90,822	29,21,923
165	Budget		Interest Credit		-				
166	Budget		Adj. Amount		-				
167	Budget		Net Charges	-	-	-	-	15,90,822	29,21,923
168	Budget		Financial charges		-				
169	Bonds								
170	Bonds	<b>67</b>	<b>Drawl Amount</b>						
171	Bonds		Interest Debit						

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q4 2016-17	2016-17	Q1 2017-18	Q2 2017-18	Q3 2017-18	Q4 2017-18
S NO	Department	Name of the Bank	Description	Q4	Total	Q1	Q2	Q3	Q4
172	Bonds		Interest Credit						
173	Bonds		Adj. Amount						
174	Bonds		Net Charges						
175	Bonds		Financial Charges						
176	Bonds	69	<b>Drawl Amount</b>						
177	Bonds		Interest Debit						
178	Bonds		Interest Credit						
179	Bonds		Adj. Amount						
180	Bonds		Net Charges						
181	Bonds		Financial Charges						
182	Bonds	73	<b>Drawl Amount</b>						
183	Bonds		Interest Debit						
184	Bonds		Interest Credit						
185	Bonds		Adj. Amount						
186	Bonds		Net Charges						
187	Bonds		Financial Charges						
188	Bonds	74	<b>Drawl Amount</b>						
189	Bonds		Interest Debit						
190	Bonds		Interest Credit						
191	Bonds		Adj. Amount						
192	Bonds		Net Charges						
193	Bonds		Financial Charges						
194	Bonds	75	<b>Drawl Amount</b>						
195	Bonds		Interest Debit						
196	Bonds		Interest Credit						
197	Bonds		Adj. Amount						
198	Bonds		Net Charges						
199	Bonds		Financial Charges						
200	Bonds	76	<b>Drawl Amount</b>						
201	Bonds		Interest Debit						
202	Bonds		Interest Credit						
203	Bonds		Adj. Amount						
204	Bonds		Net Charges						
205	Bonds		Financial Charges						
206	Bonds	78	<b>Drawl Amount</b>						
207	Bonds		Interest Debit						
208	Bonds		Interest Credit						
209	Bonds		Adj. Amount						
210	Bonds		Net Charges						
211	Bonds		Financial Charges						
212	IF								
213	IF	EURO Loan I Drawl I	Drawl Amount						
214	IF	EURO Loan I Drawl I	Interest Debit						
215	IF	EURO Loan I Drawl I	Interest Credit						
216	IF	EURO Loan I Drawl I	Withholding Tax						
217	IF	EURO Loan I Drawl I	Adj. Amount						
218	IF	EURO Loan I Drawl I	Net Charges						
219	IF	EURO Loan I Drawl I	Financial charges						
220	IF								
221	IF	EURO Loan I Drawl II	Drawl Amount						
222	IF	EURO Loan I Drawl II	Interest Debit						
223	IF	EURO Loan I Drawl II	Interest Credit						
224	IF	EURO Loan I Drawl II	Withholding Tax						
225	IF	EURO Loan I Drawl II	Adj. Amount						
226	IF	EURO Loan I Drawl II	Net Charges						
227	IF	EURO Loan I Drawl II	Financial charges						
228	IF								

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q4 2016-17	2016-17	Q1 2017-18	Q2 2017-18	Q3 2017-18	Q4 2017-18
S NO	Department	Name of the Bank	Description	Q4	Total	Q1	Q2	Q3	Q4
229 IF		EURO Loan I Drawl III	Drawl Amount						
230 IF		EURO Loan I Drawl III	Interest Debit						
231 IF		EURO Loan I Drawl III	Interest Credit						
232 IF		EURO Loan I Drawl III	Witholding Tax						
233 IF		EURO Loan I Drawl III	Adj. Amount						
234 IF		EURO Loan I Drawl III	Net Charges						
235 IF		EURO Loan I Drawl III	Financial charges						
236 IF									
237 IF		USD 750 Million I Drawl I	Drawl Amount						
238 IF		USD 750 Million I Drawl I	Interest Debit						
239 IF		USD 750 Million I Drawl I	Interest Credit						
240 IF		USD 750 Million I Drawl I	Witholding Tax						
241 IF		USD 750 Million I Drawl I	Adj. Amount						
242 IF		USD 750 Million I Drawl I	Net Charges						
243 IF		USD 750 Million I Drawl I	Financial charges						
244 IF									
245 IF		USD 750 Million I Drawl II	Drawl Amount						
246 IF		USD 750 Million I Drawl II	Interest Debit						
247 IF		USD 750 Million I Drawl II	Interest Credit						
248 IF		USD 750 Million I Drawl II	Witholding Tax						
249 IF		USD 750 Million I Drawl II	Adj. Amount						
250 IF		USD 750 Million I Drawl II	Net Charges						
251 IF		USD 750 Million I Drawl II	Financial charges						
252 IF									
253 IF		USD 750 Million I Drawl III	Drawl Amount						
254 IF		USD 750 Million I Drawl III	Interest Debit						
255 IF		USD 750 Million I Drawl III	Interest Credit						
256 IF		USD 750 Million I Drawl III	Witholding Tax						
257 IF		USD 750 Million I Drawl III	Adj. Amount						
258 IF		USD 750 Million I Drawl III	Net Charges						
259 IF		USD 750 Million I Drawl III	Financial charges						
260 IF									
261 IF		USD 750 Million I Drawl IV	Drawl Amount						
262 IF		USD 750 Million I Drawl IV	Interest Debit						
263 IF		USD 750 Million I Drawl IV	Interest Credit						
264 IF		USD 750 Million I Drawl IV	Witholding Tax						
265 IF		USD 750 Million I Drawl IV	Adj. Amount						
266 IF		USD 750 Million I Drawl IV	Net Charges						
267 IF		USD 750 Million I Drawl IV	Financial charges						
268 IF									
269 IF		USD 750 Million I Drawl V	Drawl Amount						
270 IF		USD 750 Million I Drawl V	Interest Debit						
271 IF		USD 750 Million I Drawl V	Interest Credit						
272 IF		USD 750 Million I Drawl V	Witholding Tax						
273 IF		USD 750 Million I Drawl V	Adj. Amount						
274 IF		USD 750 Million I Drawl V	Net Charges						
275 IF		USD 750 Million I Drawl V	Financial charges						
276 IF									
277 IF		USD 750 Million I Drawl VI	Drawl Amount						
278 IF		USD 750 Million I Drawl VI	Interest Debit						
279 IF		USD 750 Million I Drawl VI	Interest Credit						
280 IF		USD 750 Million I Drawl VI	Witholding Tax						
281 IF		USD 750 Million I Drawl VI	Adj. Amount						
282 IF		USD 750 Million I Drawl VI	Net Charges						
283 IF		USD 750 Million I Drawl VI	Financial charges						
284 IF									
285 IF		JPY Equ. \$400 Million Drawl I	Drawl Amount						

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPELLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q4 2016-17	2016-17	Q1 2017-18	Q2 2017-18	Q3 2017-18	Q4 2017-18
S NO	Department	Name of the Bank	Description	Q4	Total	Q1	Q2	Q3	Q4
286	IF	JPY Equ. \$400 Million Drawl I	Interest Debit						
287	IF	JPY Equ. \$400 Million Drawl I	Interest Credit						
288	IF	JPY Equ. \$400 Million Drawl I	Withholding Tax						
289	IF	JPY Equ. \$400 Million Drawl I	Adj. Amount						
290	IF	JPY Equ. \$400 Million Drawl I	Net Charges						
291	IF	JPY Equ. \$400 Million Drawl I	Financial charges						
292	IF								
293	IF	JPY Equ. \$400 Million Drawl II	Drawl Amount						
294	IF	JPY Equ. \$400 Million Drawl II	Interest Debit						
295	IF	JPY Equ. \$400 Million Drawl II	Interest Credit						
296	IF	JPY Equ. \$400 Million Drawl II	Withholding Tax						
297	IF	JPY Equ. \$400 Million Drawl II	Adj. Amount						
298	IF	JPY Equ. \$400 Million Drawl II	Net Charges						
299	IF	JPY Equ. \$400 Million Drawl II	Financial charges						

<b>Drawl Amount</b>	<b>5,00,00,00,000</b>	<b>5,00,00,00,000</b>	<b>-</b>	<b>34,00,00,000</b>	<b>30,00,00,000</b>	<b>-</b>
Interest Debit	-	-	9,84,79,452	10,00,03,171	10,80,62,267	10,98,45,992
Interest Credit	-	-	-	-	-	-
Withholding Tax	-	-	-	-	-	-
Adj. Amount	-	-	-	-	-	-
Net Charges	-	-	9,84,79,452	10,00,03,171	10,80,62,267	10,98,45,992
Financial Charges	-	-	-	-	-	-
Drawl						
Budget	5,00,00,00,000	5,00,00,00,000	-	34,00,00,000	30,00,00,000	-
Bonds	-	-	-	-	-	-
IF	-	-	-	-	-	-
Total Drawl	5,00,00,00,000		-	34,00,00,000	30,00,00,000	-
Cumulative Drawl	5,00,00,00,000		5,00,00,00,000	5,34,00,00,000	5,64,00,00,000	5,64,00,00,000
Repayment (incl trf to loan trf to Lara)						
Cum Repayment						
FERV						
Cum FERV	-					
<b>Net Cumm Loan inc FERV</b>	<b>5,00,00,00,000</b>		<b>5,00,00,00,000</b>	<b>5,34,00,00,000</b>	<b>5,64,00,00,000</b>	<b>5,64,00,00,000</b>
<b>Net charges</b>						
Budget	-	-	9,84,79,452	10,00,03,171	10,80,62,267	10,98,45,992
Bonds	-	-	-	-	-	-
IF	-	-	-	-	-	-
<b>Total</b>	<b>-</b>		<b>9,84,79,452</b>	<b>10,00,03,171</b>	<b>10,80,62,267</b>	<b>10,98,45,992</b>
<b>Financial Charges</b>						
Budget	-	-	-	-	-	-
Bonds	-	-	-	-	-	-
IF	-	-	-	-	-	-
<b>Total FC</b>	<b>-</b>		<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

		Name of the Bank	Description	Q4 2016-17	2016-17	Q1 2017-18	Q2 2017-18	Q3 2017-18	Q4 2017-18
S NO	Department	Name of the Bank	Description	Q4	Total	Q1	Q2	Q3	Q4
			Interest Rate	0.00%		1.97%	1.87%	1.92%	1.95%

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	2017-18	Q1 2018-19	Q2 2018-19	Q3 2018-19	Q4 2018-19	2018-19
S NO	Department	Name of the Bank	Description	Total	Q1	Q2	Q3	Q4	Total
1	Budget								
2	Budget	<b>Axis Bank-II</b>	<b>Drawl Amount</b>	-					-
3	Budget		Interest Debit	-					-
4	Budget		Interest Credit	-					-
5	Budget		Adj. Amount	-					-
6	Budget		Net Charges	-	-	-	-	-	-
7	Budget		Financial charges	-					-
8	Budget								
9	Budget	<b>Axis Bank-III</b>	<b>Drawl Amount</b>	-					-
10	Budget		Interest Debit	-					-
11	Budget		Interest Credit	-					-
12	Budget		Adj. Amount	-					-
13	Budget		Net Charges	-	-	-	-	-	-
14	Budget		Financial charges	-					-
15	Budget								
16	Budget	<b>Axis Bank-IV</b>	<b>Drawl Amount</b>						
17	Budget		Interest Debit						
18	Budget		Interest Credit						
19	Budget		Adj. Amount						
20	Budget		Net Charges						
21	Budget		Financial charges						
22	Budget								
23	Budget	<b>BANK OF BARODA II</b>	<b>Drawl Amount</b>	-					-
24	Budget		Interest Debit	-					-
25	Budget		Interest Credit	-					-
26	Budget		Adj. Amount	-					-
27	Budget		Net Charges	-	-	-	-	-	-
28	Budget		Financial charges	-					-
29	Budget								
30	Budget	<b>Bank of India-V-A</b>	<b>Drawl Amount</b>						
31	Budget		Interest Debit						
32	Budget		Interest Credit						
33	Budget		Adj. Amount						
34	Budget		Net Charges						
35	Budget		Financial charges						
36	Budget								
37	Budget	<b>HDFC Bank Limited-V</b>	<b>Drawl Amount</b>	-		10,00,00,000			10,00,00,000
38	Budget		Interest Debit	-		20,22,739	20,94,932	20,83,561	62,01,232
39	Budget		Interest Credit	-					-
40	Budget		Adj. Amount	-					-
41	Budget		Net Charges	-	-	20,22,739	20,94,932	20,83,561	62,01,232
42	Budget		Financial charges	-					-
43	Budget								
44	Budget	<b>HDFC Bank Limited-VII</b>	<b>Drawl Amount</b>	-					-
45	Budget		Interest Debit	-					-
46	Budget		Interest Credit	-					-
47	Budget		Adj. Amount	-					-
48	Budget		Net Charges	-	-	-	-	-	-
49	Budget		Financial charges	-					-
50	Budget								
51	Budget	<b>HDFC Bank Limited-IX</b>	<b>Drawl Amount</b>	-					-
52	Budget		Interest Debit	-					-
53	Budget		Interest Credit	-					-
54	Budget		Adj. Amount	-					-
55	Budget		Net Charges	-	-	-	-	-	-
56	Budget		Financial charges	-					-
57	Budget								



PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPELLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	2017-18	Q1 2018-19	Q2 2018-19	Q3 2018-19	Q4 2018-19	2018-19
S NO	Department	Name of the Bank	Description	Total	Q1	Q2	Q3	Q4	Total
58	Budget	<b>HDFC Bank Limited-X</b>	<b>Drawl Amount</b>	-					-
59	Budget		Interest Debit	-					-
60	Budget		Interest Credit	-					-
61	Budget		Adj. Amount	-					-
62	Budget		Net Charges	-	-	-	-	-	-
63	Budget		Financial charges	-					-
64	Budget								
65	Budget	<b>HDFC Bank Limited-XI</b>	<b>Drawl Amount</b>						
66	Budget		Interest Debit						
67	Budget		Interest Credit						
68	Budget		Adj. Amount						
69	Budget		Net Charges						
70	Budget		Financial charges						
71	Budget								
72	Budget	<b>ICICI - IV</b>	<b>Drawl Amount</b>	-					-
73	Budget		Interest Debit	39,47,94,520	10,01,23,287	10,30,75,343	10,62,60,274		30,94,58,904
74	Budget		Interest Credit	-					-
75	Budget		Adj. Amount	-					-
76	Budget		Net Charges	39,47,94,520	10,01,23,287	10,30,75,343	10,62,60,274	-	30,94,58,904
77	Budget		Financial charges	-					-
78	Budget								
79	Budget	<b>ICICI - VI</b>	<b>Drawl Amount</b>	49,00,00,000					-
80	Budget		Interest Debit	1,70,83,617	98,00,000	1,00,71,177	1,03,83,301	16,16,329	3,18,70,807
81	Budget		Interest Credit	-					-
82	Budget		Adj. Amount	-					-
83	Budget		Net Charges	1,70,83,617	98,00,000	1,00,71,177	1,03,83,301	16,16,329	3,18,70,807
84	Budget		Financial charges	-					-
85	Budget								
86	Budget	<b>ICICI - VII</b>	<b>Drawl Amount</b>	-					-
87	Budget		Interest Debit	-					-
88	Budget		Interest Credit	-					-
89	Budget		Adj. Amount	-					-
90	Budget		Net Charges	-	-	-	-	-	-
91	Budget		Financial charges	-					-
92	Budget								
93	Budget	<b>IndusInd Bank</b>	<b>Drawl Amount</b>	-					-
94	Budget		Interest Debit	-					-
95	Budget		Interest Credit	-					-
96	Budget		Adj. Amount	-					-
97	Budget		Net Charges	-	-	-	-	-	-
98	Budget		Financial charges	-					-
99	Budget								
100	Budget	<b>PNB-III</b>	<b>Drawl Amount</b>	-		50,00,00,000			50,00,00,000
101	Budget		Interest Debit	-		54,03,425	1,03,54,109	1,02,32,878	2,59,90,412
102	Budget		Interest Credit	-					-
103	Budget		Adj. Amount	-					-
104	Budget		Net Charges	-	-	54,03,425	1,03,54,109	1,02,32,878	2,59,90,412
105	Budget		Financial charges	-					-
106	Budget								
107	Budget	<b>PNB-IV</b>	<b>Drawl Amount</b>	-				5,00,00,00,000	5,00,00,00,000
108	Budget		Interest Debit	-				10,37,26,028	10,37,26,028
109	Budget		Interest Credit	-					-
110	Budget		Adj. Amount	-					-
111	Budget		Net Charges	-	-	-	-	10,37,26,028	10,37,26,028
112	Budget		Financial charges	-					-
113	Budget								
114	Budget	<b>PNB-V</b>	<b>Drawl Amount</b>	-					-

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	2017-18	Q1 2018-19	Q2 2018-19	Q3 2018-19	Q4 2018-19	2018-19
S NO	Department	Name of the Bank	Description	Total	Q1	Q2	Q3	Q4	Total
115	Budget		Interest Debit	-					-
116	Budget		Interest Credit	-					-
117	Budget		Adj. Amount	-					-
118	Budget		Net Charges	-	-	-	-	-	-
119	Budget		Financial charges	-					-
120	Budget								
121	Budget	<b>State Bank of India - IX</b>	<b>Drawl Amount</b>	-	13,00,00,000				13,00,00,000
122	Budget		Interest Debit	-	3,07,548	25,89,319	26,47,716	26,36,687	81,81,270
123	Budget		Interest Credit	-					-
124	Budget		Adj. Amount	-					-
125	Budget		Net Charges	-	3,07,548	25,89,319	26,47,716	26,36,687	81,81,270
126	Budget		Financial charges	-					-
127	Budget								
128	Budget	<b>State Bank of India - X</b>	<b>Drawl Amount</b>	-	1,90,00,00,000				1,90,00,00,000
129	Budget		Interest Debit	-	2,49,57,672	3,81,35,342	3,90,66,648	3,86,49,983	14,08,09,645
130	Budget		Interest Credit	-					-
131	Budget		Adj. Amount	-					-
132	Budget		Net Charges	-	2,49,57,672	3,81,35,342	3,90,66,648	3,86,49,983	14,08,09,645
133	Budget		Financial charges	-					-
134	Budget								
135	Budget	<b>State Bank of India - XI</b>	<b>Drawl Amount</b>	-			77,00,00,000		77,00,00,000
136	Budget		Interest Debit	-			1,28,93,424	1,58,43,016	2,87,36,440
137	Budget		Interest Credit	-					-
138	Budget		Adj. Amount	-					-
139	Budget		Net Charges	-	-	-	1,28,93,424	1,58,43,016	2,87,36,440
140	Budget		Financial charges	-					-
141	Budget								
142	Budget	<b>State Bank of India - XII</b>	<b>Drawl Amount</b>	-				90,00,00,000	90,00,00,000
143	Budget		Interest Debit	-				91,04,932	91,04,932
144	Budget		Interest Credit	-					-
145	Budget		Adj. Amount	-					-
146	Budget		Net Charges	-	-	-	-	91,04,932	91,04,932
147	Budget		Financial charges	-					-
148	Budget								
149	Budget	<b>State Bank of India - XIII</b>	<b>Drawl Amount</b>	-					-
150	Budget		Interest Debit	-					-
151	Budget		Interest Credit	-					-
152	Budget		Adj. Amount	-					-
153	Budget		Net Charges	-	-	-	-	-	-
154	Budget		Financial charges	-					-
155	Budget								
156	Budget	<b>UCO Bank-IV</b>	<b>Drawl Amount</b>						
157	Budget		Interest Debit						
158	Budget		Interest Credit						
159	Budget		Adj. Amount						
160	Budget		Net Charges						
161	Budget		Financial charges						
162	Budget								
163	Budget	<b>VIJAYA BANK VI</b>	<b>Drawl Amount</b>	15,00,00,000					-
164	Budget		Interest Debit	45,12,745	29,54,385	30,30,822	31,07,877	30,93,081	1,21,86,165
165	Budget		Interest Credit	-					-
166	Budget		Adj. Amount	-					-
167	Budget		Net Charges	45,12,745	29,54,385	30,30,822	31,07,877	30,93,081	1,21,86,165
168	Budget		Financial charges	-					-
169	Bonds								
170	Bonds	<b>67</b>	<b>Drawl Amount</b>					49,00,00,000	49,00,00,000
171	Bonds		Interest Debit					84,68,274	84,68,274

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAI PALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	2017-18	Q1 2018-19	Q2 2018-19	Q3 2018-19	Q4 2018-19	2018-19
S NO	Department	Name of the Bank	Description	Total	Q1	Q2	Q3	Q4	Total
172	Bonds		Interest Credit						-
173	Bonds		Adj. Amount						-
174	Bonds		Net Charges					84,68,274	84,68,274
175	Bonds		Financial Charges					30,806	30,806
176	Bonds	69	<b>Drawl Amount</b>						-
177	Bonds		Interest Debit					-	-
178	Bonds		Interest Credit					-	-
179	Bonds		Adj. Amount					-	-
180	Bonds		Net Charges					-	-
181	Bonds		Financial Charges					-	-
182	Bonds	73	<b>Drawl Amount</b>						-
183	Bonds		Interest Debit					-	-
184	Bonds		Interest Credit					-	-
185	Bonds		Adj. Amount					-	-
186	Bonds		Net Charges					-	-
187	Bonds		Financial Charges					-	-
188	Bonds	74	<b>Drawl Amount</b>						-
189	Bonds		Interest Debit					-	-
190	Bonds		Interest Credit					-	-
191	Bonds		Adj. Amount					-	-
192	Bonds		Net Charges					-	-
193	Bonds		Financial Charges					-	-
194	Bonds	75	<b>Drawl Amount</b>						-
195	Bonds		Interest Debit					-	-
196	Bonds		Interest Credit					-	-
197	Bonds		Adj. Amount					-	-
198	Bonds		Net Charges					-	-
199	Bonds		Financial Charges					-	-
200	Bonds	76	<b>Drawl Amount</b>						-
201	Bonds		Interest Debit					-	-
202	Bonds		Interest Credit					-	-
203	Bonds		Adj. Amount					-	-
204	Bonds		Net Charges					-	-
205	Bonds		Financial Charges					-	-
206	Bonds	78	<b>Drawl Amount</b>						-
207	Bonds		Interest Debit					-	-
208	Bonds		Interest Credit					-	-
209	Bonds		Adj. Amount					-	-
210	Bonds		Net Charges					-	-
211	Bonds		Financial Charges					-	-
212	IF								
213	IF	EURO Loan I Drawl I	Drawl Amount						
214	IF	EURO Loan I Drawl I	Interest Debit						
215	IF	EURO Loan I Drawl I	Interest Credit						
216	IF	EURO Loan I Drawl I	Withholding Tax						
217	IF	EURO Loan I Drawl I	Adj. Amount						
218	IF	EURO Loan I Drawl I	Net Charges						
219	IF	EURO Loan I Drawl I	Financial charges						
220	IF								
221	IF	EURO Loan I Drawl II	Drawl Amount						
222	IF	EURO Loan I Drawl II	Interest Debit						
223	IF	EURO Loan I Drawl II	Interest Credit						
224	IF	EURO Loan I Drawl II	Withholding Tax						
225	IF	EURO Loan I Drawl II	Adj. Amount						
226	IF	EURO Loan I Drawl II	Net Charges						
227	IF	EURO Loan I Drawl II	Financial charges						
228	IF								

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	2017-18	Q1 2018-19	Q2 2018-19	Q3 2018-19	Q4 2018-19	2018-19
S NO	Department	Name of the Bank	Description	Total	Q1	Q2	Q3	Q4	Total
229 IF		EURO Loan I Drawl III	Drawl Amount						
230 IF		EURO Loan I Drawl III	Interest Debit						
231 IF		EURO Loan I Drawl III	Interest Credit						
232 IF		EURO Loan I Drawl III	Withholding Tax						
233 IF		EURO Loan I Drawl III	Adj. Amount						
234 IF		EURO Loan I Drawl III	Net Charges						
235 IF		EURO Loan I Drawl III	Financial charges						
236 IF									
237 IF		USD 750 Million I Drawl I	Drawl Amount						
238 IF		USD 750 Million I Drawl I	Interest Debit						
239 IF		USD 750 Million I Drawl I	Interest Credit						
240 IF		USD 750 Million I Drawl I	Withholding Tax						
241 IF		USD 750 Million I Drawl I	Adj. Amount						
242 IF		USD 750 Million I Drawl I	Net Charges						
243 IF		USD 750 Million I Drawl I	Financial charges						
244 IF									
245 IF		USD 750 Million I Drawl II	Drawl Amount						
246 IF		USD 750 Million I Drawl II	Interest Debit						
247 IF		USD 750 Million I Drawl II	Interest Credit						
248 IF		USD 750 Million I Drawl II	Withholding Tax						
249 IF		USD 750 Million I Drawl II	Adj. Amount						
250 IF		USD 750 Million I Drawl II	Net Charges						
251 IF		USD 750 Million I Drawl II	Financial charges						
252 IF									
253 IF		USD 750 Million I Drawl III	Drawl Amount						
254 IF		USD 750 Million I Drawl III	Interest Debit						
255 IF		USD 750 Million I Drawl III	Interest Credit						
256 IF		USD 750 Million I Drawl III	Withholding Tax						
257 IF		USD 750 Million I Drawl III	Adj. Amount						
258 IF		USD 750 Million I Drawl III	Net Charges						
259 IF		USD 750 Million I Drawl III	Financial charges						
260 IF									
261 IF		USD 750 Million I Drawl IV	Drawl Amount						
262 IF		USD 750 Million I Drawl IV	Interest Debit						
263 IF		USD 750 Million I Drawl IV	Interest Credit						
264 IF		USD 750 Million I Drawl IV	Withholding Tax						
265 IF		USD 750 Million I Drawl IV	Adj. Amount						
266 IF		USD 750 Million I Drawl IV	Net Charges						
267 IF		USD 750 Million I Drawl IV	Financial charges						
268 IF									
269 IF		USD 750 Million I Drawl V	Drawl Amount						
270 IF		USD 750 Million I Drawl V	Interest Debit						
271 IF		USD 750 Million I Drawl V	Interest Credit						
272 IF		USD 750 Million I Drawl V	Withholding Tax						
273 IF		USD 750 Million I Drawl V	Adj. Amount						
274 IF		USD 750 Million I Drawl V	Net Charges						
275 IF		USD 750 Million I Drawl V	Financial charges						
276 IF									
277 IF		USD 750 Million I Drawl VI	Drawl Amount						
278 IF		USD 750 Million I Drawl VI	Interest Debit						
279 IF		USD 750 Million I Drawl VI	Interest Credit						
280 IF		USD 750 Million I Drawl VI	Withholding Tax						
281 IF		USD 750 Million I Drawl VI	Adj. Amount						
282 IF		USD 750 Million I Drawl VI	Net Charges						
283 IF		USD 750 Million I Drawl VI	Financial charges						
284 IF									
285 IF		JPY Equ. \$400 Million Drawl I	Drawl Amount						

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPELLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	2017-18	Q1 2018-19	Q2 2018-19	Q3 2018-19	Q4 2018-19	2018-19
S NO	Department	Name of the Bank	Description	Total	Q1	Q2	Q3	Q4	Total
286	IF	JPY Equ. \$400 Million Drawl I	Interest Debit						
287	IF	JPY Equ. \$400 Million Drawl I	Interest Credit						
288	IF	JPY Equ. \$400 Million Drawl I	Withholding Tax						
289	IF	JPY Equ. \$400 Million Drawl I	Adj. Amount						
290	IF	JPY Equ. \$400 Million Drawl I	Net Charges						
291	IF	JPY Equ. \$400 Million Drawl I	Financial charges						
292	IF								
293	IF	JPY Equ. \$400 Million Drawl II	Drawl Amount						
294	IF	JPY Equ. \$400 Million Drawl II	Interest Debit						
295	IF	JPY Equ. \$400 Million Drawl II	Interest Credit						
296	IF	JPY Equ. \$400 Million Drawl II	Withholding Tax						
297	IF	JPY Equ. \$400 Million Drawl II	Adj. Amount						
298	IF	JPY Equ. \$400 Million Drawl II	Net Charges						
299	IF	JPY Equ. \$400 Million Drawl II	Financial charges						

<b>Drawl Amount</b>	<b>64,00,00,000</b>	<b>2,03,00,00,000</b>	<b>60,00,00,000</b>	<b>77,00,00,000</b>	<b>6,39,00,00,000</b>	<b>9,79,00,00,000</b>
Interest Debit	41,63,90,882	13,81,42,892	16,43,28,167	18,68,08,281	19,54,54,769	68,47,34,109
Interest Credit	-	-	-	-	-	-
Withholding Tax	-	-	-	-	-	-
Adj. Amount	-	-	-	-	-	-
Net Charges	41,63,90,882	13,81,42,892	16,43,28,167	18,68,08,281	19,54,54,769	68,47,34,109
Financial Charges	-	-	-	-	30,806	30,806
Drawl						
Budget	64,00,00,000	2,03,00,00,000	60,00,00,000	77,00,00,000	5,90,00,00,000	9,30,00,00,000
Bonds	-	-	-	-	49,00,00,000	49,00,00,000
IF	-	-	-	-	-	-
Total Drawl		2,03,00,00,000	60,00,00,000	77,00,00,000	6,39,00,00,000	
Cumulative Drawl		7,67,00,00,000	8,27,00,00,000	9,04,00,00,000	15,43,00,00,000	
Repayment (incl trf to loan trf to Lara)					5,49,00,00,000	
Cum Repayment					5,49,00,00,000	
FERV						
Cum FERV						
<b>Net Cumm Loan inc FERV</b>		7,67,00,00,000	8,27,00,00,000	9,04,00,00,000	9,94,00,00,000	
<b>Net charges</b>						
Budget	41,63,90,882	13,81,42,892	16,43,28,167	18,68,08,281	18,69,86,495	67,62,65,835
Bonds	-	-	-	-	84,68,274	84,68,274
IF	-	-	-	-	-	-
<b>Total</b>		13,81,42,892	16,43,28,167	18,68,08,281	19,54,54,769	
<b>Financial Charges</b>						
Budget	-	-	-	-	-	-
Bonds	-	-	-	-	30,806	30,806
IF	-	-	-	-	-	-
<b>Total FC</b>		-	-	-	30,806	

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

		Name of the Bank	Description	2017-18	Q1 2018-19	Q2 2018-19	Q3 2018-19	Q4 2018-19	2018-19
S NO	Department	Name of the Bank	Description	Total	Q1	Q2	Q3	Q4	Total
			Interest Rate		1.80%	1.99%	2.07%	1.97%	

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2019-20	Q2 2019-20	Q3 2019-20	Q4 2019-20	2019-20
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total
1	Budget							
2	Budget	<b>Axis Bank-II</b>	<b>Drawl Amount</b>		1,00,00,00,000			1,00,00,00,000
3	Budget		Interest Debit		1,85,49,315	2,02,46,576	1,89,90,412	5,77,86,303
4	Budget		Interest Credit					-
5	Budget		Adj. Amount					-
6	Budget		Net Charges	-	1,85,49,315	2,02,46,576	1,89,90,412	5,77,86,303
7	Budget		Financial charges					-
8	Budget							
9	Budget	<b>Axis Bank-III</b>	<b>Drawl Amount</b>					-
10	Budget		Interest Debit					-
11	Budget		Interest Credit					-
12	Budget		Adj. Amount					-
13	Budget		Net Charges	-	-	-	-	-
14	Budget		Financial charges					-
15	Budget							
16	Budget	<b>Axis Bank-IV</b>	<b>Drawl Amount</b>					
17	Budget		Interest Debit					
18	Budget		Interest Credit					
19	Budget		Adj. Amount					
20	Budget		Net Charges					
21	Budget		Financial charges					
22	Budget							
23	Budget	<b>BANK OF BARODA II</b>	<b>Drawl Amount</b>					-
24	Budget		Interest Debit					-
25	Budget		Interest Credit					-
26	Budget		Adj. Amount					-
27	Budget		Net Charges	-	-	-	-	-
28	Budget		Financial charges					-
29	Budget							
30	Budget	<b>Bank of India-V-A</b>	<b>Drawl Amount</b>					
31	Budget		Interest Debit					
32	Budget		Interest Credit					
33	Budget		Adj. Amount					
34	Budget		Net Charges					
35	Budget		Financial charges					
36	Budget							
37	Budget	<b>HDFC Bank Limited-V</b>	<b>Drawl Amount</b>					-
38	Budget		Interest Debit	21,05,890	20,90,138	19,94,383	18,90,274	80,80,685
39	Budget		Interest Credit					-
40	Budget		Adj. Amount					-
41	Budget		Net Charges	21,05,890	20,90,138	19,94,383	18,90,274	80,80,685
42	Budget		Financial charges					-
43	Budget							
44	Budget	<b>HDFC Bank Limited-VII</b>	<b>Drawl Amount</b>	30,00,00,000			30,00,00,000	60,00,00,000
45	Budget		Interest Debit	13,80,822	62,70,412	59,83,150	87,40,274	2,23,74,658
46	Budget		Interest Credit					-
47	Budget		Adj. Amount					-
48	Budget		Net Charges	13,80,822	62,70,412	59,83,150	87,40,274	2,23,74,658
49	Budget		Financial charges					-
50	Budget							
51	Budget	<b>HDFC Bank Limited-IX</b>	<b>Drawl Amount</b>					-
52	Budget		Interest Debit					-
53	Budget		Interest Credit					-
54	Budget		Adj. Amount					-
55	Budget		Net Charges	-	-	-	-	-
56	Budget		Financial charges					-
57	Budget							

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Form 14Name of the Petitioner  
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(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2019-20	Q2 2019-20	Q3 2019-20	Q4 2019-20	2019-20
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total
58	Budget	<b>HDFC Bank Limited-X</b>	<b>Drawl Amount</b>					-
59	Budget		Interest Debit					-
60	Budget		Interest Credit					-
61	Budget		Adj. Amount					-
62	Budget		Net Charges	-	-	-	-	-
63	Budget		Financial charges					-
64	Budget							
65	Budget	<b>HDFC Bank Limited-XI</b>	<b>Drawl Amount</b>					
66	Budget		Interest Debit					
67	Budget		Interest Credit					
68	Budget		Adj. Amount					
69	Budget		Net Charges					
70	Budget		Financial charges					
71	Budget							
72	Budget	<b>ICICI - IV</b>	<b>Drawl Amount</b>					-
73	Budget		Interest Debit					-
74	Budget		Interest Credit					-
75	Budget		Adj. Amount					-
76	Budget		Net Charges	-	-	-	-	-
77	Budget		Financial charges					-
78	Budget							
79	Budget	<b>ICICI - VI</b>	<b>Drawl Amount</b>					-
80	Budget		Interest Debit					-
81	Budget		Interest Credit					-
82	Budget		Adj. Amount					-
83	Budget		Net Charges	-	-	-	-	-
84	Budget		Financial charges					-
85	Budget							
86	Budget	<b>ICICI - VII</b>	<b>Drawl Amount</b>					-
87	Budget		Interest Debit					-
88	Budget		Interest Credit					-
89	Budget		Adj. Amount					-
90	Budget		Net Charges	-	-	-	-	-
91	Budget		Financial charges					-
92	Budget							
93	Budget	<b>IndusInd Bank</b>	<b>Drawl Amount</b>					-
94	Budget		Interest Debit					-
95	Budget		Interest Credit					-
96	Budget		Adj. Amount					-
97	Budget		Net Charges	-	-	-	-	-
98	Budget		Financial charges					-
99	Budget							
100	Budget	<b>PNB-III</b>	<b>Drawl Amount</b>					-
101	Budget		Interest Debit	1,02,67,123	1,02,15,069	1,00,26,027	96,52,740	4,01,60,959
102	Budget		Interest Credit					-
103	Budget		Adj. Amount					-
104	Budget		Net Charges	1,02,67,123	1,02,15,069	1,00,26,027	96,52,740	4,01,60,959
105	Budget		Financial charges					-
106	Budget							
107	Budget	<b>PNB-IV</b>	<b>Drawl Amount</b>					-
108	Budget		Interest Debit	10,26,71,233	10,21,50,685	10,02,60,274	9,65,27,398	40,16,09,590
109	Budget		Interest Credit					-
110	Budget		Adj. Amount					-
111	Budget		Net Charges	10,26,71,233	10,21,50,685	10,02,60,274	9,65,27,398	40,16,09,590
112	Budget		Financial charges					-
113	Budget							
114	Budget	<b>PNB-V</b>	<b>Drawl Amount</b>					-



PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2019-20	Q2 2019-20	Q3 2019-20	Q4 2019-20	2019-20
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total
115	Budget		Interest Debit					-
116	Budget		Interest Credit					-
117	Budget		Adj. Amount					-
118	Budget		Net Charges	-	-	-	-	-
119	Budget		Financial charges					-
120	Budget							
121	Budget	<b>State Bank of India - IX</b>	<b>Drawl Amount</b>					-
122	Budget		Interest Debit	26,56,808	26,36,329	25,62,245	24,87,273	1,03,42,655
123	Budget		Interest Credit					-
124	Budget		Adj. Amount					-
125	Budget		Net Charges	26,56,808	26,36,329	25,62,245	24,87,273	1,03,42,655
126	Budget		Financial charges					-
127	Budget							
128	Budget	<b>State Bank of India - X</b>	<b>Drawl Amount</b>					-
129	Budget		Interest Debit	3,90,48,161	3,89,36,987	3,75,39,314	3,64,01,919	15,19,26,381
130	Budget		Interest Credit					-
131	Budget		Adj. Amount					-
132	Budget		Net Charges	3,90,48,161	3,89,36,987	3,75,39,314	3,64,01,919	15,19,26,381
133	Budget		Financial charges					-
134	Budget							
135	Budget	<b>State Bank of India - XI</b>	<b>Drawl Amount</b>					-
136	Budget		Interest Debit	1,59,44,274	1,59,35,835	1,53,09,289	1,48,35,684	6,20,25,082
137	Budget		Interest Credit					-
138	Budget		Adj. Amount					-
139	Budget		Net Charges	1,59,44,274	1,59,35,835	1,53,09,289	1,48,35,684	6,20,25,082
140	Budget		Financial charges					-
141	Budget							
142	Budget	<b>State Bank of India - XII</b>	<b>Drawl Amount</b>					-
143	Budget		Interest Debit	1,86,10,274	1,84,63,561	1,79,46,987	1,73,28,081	7,23,48,903
144	Budget		Interest Credit					-
145	Budget		Adj. Amount					-
146	Budget		Net Charges	1,86,10,274	1,84,63,561	1,79,46,987	1,73,28,081	7,23,48,903
147	Budget		Financial charges					-
148	Budget							
149	Budget	<b>State Bank of India - XIII</b>	<b>Drawl Amount</b>				20,00,00,000	20,00,00,000
150	Budget		Interest Debit				3,26,575	3,26,575
151	Budget		Interest Credit					-
152	Budget		Adj. Amount					-
153	Budget		Net Charges	-	-	-	3,26,575	3,26,575
154	Budget		Financial charges					-
155	Budget							
156	Budget	<b>UCO Bank-IV</b>	<b>Drawl Amount</b>					-
157	Budget		Interest Debit					-
158	Budget		Interest Credit					-
159	Budget		Adj. Amount					-
160	Budget		Net Charges					-
161	Budget		Financial charges					-
162	Budget							
163	Budget	<b>VIJAYA BANK VI</b>	<b>Drawl Amount</b>					-
164	Budget		Interest Debit	31,18,973	31,06,644	29,90,137	27,85,151	1,20,00,905
165	Budget		Interest Credit					-
166	Budget		Adj. Amount					-
167	Budget		Net Charges	31,18,973	31,06,644	29,90,137	27,85,151	1,20,00,905
168	Budget		Financial charges					-
169	Bonds							
170	Bonds	<b>67</b>	<b>Drawl Amount</b>					-
171	Bonds		Interest Debit	1,01,39,644	1,02,51,068	1,02,51,068	1,01,16,202	4,07,57,983

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
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(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2019-20	Q2 2019-20	Q3 2019-20	Q4 2019-20	2019-20
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total
172	Bonds		Interest Credit					-
173	Bonds		Adj. Amount					-
174	Bonds		Net Charges	1,01,39,644	1,02,51,068	1,02,51,068	1,01,16,202	4,07,57,983
175	Bonds		Financial Charges	15,791	12,650	4,311	8	32,760
176	Bonds	69	Drawl Amount		1,15,00,00,000			1,15,00,00,000
177	Bonds		Interest Debit	-	52,48,647	1,95,81,048	2,08,24,137	4,56,53,831
178	Bonds		Interest Credit					-
179	Bonds		Adj. Amount					-
180	Bonds		Net Charges	-	52,48,647	1,95,81,048	2,08,24,137	4,56,53,831
181	Bonds		Financial Charges	-	81,799	13,683	98	95,581
182	Bonds	73	Drawl Amount					-
183	Bonds		Interest Debit	-	-	-	-	-
184	Bonds		Interest Credit					-
185	Bonds		Adj. Amount					-
186	Bonds		Net Charges	-	-	-	-	-
187	Bonds		Financial Charges	-	-	-	-	-
188	Bonds	74	Drawl Amount					-
189	Bonds		Interest Debit	-	-	-	-	-
190	Bonds		Interest Credit					-
191	Bonds		Adj. Amount					-
192	Bonds		Net Charges	-	-	-	-	-
193	Bonds		Financial Charges	-	-	-	-	-
194	Bonds	75	Drawl Amount					-
195	Bonds		Interest Debit	-	-	-	-	-
196	Bonds		Interest Credit					-
197	Bonds		Adj. Amount					-
198	Bonds		Net Charges	-	-	-	-	-
199	Bonds		Financial Charges	-	-	-	-	-
200	Bonds	76	Drawl Amount					-
201	Bonds		Interest Debit	-	-	-	-	-
202	Bonds		Interest Credit					-
203	Bonds		Adj. Amount					-
204	Bonds		Net Charges	-	-	-	-	-
205	Bonds		Financial Charges	-	-	-	-	-
206	Bonds	78	Drawl Amount					-
207	Bonds		Interest Debit	-	-	-	-	-
208	Bonds		Interest Credit					-
209	Bonds		Adj. Amount					-
210	Bonds		Net Charges	-	-	-	-	-
211	Bonds		Financial Charges	-	-	-	-	-
212	IF							
213	IF	EURO Loan I Drawl I	Drawl Amount					
214	IF	EURO Loan I Drawl I	Interest Debit					
215	IF	EURO Loan I Drawl I	Interest Credit					
216	IF	EURO Loan I Drawl I	Withholding Tax					
217	IF	EURO Loan I Drawl I	Adj. Amount					
218	IF	EURO Loan I Drawl I	Net Charges					
219	IF	EURO Loan I Drawl I	Financial charges					
220	IF							
221	IF	EURO Loan I Drawl II	Drawl Amount					
222	IF	EURO Loan I Drawl II	Interest Debit					
223	IF	EURO Loan I Drawl II	Interest Credit					
224	IF	EURO Loan I Drawl II	Withholding Tax					
225	IF	EURO Loan I Drawl II	Adj. Amount					
226	IF	EURO Loan I Drawl II	Net Charges					
227	IF	EURO Loan I Drawl II	Financial charges					
228	IF							

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2019-20	Q2 2019-20	Q3 2019-20	Q4 2019-20	2019-20
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total
229 IF		EURO Loan I Drawl III	Drawl Amount					
230 IF		EURO Loan I Drawl III	Interest Debit					
231 IF		EURO Loan I Drawl III	Interest Credit					
232 IF		EURO Loan I Drawl III	Withholding Tax					
233 IF		EURO Loan I Drawl III	Adj. Amount					
234 IF		EURO Loan I Drawl III	Net Charges					
235 IF		EURO Loan I Drawl III	Financial charges					
236 IF								
237 IF		USD 750 Million I Drawl I	Drawl Amount					
238 IF		USD 750 Million I Drawl I	Interest Debit					
239 IF		USD 750 Million I Drawl I	Interest Credit					
240 IF		USD 750 Million I Drawl I	Withholding Tax					
241 IF		USD 750 Million I Drawl I	Adj. Amount					
242 IF		USD 750 Million I Drawl I	Net Charges					
243 IF		USD 750 Million I Drawl I	Financial charges					
244 IF								
245 IF		USD 750 Million I Drawl II	Drawl Amount					
246 IF		USD 750 Million I Drawl II	Interest Debit					
247 IF		USD 750 Million I Drawl II	Interest Credit					
248 IF		USD 750 Million I Drawl II	Withholding Tax					
249 IF		USD 750 Million I Drawl II	Adj. Amount					
250 IF		USD 750 Million I Drawl II	Net Charges					
251 IF		USD 750 Million I Drawl II	Financial charges					
252 IF								
253 IF		USD 750 Million I Drawl III	Drawl Amount					
254 IF		USD 750 Million I Drawl III	Interest Debit					
255 IF		USD 750 Million I Drawl III	Interest Credit					
256 IF		USD 750 Million I Drawl III	Withholding Tax					
257 IF		USD 750 Million I Drawl III	Adj. Amount					
258 IF		USD 750 Million I Drawl III	Net Charges					
259 IF		USD 750 Million I Drawl III	Financial charges					
260 IF								
261 IF		USD 750 Million I Drawl IV	Drawl Amount					
262 IF		USD 750 Million I Drawl IV	Interest Debit					
263 IF		USD 750 Million I Drawl IV	Interest Credit					
264 IF		USD 750 Million I Drawl IV	Withholding Tax					
265 IF		USD 750 Million I Drawl IV	Adj. Amount					
266 IF		USD 750 Million I Drawl IV	Net Charges					
267 IF		USD 750 Million I Drawl IV	Financial charges					
268 IF								
269 IF		USD 750 Million I Drawl V	Drawl Amount					
270 IF		USD 750 Million I Drawl V	Interest Debit					
271 IF		USD 750 Million I Drawl V	Interest Credit					
272 IF		USD 750 Million I Drawl V	Withholding Tax					
273 IF		USD 750 Million I Drawl V	Adj. Amount					
274 IF		USD 750 Million I Drawl V	Net Charges					
275 IF		USD 750 Million I Drawl V	Financial charges					
276 IF								
277 IF		USD 750 Million I Drawl VI	Drawl Amount					
278 IF		USD 750 Million I Drawl VI	Interest Debit					
279 IF		USD 750 Million I Drawl VI	Interest Credit					
280 IF		USD 750 Million I Drawl VI	Withholding Tax					
281 IF		USD 750 Million I Drawl VI	Adj. Amount					
282 IF		USD 750 Million I Drawl VI	Net Charges					
283 IF		USD 750 Million I Drawl VI	Financial charges					
284 IF								
285 IF		JPY Equ. \$400 Million Drawl I	Drawl Amount					

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2019-20	Q2 2019-20	Q3 2019-20	Q4 2019-20	2019-20
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total
286	IF	JPY Equ. \$400 Million Drawl I	Interest Debit					
287	IF	JPY Equ. \$400 Million Drawl I	Interest Credit					
288	IF	JPY Equ. \$400 Million Drawl I	Withholding Tax					
289	IF	JPY Equ. \$400 Million Drawl I	Adj. Amount					
290	IF	JPY Equ. \$400 Million Drawl I	Net Charges					
291	IF	JPY Equ. \$400 Million Drawl I	Financial charges					
292	IF							
293	IF	JPY Equ. \$400 Million Drawl II	Drawl Amount					
294	IF	JPY Equ. \$400 Million Drawl II	Interest Debit					
295	IF	JPY Equ. \$400 Million Drawl II	Interest Credit					
296	IF	JPY Equ. \$400 Million Drawl II	Withholding Tax					
297	IF	JPY Equ. \$400 Million Drawl II	Adj. Amount					
298	IF	JPY Equ. \$400 Million Drawl II	Net Charges					
299	IF	JPY Equ. \$400 Million Drawl II	Financial charges					

<b>Drawl Amount</b>	<b>30,00,00,000</b>	<b>2,15,00,00,000</b>	<b>-</b>	<b>50,00,00,000</b>	<b>2,95,00,00,000</b>
Interest Debit	20,59,43,202	23,38,54,690	24,46,90,498	24,09,06,120	92,53,94,510
Interest Credit	-	-	-	-	-
Withholding Tax	-	-	-	-	-
Adj. Amount	-	-	-	-	-
Net Charges	20,59,43,202	23,38,54,690	24,46,90,498	24,09,06,120	92,53,94,510
Financial Charges	15,791	94,449	17,994	107	1,28,340
Drawl					
Budget	30,00,00,000	1,00,00,00,000	-	50,00,00,000	1,80,00,00,000
Bonds	-	1,15,00,00,000	-	-	1,15,00,00,000
IF	-	-	-	-	-
Total Drawl	30,00,00,000	2,15,00,00,000	-	50,00,00,000	
Cumulative Drawl	15,73,00,00,000	17,88,00,00,000	17,88,00,00,000	18,38,00,00,000	
Repayment (incl trf to loan trf to Lara)				1,50,00,000	
Cum Repayment	5,49,00,00,000	5,49,00,00,000	5,49,00,00,000	5,50,50,00,000	
FERV					
Cum FERV					
<b>Net Cumm Loan inc FERV</b>	<b>10,24,00,00,000</b>	<b>12,39,00,00,000</b>	<b>12,39,00,00,000</b>	<b>12,87,50,00,000</b>	
<b>Net charges</b>					
Budget	19,58,03,558	21,83,54,975	21,48,58,382	20,99,65,781	83,89,82,696
Bonds	1,01,39,644	1,54,99,715	2,98,32,116	3,09,40,339	8,64,11,814
IF	-	-	-	-	-
<b>Total</b>	<b>20,59,43,202</b>	<b>23,38,54,690</b>	<b>24,46,90,498</b>	<b>24,09,06,120</b>	
<b>Financial Charges</b>					
Budget	-	-	-	-	-
Bonds	15,791	94,449	17,994	107	1,28,340
IF	-	-	-	-	-
<b>Total FC</b>	<b>15,791</b>	<b>94,449</b>	<b>17,994</b>	<b>107</b>	

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

		Name of the Bank	Description	Q1 2019-20	Q2 2019-20	Q3 2019-20	Q4 2019-20	2019-20
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total
			Interest Rate	2.01%	1.89%	1.97%	1.87%	

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2020-21	Q2 2020-21	Q3 2020-21	Q4 2020-21	2020-21	Q1 2021-22
		Name of the Bank	Description	Q1	Q2	Q3	Q4	Total	Q1
1	Budget								
2	Budget	<b>Axis Bank-II</b>	<b>Drawl Amount</b>	10,00,00,000				10,00,00,000	
3	Budget		Interest Debit	1,82,20,582	1,74,67,397	1,74,67,397	1,70,87,671	7,02,43,047	
4	Budget		Interest Credit					-	
5	Budget		Adj. Amount					-	
6	Budget		Net Charges	1,82,20,582	1,74,67,397	1,74,67,397	1,70,87,671	7,02,43,047	-
7	Budget		Financial charges					-	
8	Budget								
9	Budget	<b>Axis Bank-III</b>	<b>Drawl Amount</b>		53,50,00,000			53,50,00,000	
10	Budget		Interest Debit		10,92,575	84,95,507	83,10,822	1,78,98,904	84,03,165
11	Budget		Interest Credit					-	
12	Budget		Adj. Amount					-	
13	Budget		Net Charges	-	10,92,575	84,95,507	83,10,822	1,78,98,904	84,03,165
14	Budget		Financial charges					-	
15	Budget								
16	Budget	<b>Axis Bank-IV</b>	<b>Drawl Amount</b>						
17	Budget		Interest Debit						
18	Budget		Interest Credit						
19	Budget		Adj. Amount						
20	Budget		Net Charges						
21	Budget		Financial charges						
22	Budget								
23	Budget	<b>BANK OF BARODA II</b>	<b>Drawl Amount</b>					-	
24	Budget		Interest Debit					-	
25	Budget		Interest Credit					-	
26	Budget		Adj. Amount					-	
27	Budget		Net Charges	-	-	-	-	-	-
28	Budget		Financial charges					-	
29	Budget								
30	Budget	<b>Bank of India-V-A</b>	<b>Drawl Amount</b>						
31	Budget		Interest Debit						
32	Budget		Interest Credit						
33	Budget		Adj. Amount						
34	Budget		Net Charges						
35	Budget		Financial charges						
36	Budget								
37	Budget	<b>HDFC Bank Limited-V</b>	<b>Drawl Amount</b>					-	
38	Budget		Interest Debit	17,62,876	15,87,945	15,80,274	14,67,123	63,98,218	
39	Budget		Interest Credit					-	
40	Budget		Adj. Amount					-	
41	Budget		Net Charges	17,62,876	15,87,945	15,80,274	14,67,123	63,98,218	-
42	Budget		Financial charges					-	
43	Budget								
44	Budget	<b>HDFC Bank Limited-VII</b>	<b>Drawl Amount</b>					-	
45	Budget		Interest Debit	1,05,77,259	95,27,670	94,81,643	88,02,740	3,83,89,312	89,00,547
46	Budget		Interest Credit					-	
47	Budget		Adj. Amount					-	
48	Budget		Net Charges	1,05,77,259	95,27,670	94,81,643	88,02,740	3,83,89,312	89,00,547
49	Budget		Financial charges					-	
50	Budget								
51	Budget	<b>HDFC Bank Limited-IX</b>	<b>Drawl Amount</b>	15,00,00,000	70,00,00,000	75,00,00,000		1,60,00,00,000	
52	Budget		Interest Debit	25,890	67,14,247	1,88,11,781	2,34,73,972	4,90,25,890	
53	Budget		Interest Credit					-	
54	Budget		Adj. Amount					-	
55	Budget		Net Charges	25,890	67,14,247	1,88,11,781	2,34,73,972	4,90,25,890	-
56	Budget		Financial charges					-	
57	Budget								

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2020-21	Q2 2020-21	Q3 2020-21	Q4 2020-21	2020-21	Q1 2021-22
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total	Q1
58	Budget	<b>HDFC Bank Limited-X</b>	<b>Drawl Amount</b>					-	
59	Budget		Interest Debit					-	
60	Budget		Interest Credit					-	
61	Budget		Adj. Amount					-	
62	Budget		Net Charges	-	-	-	-	-	-
63	Budget		Financial charges					-	
64	Budget								
65	Budget	<b>HDFC Bank Limited-XI</b>	<b>Drawl Amount</b>						
66	Budget		Interest Debit						
67	Budget		Interest Credit						
68	Budget		Adj. Amount						
69	Budget		Net Charges						
70	Budget		Financial charges						
71	Budget								
72	Budget	<b>ICICI - IV</b>	<b>Drawl Amount</b>					-	
73	Budget		Interest Debit					-	
74	Budget		Interest Credit					-	
75	Budget		Adj. Amount					-	
76	Budget		Net Charges	-	-	-	-	-	-
77	Budget		Financial charges					-	
78	Budget								
79	Budget	<b>ICICI - VI</b>	<b>Drawl Amount</b>					-	
80	Budget		Interest Debit					-	
81	Budget		Interest Credit					-	
82	Budget		Adj. Amount					-	
83	Budget		Net Charges	-	-	-	-	-	-
84	Budget		Financial charges					-	
85	Budget								
86	Budget	<b>ICICI - VII</b>	<b>Drawl Amount</b>				20,00,00,000	20,00,00,000	
87	Budget		Interest Debit				8,90,302	8,90,302	
88	Budget		Interest Credit					-	
89	Budget		Adj. Amount					-	
90	Budget		Net Charges	-	-	-	8,90,302	8,90,302	-
91	Budget		Financial charges					-	
92	Budget								
93	Budget	<b>IndusInd Bank</b>	<b>Drawl Amount</b>					-	
94	Budget		Interest Debit					-	
95	Budget		Interest Credit					-	
96	Budget		Adj. Amount					-	
97	Budget		Net Charges	-	-	-	-	-	-
98	Budget		Financial charges					-	
99	Budget								
100	Budget	<b>PNB-III</b>	<b>Drawl Amount</b>					-	
101	Budget		Interest Debit	91,23,287	86,86,302	84,90,411	79,83,562	3,42,83,562	76,83,562
102	Budget		Interest Credit					-	
103	Budget		Adj. Amount					-	
104	Budget		Net Charges	91,23,287	86,86,302	84,90,411	79,83,562	3,42,83,562	76,83,562
105	Budget		Financial charges					-	
106	Budget								
107	Budget	<b>PNB-IV</b>	<b>Drawl Amount</b>					-	
108	Budget		Interest Debit	9,12,41,791	8,68,63,014	8,49,04,111	7,98,35,616	34,28,44,532	
109	Budget		Interest Credit					-	
110	Budget		Adj. Amount					-	
111	Budget		Net Charges	9,12,41,791	8,68,63,014	8,49,04,111	7,98,35,616	34,28,44,532	-
112	Budget		Financial charges					-	
113	Budget								
114	Budget	<b>PNB-V</b>	<b>Drawl Amount</b>					-	

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2020-21	Q2 2020-21	Q3 2020-21	Q4 2020-21	2020-21	Q1 2021-22
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total	Q1
115	Budget		Interest Debit					-	
116	Budget		Interest Credit					-	
117	Budget		Adj. Amount					-	
118	Budget		Net Charges	-	-	-	-	-	-
119	Budget		Financial charges					-	
120	Budget								
121	Budget	<b>State Bank of India - IX</b>	<b>Drawl Amount</b>					-	
122	Budget		Interest Debit	23,68,315	22,33,864	21,79,013	21,29,012	89,10,204	19,15,850
123	Budget		Interest Credit					-	
124	Budget		Adj. Amount					-	
125	Budget		Net Charges	23,68,315	22,33,864	21,79,013	21,29,012	89,10,204	19,15,850
126	Budget		Financial charges					-	
127	Budget								
128	Budget	<b>State Bank of India - X</b>	<b>Drawl Amount</b>					-	
129	Budget		Interest Debit	3,52,93,151	3,22,94,794	3,18,47,124	3,11,54,794	13,05,89,863	
130	Budget		Interest Credit					-	
131	Budget		Adj. Amount					-	
132	Budget		Net Charges	3,52,93,151	3,22,94,794	3,18,47,124	3,11,54,794	13,05,89,863	-
133	Budget		Financial charges					-	
134	Budget								
135	Budget	<b>State Bank of India - XI</b>	<b>Drawl Amount</b>					-	
136	Budget		Interest Debit	1,38,42,068	1,30,11,945	1,29,06,466	1,26,25,890	5,23,86,369	1,27,66,178
137	Budget		Interest Credit					-	
138	Budget		Adj. Amount					-	
139	Budget		Net Charges	1,38,42,068	1,30,11,945	1,29,06,466	1,26,25,890	5,23,86,369	1,27,66,178
140	Budget		Financial charges					-	
141	Budget								
142	Budget	<b>State Bank of India - XII</b>	<b>Drawl Amount</b>					-	
143	Budget		Interest Debit	1,61,79,041	1,52,08,768	1,50,85,479	1,47,57,534	6,12,30,822	1,49,21,507
144	Budget		Interest Credit					-	
145	Budget		Adj. Amount					-	
146	Budget		Net Charges	1,61,79,041	1,52,08,768	1,50,85,479	1,47,57,534	6,12,30,822	1,49,21,507
147	Budget		Financial charges					-	
148	Budget								
149	Budget	<b>State Bank of India - XIII</b>	<b>Drawl Amount</b>					-	
150	Budget		Interest Debit	35,43,562	33,58,631	33,52,328	22,95,617	1,25,50,138	
151	Budget		Interest Credit					-	
152	Budget		Adj. Amount					-	
153	Budget		Net Charges	35,43,562	33,58,631	33,52,328	22,95,617	1,25,50,138	-
154	Budget		Financial charges					-	
155	Budget								
156	Budget	<b>UCO Bank-IV</b>	<b>Drawl Amount</b>					-	
157	Budget		Interest Debit						
158	Budget		Interest Credit						
159	Budget		Adj. Amount						
160	Budget		Net Charges						
161	Budget		Financial charges						
162	Budget								
163	Budget	<b>VIJAYA BANK VI</b>	<b>Drawl Amount</b>					-	
164	Budget		Interest Debit	24,78,458	14,30,261	-		39,08,719	
165	Budget		Interest Credit					-	
166	Budget		Adj. Amount					-	(71,124)
167	Budget		Net Charges	24,78,458	14,30,261	-	-	39,08,719	(71,124)
168	Budget		Financial charges					-	
169	Bonds								
170	Bonds	<b>67</b>	<b>Drawl Amount</b>					-	
171	Bonds		Interest Debit	1,01,11,940	1,02,23,060	1,02,23,060	1,00,23,957	4,05,82,017	1,01,39,644



PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2020-21	Q2 2020-21	Q3 2020-21	Q4 2020-21	2020-21	Q1 2021-22
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total	Q1
172	Bonds		Interest Credit					-	
173	Bonds		Adj. Amount					-	
174	Bonds		Net Charges	1,01,11,940	1,02,23,060	1,02,23,060	1,00,23,957	4,05,82,017	1,01,39,644
175	Bonds		Financial Charges	24,139	3,821	427	8	28,396	11,126
176	Bonds	69	Drawl Amount					-	
177	Bonds		Interest Debit	2,09,30,000	2,12,07,890	2,12,17,973	2,07,56,712	8,41,12,575	2,09,87,343
178	Bonds		Interest Credit					-	
179	Bonds		Adj. Amount					-	
180	Bonds		Net Charges	2,09,30,000	2,12,07,890	2,12,17,973	2,07,56,712	8,41,12,575	2,09,87,343
181	Bonds		Financial Charges	56,648	8,967	1,001	18	66,635	26,107
182	Bonds	73	Drawl Amount				1,94,00,00,000	1,94,00,00,000	
183	Bonds		Interest Debit	-	-	-	1,82,30,621	1,82,30,621	3,11,00,060
184	Bonds		Interest Credit					-	
185	Bonds		Adj. Amount					-	
186	Bonds		Net Charges	-	-	-	1,82,30,621	1,82,30,621	3,11,00,060
187	Bonds		Financial Charges	-	-	-	1,02,957	1,02,957	41,113
188	Bonds	74	Drawl Amount					-	48,00,00,000
189	Bonds		Interest Debit	-	-	-	-	-	55,72,264
190	Bonds		Interest Credit					-	
191	Bonds		Adj. Amount					-	
192	Bonds		Net Charges	-	-	-	-	-	55,72,264
193	Bonds		Financial Charges	-	-	-	-	-	33,831
194	Bonds	75	Drawl Amount					-	
195	Bonds		Interest Debit	-	-	-	-	-	-
196	Bonds		Interest Credit					-	
197	Bonds		Adj. Amount					-	
198	Bonds		Net Charges	-	-	-	-	-	-
199	Bonds		Financial Charges	-	-	-	-	-	-
200	Bonds	76	Drawl Amount					-	
201	Bonds		Interest Debit	-	-	-	-	-	-
202	Bonds		Interest Credit					-	
203	Bonds		Adj. Amount					-	
204	Bonds		Net Charges	-	-	-	-	-	-
205	Bonds		Financial Charges	-	-	-	-	-	-
206	Bonds	78	Drawl Amount					-	
207	Bonds		Interest Debit	-	-	-	-	-	-
208	Bonds		Interest Credit					-	
209	Bonds		Adj. Amount					-	
210	Bonds		Net Charges	-	-	-	-	-	-
211	Bonds		Financial Charges	-	-	-	-	-	-
212	IF								
213	IF	EURO Loan I Drawl I	Drawl Amount						2,99,99,995
214	IF	EURO Loan I Drawl I	Interest Debit						19,101
215	IF	EURO Loan I Drawl I	Interest Credit						52,127
216	IF	EURO Loan I Drawl I	Withholding Tax						331
217	IF	EURO Loan I Drawl I	Adj. Amount						
218	IF	EURO Loan I Drawl I	Net Charges						(32,695)
219	IF	EURO Loan I Drawl I	Financial charges						61,40,460
220	IF								
221	IF	EURO Loan I Drawl II	Drawl Amount						
222	IF	EURO Loan I Drawl II	Interest Debit						
223	IF	EURO Loan I Drawl II	Interest Credit						
224	IF	EURO Loan I Drawl II	Withholding Tax						
225	IF	EURO Loan I Drawl II	Adj. Amount						
226	IF	EURO Loan I Drawl II	Net Charges						-
227	IF	EURO Loan I Drawl II	Financial charges						
228	IF								

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2020-21	Q2 2020-21	Q3 2020-21	Q4 2020-21	2020-21	Q1 2021-22
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total	Q1
229 IF		EURO Loan I Drawl III	Drawl Amount						
230 IF		EURO Loan I Drawl III	Interest Debit						
231 IF		EURO Loan I Drawl III	Interest Credit						
232 IF		EURO Loan I Drawl III	Withholding Tax						
233 IF		EURO Loan I Drawl III	Adj. Amount						
234 IF		EURO Loan I Drawl III	Net Charges						
235 IF		EURO Loan I Drawl III	Financial charges						
236 IF									
237 IF		USD 750 Million I Drawl I	Drawl Amount						
238 IF		USD 750 Million I Drawl I	Interest Debit						
239 IF		USD 750 Million I Drawl I	Interest Credit						
240 IF		USD 750 Million I Drawl I	Withholding Tax						
241 IF		USD 750 Million I Drawl I	Adj. Amount						
242 IF		USD 750 Million I Drawl I	Net Charges						
243 IF		USD 750 Million I Drawl I	Financial charges						
244 IF									
245 IF		USD 750 Million I Drawl II	Drawl Amount						
246 IF		USD 750 Million I Drawl II	Interest Debit						
247 IF		USD 750 Million I Drawl II	Interest Credit						
248 IF		USD 750 Million I Drawl II	Withholding Tax						
249 IF		USD 750 Million I Drawl II	Adj. Amount						
250 IF		USD 750 Million I Drawl II	Net Charges						
251 IF		USD 750 Million I Drawl II	Financial charges						
252 IF									
253 IF		USD 750 Million I Drawl III	Drawl Amount						
254 IF		USD 750 Million I Drawl III	Interest Debit						
255 IF		USD 750 Million I Drawl III	Interest Credit						
256 IF		USD 750 Million I Drawl III	Withholding Tax						
257 IF		USD 750 Million I Drawl III	Adj. Amount						
258 IF		USD 750 Million I Drawl III	Net Charges						
259 IF		USD 750 Million I Drawl III	Financial charges						
260 IF									
261 IF		USD 750 Million I Drawl IV	Drawl Amount						
262 IF		USD 750 Million I Drawl IV	Interest Debit						
263 IF		USD 750 Million I Drawl IV	Interest Credit						
264 IF		USD 750 Million I Drawl IV	Withholding Tax						
265 IF		USD 750 Million I Drawl IV	Adj. Amount						
266 IF		USD 750 Million I Drawl IV	Net Charges						
267 IF		USD 750 Million I Drawl IV	Financial charges						
268 IF									
269 IF		USD 750 Million I Drawl V	Drawl Amount						
270 IF		USD 750 Million I Drawl V	Interest Debit						
271 IF		USD 750 Million I Drawl V	Interest Credit						
272 IF		USD 750 Million I Drawl V	Withholding Tax						
273 IF		USD 750 Million I Drawl V	Adj. Amount						
274 IF		USD 750 Million I Drawl V	Net Charges						
275 IF		USD 750 Million I Drawl V	Financial charges						
276 IF									
277 IF		USD 750 Million I Drawl VI	Drawl Amount						
278 IF		USD 750 Million I Drawl VI	Interest Debit						
279 IF		USD 750 Million I Drawl VI	Interest Credit						
280 IF		USD 750 Million I Drawl VI	Withholding Tax						
281 IF		USD 750 Million I Drawl VI	Adj. Amount						
282 IF		USD 750 Million I Drawl VI	Net Charges						
283 IF		USD 750 Million I Drawl VI	Financial charges						
284 IF									
285 IF		JPY Equ. \$400 Million Drawl I	Drawl Amount						

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q1 2020-21	Q2 2020-21	Q3 2020-21	Q4 2020-21	2020-21	Q1 2021-22
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total	Q1
286	IF	JPY Equ. \$400 Million Drawl I	Interest Debit						
287	IF	JPY Equ. \$400 Million Drawl I	Interest Credit						
288	IF	JPY Equ. \$400 Million Drawl I	Withholding Tax						
289	IF	JPY Equ. \$400 Million Drawl I	Adj. Amount						
290	IF	JPY Equ. \$400 Million Drawl I	Net Charges						-
291	IF	JPY Equ. \$400 Million Drawl I	Financial charges						
292	IF								
293	IF	JPY Equ. \$400 Million Drawl II	Drawl Amount						
294	IF	JPY Equ. \$400 Million Drawl II	Interest Debit						
295	IF	JPY Equ. \$400 Million Drawl II	Interest Credit						
296	IF	JPY Equ. \$400 Million Drawl II	Withholding Tax						
297	IF	JPY Equ. \$400 Million Drawl II	Adj. Amount						
298	IF	JPY Equ. \$400 Million Drawl II	Net Charges						-
299	IF	JPY Equ. \$400 Million Drawl II	Financial charges						

<b>Drawl Amount</b>	<b>25,00,00,000</b>	<b>1,23,50,00,000</b>	<b>75,00,00,000</b>	<b>2,14,00,00,000</b>	<b>4,37,50,00,000</b>	<b>50,99,99,995</b>
Interest Debit	23,56,98,220	23,09,08,364	24,60,42,567	25,98,25,946	97,24,75,096	12,24,09,221
Interest Credit	-	-	-	-	-	52,127
Withholding Tax	-	-	-	-	-	331
Adj. Amount	-	-	-	-	-	(71,124)
Net Charges	23,56,98,220	23,09,08,364	24,60,42,567	25,98,25,946	97,24,75,096	12,22,86,300
Financial Charges	80,788	12,788	1,428	1,02,983	1,97,987	62,52,638
Drawl						
Budget	25,00,00,000	1,23,50,00,000	75,00,00,000	20,00,00,000	2,43,50,00,000	-
Bonds	-	-	-	1,94,00,00,000	1,94,00,00,000	48,00,00,000
IF	-	-	-	-	-	2,99,99,995
Total Drawl	25,00,00,000	1,23,50,00,000	75,00,00,000	2,14,00,00,000		50,99,99,995
Cumulative Drawl	18,63,00,00,000	19,86,50,00,000	20,61,50,00,000	22,75,50,00,000		23,26,49,99,995
Repayment (incl trf to loan trf to Lara)		13,50,00,000		10,11,44,00,000		
Cum Repayment	5,50,50,00,000	5,64,00,00,000	5,64,00,00,000	15,75,44,00,000		15,75,44,00,000
FERV						
Cum FERV						
<b>Net Cumm Loan inc FERV</b>	13,12,50,00,000	14,22,50,00,000	14,97,50,00,000	7,00,06,00,000		7,51,05,99,995
<b>Net charges</b>						
Budget	20,46,56,280	19,94,77,413	21,46,01,534	21,08,14,655	82,95,49,882	5,45,19,685
Bonds	3,10,41,940	3,14,30,951	3,14,41,033	4,90,11,291	14,29,25,214	6,77,99,311
IF	-	-	-	-	-	(32,695)
<b>Total</b>	23,56,98,220	23,09,08,364	24,60,42,567	25,98,25,946		12,22,86,300
<b>Financial Charges</b>						
Budget	-	-	-	-	-	-
Bonds	80,788	12,788	1,428	1,02,983	1,97,987	1,12,178
IF	-	-	-	-	-	61,40,460
<b>Total FC</b>	80,788	12,788	1,428	1,02,983		62,52,638

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

		Name of the Bank	Description	Q1 2020-21	Q2 2020-21	Q3 2020-21	Q4 2020-21	2020-21	Q1 2021-22
S NO	Department	Name of the Bank	Description	Q1	Q2	Q3	Q4	Total	Q1
			Interest Rate	1.80%	1.62%	1.64%	3.71%		1.63%

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q2 2021-22	Q3 2021-22	Q4 2021-22	2021-22	Q1 2022-23	Q2 2022-23
		Name of the Bank	Description	Q2	Q3	Q4	Total	Q1	Q2
1	Budget								
2	Budget	<b>Axis Bank-II</b>	<b>Drawl Amount</b>				-		
3	Budget		Interest Debit				-		
4	Budget		Interest Credit				-		
5	Budget		Adj. Amount				-		
6	Budget		Net Charges	-	-	-	-	-	-
7	Budget		Financial charges				-		
8	Budget								
9	Budget	<b>Axis Bank-III</b>	<b>Drawl Amount</b>				-		
10	Budget		Interest Debit	84,95,507	84,95,506	83,10,822	3,37,05,000	86,77,260	99,87,643
11	Budget		Interest Credit				-		
12	Budget		Adj. Amount				-		
13	Budget		Net Charges	84,95,507	84,95,506	83,10,822	3,37,05,000	86,77,260	99,87,643
14	Budget		Financial charges				-		
15	Budget								
16	Budget	<b>Axis Bank-IV</b>	<b>Drawl Amount</b>						
17	Budget		Interest Debit						
18	Budget		Interest Credit						
19	Budget		Adj. Amount						
20	Budget		Net Charges						
21	Budget		Financial charges						
22	Budget								
23	Budget	<b>BANK OF BARODA II</b>	<b>Drawl Amount</b>				-		
24	Budget		Interest Debit				-		
25	Budget		Interest Credit				-		
26	Budget		Adj. Amount				-		
27	Budget		Net Charges	-	-	-	-	-	-
28	Budget		Financial charges				-		
29	Budget								
30	Budget	<b>Bank of India-V-A</b>	<b>Drawl Amount</b>						
31	Budget		Interest Debit						
32	Budget		Interest Credit						
33	Budget		Adj. Amount						
34	Budget		Net Charges						
35	Budget		Financial charges						
36	Budget								
37	Budget	<b>HDFC Bank Limited-V</b>	<b>Drawl Amount</b>				-		
38	Budget		Interest Debit				-		
39	Budget		Interest Credit				-		
40	Budget		Adj. Amount				-		
41	Budget		Net Charges	-	-	-	-	-	-
42	Budget		Financial charges				-		
43	Budget								
44	Budget	<b>HDFC Bank Limited-VII</b>	<b>Drawl Amount</b>				-		
45	Budget		Interest Debit	89,98,356	89,98,356	88,02,731	3,56,99,990	92,07,946	1,06,71,780
46	Budget		Interest Credit				-		
47	Budget		Adj. Amount				-		
48	Budget		Net Charges	89,98,356	89,98,356	88,02,731	3,56,99,990	92,07,946	1,06,71,780
49	Budget		Financial charges				-		
50	Budget								
51	Budget	<b>HDFC Bank Limited-IX</b>	<b>Drawl Amount</b>				-		
52	Budget		Interest Debit				-		
53	Budget		Interest Credit				-		
54	Budget		Adj. Amount				-		
55	Budget		Net Charges	-	-	-	-	-	-
56	Budget		Financial charges				-		
57	Budget								

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q2 2021-22	Q3 2021-22	Q4 2021-22	2021-22	Q1 2022-23	Q2 2022-23
S NO	Department	Name of the Bank	Description	Q2	Q3	Q4	Total	Q1	Q2
58	Budget	<b>HDFC Bank Limited-X</b>	<b>Drawl Amount</b>			26,00,00,000	26,00,00,000	15,00,00,000	
59	Budget		Interest Debit			4,56,816	4,56,816	53,87,392	68,65,085
60	Budget		Interest Credit				-		
61	Budget		Adj. Amount				-		
62	Budget		Net Charges	-	-	4,56,816	4,56,816	53,87,392	68,65,085
63	Budget		Financial charges				-		
64	Budget								
65	Budget	<b>HDFC Bank Limited-XI</b>	<b>Drawl Amount</b>						
66	Budget		Interest Debit						
67	Budget		Interest Credit						
68	Budget		Adj. Amount						
69	Budget		Net Charges						
70	Budget		Financial charges						
71	Budget								
72	Budget	<b>ICICI - IV</b>	<b>Drawl Amount</b>				-		
73	Budget		Interest Debit				-		
74	Budget		Interest Credit				-		
75	Budget		Adj. Amount				-		
76	Budget		Net Charges	-	-	-	-	-	-
77	Budget		Financial charges				-		
78	Budget								
79	Budget	<b>ICICI - VI</b>	<b>Drawl Amount</b>				-		
80	Budget		Interest Debit				-		
81	Budget		Interest Credit				-		
82	Budget		Adj. Amount				-		
83	Budget		Net Charges	-	-	-	-	-	-
84	Budget		Financial charges				-		
85	Budget								
86	Budget	<b>ICICI - VII</b>	<b>Drawl Amount</b>				-		
87	Budget		Interest Debit				-		
88	Budget		Interest Credit				-		
89	Budget		Adj. Amount				-		
90	Budget		Net Charges	-	-	-	-	-	-
91	Budget		Financial charges				-		
92	Budget								
93	Budget	<b>IndusInd Bank</b>	<b>Drawl Amount</b>				-		13,00,00,000
94	Budget		Interest Debit				-		18,94,652
95	Budget		Interest Credit				-		
96	Budget		Adj. Amount				-		
97	Budget		Net Charges	-	-	-	-	-	18,94,652
98	Budget		Financial charges				-		
99	Budget								
100	Budget	<b>PNB-III</b>	<b>Drawl Amount</b>				-		
101	Budget		Interest Debit	76,04,265	71,86,302	66,29,832	2,91,03,961	65,36,378	76,88,280
102	Budget		Interest Credit				-		
103	Budget		Adj. Amount				-		
104	Budget		Net Charges	76,04,265	71,86,302	66,29,832	2,91,03,961	65,36,378	76,88,280
105	Budget		Financial charges				-		
106	Budget								
107	Budget	<b>PNB-IV</b>	<b>Drawl Amount</b>				-		
108	Budget		Interest Debit				-		
109	Budget		Interest Credit				-		
110	Budget		Adj. Amount				-		
111	Budget		Net Charges	-	-	-	-	-	-
112	Budget		Financial charges				-		
113	Budget								
114	Budget	<b>PNB-V</b>	<b>Drawl Amount</b>	60,00,00,000			60,00,00,000		

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q2 2021-22	Q3 2021-22	Q4 2021-22	2021-22	Q1 2022-23	Q2 2022-23
S NO	Department	Name of the Bank	Description	Q2	Q3	Q4	Total	Q1	Q2
115	Budget		Interest Debit	74,84,383	87,05,754	85,80,821	2,47,70,958	88,24,110	1,03,79,178
116	Budget		Interest Credit				-		
117	Budget		Adj. Amount				-		
118	Budget		Net Charges	74,84,383	87,05,754	85,80,821	2,47,70,958	88,24,110	1,03,79,178
119	Budget		Financial charges				-		
120	Budget								
121	Budget	<b>State Bank of India - IX</b>	<b>Drawl Amount</b>				-		
122	Budget		Interest Debit	19,36,904	19,36,903	18,92,166	76,81,823	16,89,669	17,73,466
123	Budget		Interest Credit				-		
124	Budget		Adj. Amount				-		
125	Budget		Net Charges	19,36,904	19,36,903	18,92,166	76,81,823	16,89,669	17,73,466
126	Budget		Financial charges				-		
127	Budget								
128	Budget	<b>State Bank of India - X</b>	<b>Drawl Amount</b>				-		
129	Budget		Interest Debit				-		
130	Budget		Interest Credit				-		
131	Budget		Adj. Amount				-		
132	Budget		Net Charges	-	-	-	-	-	-
133	Budget		Financial charges				-		
134	Budget								
135	Budget	<b>State Bank of India - XI</b>	<b>Drawl Amount</b>				-		
136	Budget		Interest Debit	1,29,06,466	1,29,06,466	1,26,25,890	5,12,05,000	1,27,66,178	1,35,98,411
137	Budget		Interest Credit				-		
138	Budget		Adj. Amount				-		
139	Budget		Net Charges	1,29,06,466	1,29,06,466	1,26,25,890	5,12,05,000	1,27,66,178	1,35,98,411
140	Budget		Financial charges				-		
141	Budget								
142	Budget	<b>State Bank of India - XII</b>	<b>Drawl Amount</b>				-		
143	Budget		Interest Debit	1,50,85,480	1,50,85,479	1,47,57,534	5,98,50,000	1,49,21,507	1,58,94,247
144	Budget		Interest Credit				-		
145	Budget		Adj. Amount				-		
146	Budget		Net Charges	1,50,85,480	1,50,85,479	1,47,57,534	5,98,50,000	1,49,21,507	1,58,94,247
147	Budget		Financial charges				-		
148	Budget								
149	Budget	<b>State Bank of India - XIII</b>	<b>Drawl Amount</b>				-		
150	Budget		Interest Debit				-		
151	Budget		Interest Credit				-		
152	Budget		Adj. Amount				-		
153	Budget		Net Charges	-	-	-	-	-	-
154	Budget		Financial charges				-		
155	Budget								
156	Budget	<b>UCO Bank-IV</b>	<b>Drawl Amount</b>				-		
157	Budget		Interest Debit				-		
158	Budget		Interest Credit				-		
159	Budget		Adj. Amount				-		
160	Budget		Net Charges				-		
161	Budget		Financial charges				-		
162	Budget								
163	Budget	<b>VIJAYA BANK VI</b>	<b>Drawl Amount</b>				-		
164	Budget		Interest Debit				-		
165	Budget		Interest Credit				-		
166	Budget		Adj. Amount				(71,124)		
167	Budget		Net Charges	-	-	-	(71,124)	-	-
168	Budget		Financial charges				-		
169	Bonds								
170	Bonds	<b>67</b>	<b>Drawl Amount</b>				-		
171	Bonds		Interest Debit	1,02,51,068	1,02,51,068	1,00,28,219	4,06,70,000	1,01,39,644	1,02,51,068

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q2 2021-22	Q3 2021-22	Q4 2021-22	2021-22	Q1 2022-23	Q2 2022-23
S NO	Department	Name of the Bank	Description	Q2	Q3	Q4	Total	Q1	Q2
172	Bonds		Interest Credit				-		
173	Bonds		Adj. Amount				-		
174	Bonds		Net Charges	1,02,51,068	1,02,51,068	1,00,28,219	4,06,70,000	1,01,39,644	1,02,51,068
175	Bonds		Financial Charges	12,986	373	21	24,505	21,005	8
176	Bonds	69	<b>Drawl Amount</b>				-		
177	Bonds		Interest Debit	2,12,17,973	2,12,17,973	2,07,56,712	8,41,80,000	2,09,87,343	2,12,17,973
178	Bonds		Interest Credit				-		
179	Bonds		Adj. Amount				-		
180	Bonds		Net Charges	2,12,17,973	2,12,17,973	2,07,56,712	8,41,80,000	2,09,87,343	2,12,17,973
181	Bonds		Financial Charges	30,456	871	47	57,481	49,290	17
182	Bonds	73	<b>Drawl Amount</b>				-		
183	Bonds		Interest Debit	3,14,41,819	3,14,41,819	3,07,58,301	12,47,42,000	3,11,00,060	3,14,41,819
184	Bonds		Interest Credit				-		
185	Bonds		Adj. Amount				-		
186	Bonds		Net Charges	3,14,41,819	3,14,41,819	3,07,58,301	12,47,42,000	3,11,00,060	3,14,41,819
187	Bonds		Financial Charges	51,568	1,457	36	94,173	78,522	84
188	Bonds	74	<b>Drawl Amount</b>				48,00,00,000		
189	Bonds		Interest Debit	82,58,113	83,11,759	81,31,069	3,02,73,205	82,21,414	83,11,759
190	Bonds		Interest Credit				-		
191	Bonds		Adj. Amount				-		
192	Bonds		Net Charges	82,58,113	83,11,759	81,31,069	3,02,73,205	82,21,414	83,11,759
193	Bonds		Financial Charges	12,095	344	13	46,283	18,691	13
194	Bonds	75	<b>Drawl Amount</b>	21,60,00,000			21,60,00,000		
195	Bonds		Interest Debit	3,80,163	21,75,113	42,45,661	68,00,937	36,02,702	36,42,293
196	Bonds		Interest Credit				-		
197	Bonds		Adj. Amount				-		
198	Bonds		Net Charges	3,80,163	21,75,113	42,45,661	68,00,937	36,02,702	36,42,293
199	Bonds		Financial Charges	13,758	73	272	14,103	8,743	8
200	Bonds	76	<b>Drawl Amount</b>		26,00,00,000		26,00,00,000		
201	Bonds		Interest Debit	-	-	31,64,967	31,64,967	43,30,604	44,17,008
202	Bonds		Interest Credit				-		
203	Bonds		Adj. Amount				-		
204	Bonds		Net Charges	-	-	31,64,967	31,64,967	43,30,604	44,17,008
205	Bonds		Financial Charges	-	26,797	4,758	31,555	11,949	1,053
206	Bonds	78	<b>Drawl Amount</b>				-		8,56,00,000
207	Bonds		Interest Debit	-	-	-	-	-	-
208	Bonds		Interest Credit				-		
209	Bonds		Adj. Amount				-		
210	Bonds		Net Charges	-	-	-	-	-	-
211	Bonds		Financial Charges	-	-	-	-	-	4,595
212	IF								
213	IF	EURO Loan I Drawl I	Drawl Amount	20,75,99,969			23,75,99,964		
214	IF	EURO Loan I Drawl I	Interest Debit	6,93,735	5,29,128	5,42,999	17,84,963	5,05,361	5,21,092
215	IF	EURO Loan I Drawl I	Interest Credit	6,68,024			7,20,151		
216	IF	EURO Loan I Drawl I	Witholding Tax	12,008	9,446	9,395	31,179	9,275	9,004
217	IF	EURO Loan I Drawl I	Adj. Amount				-		
218	IF	EURO Loan I Drawl I	Net Charges	37,719	5,38,574	5,52,394	10,95,991	5,14,637	5,30,097
219	IF	EURO Loan I Drawl I	Financial charges				61,40,460		
220	IF						-		
221	IF	EURO Loan I Drawl II	Drawl Amount	74,72,00,039			74,72,00,039		
222	IF	EURO Loan I Drawl II	Interest Debit	10,06,886	17,37,543	17,44,526	44,88,954	16,23,605	16,74,145
223	IF	EURO Loan I Drawl II	Interest Credit	10,79,903			10,79,903		
224	IF	EURO Loan I Drawl II	Witholding Tax	17,428	29,337	29,349	76,113	28,976	28,129
225	IF	EURO Loan I Drawl II	Adj. Amount				-		
226	IF	EURO Loan I Drawl II	Net Charges	(55,590)	17,66,880	17,73,875	34,85,164	16,52,580	17,02,274
227	IF	EURO Loan I Drawl II	Financial charges	1,90,98,766			1,90,98,766		
228	IF						-		



PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q2 2021-22	Q3 2021-22	Q4 2021-22	2021-22	Q1 2022-23	Q2 2022-23
S NO	Department	Name of the Bank	Description	Q2	Q3	Q4	Total	Q1	Q2
229 IF		EURO Loan I Drawl III	Drawl Amount		46,99,99,980		46,99,99,980		
230 IF		EURO Loan I Drawl III	Interest Debit		12,44,363	11,08,312	23,52,675	10,31,490	10,63,598
231 IF		EURO Loan I Drawl III	Interest Credit		25,63,980		25,63,980		
232 IF		EURO Loan I Drawl III	Withholding Tax		21,090	18,734	39,824	17,802	17,871
233 IF		EURO Loan I Drawl III	Adj. Amount				-		
234 IF		EURO Loan I Drawl III	Net Charges	-	(12,98,527)	11,27,046	(1,71,481)	10,49,292	10,81,469
235 IF		EURO Loan I Drawl III	Financial charges		1,20,94,254		1,20,94,254		
236 IF							-		
237 IF		USD 750 Million I Drawl I	Drawl Amount				-	16,52,73,439	9,47,26,561
238 IF		USD 750 Million I Drawl I	Interest Debit				-	6,79,220	27,51,130
239 IF		USD 750 Million I Drawl I	Interest Credit				-	6,87,104	5,13,424
240 IF		USD 750 Million I Drawl I	Withholding Tax				-	4,994	20,529
241 IF		USD 750 Million I Drawl I	Adj. Amount				-		
242 IF		USD 750 Million I Drawl I	Net Charges	-	-	-	-	(2,890)	22,58,235
243 IF		USD 750 Million I Drawl I	Financial charges				-	47,58,346	
244 IF							-		
245 IF		USD 750 Million I Drawl II	Drawl Amount				-		26,00,00,000
246 IF		USD 750 Million I Drawl II	Interest Debit				-		17,82,800
247 IF		USD 750 Million I Drawl II	Interest Credit				-		8,20,501
248 IF		USD 750 Million I Drawl II	Withholding Tax				-		13,307
249 IF		USD 750 Million I Drawl II	Adj. Amount				-		
250 IF		USD 750 Million I Drawl II	Net Charges	-	-	-	-	-	9,75,607
251 IF		USD 750 Million I Drawl II	Financial charges				-		45,37,242
252 IF							-		
253 IF		USD 750 Million I Drawl III	Drawl Amount				-		
254 IF		USD 750 Million I Drawl III	Interest Debit				-		
255 IF		USD 750 Million I Drawl III	Interest Credit				-		
256 IF		USD 750 Million I Drawl III	Withholding Tax				-		
257 IF		USD 750 Million I Drawl III	Adj. Amount				-		
258 IF		USD 750 Million I Drawl III	Net Charges	-	-	-	-	-	-
259 IF		USD 750 Million I Drawl III	Financial charges				-		
260 IF							-		
261 IF		USD 750 Million I Drawl IV	Drawl Amount				-		
262 IF		USD 750 Million I Drawl IV	Interest Debit				-		
263 IF		USD 750 Million I Drawl IV	Interest Credit				-		
264 IF		USD 750 Million I Drawl IV	Withholding Tax				-		
265 IF		USD 750 Million I Drawl IV	Adj. Amount				-		
266 IF		USD 750 Million I Drawl IV	Net Charges	-	-	-	-	-	-
267 IF		USD 750 Million I Drawl IV	Financial charges				-		
268 IF							-		
269 IF		USD 750 Million I Drawl V	Drawl Amount				-		
270 IF		USD 750 Million I Drawl V	Interest Debit				-		
271 IF		USD 750 Million I Drawl V	Interest Credit				-		
272 IF		USD 750 Million I Drawl V	Withholding Tax				-		
273 IF		USD 750 Million I Drawl V	Adj. Amount				-		
274 IF		USD 750 Million I Drawl V	Net Charges	-	-	-	-	-	-
275 IF		USD 750 Million I Drawl V	Financial charges				-		
276 IF							-		
277 IF		USD 750 Million I Drawl VI	Drawl Amount				-		
278 IF		USD 750 Million I Drawl VI	Interest Debit				-		
279 IF		USD 750 Million I Drawl VI	Interest Credit				-		
280 IF		USD 750 Million I Drawl VI	Withholding Tax				-		
281 IF		USD 750 Million I Drawl VI	Adj. Amount				-		
282 IF		USD 750 Million I Drawl VI	Net Charges	-	-	-	-	-	-
283 IF		USD 750 Million I Drawl VI	Financial charges				-		
284 IF							-		
285 IF		JPY Equ. \$400 Million Drawl I	Drawl Amount				-		

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q2 2021-22	Q3 2021-22	Q4 2021-22	2021-22	Q1 2022-23	Q2 2022-23
S NO	Department	Name of the Bank	Description	Q2	Q3	Q4	Total	Q1	Q2
286	IF	JPY Equ. \$400 Million Drawl I	Interest Debit				-		
287	IF	JPY Equ. \$400 Million Drawl I	Interest Credit				-		
288	IF	JPY Equ. \$400 Million Drawl I	Withholding Tax				-		
289	IF	JPY Equ. \$400 Million Drawl I	Adj. Amount				-		
290	IF	JPY Equ. \$400 Million Drawl I	Net Charges	-	-	-	-	-	-
291	IF	JPY Equ. \$400 Million Drawl I	Financial charges				-		
292	IF						-		
293	IF	JPY Equ. \$400 Million Drawl II	Drawl Amount				-		
294	IF	JPY Equ. \$400 Million Drawl II	Interest Debit				-		
295	IF	JPY Equ. \$400 Million Drawl II	Interest Credit				-		
296	IF	JPY Equ. \$400 Million Drawl II	Withholding Tax				-		
297	IF	JPY Equ. \$400 Million Drawl II	Adj. Amount				-		
298	IF	JPY Equ. \$400 Million Drawl II	Net Charges	-	-	-	-	-	-
299	IF	JPY Equ. \$400 Million Drawl II	Financial charges				-		

<b>Drawl Amount</b>	<b>1,77,08,00,008</b>	<b>72,99,99,980</b>	<b>26,00,00,000</b>	<b>3,27,07,99,983</b>	<b>31,52,73,439</b>	<b>57,03,26,561</b>
Interest Debit	13,57,61,118	14,02,23,532	14,25,37,378	54,09,31,248	15,02,31,882	16,58,27,428
Interest Credit	17,47,927	25,63,980	-	43,64,034	6,87,104	13,33,925
Withholding Tax	29,436	59,873	57,477	1,47,117	61,048	88,840
Adj. Amount	-	-	-	(71,124)	-	-
Net Charges	13,40,42,626	13,77,19,425	14,25,94,855	53,66,43,207	14,96,05,825	16,45,82,344
Financial Charges	1,92,19,628	1,21,24,167	5,146	3,76,01,579	49,46,545	45,43,019
Drawl						
Budget	60,00,00,000	-	26,00,00,000	86,00,00,000	15,00,00,000	13,00,00,000
Bonds	21,60,00,000	26,00,00,000	-	95,60,00,000	-	8,56,00,000
IF	95,48,00,008	46,99,99,980	-	1,45,47,99,983	16,52,73,439	35,47,26,561
Total Drawl	1,77,08,00,008	72,99,99,980	26,00,00,000		31,52,73,439	57,03,26,561
Cumulative Drawl	25,03,58,00,003	25,76,57,99,983	26,02,57,99,983		26,34,10,73,422	26,91,13,99,983
Repayment (incl trf to loan trf to Lara)			7,00,00,000			
Cum Repayment	15,75,44,00,000	15,75,44,00,000	15,82,44,00,000		15,82,44,00,000	15,82,44,00,000
FERV			(2,61,29,173)	(2,61,29,173)		
Cum FERV			(2,61,29,173)	(2,61,29,173)	(2,61,29,173)	(2,61,29,173)
<b>Net Cumm Loan inc FERV</b>	9,28,14,00,003	10,01,13,99,983	10,17,52,70,810		10,49,05,44,249	11,06,08,70,810
<b>Net charges</b>						
Budget	6,25,11,361	6,33,14,766	6,20,56,612	24,24,02,423	6,80,10,440	7,87,52,742
Bonds	7,15,49,136	7,33,97,732	7,70,84,929	28,98,31,109	7,83,81,767	7,92,81,920
IF	(17,871)	10,06,927	34,53,314	44,09,675	32,13,618	65,47,682
<b>Total</b>	13,40,42,626	13,77,19,425	14,25,94,855		14,96,05,825	16,45,82,344
<b>Financial Charges</b>						
Budget	-	-	-	-	-	-
Bonds	1,20,862	29,914	5,146	2,68,100	1,88,199	5,777
IF	1,90,98,766	1,20,94,254	-	3,73,33,479	47,58,346	45,37,242
<b>Total FC</b>	1,92,19,628	1,21,24,167	5,146		49,46,545	45,43,019

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

		Name of the Bank	Description	Q2 2021-22	Q3 2021-22	Q4 2021-22	2021-22	Q1 2022-23	Q2 2022-23
S NO	Department	Name of the Bank	Description	Q2	Q3	Q4	Total	Q1	Q2
			Interest Rate	1.44%	1.38%	1.40%		1.43%	1.49%

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q3 2022-23	Q4 2022-23	2022-23	Q1 2023-24	Q2 2023-24	2023-24
		Name of the Bank	Description	Q3	Q4	Total	Q1	Q2	Total
1	Budget								
2	Budget	<b>Axis Bank-II</b>	<b>Drawl Amount</b>			-			-
3	Budget		Interest Debit			-			-
4	Budget		Interest Credit			-			-
5	Budget		Adj. Amount			-			-
6	Budget		Net Charges	-	-	-	-	-	-
7	Budget		Financial charges			-			-
8	Budget								
9	Budget	<b>Axis Bank-III</b>	<b>Drawl Amount</b>			-			-
10	Budget		Interest Debit	1,04,42,028	1,01,50,270	3,92,57,201			-
11	Budget		Interest Credit			-			-
12	Budget		Adj. Amount			-			-
13	Budget		Net Charges	1,04,42,028	1,01,50,270	3,92,57,201	-	-	-
14	Budget		Financial charges			-			-
15	Budget								
16	Budget	<b>Axis Bank-IV</b>	<b>Drawl Amount</b>		53,50,00,000	53,50,00,000			-
17	Budget		Interest Debit		3,51,781	3,51,781	1,06,70,685	1,07,87,945	2,14,58,630
18	Budget		Interest Credit			-			-
19	Budget		Adj. Amount			-			-
20	Budget		Net Charges		3,51,781	3,51,781	1,06,70,685	1,07,87,945	2,14,58,630
21	Budget		Financial charges			-			-
22	Budget								
23	Budget	<b>BANK OF BARODA II</b>	<b>Drawl Amount</b>	6,00,00,000		6,00,00,000			-
24	Budget		Interest Debit	6,00,411	11,35,397	17,35,808	11,85,945	12,03,946	23,89,891
25	Budget		Interest Credit			-			-
26	Budget		Adj. Amount			-			-
27	Budget		Net Charges	6,00,411	11,35,397	17,35,808	11,85,945	12,03,946	23,89,891
28	Budget		Financial charges			-			-
29	Budget								
30	Budget	<b>Bank of India-V-A</b>	<b>Drawl Amount</b>		1,44,00,000	1,44,00,000			-
31	Budget		Interest Debit		6,431	6,431	2,87,211	2,90,367	5,77,578
32	Budget		Interest Credit			-			-
33	Budget		Adj. Amount			-			-
34	Budget		Net Charges		6,431	6,431	2,87,211	2,90,367	5,77,578
35	Budget		Financial charges			-			-
36	Budget								
37	Budget	<b>HDFC Bank Limited-V</b>	<b>Drawl Amount</b>			-			-
38	Budget		Interest Debit			-			-
39	Budget		Interest Credit			-			-
40	Budget		Adj. Amount			-			-
41	Budget		Net Charges	-	-	-	-	-	-
42	Budget		Financial charges			-			-
43	Budget								
44	Budget	<b>HDFC Bank Limited-VII</b>	<b>Drawl Amount</b>			-			-
45	Budget		Interest Debit	1,17,28,766	1,17,92,218	4,34,00,710	1,19,52,493	1,20,23,014	2,39,75,507
46	Budget		Interest Credit			-			-
47	Budget		Adj. Amount			-			-
48	Budget		Net Charges	1,17,28,766	1,17,92,218	4,34,00,710	1,19,52,493	1,20,23,014	2,39,75,507
49	Budget		Financial charges			-			-
50	Budget								
51	Budget	<b>HDFC Bank Limited-IX</b>	<b>Drawl Amount</b>			-			-
52	Budget		Interest Debit			-			-
53	Budget		Interest Credit			-			-
54	Budget		Adj. Amount			-			-
55	Budget		Net Charges	-	-	-	-	-	-
56	Budget		Financial charges			-			-
57	Budget								

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q3 2022-23	Q4 2022-23	2022-23	Q1 2023-24	Q2 2023-24	2023-24
S NO	Department	Name of the Bank	Description	Q3	Q4	Total	Q1	Q2	Total
58	Budget	<b>HDFC Bank Limited-X</b>	<b>Drawl Amount</b>			15,00,00,000			-
59	Budget		Interest Debit	76,85,086	79,38,610	2,78,76,173	81,67,537	82,15,726	1,63,83,263
60	Budget		Interest Credit			-			-
61	Budget		Adj. Amount			-			-
62	Budget		Net Charges	76,85,086	79,38,610	2,78,76,173	81,67,537	82,15,726	1,63,83,263
63	Budget		Financial charges			-			-
64	Budget								-
65	Budget	<b>HDFC Bank Limited-XI</b>	<b>Drawl Amount</b>			-		20,00,00,000	20,00,00,000
66	Budget		Interest Debit			-		12,78,905	12,78,905
67	Budget		Interest Credit			-			-
68	Budget		Adj. Amount			-			-
69	Budget		Net Charges		-	-	-	12,78,905	12,78,905
70	Budget		Financial charges			-			-
71	Budget								-
72	Budget	<b>ICICI - IV</b>	<b>Drawl Amount</b>			-			-
73	Budget		Interest Debit			-			-
74	Budget		Interest Credit			-			-
75	Budget		Adj. Amount			-			-
76	Budget		Net Charges	-	-	-	-	-	-
77	Budget		Financial charges			-			-
78	Budget								-
79	Budget	<b>ICICI - VI</b>	<b>Drawl Amount</b>			-			-
80	Budget		Interest Debit			-			-
81	Budget		Interest Credit			-			-
82	Budget		Adj. Amount			-			-
83	Budget		Net Charges	-	-	-	-	-	-
84	Budget		Financial charges			-			-
85	Budget								-
86	Budget	<b>ICICI - VII</b>	<b>Drawl Amount</b>			-			-
87	Budget		Interest Debit			-			-
88	Budget		Interest Credit			-			-
89	Budget		Adj. Amount			-			-
90	Budget		Net Charges	-	-	-	-	-	-
91	Budget		Financial charges			-			-
92	Budget								-
93	Budget	<b>IndusInd Bank</b>	<b>Drawl Amount</b>			13,00,00,000			-
94	Budget		Interest Debit	25,26,416	25,57,901	69,78,969	26,20,301	26,62,152	52,82,453
95	Budget		Interest Credit			-			-
96	Budget		Adj. Amount			-			-
97	Budget		Net Charges	25,26,416	25,57,901	69,78,969	26,20,301	26,62,152	52,82,453
98	Budget		Financial charges			-			-
99	Budget								-
100	Budget	<b>PNB-III</b>	<b>Drawl Amount</b>			-			-
101	Budget		Interest Debit	86,25,875	81,81,583	3,10,32,116	76,59,513	77,43,683	1,54,03,196
102	Budget		Interest Credit			-			-
103	Budget		Adj. Amount			-			-
104	Budget		Net Charges	86,25,875	81,81,583	3,10,32,116	76,59,513	77,43,683	1,54,03,196
105	Budget		Financial charges			-			-
106	Budget								-
107	Budget	<b>PNB-IV</b>	<b>Drawl Amount</b>			-			-
108	Budget		Interest Debit			-			-
109	Budget		Interest Credit			-			-
110	Budget		Adj. Amount			-			-
111	Budget		Net Charges	-	-	-	-	-	-
112	Budget		Financial charges			-			-
113	Budget								-
114	Budget	<b>PNB-V</b>	<b>Drawl Amount</b>			-			-

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q3 2022-23	Q4 2022-23	2022-23	Q1 2023-24	Q2 2023-24	2023-24
S NO	Department	Name of the Bank	Description	Q3	Q4	Total	Q1	Q2	Total
115	Budget		Interest Debit	1,16,44,932	1,20,36,986	4,28,85,206	1,18,17,534	1,19,47,398	2,37,64,932
116	Budget		Interest Credit			-			-
117	Budget		Adj. Amount			-			-
118	Budget		Net Charges	1,16,44,932	1,20,36,986	4,28,85,206	1,18,17,534	1,19,47,398	2,37,64,932
119	Budget		Financial charges			-			-
120	Budget								-
121	Budget	<b>State Bank of India - IX</b>	<b>Drawl Amount</b>		40,77,82,894	40,77,82,894			-
122	Budget		Interest Debit	18,82,057	20,31,983	73,77,175	99,26,930	1,01,27,420	2,00,54,350
123	Budget		Interest Credit			-			-
124	Budget		Adj. Amount			-			-
125	Budget		Net Charges	18,82,057	20,31,983	73,77,175	99,26,930	1,01,27,420	2,00,54,350
126	Budget		Financial charges			-			-
127	Budget								-
128	Budget	<b>State Bank of India - X</b>	<b>Drawl Amount</b>			-			-
129	Budget		Interest Debit			-			-
130	Budget		Interest Credit			-			-
131	Budget		Adj. Amount			-			-
132	Budget		Net Charges	-	-	-	-	-	-
133	Budget		Financial charges			-			-
134	Budget								-
135	Budget	<b>State Bank of India - XI</b>	<b>Drawl Amount</b>			-			-
136	Budget		Interest Debit	1,26,23,797	1,33,79,499	5,23,67,885	1,38,03,293	1,39,54,948	2,77,58,241
137	Budget		Interest Credit			-			-
138	Budget		Adj. Amount			-			-
139	Budget		Net Charges	1,26,23,797	1,33,79,499	5,23,67,885	1,38,03,293	1,39,54,948	2,77,58,241
140	Budget		Financial charges			-			-
141	Budget								-
142	Budget	<b>State Bank of India - XII</b>	<b>Drawl Amount</b>			-			-
143	Budget		Interest Debit	1,65,99,451	1,75,93,151	6,50,08,356	1,81,50,411	1,83,74,795	3,65,25,206
144	Budget		Interest Credit			-			-
145	Budget		Adj. Amount			-			-
146	Budget		Net Charges	1,65,99,451	1,75,93,151	6,50,08,356	1,81,50,411	1,83,74,795	3,65,25,206
147	Budget		Financial charges			-			-
148	Budget								-
149	Budget	<b>State Bank of India - XIII</b>	<b>Drawl Amount</b>			-			-
150	Budget		Interest Debit			-			-
151	Budget		Interest Credit			-			-
152	Budget		Adj. Amount			-			-
153	Budget		Net Charges	-	-	-	-	-	-
154	Budget		Financial charges			-			-
155	Budget								-
156	Budget	<b>UCO Bank-IV</b>	<b>Drawl Amount</b>		6,94,00,000	6,94,00,000	47,00,00,000		47,00,00,000
157	Budget		Interest Debit		8,44,874	8,44,874	45,76,838	1,04,68,793	1,50,45,631
158	Budget		Interest Credit			-			-
159	Budget		Adj. Amount			-			-
160	Budget		Net Charges		8,44,874	8,44,874	45,76,838	1,04,68,793	1,50,45,631
161	Budget		Financial charges			-			-
162	Budget								-
163	Budget	<b>VIJAYA BANK VI</b>	<b>Drawl Amount</b>			-			-
164	Budget		Interest Debit			-			-
165	Budget		Interest Credit			-			-
166	Budget		Adj. Amount			-			-
167	Budget		Net Charges	-	-	-	-	-	-
168	Budget		Financial charges			-			-
169	Bonds								-
170	Bonds	<b>67</b>	<b>Drawl Amount</b>			-			-
171	Bonds		Interest Debit	1,02,51,068	1,00,28,219	4,06,70,000	1,01,39,644	1,02,51,068	2,03,90,712

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q3 2022-23	Q4 2022-23	2022-23	Q1 2023-24	Q2 2023-24	2023-24
S NO	Department	Name of the Bank	Description	Q3	Q4	Total	Q1	Q2	Total
172	Bonds		Interest Credit			-			-
173	Bonds		Adj. Amount			-			-
174	Bonds		Net Charges	1,02,51,068	1,00,28,219	4,06,70,000	1,01,39,644	1,02,51,068	2,03,90,712
175	Bonds		Financial Charges	367	3,468	24,847	21,622	3,681	25,303
176	Bonds	69	Drawl Amount			-			-
177	Bonds		Interest Debit	2,12,17,973	2,07,56,714	8,41,80,002	2,09,87,342	2,12,17,973	4,22,05,315
178	Bonds		Interest Credit			-			-
179	Bonds		Adj. Amount			-			-
180	Bonds		Net Charges	2,12,17,973	2,07,56,714	8,41,80,002	2,09,87,342	2,12,17,973	4,22,05,315
181	Bonds		Financial Charges	861	8,137	58,304	50,738	8,639	59,377
182	Bonds	73	Drawl Amount			-			-
183	Bonds		Interest Debit	3,14,41,819	3,07,58,301	12,47,42,000	3,11,00,060	3,14,41,819	6,25,41,879
184	Bonds		Interest Credit			-			-
185	Bonds		Adj. Amount			-			-
186	Bonds		Net Charges	3,14,41,819	3,07,58,301	12,47,42,000	3,11,00,060	3,14,41,819	6,25,41,879
187	Bonds		Financial Charges	1,486	13,571	93,664	82,041	14,499	96,540
188	Bonds	74	Drawl Amount			-			-
189	Bonds		Interest Debit	83,11,759	81,31,069	3,29,76,000	82,21,414	83,11,759	1,65,33,173
190	Bonds		Interest Credit			-			-
191	Bonds		Adj. Amount			-			-
192	Bonds		Net Charges	83,11,759	81,31,069	3,29,76,000	82,21,414	83,11,759	1,65,33,173
193	Bonds		Financial Charges	348	3,362	22,414	20,384	3,592	23,976
194	Bonds	75	Drawl Amount			-			-
195	Bonds		Interest Debit	36,42,293	35,63,112	1,44,50,400	36,02,702	36,42,293	72,44,995
196	Bonds		Interest Credit			-			-
197	Bonds		Adj. Amount			-			-
198	Bonds		Net Charges	36,42,293	35,63,112	1,44,50,400	36,02,702	36,42,293	72,44,995
199	Bonds		Financial Charges	159	1,515	10,424	9,119	1,618	10,737
200	Bonds	76	Drawl Amount			-			-
201	Bonds		Interest Debit	44,17,008	43,20,986	1,74,85,607	43,68,997	44,17,008	87,86,005
202	Bonds		Interest Credit			-			-
203	Bonds		Adj. Amount			-			-
204	Bonds		Net Charges	44,17,008	43,20,986	1,74,85,607	43,68,997	44,17,008	87,86,005
205	Bonds		Financial Charges	2,573	1,824	17,399	15,217	1,949	17,166
206	Bonds	78	Drawl Amount			8,56,00,000			-
207	Bonds		Interest Debit	20,33,321	15,70,350	36,03,671	15,87,798	16,05,246	31,93,044
208	Bonds		Interest Credit			-			-
209	Bonds		Adj. Amount			-			-
210	Bonds		Net Charges	20,33,321	15,70,350	36,03,671	15,87,798	16,05,246	31,93,044
211	Bonds		Financial Charges	1,058	397	6,049	5,008	640	5,649
212	IF					-			-
213	IF	EURO Loan I Drawl I	Drawl Amount			-			-
214	IF	EURO Loan I Drawl I	Interest Debit	10,09,439	20,39,263	40,75,156	21,72,595	28,32,012	50,04,607
215	IF	EURO Loan I Drawl I	Interest Credit			-			-
216	IF	EURO Loan I Drawl I	Withholding Tax	17,728	35,275	71,282	39,045	48,969	88,014
217	IF	EURO Loan I Drawl I	Adj. Amount			-			-
218	IF	EURO Loan I Drawl I	Net Charges	10,27,166	20,74,538	41,46,438	22,11,640	28,80,981	50,92,620
219	IF	EURO Loan I Drawl I	Financial charges			-			-
220	IF					-			-
221	IF	EURO Loan I Drawl II	Drawl Amount			-			-
222	IF	EURO Loan I Drawl II	Interest Debit	32,43,085	65,51,665	1,30,92,501	69,80,028	90,98,577	1,60,78,604
223	IF	EURO Loan I Drawl II	Interest Credit			-			-
224	IF	EURO Loan I Drawl II	Withholding Tax	56,206	1,11,193	2,24,503	1,23,076	1,54,359	2,77,435
225	IF	EURO Loan I Drawl II	Adj. Amount			-			-
226	IF	EURO Loan I Drawl II	Net Charges	32,99,291	66,62,858	1,33,17,004	71,03,104	92,52,935	1,63,56,039
227	IF	EURO Loan I Drawl II	Financial charges			-			-
228	IF					-			-

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAI PALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q3 2022-23	Q4 2022-23	2022-23	Q1 2023-24	Q2 2023-24	2023-24
S NO	Department	Name of the Bank	Description	Q3	Q4	Total	Q1	Q2	Total
229 IF		EURO Loan I Drawl III	Drawl Amount			-			-
230 IF		EURO Loan I Drawl III	Interest Debit	20,60,359	41,62,328	83,17,775	44,34,470	57,80,402	1,02,14,872
231 IF		EURO Loan I Drawl III	Interest Credit			-			-
232 IF		EURO Loan I Drawl III	Withholding Tax	35,056	69,855	1,40,584	77,321	96,974	1,74,295
233 IF		EURO Loan I Drawl III	Adj. Amount			-			-
234 IF		EURO Loan I Drawl III	Net Charges	20,95,415	42,32,183	84,58,359	45,11,791	58,77,376	1,03,89,167
235 IF		EURO Loan I Drawl III	Financial charges			-			-
236 IF						-			-
237 IF		USD 750 Million I Drawl I	Drawl Amount			26,00,00,000			-
238 IF		USD 750 Million I Drawl I	Interest Debit	37,68,255	39,75,658	1,11,74,263	42,95,110	46,16,748	89,11,858
239 IF		USD 750 Million I Drawl I	Interest Credit			12,00,528			-
240 IF		USD 750 Million I Drawl I	Withholding Tax	28,384	29,865	83,772	32,725	34,733	67,458
241 IF		USD 750 Million I Drawl I	Adj. Amount			-			-
242 IF		USD 750 Million I Drawl I	Net Charges	37,96,639	40,05,523	1,00,57,506	43,27,835	46,51,481	89,79,316
243 IF		USD 750 Million I Drawl I	Financial charges			47,58,346			-
244 IF						-			-
245 IF		USD 750 Million I Drawl II	Drawl Amount			26,00,00,000			-
246 IF		USD 750 Million I Drawl II	Interest Debit	35,98,603	37,90,922	91,72,326	40,95,530	44,02,223	84,97,753
247 IF		USD 750 Million I Drawl II	Interest Credit			8,20,501			-
248 IF		USD 750 Million I Drawl II	Withholding Tax	27,103	28,477	68,887	31,205	33,119	64,324
249 IF		USD 750 Million I Drawl II	Adj. Amount			-			-
250 IF		USD 750 Million I Drawl II	Net Charges	36,25,707	38,19,399	84,20,712	41,26,735	44,35,342	85,62,077
251 IF		USD 750 Million I Drawl II	Financial charges			45,37,242			-
252 IF						-			-
253 IF		USD 750 Million I Drawl III	Drawl Amount	3,00,00,000		3,00,00,000			-
254 IF		USD 750 Million I Drawl III	Interest Debit	4,22,890	4,28,290	8,51,180	4,62,704	4,97,353	9,60,057
255 IF		USD 750 Million I Drawl III	Interest Credit	17,549		17,549			-
256 IF		USD 750 Million I Drawl III	Withholding Tax	3,178	3,217	6,395	3,525	3,742	7,267
257 IF		USD 750 Million I Drawl III	Adj. Amount			-			-
258 IF		USD 750 Million I Drawl III	Net Charges	4,08,519	4,31,507	8,40,026	4,66,229	5,01,095	9,67,324
259 IF		USD 750 Million I Drawl III	Financial charges	5,12,607		5,12,607			-
260 IF						-			-
261 IF		USD 750 Million I Drawl IV	Drawl Amount	15,99,96,119		15,99,96,119			-
262 IF		USD 750 Million I Drawl IV	Interest Debit	13,59,275	22,80,052	36,39,326	24,48,365	26,24,051	50,72,416
263 IF		USD 750 Million I Drawl IV	Interest Credit	3,40,815		3,40,815			-
264 IF		USD 750 Million I Drawl IV	Withholding Tax	10,213	17,129	27,343	18,636	19,741	38,377
265 IF		USD 750 Million I Drawl IV	Adj. Amount			-			-
266 IF		USD 750 Million I Drawl IV	Net Charges	10,28,673	22,97,181	33,25,854	24,67,001	26,43,793	51,10,793
267 IF		USD 750 Million I Drawl IV	Financial charges	27,04,532		27,04,532			-
268 IF						-			-
269 IF		USD 750 Million I Drawl V	Drawl Amount		7,00,02,855	7,00,02,855			-
270 IF		USD 750 Million I Drawl V	Interest Debit		11,11,169	11,11,169	10,73,987	11,44,212	22,18,199
271 IF		USD 750 Million I Drawl V	Interest Credit		1,18,890	1,18,890			-
272 IF		USD 750 Million I Drawl V	Withholding Tax		8,350	8,350	8,149	8,608	16,757
273 IF		USD 750 Million I Drawl V	Adj. Amount			-			-
274 IF		USD 750 Million I Drawl V	Net Charges	-	10,00,629	10,00,629	10,82,136	11,52,820	22,34,956
275 IF		USD 750 Million I Drawl V	Financial charges		11,79,305	11,79,305			-
276 IF						-			-
277 IF		USD 750 Million I Drawl VI	Drawl Amount		29,99,95,906	29,99,95,906			-
278 IF		USD 750 Million I Drawl VI	Interest Debit		25,42,609	25,42,609	46,49,935	49,21,342	95,71,276
279 IF		USD 750 Million I Drawl VI	Interest Credit		12,48,743	12,48,743	14,397		14,397
280 IF		USD 750 Million I Drawl VI	Withholding Tax		19,109	19,109	35,166	37,025	72,190
281 IF		USD 750 Million I Drawl VI	Adj. Amount			-			-
282 IF		USD 750 Million I Drawl VI	Net Charges	-	13,12,974	13,12,974	46,70,703	49,58,366	96,29,070
283 IF		USD 750 Million I Drawl VI	Financial charges		50,72,283	50,72,283			-
284 IF						-			-
285 IF		JPY Equ. \$400 Million Drawl I	Drawl Amount			-	13,49,99,996		13,49,99,996



PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	Q3 2022-23	Q4 2022-23	2022-23	Q1 2023-24	Q2 2023-24	2023-24
S NO	Department	Name of the Bank	Description	Q3	Q4	Total	Q1	Q2	Total
286	IF	JPY Equ. \$400 Million Drawl I	Interest Debit			-	1,95,952	3,73,166	5,69,118
287	IF	JPY Equ. \$400 Million Drawl I	Interest Credit			-	5,30,006	3,534	5,33,540
288	IF	JPY Equ. \$400 Million Drawl I	Withholding Tax			-			-
289	IF	JPY Equ. \$400 Million Drawl I	Adj. Amount			-			-
290	IF	JPY Equ. \$400 Million Drawl I	Net Charges	-		-	(3,34,054)	3,69,631	35,578
291	IF	JPY Equ. \$400 Million Drawl I	Financial charges			-	22,08,710		22,08,710
292	IF					-			-
293	IF	JPY Equ. \$400 Million Drawl II	Drawl Amount			-		50,00,00,000	50,00,00,000
294	IF	JPY Equ. \$400 Million Drawl II	Interest Debit			-		10,85,840	10,85,840
295	IF	JPY Equ. \$400 Million Drawl II	Interest Credit			-		2,04,866	2,04,866
296	IF	JPY Equ. \$400 Million Drawl II	Withholding Tax			-		-	-
297	IF	JPY Equ. \$400 Million Drawl II	Adj. Amount			-			-
298	IF	JPY Equ. \$400 Million Drawl II	Net Charges	-		-		8,80,974	8,80,974
299	IF	JPY Equ. \$400 Million Drawl II	Financial charges					82,59,151	82,59,151

<b>Drawl Amount</b>	<b>24,99,96,119</b>	<b>1,39,65,81,656</b>	<b>2,53,21,77,775</b>	<b>60,49,99,996</b>	<b>70,00,00,000</b>	<b>1,30,49,99,996</b>
Interest Debit	18,11,35,967	19,40,11,391	69,12,06,668	21,16,35,324	22,73,42,183	43,89,77,507
Interest Credit	3,58,364	13,67,634	37,47,027	5,44,403	2,08,400	7,52,803
Withholding Tax	1,77,867	3,22,469	6,50,224	3,68,847	4,37,270	8,06,117
Adj. Amount	-	-	-	-	-	-
Net Charges	18,09,55,470	19,29,66,226	68,81,09,865	21,14,59,769	22,75,71,053	43,90,30,821
Financial Charges	32,23,991	62,83,861	1,89,97,417	24,12,839	82,93,768	1,07,06,607
Drawl						
Budget	6,00,00,000	1,02,65,82,894	1,36,65,82,894	47,00,00,000	20,00,00,000	67,00,00,000
Bonds	-	-	8,56,00,000	-	-	-
IF	18,99,96,119	36,99,98,762	1,07,99,94,881	13,49,99,996	50,00,00,000	63,49,99,996
Total Drawl	24,99,96,119	1,39,65,81,656		60,49,99,996	70,00,00,000	
Cumulative Drawl	27,16,13,96,102	28,55,79,77,758		29,16,29,77,754	29,86,29,77,754	
Repayment (incl trf to loan trf to Lara)	8,56,00,000	60,50,00,000			8,56,00,000	8,56,00,000
Cum Repayment	15,91,00,00,000	16,51,50,00,000		16,51,50,00,000	16,60,06,00,000	
FERV		11,89,65,591	11,89,65,591		(4,47,24,452)	(4,47,24,452)
Cum FERV	(2,61,29,173)	9,28,36,419	9,28,36,419	9,28,36,419	4,81,11,967	4,81,11,967
<b>Net Cum Loan inc FERV</b>	11,22,52,66,930	12,13,58,14,177		12,74,08,14,173	13,31,04,89,722	
<b>Net charges</b>						
Budget	8,43,58,819	8,80,00,684	31,91,22,685	10,08,18,691	10,90,79,092	20,98,97,783
Bonds	8,13,15,241	7,91,28,751	31,81,07,679	8,00,07,958	8,08,87,166	16,08,95,124
IF	1,52,81,410	2,58,36,791	5,08,79,501	3,06,33,120	3,76,04,794	6,82,37,914
<b>Total</b>	18,09,55,470	19,29,66,226		21,14,59,769	22,75,71,053	
<b>Financial Charges</b>						
Budget	-	-	-	-	-	-
Bonds	6,852	32,273	2,33,101	2,04,129	34,617	2,38,747
IF	32,17,139	62,51,588	1,87,64,315	22,08,710	82,59,151	1,04,67,860
<b>Total FC</b>	32,23,991	62,83,861		24,12,839	82,93,768	

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

		Name of the Bank	Description	Q3 2022-23	Q4 2022-23	2022-23	Q1 2023-24	Q2 2023-24	2023-24
S NO	Department	Name of the Bank	Description	Q3	Q4	Total	Q1	Q2	Total
			Interest Rate	1.61%	1.59%		1.66%	1.71%	

PART-IV  
Form 14

Name of the Petitioner Name of the Coal Mine		NTPC Ltd TALAIPALLI (Amount in Rs. Lakh)		
S NO	Department	Name of the Bank	Description	GRAND TOTAL
1	Budget			
2	Budget	<b>Axis Bank-II</b>	<b>Drawl Amount</b>	1,10,00,00,000
3	Budget		Interest Debit	12,80,29,350
4	Budget		Interest Credit	-
5	Budget		Adj. Amount	-
6	Budget		Net Charges	12,80,29,350
7	Budget		Financial charges	-
8	Budget			
9	Budget	<b>Axis Bank-III</b>	<b>Drawl Amount</b>	53,50,00,000
10	Budget		Interest Debit	9,08,61,105
11	Budget		Interest Credit	-
12	Budget		Adj. Amount	-
13	Budget		Net Charges	9,08,61,105
14	Budget		Financial charges	-
15	Budget			
16	Budget	<b>Axis Bank-IV</b>	<b>Drawl Amount</b>	53,50,00,000
17	Budget		Interest Debit	2,18,10,411
18	Budget		Interest Credit	-
19	Budget		Adj. Amount	-
20	Budget		Net Charges	2,18,10,411
21	Budget		Financial charges	-
22	Budget			
23	Budget	<b>BANK OF BARODA II</b>	<b>Drawl Amount</b>	6,00,00,000
24	Budget		Interest Debit	41,25,699
25	Budget		Interest Credit	-
26	Budget		Adj. Amount	-
27	Budget		Net Charges	41,25,699
28	Budget		Financial charges	-
29	Budget			
30	Budget	<b>Bank of India-V-A</b>	<b>Drawl Amount</b>	1,44,00,000
31	Budget		Interest Debit	5,84,009
32	Budget		Interest Credit	-
33	Budget		Adj. Amount	-
34	Budget		Net Charges	5,84,009
35	Budget		Financial charges	-
36	Budget			
37	Budget	<b>HDFC Bank Limited-V</b>	<b>Drawl Amount</b>	10,00,00,000
38	Budget		Interest Debit	2,06,80,135
39	Budget		Interest Credit	-
40	Budget		Adj. Amount	-
41	Budget		Net Charges	2,06,80,135
42	Budget		Financial charges	-
43	Budget			
44	Budget	<b>HDFC Bank Limited-VII</b>	<b>Drawl Amount</b>	60,00,00,000
45	Budget		Interest Debit	16,38,40,177
46	Budget		Interest Credit	-
47	Budget		Adj. Amount	-
48	Budget		Net Charges	16,38,40,177
49	Budget		Financial charges	-
50	Budget			
51	Budget	<b>HDFC Bank Limited-IX</b>	<b>Drawl Amount</b>	1,60,00,00,000
52	Budget		Interest Debit	4,90,25,890
53	Budget		Interest Credit	-
54	Budget		Adj. Amount	-
55	Budget		Net Charges	4,90,25,890
56	Budget		Financial charges	-
57	Budget			

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	GRAND TOTAL
58	Budget	<b>HDFC Bank Limited-X</b>	<b>Drawl Amount</b>	41,00,00,000
59	Budget		Interest Debit	4,47,16,252
60	Budget		Interest Credit	-
61	Budget		Adj. Amount	-
62	Budget		Net Charges	4,47,16,252
63	Budget		Financial charges	-
64	Budget			
65	Budget	<b>HDFC Bank Limited-XI</b>	<b>Drawl Amount</b>	20,00,00,000
66	Budget		Interest Debit	12,78,905
67	Budget		Interest Credit	-
68	Budget		Adj. Amount	-
69	Budget		Net Charges	12,78,905
70	Budget		Financial charges	-
71	Budget			
72	Budget	<b>ICICI - IV</b>	<b>Drawl Amount</b>	5,00,00,00,000
73	Budget		Interest Debit	70,42,53,424
74	Budget		Interest Credit	-
75	Budget		Adj. Amount	-
76	Budget		Net Charges	70,42,53,424
77	Budget		Financial charges	-
78	Budget			
79	Budget	<b>ICICI - VI</b>	<b>Drawl Amount</b>	49,00,00,000
80	Budget		Interest Debit	4,89,54,424
81	Budget		Interest Credit	-
82	Budget		Adj. Amount	-
83	Budget		Net Charges	4,89,54,424
84	Budget		Financial charges	-
85	Budget			
86	Budget	<b>ICICI - VII</b>	<b>Drawl Amount</b>	20,00,00,000
87	Budget		Interest Debit	8,90,302
88	Budget		Interest Credit	-
89	Budget		Adj. Amount	-
90	Budget		Net Charges	8,90,302
91	Budget		Financial charges	-
92	Budget			
93	Budget	<b>IndusInd Bank</b>	<b>Drawl Amount</b>	13,00,00,000
94	Budget		Interest Debit	1,22,61,422
95	Budget		Interest Credit	-
96	Budget		Adj. Amount	-
97	Budget		Net Charges	1,22,61,422
98	Budget		Financial charges	-
99	Budget			
100	Budget	<b>PNB-III</b>	<b>Drawl Amount</b>	50,00,00,000
101	Budget		Interest Debit	17,59,74,206
102	Budget		Interest Credit	-
103	Budget		Adj. Amount	-
104	Budget		Net Charges	17,59,74,206
105	Budget		Financial charges	-
106	Budget			
107	Budget	<b>PNB-IV</b>	<b>Drawl Amount</b>	5,00,00,00,000
108	Budget		Interest Debit	84,81,80,150
109	Budget		Interest Credit	-
110	Budget		Adj. Amount	-
111	Budget		Net Charges	84,81,80,150
112	Budget		Financial charges	-
113	Budget			
114	Budget	<b>PNB-V</b>	<b>Drawl Amount</b>	60,00,00,000

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	GRAND TOTAL
115	Budget		Interest Debit	9,14,21,096
116	Budget		Interest Credit	-
117	Budget		Adj. Amount	-
118	Budget		Net Charges	9,14,21,096
119	Budget		Financial charges	-
120	Budget			
121	Budget	<b>State Bank of India - IX</b>	<b>Drawl Amount</b>	53,77,82,894
122	Budget		Interest Debit	6,25,47,477
123	Budget		Interest Credit	-
124	Budget		Adj. Amount	-
125	Budget		Net Charges	6,25,47,477
126	Budget		Financial charges	-
127	Budget			
128	Budget	<b>State Bank of India - X</b>	<b>Drawl Amount</b>	1,90,00,00,000
129	Budget		Interest Debit	42,33,25,889
130	Budget		Interest Credit	-
131	Budget		Adj. Amount	-
132	Budget		Net Charges	42,33,25,889
133	Budget		Financial charges	-
134	Budget			
135	Budget	<b>State Bank of India - XI</b>	<b>Drawl Amount</b>	77,00,00,000
136	Budget		Interest Debit	27,44,79,017
137	Budget		Interest Credit	-
138	Budget		Adj. Amount	-
139	Budget		Net Charges	27,44,79,017
140	Budget		Financial charges	-
141	Budget			
142	Budget	<b>State Bank of India - XII</b>	<b>Drawl Amount</b>	90,00,00,000
143	Budget		Interest Debit	30,40,68,219
144	Budget		Interest Credit	-
145	Budget		Adj. Amount	-
146	Budget		Net Charges	30,40,68,219
147	Budget		Financial charges	-
148	Budget			
149	Budget	<b>State Bank of India - XIII</b>	<b>Drawl Amount</b>	20,00,00,000
150	Budget		Interest Debit	1,28,76,713
151	Budget		Interest Credit	-
152	Budget		Adj. Amount	-
153	Budget		Net Charges	1,28,76,713
154	Budget		Financial charges	-
155	Budget			
156	Budget	<b>UCO Bank-IV</b>	<b>Drawl Amount</b>	53,94,00,000
157	Budget		Interest Debit	1,58,90,505
158	Budget		Interest Credit	-
159	Budget		Adj. Amount	-
160	Budget		Net Charges	1,58,90,505
161	Budget		Financial charges	-
162	Budget			
163	Budget	<b>VIJAYA BANK VI</b>	<b>Drawl Amount</b>	15,00,00,000
164	Budget		Interest Debit	3,26,08,534
165	Budget		Interest Credit	-
166	Budget		Adj. Amount	(71,124)
167	Budget		Net Charges	3,25,37,410
168	Budget		Financial charges	-
169	Bonds			
170	Bonds	<b>67</b>	<b>Drawl Amount</b>	49,00,00,000
171	Bonds		Interest Debit	19,15,38,986

PART-IV  
Form 14

Name of the Petitioner Name of the Coal Mine		NTPC Ltd TALAI PALLI (Amount in Rs. Lakh)		
S NO	Department	Name of the Bank	Description	GRAND TOTAL
172	Bonds		Interest Credit	-
173	Bonds		Adj. Amount	-
174	Bonds		Net Charges	19,15,38,986
175	Bonds		Financial Charges	1,66,618
176	Bonds	69	<b>Drawl Amount</b>	1,15,00,00,000
177	Bonds		Interest Debit	34,03,31,723
178	Bonds		Interest Credit	-
179	Bonds		Adj. Amount	-
180	Bonds		Net Charges	34,03,31,723
181	Bonds		Financial Charges	3,37,376
182	Bonds	73	<b>Drawl Amount</b>	1,94,00,00,000
183	Bonds		Interest Debit	33,02,56,501
184	Bonds		Interest Credit	-
185	Bonds		Adj. Amount	-
186	Bonds		Net Charges	33,02,56,501
187	Bonds		Financial Charges	3,87,334
188	Bonds	74	<b>Drawl Amount</b>	48,00,00,000
189	Bonds		Interest Debit	7,97,82,378
190	Bonds		Interest Credit	-
191	Bonds		Adj. Amount	-
192	Bonds		Net Charges	7,97,82,378
193	Bonds		Financial Charges	92,672
194	Bonds	75	<b>Drawl Amount</b>	21,60,00,000
195	Bonds		Interest Debit	2,84,96,332
196	Bonds		Interest Credit	-
197	Bonds		Adj. Amount	-
198	Bonds		Net Charges	2,84,96,332
199	Bonds		Financial Charges	35,264
200	Bonds	76	<b>Drawl Amount</b>	26,00,00,000
201	Bonds		Interest Debit	2,94,36,579
202	Bonds		Interest Credit	-
203	Bonds		Adj. Amount	-
204	Bonds		Net Charges	2,94,36,579
205	Bonds		Financial Charges	66,120
206	Bonds	78	<b>Drawl Amount</b>	8,56,00,000
207	Bonds		Interest Debit	67,96,715
208	Bonds		Interest Credit	-
209	Bonds		Adj. Amount	-
210	Bonds		Net Charges	67,96,715
211	Bonds		Financial Charges	11,698
212	IF			
213	IF	EURO Loan I Drawl I	Drawl Amount	23,75,99,964
214	IF	EURO Loan I Drawl I	Interest Debit	1,08,64,725
215	IF	EURO Loan I Drawl I	Interest Credit	7,20,151
216	IF	EURO Loan I Drawl I	Withholding Tax	1,90,475
217	IF	EURO Loan I Drawl I	Adj. Amount	-
218	IF	EURO Loan I Drawl I	Net Charges	1,03,35,049
219	IF	EURO Loan I Drawl I	Financial charges	61,40,460
220	IF			-
221	IF	EURO Loan I Drawl II	Drawl Amount	74,72,00,039
222	IF	EURO Loan I Drawl II	Interest Debit	3,36,60,059
223	IF	EURO Loan I Drawl II	Interest Credit	10,79,903
224	IF	EURO Loan I Drawl II	Withholding Tax	5,78,051
225	IF	EURO Loan I Drawl II	Adj. Amount	-
226	IF	EURO Loan I Drawl II	Net Charges	3,31,58,207
227	IF	EURO Loan I Drawl II	Financial charges	1,90,98,766
228	IF			-

PART-IV  
Form 14

Name of the Petitioner Name of the Coal Mine		NTPC Ltd TALAIPALLI (Amount in Rs. Lakh)		
S NO	Department	Name of the Bank	Description	GRAND TOTAL
229 IF		EURO Loan I Drawl III	Drawl Amount	46,99,99,980
230 IF		EURO Loan I Drawl III	Interest Debit	2,08,85,321
231 IF		EURO Loan I Drawl III	Interest Credit	25,63,980
232 IF		EURO Loan I Drawl III	Withholding Tax	3,54,704
233 IF		EURO Loan I Drawl III	Adj. Amount	-
234 IF		EURO Loan I Drawl III	Net Charges	1,86,76,045
235 IF		EURO Loan I Drawl III	Financial charges	1,20,94,254
236 IF				-
237 IF		USD 750 Million I Drawl I	Drawl Amount	26,00,00,000
238 IF		USD 750 Million I Drawl I	Interest Debit	2,00,86,121
239 IF		USD 750 Million I Drawl I	Interest Credit	12,00,528
240 IF		USD 750 Million I Drawl I	Withholding Tax	1,51,230
241 IF		USD 750 Million I Drawl I	Adj. Amount	-
242 IF		USD 750 Million I Drawl I	Net Charges	1,90,36,822
243 IF		USD 750 Million I Drawl I	Financial charges	47,58,346
244 IF				-
245 IF		USD 750 Million I Drawl II	Drawl Amount	26,00,00,000
246 IF		USD 750 Million I Drawl II	Interest Debit	1,76,70,079
247 IF		USD 750 Million I Drawl II	Interest Credit	8,20,501
248 IF		USD 750 Million I Drawl II	Withholding Tax	1,33,211
249 IF		USD 750 Million I Drawl II	Adj. Amount	-
250 IF		USD 750 Million I Drawl II	Net Charges	1,69,82,789
251 IF		USD 750 Million I Drawl II	Financial charges	45,37,242
252 IF				-
253 IF		USD 750 Million I Drawl III	Drawl Amount	3,00,00,000
254 IF		USD 750 Million I Drawl III	Interest Debit	18,11,236
255 IF		USD 750 Million I Drawl III	Interest Credit	17,549
256 IF		USD 750 Million I Drawl III	Withholding Tax	13,662
257 IF		USD 750 Million I Drawl III	Adj. Amount	-
258 IF		USD 750 Million I Drawl III	Net Charges	18,07,349
259 IF		USD 750 Million I Drawl III	Financial charges	5,12,607
260 IF				-
261 IF		USD 750 Million I Drawl IV	Drawl Amount	15,99,96,119
262 IF		USD 750 Million I Drawl IV	Interest Debit	87,11,742
263 IF		USD 750 Million I Drawl IV	Interest Credit	3,40,815
264 IF		USD 750 Million I Drawl IV	Withholding Tax	65,720
265 IF		USD 750 Million I Drawl IV	Adj. Amount	-
266 IF		USD 750 Million I Drawl IV	Net Charges	84,36,648
267 IF		USD 750 Million I Drawl IV	Financial charges	27,04,532
268 IF				-
269 IF		USD 750 Million I Drawl V	Drawl Amount	7,00,02,855
270 IF		USD 750 Million I Drawl V	Interest Debit	33,29,369
271 IF		USD 750 Million I Drawl V	Interest Credit	1,18,890
272 IF		USD 750 Million I Drawl V	Withholding Tax	25,107
273 IF		USD 750 Million I Drawl V	Adj. Amount	-
274 IF		USD 750 Million I Drawl V	Net Charges	32,35,585
275 IF		USD 750 Million I Drawl V	Financial charges	11,79,305
276 IF				-
277 IF		USD 750 Million I Drawl VI	Drawl Amount	29,99,95,906
278 IF		USD 750 Million I Drawl VI	Interest Debit	1,21,13,885
279 IF		USD 750 Million I Drawl VI	Interest Credit	12,63,140
280 IF		USD 750 Million I Drawl VI	Withholding Tax	91,299
281 IF		USD 750 Million I Drawl VI	Adj. Amount	-
282 IF		USD 750 Million I Drawl VI	Net Charges	1,09,42,043
283 IF		USD 750 Million I Drawl VI	Financial charges	50,72,283
284 IF				-
285 IF		JPY Equ. \$400 Million Drawl I	Drawl Amount	13,49,99,996

PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

S NO	Department	Name of the Bank	Description	GRAND TOTAL
286	IF	JPY Equ. \$400 Million Drawl I	Interest Debit	5,69,118
287	IF	JPY Equ. \$400 Million Drawl I	Interest Credit	5,33,540
288	IF	JPY Equ. \$400 Million Drawl I	Withholding Tax	-
289	IF	JPY Equ. \$400 Million Drawl I	Adj. Amount	-
290	IF	JPY Equ. \$400 Million Drawl I	Net Charges	35,578
291	IF	JPY Equ. \$400 Million Drawl I	Financial charges	22,08,710
292	IF			-
293	IF	JPY Equ. \$400 Million Drawl II	Drawl Amount	50,00,00,000
294	IF	JPY Equ. \$400 Million Drawl II	Interest Debit	10,85,840
295	IF	JPY Equ. \$400 Million Drawl II	Interest Credit	2,04,866
296	IF	JPY Equ. \$400 Million Drawl II	Withholding Tax	-
297	IF	JPY Equ. \$400 Million Drawl II	Adj. Amount	-
298	IF	JPY Equ. \$400 Million Drawl II	Net Charges	8,80,974
299	IF	JPY Equ. \$400 Million Drawl II	Financial charges	82,59,151

<b>Drawl Amount</b>	<b>29,86,29,77,754</b>
Interest Debit	4,67,01,10,021
Interest Credit	88,63,864
Withholding Tax	16,03,458
Adj. Amount	(71,124)
Net Charges	4,66,27,78,490
Financial Charges	6,76,62,737
Drawl	
Budget	22,07,15,82,894
Bonds	4,62,16,00,000
IF	3,16,97,94,860
Total Drawl	29,86,29,77,754
Cumulative Drawl	
Repayment (incl trf to loan trf to Lara)	16,60,06,00,000
Cum Repayment	
FERV	4,81,11,967
Cum FERV	
<b>Net Cumm Loan inc FERV</b>	
<b>Net charges</b>	-
Budget	3,53,26,12,186
Bonds	1,00,66,39,214
IF	12,35,27,090
<b>Total</b>	
<b>Financial Charges</b>	
Budget	-
Bonds	10,97,082
IF	6,65,65,655
<b>Total FC</b>	



PART-IV  
Form 14Name of the Petitioner  
Name of the Coal MineNTPC Ltd  
TALAIPALLI

(Amount in Rs. Lakh)

		Name of the Bank	Description	GRAND TOTAL
S NO	Department	Name of the Bank	Description	GRAND TOTAL
			Interest Rate	

## Calculation of Notional IDC

Name of the Petitioner NTPC Ltd  
 Name of the Mine Talaipalli  
 Quarterly Debt Equity Ratio

(Amt in Rs. crore)

Qtr	Qtr Ended on	Expr. During Qtr	Cumulative Expr. Upto the end of Qtr	Debt Applied (Dom Borr and Bonds)	Repayments of DB & Bonds	Cumulative debt applied (DB & Bonds)	Debt Applied (ECB)	Repayments of ECB	ERV	Cumulative debt applied (ECB)	Cumulative debt applied (Total)	Debt Equity Ratio	Normative debt	Interest Rate pa	Notional IDC	Cumulative Notional IDC
		-	-	-		-										
	31-03-2017	721.51	721.51	-		-					-	0:100	505.06	1.97%	9.95	9.95
	30-06-2017	12.51	734.02	500.00		500.00					500.00	68:32	513.82	1.97%	0.27	10.22
	31-09-2017	30.14	764.16	34.00		534.00					534.00	70:30	534.91	1.87%	0.02	10.24
2017-Qtr3	31-12-2017	38.53	802.69	30.00		564.00					564.00	70:30	561.88	1.92%	-	10.24
2017-Qtr4	31-03-2018	279.38	1,082.08	-		564.00					564.00	52:48	757.45	1.95%	3.77	14.00
2018-Qtr1	30-06-2018	20.23	1,102.31	203.00		767.00					767.00	70:30	771.62	1.80%	0.08	14.09
2018-Qtr2	30-09-2019	122.64	1,224.95	60.00		827.00				-	827.00	68:32	857.47	1.99%	0.61	14.69
2018-Qtr3	31-12-2018	72.31	1,297.26	77.00		904.00				-	904.00	70:30	908.08	2.07%	0.08	14.78
2018-Qtr4	31-03-2019	256.33	1,553.59	639.00	549.00	994.00	-			-	994.00	64:36	1,087.51	1.97%	1.84	16.62
2019-Qtr1	30-06-2019	28.99	1,582.58	30.00		1,024.00	-			-	1,024.00	65:35	1,107.81	2.01%	1.69	18.30
2019-Qtr2	30-09-2019	165.18	1,747.76	215.00		1,239.00	-			-	1,239.00	71:29	1,223.43	1.89%	-	18.30
2019-Qtr3	31-12-2019	46.30	1,794.06	-		1,239.00	-			-	1,239.00	69:31	1,255.84	1.97%	0.33	18.63
2019-Qtr4	31-03-2020	187.07	1,981.13	50.00	1.50	1,287.50	-			-	1,287.50	65:35	1,386.79	1.87%	1.86	20.49
2020-Qtr1	30-06-2020	41.61	2,022.74	25.00		1,312.50	-			-	1,312.50	65:35	1,415.92	1.80%	1.86	22.35
2020-Qtr2	30-09-2020	84.09	2,106.83	123.50	13.50	1,422.50	-			-	1,422.50	68:32	1,474.78	1.62%	0.85	23.20
2020-Qtr3	31-12-2020	113.33	2,220.16	75.00		1,497.50	-			-	1,497.50	67:33	1,554.11	1.64%	0.93	24.13
2020-Qtr4	31-03-2021	(1,077.89)	1,142.27	214.00	1,011.44	700.06	-			-	700.06	61:39	799.59	3.71%	3.69	27.82
2021-Qtr1	30-06-2021	53.36	1,195.63	48.00		748.06	23.76			23.76	771.82	65:35	836.94	1.63%	1.06	28.88
2021-Qtr2	30-09-2021	124.27	1,319.90	81.60		829.66	121.72			145.48	975.14	74:26	923.93	1.44%	-	28.88
2021-Qtr3	31-12-2021	75.56	1,395.46	26.00		855.66	-			145.48	1,001.14	72:28	976.82	1.38%	-	28.88
2021-Qtr4	31-03-2022	101.21	1,496.67	26.00	7.00	874.66	-	(2.61)		142.87	1,017.53	68:32	1,047.67	1.40%	0.42	29.30
2022-Qtr1	30-06-2022	44.61	1,541.28	15.00		889.66	26.00			168.87	1,058.53	69:31	1,078.90	1.43%	0.29	29.60
2022-Qtr2	30-09-2022	34.42	1,575.70	21.56		911.22	29.00			197.87	1,109.09	70:30	1,102.99	1.49%	-	29.60
2022-Qtr3	31-12-2022	79.81	1,655.51	6.00	8.56	908.66	23.00		-	220.87	1,129.53	68:32	1,158.86	1.61%	0.47	30.07
2022-Qtr4	31-03-2023	180.41	1,835.92	102.66	60.50	950.82	30.00		11.89	262.76	1,213.58	66:34	1,285.14	1.59%	1.14	31.21
2023-Qtr1	30-06-2023	90.54	1,926.46	47.00		997.82	13.50			276.26	1,274.08	66:34	1,348.52	1.66%	1.24	32.44
2023-Qtr2	30-09-2023	139.99	2,066.45	20.00	8.56	1,009.26	50.00		(4.48)	321.78	1,331.04	64:36	1,446.52	1.71%	1.97	34.42

<u>Details of Applicable Statutory Charges</u>							PART- IV FORM- 16
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
Particulars	Applicable Rate	Quantity	Amount (2019-20)	Amount (2020-21)	Amount (2021- 22)	Amount (2022- 23)	Amount (2023- 24)
Royalty	% of Input Price (CIL Basic Rate)	14%					115.78
GST under Reverse Charge Mechanism	% of Royalty	18%					20.84
District Mineral Foundation (DMF)	% of Royalty	10%					11.58
GST under Reverse Charge Mechanism	% of DMF	18%					2.08
National Mineral Exploration Trust (NMET)	% of Royalty	2%					2.32
GST under Reverse Charge Mechanism	% of NMET	18%					0.42
Mineral Transit Cess (Forest Cess)	Rs per tonne	19.32					19.32
GST under Reverse Charge Mechanism	% of Forest Cess	18%					3.48
CG Vikas Upkar	Rs per tonne	11.25	Not Applicable	Not Applicable	Not Applicable	Not Applicable	11.25
GST under Reverse Charge Mechanism	% of CG Vikas Upkar	18%					2.03
CG Paryavaran Upkar	Rs per tonne	11.25					11.25
GST under Reverse Charge Mechanism	% of Paryavaran Upkar	18%					2.03
Reserve Price (with escalation)	Rs per tonne	133.00					133.00
GST under Reverse Charge Mechanism	% Reserve Price	18%					23.94
GST on MDO price	% of Mining Charges	18%					142.90
Total							502.21
							(Petitioner)

<u>Details of Mine Closure Expenses</u>						PART- IV FORM- 17
Name of the Petitioner : NTPC						
Name of the Integrated Mine : Talaipalli						
<b>Amount in Rs Lakhs</b>						
1. Amount Deposited in Escrow Account prior to date of Commercial Operation (Rs)					PV	2,190.86
2. Life of Mine over which amount is to be recovered (Yrs)					n	31
3. Borrowing Rate per year (%)					r	6.83%
4. Amount recoverable per Year (Rs)					$P = PV \times r / [1-(1+r)^{-n}]$	71.45
<b>5. Deposit after the date of Commercial operation - when mine closure is in scope of Generating Company itself</b>						
Production Year No. (1)	Amount of Deposit in Escrow account (2)	Date of Deposit in Escrow account (3)	Interest Earned/Accrued in Escrow account (4)	Amount received from Escrow account towards Mine closure (5)	Admissible Mine closure expense (6)	
3	304.24				304.24	
4					0.00	
5					0.00	
6					0.00	
<b>6. Deposit after the date of Commercial operation - when mine closure is in scope of Mine Developer &amp; Operator (MDO)</b>						
Production Year No. (1)	Amount of Deposit in Escrow account (2)	Date of Deposit in Escrow account (3)	Borrowing cost at weighted average rate of interest of actual loan (4)	Interest Earned/Accrued in Escrow account (5)	Amount received from Escrow account towards Mine closure (6)	Adjustment to be made in Input price as a part of Mine closure expense (7)
3	304.24		20.77	12.17		8.60
4			20.77			20.77
5			20.77			20.77
6			20.77			20.77
Note: Rate of interest in escrow account has been provisionally taken as 4% and the actual interest shall be submitted at the time of truing up.						
						<b>Petitioner</b>

<b>Abstract of Capital Cost Estimates and Cost on the date of Commercial Operation of the Integrated Mine</b>				PART- IV FORM- A	
<b>Name of the Petitioner : NTPC</b>					
<b>Name of the Integrated Mine : Talaipalli</b>					
Board of Director/ Agency approving the Capital cost estimates:				Board of Director	
	As per original Investment Approval	As per original Investment Approval	As per Revised Investment Approval	Actual	
	Initial Cost	Completed Cost	Present Day Cost		
Price level of approved estimates	As on End of III Qtr. of the year 2016		Present Day Cost	As on COD 01.10.2023	
Foreign Exchange rate considered for the Capital cost estimates					
<b>Capital Cost excluding IDC, IEDC &amp; FC (Rs. Lakh)</b>					
Foreign Component, if any (In Million US \$ or the relevant Currency)					
Domestic Component (Rs. Lakh)	2,86,982	3,17,910	3,63,870	2,01,969	
<b>Capital cost excluding IDC, IEDC, FC, FERV &amp; Hedging Cost (Rs. Lakh)</b>					
Foreign Component, if any (In Million US \$ or the relevant Currency)					
Domestic Component (Rs. Lakh)	19,549	20,178	35,817	30,286	
<b>Total IDC, WC, FC, FERV &amp; Hedging Cost (Rs. Lakh)</b>					
Rate of taxes & duties considered					
<b>Capital cost Including IDC, IEDC, FC, FERV &amp; Hedging Cost</b>					
Foreign Component, if any (In Million US \$ or the relevant Currency)					
Domestic Component (Rs. Lakh)	3,06,531	3,38,088	3,99,687	2,32,255	
<b>Capital cost Including IDC, IEDC&amp; FC (Rs. Lakh)</b>					
Foreign Component, if any (In Million US \$ or the relevant Currency)					
<b>Schedule</b>					
Scheduled date of commercial operation as per Investment Approval/Mine Plan			Not Defined		
Scheduled date of Peak rated capacity as per Investment Approval/Mine Plan			Not Defined		
Actual COD of last Unit/Block			01.10.2023		
<b>(Petitioner)</b>					

Break-up of Capital Cost for New Integrated Mine									Part - IV Form-B
Name of the Petitioner : NTPC									
Name of the Integrated Mine : Talaipalli									
(Amount in Rs. Lakh)									
S. No.	Break Down	As per Original Investment Approval	MGR Cost transferred to LARA	As per revised Investment Approval (RCE)	Actual Capital Expenditure as on date of commercial operation	Liabilities/ Provisions	Variation (3A - 4 - 5)	Specific Reasons for Variation	Estimated Capital expenditure up to Peak Rated Capacity
1	2	3		3A	4	5	6	7	8
<b>1</b>	<b>Cost of Land &amp; Site Development</b>								
1.1	Land								
1.2	Freehold Land *	23,685.00	-10,195.67	15,279.33	1,649.84	-	16,664.33	Ajjigarh land issue (approx. 240 acres) which was pending with district administration has been resolved recently and payment shall be disbursed to concerned claimants shortly.	
1.3	Lease Hold Land *				436.34				
1.4	CBA Land	53,151.00	-10,863.00	42,288.00	38,816.82	-			
1.5	Rehabilitation & Resettlement (R&R)	51,484.00	-	64,013.25	37,362.10	26,651.15	-		
1.6	Preliminary Investigation & Site Development (Prospecting and Boring)	3,474.00	-	4,570.23	4,570.23	-	-		
	<b>Total Land &amp; Site Development</b>	<b>1,31,794.00</b>	<b>-21,058.67</b>	<b>1,26,150.81</b>	<b>82,835.33</b>	<b>26,651.15</b>	<b>16,664.33</b>		
<b>2</b>	<b>Plant &amp; Equipment</b>	-	-			-	-		
2.1	Coal Handling Plant	-	-	1,15,556.22	-	-	1,15,556.22	CHP has been shifted from the scope of MDO to NTPC scope as per Revised Cost Estimate (RCE) which is under approval. Expected/Tentative Cost- approx. 1156 Cr, the work of which will commence after Mar'24.	
2.2	Material Handling system	-	-	-	-	-	-		
2.3	Fixed Infrastructure Mechanical	-	-	-	-	-	-		
2.4	Other Plant and Machinery incl Elect Installation	3,632.00	-	9,346.00	4,252.05	500.46	4,593.49	10MW solar plant in MGR bulb area expected till achieving peak rated capacity.	
2.5	Railway Siding *	1,04,929.00	-1,02,940.00	4,289.00	-	-	4,289.00	Construction of Wharf wall is under progress.	
	<b>Total BOP Mechanical</b>	<b>1,08,561.00</b>	<b>-1,02,940.00</b>	<b>1,29,191.22</b>	<b>4,252.05</b>	<b>500.46</b>	<b>1,24,438.71</b>		
<b>3</b>	<b>Plant &amp; Machinery</b>								
3.1	Switchyard Package	-	-	-	-	-	-		
3.2	Emergency D G Set	-	-	-	-	-	-		
3.3	Fixed Infrastructure Electrical	-	-	-	-	-	-		
	<b>Total BOP Electrical</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>		
<b>4</b>	<b>Spares</b>	-	-	-	-	-	-		
4.1	Initial Spares	-	-	-	-	-	-		
	<b>Total Plant and Machinery</b>	<b>1,08,561.00</b>	<b>-1,02,940.00</b>	<b>1,29,191.22</b>	<b>4,252.05</b>	<b>500.46</b>	<b>1,24,438.71</b>		
<b>5</b>	<b>Civil Works</b>								
5.1	Township & Colony/Aux Building	6,422.00	-	24,651.00	11,600.32	707.75	12,342.94	Work is in progress for Admin building, other buildings, roads, township and associated developmental works, WTP plant, Security Barrack etc.	
5.2	Temporary Construction & Enabling Works	-	-	-	-	-	-		
5.3	Road and Drainage	2,480.00	-	5,170.00	3,323.40	167.67	1,482.19		
5.4	Fixed Infrastructure Civil	4,656.00	-		189.23	7.52			
	<b>Total Civil Works</b>	<b>13,558.00</b>	<b>-</b>	<b>29,821.00</b>	<b>15,112.95</b>	<b>882.93</b>	<b>13,825.12</b>		
<b>6</b>	<b>Overheads</b>								
6.1	Establishment (Other Expenditure directly attributable to Construction)	17,779.00	-	72,454.52	54,747.74	1,445.94	2,265.87	Delay in COD by approx 02 years i.e.instead of November 2021,COD was declared on 01.10.2023 as detailed out in the petition enclosed.	

## Break-up of Capital Cost for New Integrated Mine

Part - IV  
Form-B

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

(Amount in Rs. Lakh)

S. No.	Break Down	As per Original Investment Approval	MGR Cost transferred to LARA	As per revised Investment Approval (RCE)	Actual Capital Expenditure as on date of commercial operation	Liabilities/ Provisions	Variation (3A - 4 - 5)	Specific Reasons for Variation	Estimated Capital expenditure up to Peak Rated Capacity
					Actual Amount (Cash Basis)				
1	2	3		3A	4	5	6	7	8
6.2	Mine Development expenditure excluding IDC	14,920.00	-		13,994.97	-		Work is in progress	
6.3	MBOA	367.00	-	6,252.50	1,534.21	11.32	4,706.96	Work in progress regarding furnishing and completion of Admin building, survey instruments, softwares, procurement of TLS, Dump slope radar, Simulator, IPBAX system, furnishing newly built Township etc.	
	<b>Total Overheads</b>	<b>33,066.00</b>	<b>-</b>	<b>78,707.02</b>	<b>70,276.92</b>	<b>1,457.26</b>	<b>6,972.84</b>		
7	<b>Total Capital cost excluding IDC &amp; FC</b>	<b>2,86,979.00</b>	<b>-1,23,999</b>	<b>3,63,870.05</b>	<b>1,72,477.25</b>	<b>29,491.81</b>	<b>1,61,900.99</b>		
8	<b>IDC, FC, FERV &amp; Hedging cost</b>								
8.1	Interest During Construction (IDC) *	12,369.00	-16,564.00		30,106.20			Delay in COD by approx 02 years i.e.instead of November 2021,COD was declared on 01.10.2023 as detailed out in the petition enclosed.	
8.2	Financing charges (FC)	1,051.00	-	29,688.00	179.73		-597.93		
8.3	Foreign Exchange Rate Variation (FERV)	-	-	-	-		-		
8.4	Hedging cost	-	-	-	-		-		
8.5	WCM	6,129.00	-	6,129.00	-		6,129.00		
	<b>Total of IDC, FC, FERV &amp; Hedging cost</b>	<b>19,549.00</b>	<b>-16,564.00</b>	<b>35,817.00</b>	<b>30,285.93</b>	<b>-</b>	<b>5,531.07</b>		
9	Capital cost including IDC,FC,FERV & Hedging cost								
11	<b>Total</b>	<b>3,06,528.00</b>	<b>-1,40,562.67</b>	<b>3,99,687.05</b>	<b>2,02,763.18</b>	<b>29,491.81</b>	<b>1,67,432.06</b>		

(Petitioner)

<u>Break-up of Construction/Supply/Service packages</u>							PART- IV FORM- C
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
(Amount in Rs. Lakh)							
S. No.	Name/No. of Construction / Supply / Service Package	Land Acquisition		Mine development expenses	MBOA	Other Misc Works	Total Cost of all packages
		Lease Hold Land	R&R Expenses	Mine development expenses			
1	Scope of works (in line with head of cost break-ups as applicable)						
2	Whether awarded through ICB/DCB/ Departmentally/ Deposit Work			DCB	DCB	DCB	DCB
3	No. of bids received						
4	Date of Award						
5	Date of Start of work			25	320	57	402
6	Date of Completion of Work/Expected date of completion of work						
7	Value of Award in (Rs. Lakh)			15,638.81	1,723.71	24,328.71	41,691.23
8	Firm or With Escalation in prices			Firm	Firm	Firm	Firm
9	Actual capital expenditure till the completion or up to date of commercial operation whichever is earlier(Rs.Lakh)	45,473.23	64,013.25	13,994.97	1,545.54	20,748.40	1,45,775.38
10	Taxes & Duties and IEDC (Rs. Lakh)			56,193.68	-		56,193.68
11	IDC, FC, FERV & Hedging cost (Rs. Lakh)			30,285.93	-		30,285.93
12	Sub -total (9+10+11) (Rs. Lakh)	45,473.23	64,013.25	1,00,474.58	1,545.54	20,748.40	2,32,254.99
<b>(Petitioner)</b>							



<b>Reconciliation of capitalization claimed vis-à-vis books of accounts</b>		<b>PART-IV Form-E</b>
<b>Name of the Petitioner : NTPC</b>		
<b>Name of the Integrated Mine : Talaipalli</b>		
(Amount in Rs. Lakh)		
<b>S. No.</b>	<b>Particulars</b>	<b>2023-24 (as on COD)</b>
<b>1</b>	<b>2</b>	<b>3</b>
1	Closing Gross Block as per IND AS	
2	Ind-AS Adjustment	
3	Closing Gross Block as per I GAAP	
4	Opening Gross Block as per IND AS	2,43,259.33
5	Add/Less: Adjustments	-11,004.33
6	Opening Gross Block as per I GAAP	2,32,254.99
<b>7</b>	<b>Total Additions as per books (G = 3 - 5)</b>	
8	Less: Additions pertaining to other Mines (give Mine wise breakup)	
<b>9</b>	<b>Net Additions pertaining to instant Mine</b>	
10	Less: Exclusions (items not allowable / not claimed)	
<b>11</b>	<b>Net Additional Capital Expenditure Claimed (on accrual basis) (I GAAP)</b>	
<b>12</b>	<b>Less: Un-discharged Liabilities</b>	
<b>13</b>	<b>Add: Discharges of un-discharged liabilities, corresponding to admitted asstes/works</b>	
<b>14</b>	<b>Net Additional Capital Expenditure Claimed (on cash basis)</b>	
<i>Note: Other figures to be provided at the time of truing-up</i>		
<b>Petitioner</b>		

## Statement of Capital cost

PART- IV  
FORM- G

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

(Amount in Rs. Lakh)

S. No.	Particulars	As on COD		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening Gross Block Amount as per books (Indian GAAP)	2,32,254.99	29,491.81	2,02,763.18
	b) Amount of IDC in A(a) above	30,106.20	-	30,106.20
	c) Amount of FC in A(a) above	179.73	-	179.73
	d) Amount of FERV in A(a) above	-	-	-
	e) Amount of Hedging Cost in A(a) above			
	f) Amount of IEDC in A(a) above			
B	a) Addition in Gross Block Amount during the period (Direct purchases) (Indian GAAP)			
	b) Amount of IDC in B(a) above			
	c) Amount of FC in B(a) above			
	d) Amount of FERV in B(a) above			
	e) Amount of Hedging Cost in B(a) above			
	f) Amount of IEDC in B(a) above			
C	a) Addition in Gross Block Amount during the period (Transferred from CWIP) (Indian GAAP)			
	b) Amount of IDC in C(a) above			
	c) Amount of FC in C(a) above			
	d) Amount of FERV in C(a) above			
	e) Amount of Hedging Cost in C(a) above			
	f) Amount of IEDC in C(a) above			
D	a) Deletion in Gross Block Amount during the period (Indian GAAP)			
	b) Amount of IDC in D(a) above			
	c) Amount of FC in D(a) above			
	d) Amount of FERV in D(a) above			
	e) Amount of Hedging Cost in D(a) above			
	f) Amount of IEDC in D(a) above			
E	a) Closing Gross Block Amount as per books (Indian GAAP)			
	b) Amount of IDC in E(a) above			
	c) Amount of FC in E(a) above			
	d) Amount of FERV in E(a) above			
	e) Amount of Hedging Cost in E(a) above			
	f) Amount of IEDC in E(a) above			

Shall be provided at the time of truing up

(Petitioner)

<u>Statement of Capital Works in Progress</u>				PART- IV FORM- H
<b>Name of the Petitioner : NTPC</b>				
<b>Name of the Integrated Mine : Talaipalli</b>				
(Amount in Rs. Lakh)				
S. No.	Particulars	As on COD		
		Accrual Basis	Un-discharged Liabilities	Cash Basis
A	a) Opening CWIP as per books (Indian GAAP)	1,483.05	1,313.64	169.41
	b) Amount of IDC in A(a) above	33.74	-	33.74
	c) Amount of FC in A(a) above			
	d) Amount of FERV in A(a) above			
	e) Amount of Hedging Cost in A(a) above			
	f) Amount of IEDC in A(a) above			
B	a) Addition in CWIP during the period(Indian GAAP)			
	b) Amount of IDC in B(a) above			
	c) Amount of FC in B(a) above			
	d) Amount of FERV in B(a) above			
	e) Amount of Hedging Cost in B(a) above			
	f) Amount of IEDC in B(a) above			
C	a) Transferred to Gross Block Amount during the period (Indian GAAP)			
	b) Amount of IDC in C(a) above			
	c) Amount of FC in C(a) above			
	d) Amount of FERV in C(a) above			
	e) Amount of Hedging Cost in C(a) above			
	f) Amount of IEDC in C(a) above			
D	a) Closing CWIP as per books (Indian GAAP)			
	b) Amount of IDC in E(a) above			
	c) Amount of FC in E(a) above			
	d) Amount of FERV in E(a) above			
	e) Amount of Hedging Cost in E(a) above			
	f) Amount of IEDC in E(a) above			
Shall be provided at the time of truing up				
<b>(Petitioner)</b>				

**Calculation of Interest on Normative Loan****PART- IV  
FORM- I**

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24 (01.10.2023- 31.03.2024)
1	2	3	4	5	6	7	8
1	Gross Normative loan – Opening		Not Applicable	Not Applicable	Not Applicable	Not Applicable	1,44,974.62
2	Cumulative repayment of Normative loan up to previous year						-
3	<b>Net Normative loan – Opening</b>						1,44,974.62
4	Add: Increase due to addition during the year						7,249.01
5	Less: Decrease due to de-capitalisation during the year						-
6	Add: Increase due to discharges during the year / period						-
6A	Less: repayment during the period						4,570.25
7	<b>Net Normative loan - Closing</b>						1,47,653.38
8	<b>Average Normative loan</b>						1,46,314.00
9	Weighted average rate of interest						6.83%
10	Interest on Loan		9,989.69				

**(Petitioner)**

Calculation of Interest on Working CapitalPART- IV  
FORM- J

Name of the Petitioner : NTPC

Name of the Integrated Mine : Talaipalli

(Amount in Rs Lakh)

S. No.	Particulars	Existing 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
1	2	3	4	5	6	7	8
1	Input Cost of Coal Stock for 7 days of Production corresponding to ATQ for the relevant year						1609.60
2	Consumption of stores and spare including explosives, lubricants and fuels (@ 15%) of O&M expenses excluding mining charge of MDO or annual charge of any agency other than MDO		Not Applicable	Not Applicable	Not Applicable	Not Applicable	1253.15
3	One Month O & M Expenses excluding mining charge of MDO or annual charge of any agency other than MDO						696.20
4	Total Working Capital						3558.95
5	Rate of Interest						12.00
6	Interest on Working Capital						427.07

(Petitioner)

<u>Incidental Expenditure up to date of commencement of Production and up to Actual date of commercial operation</u>			PART- IV FORM- K
Name of the Petitioner : NTPC			
Name of the Integrated Mine : Talaipalli			
(Amount in Rs. Lakh)			
S. No.	Parameters	As on date of commencement of Production	As on actual/anticipated date of commercial operation
<b>A</b>	<b>Head of Expenses:</b>		
1	Employees' Benefits Expenses	13,063.11	24,118.03
2	Other Finance Charges	127.64	154.31
2	Communication Expenses	236.00	467.71
3	Power Charges	190.89	926.79
3	Depreciation	1,035.94	10,896.67
4	EDP hire and other charges	120.40	187.57
4	Entertainment expenses	113.52	204.27
5	Vehicle running expenses	604.65	1,555.74
5	Insurance	6.72	59.08
6	Legal expenses	28.51	759.26
6	Miscellaneous expenses	254.48	405.01
7	Printing and stationery	40.39	69.70
7	Rates and taxes	166.90	338.60
8	Rent	90.62	162.44
8	Security expenses	377.28	1,732.53
9	Repair & Mtce	1,149.88	3,409.53
9	Advertisement and publicity	152.46	170.17
10	IEDC Allocated	3,424.22	5,993.47
10	Canteen expenses	24.89	398.03
11	Manpower hiring expenses	452.74	1,590.25
11	Other Pre-Operating Expenses -Cost of captive coal	1,157.54	93,994.60
<b>B</b>	<b>Total Expenses</b>	<b>22,818.79</b>	<b>1,47,593.76</b>
1	Less: Income from sale of tenders	-1.87	-2.57
2	Less: Income recovered from Contractors	-41.49	-321.09
3	Less: Other Misc Income	-92.71	-196.26
4	Less: Pre Commsioning Income on Sale of Coal	-	-90,880.17
<b>Establishment (Other Expenditure directly attributable to Construction)</b>		<b>22,682.71</b>	<b>56,193.68</b>
<b>(Petitioner)</b>			

Actual cash expenditure							PART- IV FORM- M
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
(Amount in Rs. Lakh)							
Particulars	Expenditure towards Gross Block	Add: Expenditure towards CWIP	Add: Capital Advances, if any	Less: Un- discharged liabilities (included)	Add/Less: Others	Payment to contractors / suppliers towards capital assets	Cumulative payments
Q42006-07	2.11					2.11	2.11
Q12007-08	0.21					0.21	2.32
Q42007-08	7.29					7.29	9.62
Q12008-09	0.19					0.19	9.81
Q22008-09	9.31					9.31	19.12
Q32008-09	12.48					12.48	31.60
Q42008-09	11.04					11.04	42.64
Q32009-10	2.98					2.98	45.63
Q42009-10	4.57					4.57	50.20
Q12010-11	4.50					4.50	54.70
Q22010-11	14.89					14.89	69.58
Q32010-11	3.08					3.08	72.66
Q42010-11	1.17		2,108.06			2,109.23	2,181.89
Q12011-12	3.71					3.71	2,185.60
Q22011-12	231.14					231.14	2,416.74
Q32011-12	21.54					21.54	2,438.28
Q42011-12	2.51		3,545.35			3,547.86	5,986.14
Q12012-13	5.43					5.43	5,991.56
Q22012-13	1.53					1.53	5,993.09
Q32012-13	39,242.32					39,242.32	45,235.42
Q42012-13	43,330.32		1,222.09	5643.5031		38,908.90	84,144.32
Q12013-14	3.11					3.11	84,147.43
Q22013-14	288.71					288.71	84,436.14
Q32013-14	0.41			4520.93636		-4,520.53	79,915.62
Q12014-15	12.40		2,047.96	2278.475471		-218.11	79,697.50
Q22014-15	9,452.53		-8,923.45	-		529.08	80,226.58
Q32014-15	3.65			0		3.65	80,230.23
Q42014-15				5,494.74		-5,494.74	74,735.49
Q12015-16				16,169.79		-16,169.79	58,565.70
Q22015-16	6.38			0.00		6.38	58,572.08
Q32015-16	5.96			0.00		5.96	58,578.04
Q42015-16	9.52	37,169.29		0.00		37,178.80	95,756.84
Q12016-17	4.47			16,419.35		-16,414.88	79,341.96
Q22016-17	242.24			0.00		242.24	79,584.20
Q32016-17	2.39			0.00		2.39	79,586.59
Q42016-17	1,123.43	2,492.15	337.49	5,859.70		-1,906.64	77,679.96
Q1 2017-18	2.84		22,723.50	3,547.43		19,178.91	96,858.87
Q2 2017-18	9.89		2,034.69	7.05		2,037.53	98,896.40
Q3 2017-18	23.95		936.18	-14.75		974.88	99,871.28
Q4 2017-18	44.59	27,426.15	-8,738.57	-2,986.67		21,718.84	1,21,590.12
Q1 2018-19	26.24		154.05	179.97		0.32	1,21,590.44
Q2 2018-19	10,847.65		-8,104.45	-4,030.50		6,773.69	1,28,364.13
Q3 2018-19	91.23		805.69	-135.36		1,032.29	1,29,396.42
Q4 2018-19	4,980.14	43,756.85	-7,949.16	1,676.87		39,110.97	1,68,507.39
Q1 2019-20	287.38	6,761.56	1,554.09	73.47		8,529.57	1,77,036.96
Q2 2019-20	423.50	6,463.50	2,408.47	-5.44		9,300.91	1,86,337.87
Q3 2019-20	988.74	8,172.66	1,023.13	829.82		9,354.72	1,95,692.59
Q4 2019-20	1,957.27	12,079.54	-3,265.27	-4699.01		15,470.55	2,11,163.14
Q1 2020-21	593.04	7,657.32	-291.68	-1459.36		9,418.03	2,20,581.18
Q2 2020-21	390.12	7,492.34	201.99	-1090.44		9,174.89	2,29,756.07
Q3 2020-21	3,672.75	9,029.12	877.85	-155.88		13,735.60	2,43,491.67
Q4 2020-21	-15,657.64	-1,15,974.96	289.87	-3153.76		-1,28,188.96	1,15,302.70
Q1 2021-22	-84.62	12,833.48	-522.77	-2456.81		14,682.90	1,29,985.60
Q2 2021-22	675.48	5,469.59	-744.95	-2427.68		7,827.80	1,37,813.40
Q3 2021-22	310.37	4,247.51	1,282.28	-24.46		5,864.63	1,43,678.03
Q4 2021-22	2,343.03	4,561.08	-1,925.80	-4512.18		9,490.49	1,53,168.52
Q12022-23	196.18	4,187.39	270.40	-1486.26		6,140.24	1,59,308.76
Q22022-23	9,415.23	1,353.13	-1,243.73	2940.76		6,583.87	1,65,892.63
Q32022-23	5,391.19	5,748.08	645.03	-938.20		12,722.50	1,78,615.13
Q42022-23	4,309.09	3,035.65	-1,411.64	-4946.67		10,879.77	1,89,494.90
Q12023-24	59.42	5,508.83	2,440.52	-2044.35		10,053.12	1,99,548.02
Q22023-24	3,593.73	5,309.44	-74.86	1731.35		7,096.96	2,06,644.98
COD -01.10.23	1,03,296.63	-1,03,296.63				-	2,06,644.98
<b>Total</b>	<b>2,32,254.99</b>	<b>1,483.05</b>	<b>3,712.38</b>	<b>30,805.44</b>	<b>-</b>	<b>2,06,644.98</b>	

(Petitioner)

Statement of Liability Flow							PART- IV FORM- N
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
Amount in Rs Lakhs							
Party	Asset / Work	Year of actual capitalization	Original Liability in case date of commercial operation is prior to 31.3.2019	Liability as on CoD 01.10.2023	Discharges (Year wise)	Reversal (Year wise)	Net Liability at end of each year
4200052190 : SARTECH INTL	Procurement of TGA for establishment of Coal lab at Talaipalli Coal	01.10.2023		0.52			
4200052796 : N R ENTERPRISE	Procurement of Coal Lab equipments for Talaipalli Coal Mining Project.	01.10.2023		1.64			
4200053900 : Allied Commercial Agencies Pvt LTD	Procurement of outdoor type changeover Switch board and Distribution	01.10.2023		0.39			
4200055631 : ADHUNIK SWITCHGEARS PVT LTD	Procurement of electrical Items for Talaipalli CMP	01.10.2023		0.28			
4200056418 : TEMPESENS INSTRUMENTS (I) PVT LTD	Regularising case of GeM PO no. GEMC-511687767323907 dt. 27.06.2022 for	01.10.2023		0.19			
4200056536 : GANPATI CASTINGS	Procurement of Hume pipes of diameter 600mm 24 nos each 2.5m length and	01.10.2023		0.12			
4200057203 : PARTH ENERGY SYSTEMS PVT LTD	Procurement of Dewatering pump along with accessories for Talaipalli	01.10.2023		0.95			
4200058858 : META TECH PORTABLE CABIN	Design, Supply & Installation of 7nos of porta Office	01.10.2023		0.79			
4200059041 : GREEN DHARA	Procurement of 1000 GPM Pump for dewatering of mine to deal with	01.10.2023		0.20			
4200059181 : SHIVPRIYA INDUSTRIES	Supply and installation of Prefab toilets (6 nos) and prefab security	01.10.2023		0.34			
4200059184 : ELTECKS INDIA	Procurement of LED Flood lights TLCMP	01.10.2023		0.13			
4200059400 : PYROTRONICS INDIA PRIVATE LIMITED	Procurement of Digital Electromagnetic flow meter.	01.10.2023		0.04			
4200059407 : ARROW PC NETWORK PRIVATE LIMITED	Procurement of UPS for various locations of TLCMP.	01.10.2023		0.77			
4200059490 : HARISON GENERATORS PRIVATE LIMITED	Regularising case of GeM PO no. GEMC-511687792149407 dt. 16.05.2023 for	01.10.2023		0.56			
4500081868 : A N EXFLAME FIRE PROTECTION PVT LTD	Procurement of CO2 Fire Extinguisher for store room at 132 KV	01.10.2023		0.10			
4600010276 : SATYA FABRICATE	“Providing Courier service between TLCMP , Raigarh (C.G.) to NTPC Scope	01.10.2023		0.34			
4600021912 : UTILITY POWERTECH LIMITED	Deployment of ad-hoc manpower for LA at TLCMP Gharghoda Dist. Raigarh	01.10.2023		0.04			
4600039766 : SHASTRI ASSOCIATES	OVERHAULING OF DG SET MAKE-MAHINDRA POWEROL (02 Nos.) of TALAIPALLI COAL	01.10.2023		0.17			



Statement of Liability Flow							PART- IV FORM- N
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
Amount in Rs Lakhs							
Party	Asset / Work	Year of actual capitalization	Original Liability in case date of commercial operation is prior to 31.3.2019	Liability as on CoD 01.10.2023	Discharges (Year wise)	Reversal (Year wise)	Net Liability at end of each year
4600049424 : SHRI SHYAM TECHNO	Supply, Installation and Commissioning of two nos. of fully electronic	01.10.2023		3.32			
4600049933 : GOYAL MEDICO	Procurement of ECG MACHINE.	01.10.2023		0.04			
4600049964 : YORCO SALES PVT LTD	Procurement of AUTOCLAVE.	01.10.2023		0.02			
4600050408 : DEEPEE ELECTRONICS	Procurement of "All-In-One Computer"	01.10.2023		0.39			
4600050425 : GOYAL MEDICO	procurement of oxygen concentrator system.	01.10.2023		0.02			
4600050614 : DEEPA ENTERPRISES	PROCUREMENT OF AUTOMATED EXTERNAL DEFIBRILLATOR (AED) FOR STABILISATION	01.10.2023		0.04			
4600051442 : KAMLA INSTRUMENTS	Supply installation and commissioning 10KW Solar power plant.	01.10.2023		1.70			
4600052261 : RATAN TRADERS	Procurement of steel almira for tehsildar office Raigarh under	01.10.2023		0.13			
4600056381 : NADVIN TECH LABS	Procurement of 10 Nos Network Swiches.	01.10.2023		0.14			
4600057207 : EBIZ SOLUTIONS PVT LTD	Procurement of walkie talkie communication system for Talaipalli Coal	01.10.2023		0.17			
4600058366 : INDIA MEDICO INSTRUMENTS	Supply of Physiotherapeutic equipments.	01.10.2023		0.23			
4600060791 : LOKHIT JAN KALYAN SEVA SAMITI	Supply and Installation of 1 No. 2 HP Submersible Pump Including	01.10.2023		1.32			
4600061625 : FORTUNA IMPEX PVT.LTD.	SUPPLY, INSTALLATION, COMMISSIONING <(>&<)> AMC OF BIOMETRIC SYSTEM WITH	01.10.2023		1.88			
4600061763 : CACTUS PROFILES PVT LTD	Supply <(>&<)> Installation of Prefab Security cabins at Talaipalli Coal	01.10.2023		1.52			
4600062778 : R K NURSERY	FOR SUPPLY, PLANTATION <(>&<)> MAINTENANCE OF INDOOR PLANTS, TREES,	01.10.2023		0.67			
4600065354 : EWIT INFOTECH PRIVATE LIMITED	Procurement of ONE number of 65 inch TV and ONE number of 43 inch TV	01.10.2023		0.03			
4600066936 : R S POWER SOLUTIONS LLP	Procurement of 02 number of 10KVA ONLINE UPS for Talaipalli Coal Mining	01.10.2023		0.14			
4600069546 : GRAND SLAM FITNESS PVT LTD	Regularising case of GeM PO no.GEMC-511687751073634 dt. 11.03.2022 for	01.10.2023		0.55			
4600069569 : VEDANTA ELECTRICALS PVT. LTD.	Prourment of 48 nos of LED TV 43 inch.	01.10.2023		0.29			

Statement of Liability Flow							PART- IV FORM- N
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
Amount in Rs Lakhs							
Party	Asset / Work	Year of actual capitalization	Original Liability in case date of commercial operation is prior to 31.3.2019	Liability as on CoD 01.10.2023	Discharges (Year wise)	Reversal (Year wise)	Net Liability at end of each year
4600070320 : AQUA INDIA	Regularising case of GeM PO no. GEMC-511687759915922 dt. 26.04.2022 for	01.10.2023		0.04			
4600070329 : OXYMERGE SOLUTION LLP	Regularising case of GeM PO no. GEMC-511687785709627 dt. 26.04.2022 for	01.10.2023		0.02			
4600070685 : ROCKET MARKETING	Regularising case of GeM PO no. GEMC-511687733067424 dt. 01.06.2022 for	01.10.2023		0.18			
4600070789 : Progility Technologies Pvt Ltd	Procurement of Video Conferencing System for Substation Conference room	01.10.2023		0.26			
4600071132 : SOURABH ENGINEERS & GRAPHICS INDIA	Supply and installation of 03 no.s of LED Displays for Talaipalli CMP.	01.10.2023		0.36			
4600072748 : E SQUARE SYSTEM & TECHNOLOGIES	Regularising case of GeM PO no. GEMC-511687757943877 dt. 01.12.2022 for	01.10.2023		0.77			
4600072931 : TRISITA ENGINEERING LLP	Regularising case of GeM PO no. GEMC-511687705363853 dt. 22.12.2022 for	01.10.2023		0.51			
4600073015 : K2 INFOSYS	Procurement of IP camera and WiFi Access Point for NTPC TALAIPALLI.	01.10.2023		0.69			
4600073497 : E SQUARE SYSTEM & TECHNOLOGIES	Regularising case of GeM PO no. GEMC-511687788106884 dt.13.02.2023 for	01.10.2023		0.20			
4600073551 : UNIWAY INFOCOM	Procurement of Fibre Splicing Machine for PB, DL and TLCMP.	01.10.2023		0.02			
4600073552 : AISHWARYA TECHNOLOGIES AND	Procurement of OTDR for PB, DL and TLCMP.	01.10.2023		0.03			
4600073687 : MITTAL AGENCIES	Regularising case of GeM PO no. GEMC-511687738297198 dt. 22.02.2023 for	01.10.2023		0.34			
5500027694 : LARSEN & TOUBRO LTD	Supply BBU Items Currency (INR), Package:CS-7014-204--9, Project:COAL	01.10.2023		138.69			
5500028242 : LARSEN & TOUBRO LTD	132/33/0.415 KV SUB STATION FOR TLCMP	01.10.2023		71.90			
5500029975 : LARSEN & TOUBRO LTD	132/33/0.415 KV SUB STATION FOR TLCMP	01.10.2023		2.77			
5500031620 : LARSEN & TOUBRO LTD	Mandatory spares PO for 132 kV S/s of TLCMP	01.10.2023		0.73			
5500032728 : SHALIMAR CORP. LTD.	TLCMP Township Contract : Site service PO	01.10.2023		391.02			

Shall be submitted at the time of truing up

Statement of Liability Flow							PART- IV FORM- N
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
Amount in Rs Lakhs							
Party	Asset / Work	Year of actual capitalization	Original Liability in case date of commercial operation is prior to 31.3.2019	Liability as on CoD 01.10.2023	Discharges (Year wise)	Reversal (Year wise)	Net Liability at end of each year
5500033252 : STANDARD INFRA TECH INDIA PVT LTD	Construction of Admin Office Building (Composite Works i.e. CIVIL,	01.10.2023		129.18			
5500033341 : CENTRAL MINE PLANNING & DESIGN	Appointment of M/s. CMPDIL, as an external agency for carrying out	01.10.2023		46.52			
5500033449 : S.S. CHHATWAL AND COMPANY	Commencement of mining operation for overburden removal, coal extraction	01.10.2023		47.53			
5500033851 : SHRI BALAJI CONSTRUCTION	Construction additional foundations and associated works for	01.10.2023		7.60			
5500034279 : SHALIMAR CORP. LTD.	TLCMP Township Contract : Site service PO	01.10.2023		112.76			
5500034314 : SHALIMAR CORP. LTD.	TLCMP Township Contract : Site service PO	01.10.2023		58.07			
5500035074 : SHALIMAR CORP. LTD.	Construction of Boundary Wall for Township Land for Talaipalli Coal	01.10.2023		2.11			
5500035807 : ABHI CONSTRUCTIONS & HARDWARE	Water supply arrangement from borewell to overhead tanks in 132 Kv	01.10.2023		0.08			
5500036468 : SHANTI ENGGICON PVT LTD	Construction of Road for Section B for Coal Evacuation and Section C for	01.10.2023		141.58			
5500036527 : SUNIL KUMAR AGRAWAL LLP	Maintenance of PMGSY Roads in Coal Block and construction of approach	01.10.2023		1.29			
5500036783 : INDUTECH SOLUTIONS AND MANUFACTURE	Design, Supply & Installation of 7nos of Bunkhouse type porta	01.10.2023		4.73			
5500036824 : SHALIMAR CORP. LTD.	TLCMP Township Contract : Site service PO	01.10.2023		7.40			
5500037219 : AYUSH CONSTRUCTION	VARIOUS DEVELOPMENTAL WORKS A COAL CRUSHER SHED B COAL SAMPLING	01.10.2023		8.40			
5500037334 : ABHI CONSTRUCTIONS & HARDWARE	Annual rate contract for installation of MS tubular poles, laying of	01.10.2023		1.84			
5500038510 : SURYA ROSHNI LTD	Supply and installation of street lights on coal evacuation and other	01.10.2023		16.19			
5500038550 : SHRI RAM CONSTRUCTIONS	Drilling and Installation of fifteen (15) numbers of borewell for TLCMP.	01.10.2023		2.20			

Statement of Liability Flow							PART- IV FORM- N
Name of the Petitioner : NTPC							
Name of the Integrated Mine : Talaipalli							
Amount in Rs Lakhs							
Party	Asset / Work	Year of actual capitalization	Original Liability in case date of commercial operation is prior to 31.3.2019	Liability as on CoD 01.10.2023	Discharges (Year wise)	Reversal (Year wise)	Net Liability at end of each year
5500039289 : KISAN MITAN KALYAN SAMITI	Construction, transportation & erection of RCC pillars along	01.10.2023		0.58			
5500040396 : WEIGH TRACK	Supply and installation of one set-2nos fully electronic pit less road	01.10.2023		10.07			
5500040943 : ABHI CONSTRUCTIONS & HARDWARE	Barbed wire fencing first phase(5KM) along the project boundary of south	01.10.2023		4.20			
5500040974 : TEJAS CONSTRUCTION	Construction of Hume pipe culvert on the coal transportation route for	01.10.2023		0.50			
5500040979 : RAJESH KUMAR AGRAWAL	Township peripheral road(900m) along with Drain (outside boundary wall)	01.10.2023		24.80			
5500041032 : RADHEY DECOR	Construction of various civil works at NTPC TLCMP.	01.10.2023		3.07			
5500041451 : ABHI CONSTRUCTIONS & HARDWARE	Procurement, fabrication and erection of watchtower at portable magazine	01.10.2023		0.12			
5500041818 : A 2 Z SUPPLIER	Supply and Installation works of the 15meter triangular tower for	01.10.2023		0.74			
5500041913 : BHARAT CONSTRUCTION	Construction of two nos. of Permanent Explosive Magazine and associated	01.10.2023		7.20			
5500041965 : E SQUARE SYSTEM & TECHNOLOGIES	Supply and installation of CCTV items for Southpit extension, Westpit,	01.10.2023		0.14			
5500042203 : DIGITAL WEIGHING SYSTEMS PVT LTD	Supply, Installation & Commissioning of Pitless Electronic	01.10.2023		14.86			
5500042370 : APPLIED RESEARCH INTERNATIONAL	Supply and Installation of Simulator for HEMM for Talaipalli Coal Mining	01.10.2023		230.92			
5500042730 : ABHI CONSTRUCTIONS & HARDWARE	Civil works for simulator Installation TLCMP.	01.10.2023		5.12			
8200378658 : KISAN MITAN KALYAN SAMITI	Repair of kutcha road at Village Talaipalli Under CD-CSR activity of	01.10.2023		1.01			
2100100-Mine end MDO Liab	Mine end MDO Liab	01.10.2023		884.28			
2070735-Reserve price	Reserve price	01.10.2023		436.90			
CBA Land : CBA Land	CBA Land	01.10.2023		26,651.15			
<b>Total</b>							<b>29,491.81</b>

(Petitioner)

NTPC Talaipalli		<b>PART- IV FORM- W</b>			
<b>Details of ERV not taken to capital cost</b>					
Amount in Rs. lakhs					
Year	Quarter	Loan ERV	Other than Loan ERV	Total ERV charged to P&L	Cumulative ERV charged to P&L
2021-22	Q1	66,792.00		66,792.00	66,792.00
	Q2	(47,98,464.92)		(47,98,464.92)	(47,31,672.92)
	Q3	(2,53,95,646.03)		(2,53,95,646.03)	(3,01,27,318.95)
	Q4	39,98,145.90		39,98,145.90	(2,61,29,173.05)
2022-23	Q1	(2,75,99,318.50)		(2,75,99,318.50)	(5,37,28,491.55)
	Q2	(2,17,99,549.43)		(2,17,99,549.43)	(7,55,28,040.98)
	Q3	12,41,10,150.02		12,41,10,150.02	4,85,82,109.04
	Q4	99,57,799.41		99,57,799.41	5,85,39,908.45
2023-24 (upto 30.09.2023)	Q1	(93,98,415.46)		(93,98,415.46)	4,91,41,492.98
	Q2	(86,71,729.00)		(86,71,729.00)	4,04,69,763.98
		<b>4,04,69,763.98</b>	-	<b>4,04,69,763.98</b>	
<b>Total FERV not taken to capital Cost</b>					
		<b>As on 1st unit COD</b>		<b>As on 2nd unit COD</b>	
Sr. No.	Particulars		Amount(in Rs. Lakhs)	Amount(in Rs. Lakhs)	
1	Loan ERV treated as Borrowing Cost drawn after 01.04.2016 transfer to P&L		-		
2	Loan FERV after 01.04.2016 transfer to P&L		4,04,69,763.98		
3	SHORT Term Loan ERV		-		
4	Other than Loan ERV		-		
	<b>Total</b>		<b>4,04,69,763.98</b>	-	
<b>Petitioner</b>					

NTPC		Talaipalli								PART- IV FORM- X
<u>Finance Charges for the loan drawn after IND AS</u>										
As per Form 14									Rs.	
Loan	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24 (upto 30.09.2023)	Total	
<b>Foreign Currency Loan</b>										
EURO Loan I Drawl I						61,40,460.06			61,40,460.06	
EURO Loan I Drawl II						1,90,98,765.77			1,90,98,765.77	
EURO Loan I Drawl III						1,20,94,253.62			1,20,94,253.62	
USD 750 Million I Drawl I							47,58,345.78		47,58,345.78	
USD 750 Million I Drawl II							45,37,241.80		45,37,241.80	
USD 750 Million I Drawl III							5,12,607.13		5,12,607.13	
USD 750 Million I Drawl IV							27,04,532.32		27,04,532.32	
USD 750 Million I Drawl V							11,79,305.42		11,79,305.42	
USD 750 Million I Drawl VI							50,72,283.00		50,72,283.00	
JPY Equ. \$400 Million Drawl I								22,08,709.55	22,08,709.55	
JPY Equ. \$400 Million Drawl II								82,59,150.70	82,59,150.70	
<b>Total IF</b>	-	-	-	-	-	<b>3,73,33,479.45</b>	<b>1,87,64,315.45</b>	<b>1,04,67,860.25</b>	<b>6,65,65,655.15</b>	
<b>Amount in ₹ Lacs</b>										
<u>Domestic Bonds</u>	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24 (upto 30.09.2023)	Total	
67			30,806.44	32,759.65	28,396.15	24,505.42	24,847.49	25,302.96	1,66,618.11	
69				95,580.75	66,634.56	57,480.58	58,303.75	59,376.50	3,37,376.14	
73					1,02,956.65	94,173.37	93,663.86	96,539.67	3,87,333.55	
74						46,282.84	22,413.58	23,975.84	92,672.26	
75						14,102.96	10,424.17	10,736.96	35,264.09	
76						31,554.55	17,399.06	17,166.03	66,119.64	
78							6,049.28	5,648.57	11,697.85	
<b>Total Bond</b>	-	-	<b>30,806.44</b>	<b>1,28,340.40</b>	<b>1,97,987.36</b>	<b>2,68,099.72</b>	<b>2,33,101.19</b>	<b>2,38,746.53</b>	<b>10,97,081.64</b>	
									Petitioner	

NTPC		Talaipalli		PART- IV FORM- X						
Finance Charges for the loan drawn after IND AS										
Total Bond + IF(Finance charges)	-	-	30,806.44	1,28,340.40	1,97,987.36	3,76,01,579.17	1,89,97,416.64	1,07,06,606.78	6,76,62,736.79	
Cumulative Total Bond + IF (Finance charges)	-	-	30,806.44	1,59,146.84	3,57,134.20	3,79,58,713.37	5,69,56,130.01	6,76,62,736.79		
Total Finance Charges Capitalized as IDC Through Amortization										
Year	Amount in ₹		Cumulative Amount in ₹							
2016-17	-		-							
2017-18	-		-							
2018-19	444		444							
2019-20	66,693		67,137							
2020-21	1,03,759		1,70,895							
2021-22	35,42,174		37,13,069							
2022-23	82,67,322		1,19,80,391							
2023-24 (upto 30.09.2023)	59,66,472		1,79,46,863							
Total Finance Charges capitalized through IDC	1,79,46,863.05		-							
Net amount to be claimed			4,97,15,873.74							
Petitioner										

<b>IDC Details</b>								
<b>NTPC Talaipalli</b>								
<b>Year</b>	<b>Form 14</b>			<b>Note 40</b>				
	<b>IDC DOMESTIC LOAN</b>	<b>IDC BONDS</b>	<b>IDC FOREIGN LOAN</b>	<b>IDC DOMESTIC LOAN</b>	<b>IDC BONDS</b>	<b>IDC BONDS_Ind AS Adj</b>	<b>IDC FOREIGN LOAN- Current Year</b>	<b>IDC FOREIGN LOAN_Ind AS Adj</b>
<b>2016-17</b>								
<b>2017-18</b>	41,63,90,882	-	-	41,63,90,872.00				
<b>2018-19</b>	67,62,65,835	84,68,274	-	67,62,65,834.00	84,68,273.97	430.58		
<b>2019-20</b>	83,89,82,696	8,64,11,814	-	83,89,82,697.00	8,64,11,813.95	5,527.42		
<b>2020-21</b>	82,95,49,882	14,29,25,214	-	82,95,49,880.00	14,29,25,213.69	8,668.92		
<b>2021-22</b>	24,24,02,423	28,98,31,109	44,09,675	24,24,02,423.51	28,98,31,108.76	13,332.61	44,09,673.91	33,23,795.98
<b>2022-23</b>	31,91,22,685	31,81,07,679	5,08,79,501	31,91,22,694.00	31,81,07,677.56	20,766.23	5,08,79,499.74	80,18,048.80
<b>2023-24 (upto 30.09.2023)</b>	20,98,97,783	16,08,95,124	6,82,37,914	20,98,97,772.00	16,08,95,124.16	11,019.76	6,82,37,910.60	57,16,706.10
<b>Total upto 30.09.2023</b>	<b>3,53,26,12,186</b>	<b>1,00,66,39,214</b>	<b>12,35,27,090</b>	<b>3,53,26,12,173</b>	<b>1,00,66,39,212</b>	<b>59,746</b>	<b>12,35,27,084</b>	<b>1,70,58,551</b>



<b>IDC Details</b>									
<b>Year</b>	<b>Financial charges capitalised</b>	<b>Prev Period IDC-Financial charge</b>	<b>Total Finance Charges Capitalized</b>	<b>ERV treated As BC</b>	<b>Total Interest and Finance Charges</b>	<b>Amort Exp Vendor Disc-ind AS</b>	<b>Amort Exp Leasehold Land Discounting-ind AS</b>	<b>Total IDC incl IND AS ADJ</b>	<b>Charged to P&amp;L</b>
<b>2016-17</b>			-		-			-	-
<b>2017-18</b>			-		41,63,90,882	63,537	11,18,127	41,75,72,545.69	-
<b>2018-19</b>	444		443.58		68,47,34,553	1,32,911		68,48,67,463.97	-
<b>2019-20</b>	66,693		66,693.10		92,54,61,203	2,14,444	1,19,086	92,57,94,733.31	-
<b>2020-21</b>	1,03,759		1,03,758.68		97,25,78,854	5,22,198	67,668	97,31,68,720.85	-
<b>2021-22</b>	35,42,172		35,42,171.60	2.06	54,01,85,380	6,29,161	28,281	54,08,42,822.30	-
<b>2022-23</b>	82,67,322		82,67,321.64	3,42,96,508.95	73,06,73,696	1,92,005	8,133	73,08,73,834.20	-
<b>2023-24 (upto 30.09.2023)</b>	59,66,472		59,66,472.39	(2,66,54,306.07)	41,83,42,988	11,04,852		41,94,47,839.53	-
<b>Total upto 30.09.2023</b>	<b>1,79,46,861</b>	<b>-</b>	<b>1,79,46,861</b>	<b>76,42,205</b>	<b>4,68,83,67,556</b>	<b>28,59,109</b>	<b>13,41,295</b>	<b>4,69,25,67,960</b>	<b>-</b>

<b>IDC Details</b>			<b>Amount in Rs.</b>				
<b>Year</b>	<b>IDC taken to CWIP</b>	<b>Cummulative IDC in CWIP- Ind AS</b>	<b>Ind AS to IGAAP</b>			<b>Gross Block</b>	
			<b>IDC Capitalized as Unwinding of Vendor Discounting</b>	<b>IDC capitalised to CWIP without Unwinding</b>	<b>Cummulative IDC in CWIP post capitalisation IGAAP</b>	<b>IDC Capitalized to Gross Block including Vendor Discounting - Ind AS</b>	<b>Unwinding of Vendor Discounting in GB as IDC</b>
<b>2016-17</b>	-	-	-	-	-	-	-
<b>2017-18</b>	41,75,72,546	41,75,72,546	11,81,664	41,63,90,882	41,63,90,882	41,75,72,536	11,81,664
<b>2018-19</b>	68,48,67,464	1,10,24,40,010	1,32,911	68,47,34,553	1,10,11,25,435	68,48,67,463	1,32,911
<b>2019-20</b>	92,57,94,733	2,02,82,34,743	3,33,530	92,54,61,203	2,02,65,86,638	92,57,94,734	3,33,530
<b>2020-21</b>	97,31,68,721	3,00,14,03,464	5,89,866	97,25,78,854	2,99,91,65,492	(1,65,89,87,516)	5,89,866
<b>2021-22</b>	54,08,42,822	3,54,22,46,286	6,57,442	54,01,85,380	3,53,93,50,872	1,51,65,99,077	6,57,442
<b>2022-23</b>	73,08,73,834	4,27,31,20,120	2,00,138	73,06,73,696	4,27,00,24,568	73,08,73,840	2,00,138
<b>2023-24 (upto 30.09.2023)</b>	41,94,47,840	4,69,25,67,960	11,04,852	41,83,42,988	4,68,83,67,556	41,60,73,367	11,04,852
<b>Total upto 30.09.2023</b>	<b>4,69,25,67,960</b>	<b>-</b>	<b>42,00,404</b>	<b>4,68,83,67,556</b>	<b>-</b>	<b>3,03,27,93,502</b>	<b>42,00,404</b>

<b>IDC Details</b>						<b>PART- IV FORM- Y</b>
<b>NTPC Talaipalli</b>						
<b>CWIP</b>						<b>Amt. in Rs.</b>
<b>Year</b>	<b>IDC Capitalized to Gross Block excluding Vendor Discounting - IGAAP</b>	<b>Balance of IDC in CWIP- Ind AS</b>	<b>Balance of IDC in CWIP - IGAAP</b>	<b>IDC transferred to LARA</b>	<b>Total IDC including LARA</b>	<b>Diff.</b>
2016-17	-				-	-
2017-18	41,63,90,872				41,63,90,872	10
2018-19	68,47,34,552				68,47,34,552	1
2019-20	92,54,61,204				92,54,61,204	(1)
2020-21	(1,65,95,77,383)			2,63,21,56,237	97,25,78,854	-
2021-22	1,51,59,41,635			(97,57,56,255)	54,01,85,380	-
2022-23	73,06,73,702				73,06,73,702	(6)
<b>2023-24 (upto 30.09.2023)</b>	41,49,68,515	33,74,458	33,74,458		41,83,42,973	14
<b>Total upto 30.09.2023</b>	<b>3,02,85,93,098</b>	<b>33,74,458</b>	<b>33,74,458</b>	<b>1,65,63,99,982</b>	<b>4,68,83,67,537.82</b>	<b>17.98</b>
						<b>Petitioner</b>

NTPC		Talaipalli								
<u>Details of FERV</u>										
					Rs.					
Name of the Loan/ Bond	2021-22	2022-23	2023-24 (upto 30.09.2023)	Total						
EURO Loan I Drawl I	(91,53,560)	1,36,11,956	(42,62,060)	1,96,335						
EURO Loan I Drawl II	(1,32,56,221)	4,37,31,958	(1,36,92,981)	1,67,82,756						
EURO Loan I Drawl III	(37,19,391)	2,77,83,278	(86,99,265)	1,53,64,622						
USD 750 Million I Drawl I		2,24,52,573	34,82,011	2,59,34,584						
USD 750 Million I Drawl II		93,27,929	33,20,214	1,26,48,143						
USD 750 Million I Drawl III		4,28,048	3,75,110	8,03,159						
USD 750 Million I Drawl IV		5,39,400	19,79,093	25,18,493						
USD 750 Million I Drawl V		2,855	8,62,979	8,65,835						
USD 750 Million I Drawl VI		10,87,594	37,11,740	47,99,334						
JPY Equ. \$400 Million Drawl I			(1,04,62,807)	(1,04,62,807)						
JPY Equ. \$400 Million Drawl II			(2,13,38,486)	(2,13,38,486)						
	<b>(2,61,29,173)</b>	<b>11,89,65,591</b>	<b>(4,47,24,452)</b>	<b>4,81,11,967</b>						
ERV to be Capitalized as per Circular (before 31.03.16) Previous Year FERV to be Cap.										
<b>Total as per IF</b>	-	-	-	-						
Amount Capitalized as per GL 1022904 Amount Capitalized to SG and TG Allocated to WBS- 4013303 Reversal of Allocation to WBS- 4013303										
<b>Total as per Books</b>	-	-	-	-						
	<b>Total FERV</b>	<b>Transferred to PL</b>	<b>ERV Treated as BC IDC</b>	<b>ERV Treated as BC- T/f to PL</b>	<b>ERV in CWIP</b>	<b>Cummulative ERV in CWIP</b>	<b>ERV capitalised</b>	<b>ERV after capitalisation</b>		
<b>2021-22</b>	(2,61,29,173)	(2,61,29,173)	-	-	-	-	-	-		
<b>2022-23</b>	11,89,65,591	8,46,69,081	3,42,96,510	-	-	-	-	-		
<b>2023-24 (upto 30.09.2023)</b>	(4,47,24,452)	(1,80,70,145)	(2,66,54,307)	-	-	-	-	-		
<b>Total</b>	<b>4,81,11,967</b>	<b>4,04,69,764</b>	<b>76,42,203</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>		
<b>Petitioner</b>										

No. 13056/28/1001-CA-I  
Government of India  
Ministry of Coal

New Delhi, dated the 28<sup>th</sup> January, 2006.

To

The Chairman-cum-Managing Director,  
National Thermal Power Corporation Limited,  
NTPC Bhawan,  
SCOPE Complex, Lodhi Road,  
New Delhi - 110 003.

Subject: Allocation of Talaspalli coal block to M/s. National Thermal Power Corporation Ltd. (NTPC) for meeting coal requirement for the 4000 MW of Power Generation capacity as part of Large integrated coal mine-cum-power project.

Sub.

I am directed to refer to your letter No. 01/FWC/Coal Mining/006-823 dated 01.09.2005 on the subject mentioned above and to convey the 'in principle' consent of the Government of India for allocation of Talaspalli coal block in the State of Chhattisgarh under the revised coal mining policy as decided by the Central Government vide letter No. 38023/2/97-CA dated 12.12.2001 subject to the following conditions:-

- I) Coal mining shall be carried out by NTPC, or a separate company to be created with NTPC participation provided such separate company is a Government company with coal mining as object in its Memorandum of Association, as provided under Section 3(3)(a)(i) of the Coal Mines (Nationalisation) Act, 1973 which allows mining by a Government Company.
- II) Coal linkages from CIL/SOCL would not be disturbed in any way with coal mined from Talaspalli coal block. In case there already exist linkages from the above sources, NTPC shall continue to honour its commitment towards long-term linkage from these nationalized coal companies.
- III) All coal mined from the block, including any run-of-mine or beneficiated coal if washing is resorted to, shall be used in NTPC power plants. No other coal will be disposed off in any other manner, whatsoever, without prior permission, in writing, of the Ministry of Coal.

DR. P. V. SRINIV. S. RANA  
OFFICE SECRETARY  
MINISTRY OF COAL  
GOVT. OF INDIA  
NEW DELHI

Proposed C, 1112
(S. B. 1112)
Ministry of Coal, Government of India
11/1/2006

- h) The Company will do coal-mining in accordance with the provisions of the Coal Mines (Nationalisation) Act, 1973, the Mines and Minerals (Development & Regulation) Act, 1957, the Contract Labour (Regulation & Abolition) Act, 1970, and all the mineral, environmental and labour laws and other regulations governing coal industry.
- i) NTPC would plan for mining in Talaspali coal block as per the approved mining plan so as to extract the reserves to the maximum extent possible.
- ii) The mining lease will be executed in the name of NTPC or such separate Government company which may be formed with equity participation of NTPC.
- iii) The power projects (4000 MW) based on coal from this block shall commence generation latest by the end of the 11<sup>th</sup> Five Year Plan. The end use project schedule and the coal mine development schedule should be submitted to this Ministry within 3 months from the date of this letter. Time frame for achieving major milestones related to coal mining is enclosed for guidance and adherence.
- iv) Violation of any of the conditions imposed above on the part of NTPC or such separate Government Company in mining and disposing of coal from the Talaspali coal block will render the mining lease liable for cancellation.


2. The company may approach CB, CMPDIL for geological report of the block on payment of necessary exploration costs to work the block as per the provisions of MMR (DPR) Act, 1957 and contact the State Government authorities concerned for completing the necessary formalities for obtaining mining lease rights and related matters. The arrangement of transport of coal, if any, etc. will have to be worked out by the company in consultation with the Ministry of Railways/ Ministry of Surface Transport depending on the mode of transport.

Yours faithfully,

  
(V.S. Rana)

Under Secretary to the Govt. of India.

Encl. As above.

  
श्री. एस. राजीव. S. RANA  
उप सचिव UNDER SECRETARY  
कोयला विभाग MINISTRY OF COAL  
भारत सरकार GOVT. OF INDIA  
नई दिल्ली NEW DELHI

Prepared by and




(A. J. Singh)

Prepared - 2 pages as requested via 22/01/74 -  
Approved - 22/01/74  
22/01/74  
22/01/74

2

EVENT	TIME-LIMIT in months from V date
1 Allocation	0
2 Purchase of GR	1.5
3 Bank Guarantee	3
4 Mining Lease Application	3
5 Mining Plan submission	6
6 Mining Plan approval	8
7 Previous approval application	11
8 Previous approval	11
9 Forest Clearance application	12
10 Forest Clearance	18
11 Environment Clearance Application	12
12 Environment Clearance	18
13 Mining Lease grant	24
14 Land requisition begin	9, 19
15 Land Acquisition	30, 36
16 Opening permission application	54, 40 for OC 45, 32 for UG
17 Opening permission grant	35, 41 for OC 47.53 for UG
18 Production	75, 42 for OC 48, 54 for UG

  
 वी. एस. वरमा S. राना  
 जूनियर सचिव  
 भारत सरकार  
 कोयला विभाग  
 नई दिल्ली

<http://coal.nic.in/coal/oc.htm>

1/1/2006

Prepared by JMK

3

(S. Nag)

RECEIVED BY PERSON AS MENTIONED BY THE  
 MENTIONED BY THE  
 DATE

Matching Rated Capacity

*[Handwritten Signature]*  
 श्री. एस. रणधीर S. RANA  
 ज्येष्ठ अधीक्षक सचिव  
 कोयला विभाग MINISTRY OF COAL  
 भारत सरकार GOVT. OF INDIA  
 नई दिल्ली NEW DELHI

14/2006

<http://cof.nic.in/captimeC.htm>

Prepared by  
*[Handwritten Signature]*  
 (S. Rana)  
 Photograph of Person as mentioned in serial of  
 Ministry of Coal, Government of India, New Delhi  
 14/2006





TEXT

ANNEXURES

PLATES

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**GEOLOGICAL REPORT ON DETAILED EXPLORATION FOR COAL**

# **TALAIPELLI COAL BLOCK**

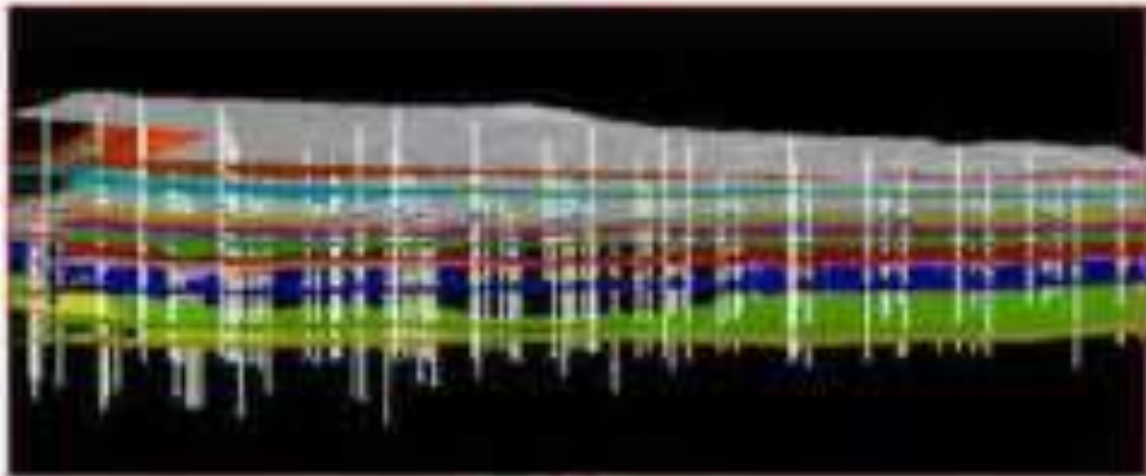
**(ON BEHALF OF NTPC LTD)**

**MAND RAIGARH COALFIELD**

**DISTRICT-RAIGARH, CHHATTISGARH**

**VOLUME-I**

**TEXT**



**MINERAL EXPLORATION CORPORATION LIMITED**

*(A Government of India Enterprise)*

**Dr. Babasaheb Ambedkar Bhavan,  
High Land Drive Road, Seminary Hills,**

**NAGPUR-440 006**

**SEPTEMBER - 2008**

GO TO SALIENT FEATURE

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OPERATING UNDER THE AUTHORITY OF THE BOARD OF MINES AND  
GEOL. SURVY OF INDIA. NO OTHER AGENCIES ARE TO BE CONSULTED.

**GEOLOGICAL REPORT ON DETAILED EXPLORATION FOR COAL**  
**TALAIPELLI COAL BLOCK**

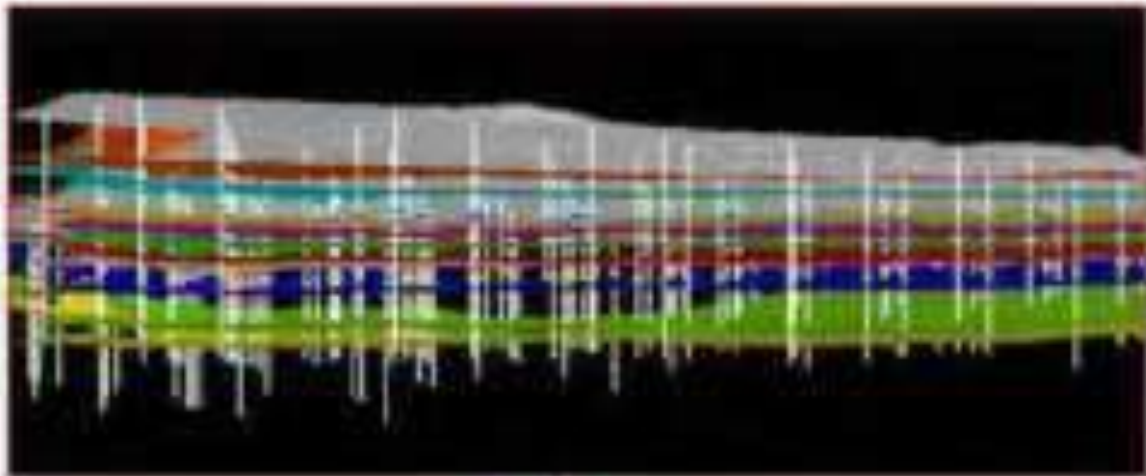
(ON BEHALF OF NTPC LTD)

**MAND RAIGARH COALFIELD**

**DISTRICT-RAIGARH, CHHATTISGARH**

**VOLUME-I**

**TEXT**



**MINERAL EXPLORATION CORPORATION LIMITED**

(A Government of India Enterprise)

Dr. Babasaheb Ambedkar Bhavan,  
High Land Drive Road, Seminary Hills,

**NAGPUR-440 066**

**SEPTEMBER - 2006**

**GEOLOGICAL REPORT ON DETAILED EXPLORATION FOR COAL  
TALAIPALI COAL BLOCK  
(ON BEHALF OF NTPC LTD)  
MAND RAIGARH COALFIELD, DISTRICT : RAIGARH, CHHATTISGARH**

**SALIENT FEATURES**

- |    |                               |  |
|----|-------------------------------|--|
| 1. | Name of the Block :           | Talaipali Coal Block   |
| 2. | Area of the Block :           | 20 sq.km   |
| 3. | Location of the Block :       | <ul style="list-style-type: none"> <li>(i) Located in the eastern part of Mand-Raigarh Coalfield, District - Raigarh, Chhattisgarh</li> <li>(ii) Included in Survey of India Toposheet No. 64 - N7 &amp; N8 (S.F. 1:50,000)</li> <li>(iii) Co-ordinates :<br/> <ul style="list-style-type: none"> <li>Latitudes (N) : 22°13'35" to 22°16'08"</li> <li>Longitudes (E) : 83°25'49" to 83°30'22"</li> </ul> </li> </ul>                 |
| 4. | Objective :                   | <ul style="list-style-type: none"> <li>(i) To prove the lay and disposition of coal seams by drilling boreholes at 400 m. x 400 m. grid interval</li> <li>(ii) To determine the quality of coal seams and its seams thickness wise, depth wise, C:OB ratio wise and grade wise proved open cast reserves and underground reserves in the block.</li> <li>(iii) Geological report in digital format and ore body modelling</li> </ul> |
| 5. | Duration of Field Operation : | Commenced on 11.08.2006 to 10.08.2007 and 21.12.2007 to 03.05.2008.  |
| 6. | Quantum of Work :             | The quantum of work carried out by MECL in Talaipali Coal Block under different activities of exploration are depicted in Table No. I  |

TABLE NO. I

## QUANTUM OF WORK DONE BY MECL IN TALAI PALLI BLOCK

Sl. No	Item of work	Target as per MOU	Work done
1.	Area of the block	20 Sq.Km	20 Sq.km.
2.	Geological Mapping	20 Sq.Km	20 Sq.Km
3.	Surveying		
	i) Triangulation	20 Sq.Km.	20 Sq.Km
	ii) R.L. of BHs	105 Nos.	102 BHs (MNRT series)
	iii) Co-ordination of BHs.	105 Nos.-	102 BHs (MNRT series)
4.	Exploratory Drilling	45,000 m	39854.75m(MNRT Series)
5.	Geological Core logging	45,000 m	39854.75m.(MNRT Series)
6.	Geophysical Logging	22,500 m	20100.00m.(MNRT Series)
7.	House keeping of BH Samples	13000 Nos	8948 Nos.
8	Preparation of Coal Samples	3500 per/5kg	2645 per/5kg
9	Chemical Analysis		
	i) Band by Band	6501 m	5965.41 m.. (8948 Nos.)
	ii) Full Proximate analysis	4742 Nos.	1469 Nos.
	iii) Moisture at 60% RH and 40°C	1300 Nos.	
	iv) Carbon dioxide	1300 Nos.	165 Nos.
	v) Gross calorific value	1300 Nos.	455 Nos.
	vi) Carbon (corrected for CO2) (outside Lab).	1300 Nos.	-
	vii) Total Sulphur	1300 Nos.	341 Nos.
	viii) Phosphorus	650 Nos.	127 Nos.
	ix) Chlorine (outside Lab).	650 Nos.	-
	x) Ultimate Analysis.	1300 Nos.	278 Nos.
	xi) Swelling Index	650 Nos.	103 Nos.
	xii) Coke type	650 Nos.	103 Nos.

Sl. No	Item of work	Target as per MOU	Work done
	xiii) GKLT assay (outside Lab).	650 Nos.	-
	xiv) Distribution of Sulphur	650 Nos.	9 Nos.
	xv) HGI	1300 Nos.	177 Nos.
	xvi) Ash Fusion Temp.	1300 Nos.	178 Nos.
	xvii) Ash Analysis	650 Nos.	99 Nos.
	xviii) Petrography Analysis (Outside lab)	10 Nos.	-
8.	Environmental Studies (10Kms Radius) (Outside lab)	1 No.	1 No.
9.	Geo-Technical Studies (Physico Mechanical) (Outside lab)	2 No.	2 No.
10.	Washability Characteristics	3 BHs	3 BHs
11.	Dove Tailing of Old data	6434.55 m. (15 BHs)	6434.55 m. (15 BHs-RT Series)
12.	Digitization	-	Talaipalli coal block plates.
13.	Ore body Modeling of block	-	Talaipalli Coal block GR.

7. **Accessibility** : Talaipalli block is about 55 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village (22° 14' 27" : 83° 29' 06") is only 20 km from Gharghoda and is connected with Gharghoda partly by fair weather road and partly by all-weather Gharghoda-Lahunga road. Gharghoda is, again, located about 35 km. North of Raigarh Railway Station which is on Howrah-Bombay Main line of South Eastern Railway. A large part of the area of investigation is practically inaccessible during monsoon.

The nearest railway station is 55 km. away from Talaipalli block lying on the Mumbai-Howrah main line of SE railways.

8. **Mining Activity** : The block is virgin

9. **Type of Land Cover, Habitation :** Central & Eastern part of the block is covered with forest. Major part of remaining area is agricultural land. Talaipalli, Kudhur - Masha, Ajjigarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajhepali are the villages located within the block .
10. **Geology of Talaipalli Block :** Talaipalli block is located in eastern part of Mand-Raigarh Coalfield. It is represented by formations of Lower Gondwana Group.

Geological sequence of the block is given below in Table-II

TABLE NO. II

GEOLOGICAL SUCCESSION IN TALAIPALLI BLOCK

Formation	Thickness (m)	Lithology
Recent	0.50 - 18.00	Soil, alluvium
Barren Measures	18.80 - 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakars	30 - 596	Fine, medium and coarse grained feldspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 - 54.30	Khakee, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

- i) **Coal Seams :** During the course of detailed exploration in Talaipalli Block, the correlation of Barakar coal seams is established. There are 27 correlatable coal horizons, viz. seams XLA, XLB, X TOP, X BOT, IXL2, IXL1, IX, VIII, VII, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, IIL3, II L2, II L1, II, II L & I. Seams of Kachharbari formation are not developed in this block. The sequence of coal seams occurring in Talaipalli Block is given in Table-III.

TABLE-III

## SEQUENCE OF COAL SEAMS AND PARTING IN TALAIPELLI BLOCK

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5



S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around 35.0 m		
27	I	0.22	0.55			-

- ii) **Strike & Dip** : The general strike of the beds is NW –SE with south westerly dip of 4° to 8°
- iii) **Fault** : The block is traversed by 12 Nos. of faults with throw varying from 0 m to 150 m. Three major faults of 85 m., 105 m. and 150 m. throw have been deciphered.
- iv) **Quality** : The coal seams of Talaipalli Block are high moisture, non-coking type. Seamwise quality details are given in Table-IV

TABLE-IX

## QUALITY PARAMETERS(equillibrated beams)ON 60% RH &amp; 40° C

Seams	Thickness		Moisture%		Ash%		UHV (K.Cal/Kg)		Grade		Dominant Grade
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
X LA	0.20	1.06	3.5	10.3	32.7	49.0	1558	3477	G	E	G&F
X LB	0.30	1.28	3.0	10.3	28.2	44.6	1600	3960	G	E	F
X TOP	0.40	1.60	3.5	11.0	22.8	44.7	1793	4525	G	D	F&E
X BOT	1.60	8.10	3.3	10.4	28.8	47.9	1627	3822	G	E	F
IXL2	1.20	2.55	3.7	13.3	17.7	42.3	2386	5409	G	C	E&D
IX L1	0.36	1.85	3.3	13.3	16.2	42.0	1931	5284	G	C	E&D
IX	0.96	6.96	2.7	10.3	24.0	42.3	2317	4567	G	D	F&E
VIII	2.06	6.64	2.5	9.8	29.2	47.0	1738	3711	G	E	F
VII	0.10	3.90	1.9	8.0	28.7	49.3	1310	3960	G	E	G
VI TOP	0.37	3.42	2.2	8.6	30.1	51.0	1351	4098	G	E	G&F
VI MID	3.09	10.01	3.5	7.7	28.5	49.5	1407	4070	G	E	F
VI BOT	0.48	1.75	2.2	9.7	23.5	48.8	1807	4939	G	D	F&E
V TOP	0.50	3.09	1.4	8.6	19.2	47.4	1959	5892	G	B	E&D
V MID	0.15	3.73	1.9	8.7	25.0	51.1	1324	4677	G	D	F&E
V BOT	0.30	5.40	1.7	8.9	23.50	51.90	1324	4939	G	D	G&F

Seams	Thickness		Moisture%		Ash%		UHV (K.Cal/Kg)		Grade		Dominant Grade
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
IV TOP	0.54	5.78	1.3	8.2	27.4	50.4	1324	4387	G	D	G&F
IV MID	0.99	7.24	1.6	7.0	21.3	42.2	2580	5395	F	C	E
IV L	0.23	4.99	1.8	6.7	24.6	50.1	1338	4843	G	D	F&E
IV BOT	0.55	5.67	1.3	6.9	22.3	48.0	1890	5105	G	C	E&D
III L	0.10	3.25	1.4	6.1	26.5	50.1	1448	4567	G	D	F&E
III	0.66	5.97	1.2	7.1	17.6	45.1	2124	5892	G	D	E&D
II L3	0.50	3.09	0.7	6.1	12.8	43.9	2469	6775	F	A	-
II L2	0.07	2.68	1.9	9.5	8.9	39.0	3021	6968	F	A	-
II L1	0.05	1.54	1.7	6.5	6.9	35.9	2152	7285	G	A	-
II	0.13	5.92	1.0	7.2	6.2	51.6	1641	7451	G	A	A
II L	0.05	2.45	2.7	6.7	8.0	48.0	1862	7285	G	A	-
I	0.22	0.55	SEAM NOT WORKABLE								

11. Reserves geological : A total of 1267,145 million tonnes of coal reserves including both opencast and underground reserves varying in grade from 'A' to 'G' have been established in the block. Out of these a total of 749,314 million tonnes are in opencast proved category, 477,553 million tonnes are in underground proved category and 40,278 million tonnes are in underground indicated category. Summary of seam-wise depth wise grade-wise proved opencast, underground and indicated underground reserves are given in Table VA to VE, VIA to VIC and VIIA to VIIC respectively.
12. Overburden and Stripping : The volume of overburden and stripping ratio Ratio : The volume of overburden and stripping ratio estimated are given in Table VII.

TABLE - VA

**SUMMARY OF CATEGORY-WISE/SECTOR-WISE TOTAL PROVED AND  
INDICATED RESERVES IN TALLAI PALLI BLOCK,  
DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

CATEGORY	SECTORS	PROVED	INDICATED	
OCP (Upto 300m depth of Seam-IV Bottom)	A	585362	--	46.20%
	C	11825	--	0.93%
	D	4752	--	0.37%
	E	11234	--	0.89%
	F	136141	--	10.74%
<b>SUB-TOTAL</b>	--	<b>749314</b>	--	<b>59.13%</b>
UG (Beyond 300 m. depth of seam-IV Bottom)  Beyond 300 m. depth of seam-IVB + For seam lying belong IVB Seam	A	384816	--	30.37
	B	36648	--	2.89
	C	4145	--	0.33
	D	8596	--	0.68
	E	3457	--	0.27
	F	39891	--	3.15
	G	--	16703	1.32
	H	--	1303	0.10
	I	--	21786	1.72
	J	--	486	0.04
<b>SUB-TOTAL</b>	--	<b>477553</b>	<b>48278</b>	<b>3.18</b>
<b>TOTAL</b>	--	<b>1226867</b>	<b>48278</b>	<b>3.18</b>
<b>BLOCK TOTAL</b>	--		<b>1267145</b>	<b>100%</b>

Say - 1267.15 Million Tonnes

TABLE - VB

**SUMMARY OF SEAM-WISE, SECTOR-WISE & GRADE-WISE TOTAL OPENCAST  
(PROVED) RESERVES IN TALAI PALLI BLOCK, DIST. RAIGARH,  
CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	SECTORS					TOTAL
	A	C	D	E	F	
X LA	0.	0.	0.	0.	28.	28.
X LB	444.	0.	0.	0.	182.	626.
X TOP	4246.	0.	0.	0.	2161.	6407.
X BOT	32883.	628.	538.	153.	13906.	48108.
IX L2	12401.	183.	161.	67.	4292.	17104.
IX L1	13595.	150.	113.	442.	4276.	18576.
IX	51268.	1067.	654.	1541.	14366.	68896.
VIII	70311.	1001.	511.	1560.	14219.	87602.
VII	4038.	0.	0.	2.	614.	4654.
VI TOP	16759.	70.	116.	430.	4303.	21678.
VI MID	102356.	2847.	763.	2197.	22853.	131016.
VI BOT	2510.	137.	63.	20.	1807.	4537.
V TOP	5580.	152.	68.	220.	2767.	8787.
V MID	21515.	818.	191.	513.	3274.	26311.
V BOT	28346.	95.	43.	23.	4082.	32589.
IV TOP	59560.	971.	353.	1226.	15149.	77259.
IV MID	87890.	2160.	627.	1554.	18677.	110908.
IV L	23262.	80.	147.	24.	2026.	25539.
IV BOT	48398.	1466.	404.	1262.	7159.	58689.
<b>TOTAL</b>	<b>585362.</b>	<b>11825.</b>	<b>4752.</b>	<b>11234.</b>	<b>136141.</b>	<b>749314.</b>
<b>%</b>	<b>78.12</b>	<b>1.58</b>	<b>0.63</b>	<b>1.50</b>	<b>18.17</b>	<b>100</b>

**TABLE - VC**  
**SEAM-WISE, RATIO-WISE NET INSITU PROVED OPENCAST RESERVES IN**  
**TALAIPELLI BLOCK, DIST. RAIGARH, CHEATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	RATIO								TOTAL
	1:1-1:2	1:2-1:3	1:3-1:4	1:4-1:5	1:5-1:6	1:6-1:7	1:7-1:8	1:8-1:9	
X LA	0.	0.	0.	19.	9.	0.	0.	0.	28.
X LB	0.	0.	399.	227.	0.	0.	0.	0.	626.
X TOP	0.	0.	602.	2934.	2657.	214.	0.	0.	6407.
X BOT	0.	0.	4602.	16609.	19377.	7087.	433.	0.	48108.
IX L2	0.	0.	1574.	6026.	6473.	2839.	192.	0.	17104.
IX L1	0.	0.	2841.	6667.	6556.	2347.	165.	0.	18576.
IX	0.	0.	10953.	26323.	23689.	7505.	426.	0.	68896.
VIII	0.	0.	13954.	32844.	30240.	10134.	430.	0.	87602.
VII	0.	0.	2198.	1369.	1087.	0.	0.	0.	4654.
VI TOP	0.	0.	3692.	8111.	7107.	2433.	150.	185.	21678.
VI MID	0.	0.	18253.	48901.	46642.	14369.	1500.	1351.	131016.
VI BOT	0.	0.	406.	1823.	1801.	339.	91.	77.	4537.
V TOP	0.	0.	1749.	3432.	3014.	503.	61.	28.	8787.
V MID	0.	0.	5186.	8123.	11122.	1239.	296.	345.	26311.
V BOT	0.	0.	7207.	12938.	10965.	1322.	133.	24.	32589.
IV TOP	0.	647.	12633.	27601.	28519.	6485.	771.	603.	77259.
IV MID	203.	2139.	15455.	39140.	41628.	9926.	1305.	1112.	110908.
IV L	131.	1284.	3595.	8202.	9721.	2355.	251.	0.	25539.
IV BOT	353.	1376.	9023.	18262.	22421.	5825.	761.	668.	58689.
<b>TOTAL</b>	<b>687.</b>	<b>5446.</b>	<b>114322.</b>	<b>269551.</b>	<b>273028.</b>	<b>74922.</b>	<b>6965.</b>	<b>4393.</b>	<b>749314.</b>

TABLE - VD

SEAM-WISE, DEPTH-WISE NET INSITU PROVED OPENCAST RESERVES IN  
TALAJPALI BLOCK, DIST. RAIGARH, CHHATTISGARH

(RESERVES IN '000 TONNES)

SEAM	DEPTH						TOTAL
	UPTO 50	50-100	100-150	150-200	200-250	250-300	
X LA	28.	0.	0.	0.	0.	0.	28.
X LB	619.	7.	0.	0.	0.	0.	626.
X TOP	3453.	2954.	0.	0.	0.	0.	6407.
X BOT	25619.	21722.	767.	0.	0.	0.	48108.
IX L2	7706.	8223.	1175.	0.	0.	0.	17104.
IX L1	6431.	8277.	3838.	30.	0.	0.	18576.
IX	20088.	31157.	16964.	687.	0.	0.	68896.
VIII	15453.	36979.	28638.	6532.	0.	0.	87602.
VII	0.	716.	2129.	1809.	0.	0.	4654.
VI TOP	1682.	4477.	8556.	6796.	167.	0.	21678.
VI MID	16988.	26353.	46913.	36608.	4154.	0.	131016.
VI BOT	173.	1073.	1494.	1320.	477.	0.	4537.
V TOP	621.	582.	2941.	3566.	1077.	0.	8787.
V MID	4032.	2463.	6551.	7456.	5802.	7.	26311.
V BOT	4025.	5367.	6223.	9442.	6494.	1038.	32589.
IV TOP	4748.	11157.	11310.	20785.	19642.	9617.	77259.
IV MID	5490.	14843.	14932.	27055.	28566.	20022.	110908.
IV L	2303.	5595.	3116.	4012.	5608.	4905.	25539.
IV BOT	2217.	9512.	8813.	12559.	14084.	11504.	58689.
<b>TOTAL</b>	<b>121676.</b>	<b>191457.</b>	<b>164360.</b>	<b>138657.</b>	<b>86071.</b>	<b>47093.</b>	<b>749314.</b>

TABLE - VD(1)

SEAM-WISE NET INSITU PROVED OPEN CAST RESERVES  
WITHIN RIVER/NALA BARRIER IN TALAIPALLI BLOCK  
DISTT. RAIGARH, CHHATTISGARH

OPENCAST	(RESERVES IN '000 TONNES)		
!SEAM !	WITHIN BARRIER	!OUTSIDE BARRIER !	! TOTAL !
X LA	9.	19.	28.
X LB	156.	470.	626.
X TOP	969.	5438.	6407.
X BOT	8144.	39964.	48108.
IX L2	2851.	14253.	17104.
IX L1	2862.	15714.	18576.
IX	11569.	57327.	68896.
VIII	14716.	72886.	87602.
VII	985.	3669.	4654.
VI TOP	3863.	17815.	21678.
VI MID	19443.	111573.	131016.
VI BOT	425.	4112.	4537.
V TOP	1308.	7479.	8787.
V MID	4336.	21975.	26311.
V BOT	5657.	26932.	32589.
IV TOP	9692.	67567.	77259.
IV MID	15073.	95835.	110908.
IVL	4322.	21217.	25539.
IV BOT	7444.	51245.	58689.
TOTAL	113824.	635490.	749314.



**TABLE - V-E**  
**SEAM-WISE, GRADE-WISE NET PROVED OPENCAST RESERVES WITH AREA IN TALAI PALLI BLOCK,**  
**DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES & AREA IN SQ. MT.)

SEAM	GRADE-C		GRADE-D		GRADE-E		GRADE-F		GRADE-G		TOTAL	
	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA
XLA	0	0	0	0	0	0	20	12500	8	5000	28	17500
XLB	0	0	0	0	0	0	443	231250	183	105000	626	336250
XTOP	0	0	0	0	1329	831250	4714	2506250	364	193750	6407	3531250
XBOT	0	0	0	0	128	53750	39613	5875000	8367	1055625	48108	6984375
DL2	734	351250	8496	4106250	7051	3238125	823	278125	0	0	17104	7973750
DL1	76	44375	12119	6013125	5228	2619375	1153	570625	0	0	18576	9247500
IX	0	0	4364	706250	26354	4219375	37876	5800000	102	13750	68896	10739380
VII	0	0	0	0	0	0	74151	9255000	13451	2115000	87602	11370000
VII	0	0	0	0	0	0	152	80000	4502	1445625	4654	1525625
VITOP	0	0	0	0	145	66250	15146	6548750	6387	2863750	21678	9478750
VIMID	0	0	0	0	275	29375	112085	11233750	18656	1896250	131016	13159380
VIBOT	0	0	0	0	940	603125	3540	2168750	57	33750	4537	2805625
VTOP	0	0	1442	950000	4374	264375	2968	1591250	3	1250	8787	5186250
VMID	0	0	2	1250	3836	2095000	14821	5788750	7600	2506250	26311	10410630
VBOT	0	0	0	0	41	26875	17709	7011250	14839	3979375	32589	11017500
IVTOP	0	0	137	53750	1349	505000	28019	6981250	47614	8128750	77259	15696880
IVMID	64	14375	1572	254375	51838	7794375	57434	7984375	0	0	110908	16047500
IVL	0	0	113	63750	2880	1692500	16878	7008750	5668	2024375	25539	10789380
IVBOT	302	82500	13170	3946875	30821	8488750	13540	3377500	856	160625	58689	16056250
TOTAL	1176	492500	41615	16095638	136589	34906878	441085	84383128	128687	26528120	749314	362373700

TABLE - VIA

SEAM-WISE, SECTOR-WISE NET PROVED UNDERGROUND RESERVES IN  
TALAIPALLI BLOCK, DIST. RAIGARH, CHHATTISGARH

(RESERVES IN '000 TONNES)

SEAM	SECTOR						TOTAL
	A	B	C	D	E	F	
X LA	2549.	0.	0.	90.	0.	70.	2709.
X LB	2646.	604.	0.	71.	0.	81.	3402.
X TOP	5864.	574.	0.	169.	0.	104.	6711.
X BOT	22904.	2726.	0.	735.	0.	468.	26833.
IX L2	7860.	1330.	0.	333.	0.	146.	9669.
IX L1	8273.	1026.	0.	189.	0.	163.	9651.
IX	24638.	3123.	0.	590.	0.	769.	29120.
VIII	31732.	3502.	0.	767.	0.	491.	36492.
VII	9984.	1189.	0.	2.	0.	2.	11177.
VI TOP	9815.	1041.	0.	252.	0.	84.	11192.
VI MID	37597.	4669.	0.	882.	0.	1234.	44382.
VI BOT	4548.	647.	0.	162.	0.	247.	5604.
V TOP	5705.	824.	0.	274.	0.	195.	6998.
V MID	7963.	845.	0.	135.	0.	152.	9095.
V BOT	7249.	574.	0.	349.	0.	168.	8340.
IV TOP	13363.	434.	0.	432.	0.	435.	14664.
IV MID	25942.	4277.	0.	543.	0.	1004.	31766.
IV L	4824.	27.	0.	118.	0.	85.	5054.
IV BOT	11542.	1420.	0.	306.	0.	629.	13897.
III L	28333.	17.	487.	289.	365.	3047.	32538.
III	58572.	2495.	1417.	905.	1250.	13979.	78618.
II L3	9838.	1295.	675.	98.	624.	5228.	17758.
II L2	4577.	1342.	0.	0.	0.	2495.	8414.
II L1	6553.	0.	0.	0.	132.	288.	6973.
II	29819.	2667.	1452.	773.	694.	6794.	42199.
II L	2126.	0.	114.	132.	392.	1533.	4297.
<b>TOTAL</b>	<b>384816.</b>	<b>36648.</b>	<b>4145.</b>	<b>8596.</b>	<b>3457.</b>	<b>39891.</b>	<b>477553.</b>

**TABLE - VII**  
**SEAM-WISE, DEPTH-WISE NET PROVED UNDERGROUND RESERVES IN**  
**TALAI PALLI BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	DEPTH												TOTAL
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	
X LA	42.	914.	1499.	254.	0.	0.	0.	0.	0.	0.	0.	0.	2709.
X LB	55.	941.	2053.	353.	0.	0.	0.	0.	0.	0.	0.	0.	3402.
X TOP	28.	1226.	3951.	1505.	1.	0.	0.	0.	0.	0.	0.	0.	6711.
X BOT	39.	3232.	15480.	8075.	7.	0.	0.	0.	0.	0.	0.	0.	26833.
IX L2	2.	414.	4228.	4932.	73.	0.	0.	0.	0.	0.	0.	0.	9669.
IX L1	0.	61.	1899.	5504.	2180.	7.	0.	0.	0.	0.	0.	0.	9651.
IX	0.	70.	2900.	15365.	10765.	20.	0.	0.	0.	0.	0.	0.	29120.
VIII	0.	0.	683.	14898.	19669.	1242.	0.	0.	0.	0.	0.	0.	36492.
VII	0.	0.	0.	949.	6166.	4062.	0.	0.	0.	0.	0.	0.	11177.
VI TOP	0.	0.	0.	681.	5394.	5115.	2.	0.	0.	0.	0.	0.	11192.
VI MID	0.	0.	0.	861.	19948.	23011.	562.	0.	0.	0.	0.	0.	44382.
VI BOT	0.	0.	0.	106.	2708.	2665.	125.	0.	0.	0.	0.	0.	5604.
V TOP	0.	0.	0.	11.	1864.	3431.	1689.	3.	0.	0.	0.	0.	6998.
V MID	0.	0.	0.	0.	843.	4886.	3354.	12.	0.	0.	0.	0.	9095.
V BOT	0.	0.	0.	0.	167.	4103.	3636.	384.	0.	0.	0.	0.	8340.
IV TOP	0.	0.	0.	0.	11.	4648.	7674.	2327.	4.	0.	0.	0.	14664.
IV MID	0.	0.	0.	0.	0.	2393.	14199.	14977.	197.	0.	0.	0.	31766.
IV L	0.	0.	0.	0.	0.	299.	2910.	1799.	46.	0.	0.	0.	5054.
IV BOT	0.	0.	0.	0.	0.	411.	7166.	5709.	611.	0.	0.	0.	13897.
III L	586.	5310.	3267.	4032.	6641.	3737.	4168.	2041.	753.	2.	1.	0.	32538.
III	0.	1777.	7144.	7378.	11177.	17630.	12788.	10240.	7904.	2466.	6.	8.	78618.
II L3	0.	0.	2109.	3628.	1915.	3156.	3026.	1099.	319.	1555.	943.	8.	17758.
II L2	0.	0.	126.	8.	27.	165.	1471.	1045.	671.	1475.	3196.	230.	8414.
II L1	0.	0.	0.	141.	782.	549.	681.	738.	1053.	1825.	960.	244.	6973.
II	0.	0.	0.	447.	1797.	4481.	5338.	7792.	6864.	5110.	4726.	5644.	42199.
II L	0.	0.	0.	0.	218.	142.	0.	1850.	781.	1219.	20.	67.	4297.
<b>TOTAL</b>	<b>752.</b>	<b>13945.</b>	<b>45439.</b>	<b>69148.</b>	<b>92353.</b>	<b>88153.</b>	<b>68839.</b>	<b>58016.</b>	<b>19283.</b>	<b>13652.</b>	<b>9852.</b>	<b>6201.</b>	<b>477553.</b>

**TABLE - VI-C**  
**SEAM-WISE, GRADE-WISE NET PROVED UNDERGROUND RESERVES WITH AREA IN TALAI PALLI BLOCK,**  
**DIST. RAIGARH, CHHATTISGARH**

SEAM	GRADE-A		GRADE-B		GRADE-C		GRADE-D		GRADE-E		GRADE-F		GRADE-G		TOTAL	
	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA
X LA	0	0	0	0	0	0	0	0	0	0	1962	1863750	747	657500	2709	2521250
X LB	0	0	0	0	0	0	0	0	73	86250	3327	3055000	2	1250	3402	3142500
X TOP	0	0	0	0	0	0	162	134375	3201	2295625	3348	1908750	0	0	6711	438750
X BOT	0	0	0	0	0	0	0	0	18	3125	26815	4348750	0	0	26833	4351875
IX L2	0	0	0	0	472	241875	5539	2640000	2786	1108750	865	342500	6	2500	9669	4325625
IX L1	0	0	0	0	760	343750	8574	3895625	317	146875	0	0	0	0	9651	4386250
IX	0	0	0	0	0	0	1371	223750	24010	3653750	3739	524375	0	0	29120	4401875
VIII	0	0	0	0	0	0	0	0	543	58750	35931	4313750	18	2500	36492	4375000
VII	0	0	0	0	0	0	0	0	0	0	6882	251875	4297	1630625	11177	4142500
VI TOP	0	0	0	0	0	0	0	0	11	6875	9141	2623125	2040	580625	11192	4218625
VI MID	0	0	0	0	0	0	0	0	13860	1450000	30522	2956250	0	0	44382	4406250
VI BOT	0	0	0	0	0	0	0	0	1654	1179375	3733	2803750	217	163125	5604	4146250
V TOP	0	0	0	0	0	0	2642	1827500	2445	1501875	1749	973750	162	79375	6998	4382500
V MID	0	0	0	0	0	0	73	72500	1937	1128125	6604	2946875	439	246875	9093	4394375
V BOT	0	0	0	0	0	0	165	123750	1071	757500	6004	2955000	1100	447500	8340	4283750
IV TOP	0	0	0	0	0	0	0	0	1074	381250	12256	3587500	1334	289375	14664	4258125
IV MID	0	0	0	0	198	69375	806	167500	16741	2429375	14021	1768125	0	0	31766	4434375
IV L	0	0	0	0	0	0	422	397500	2471	1945625	1591	890000	570	257500	5054	3490625
IV BOT	0	0	0	0	242	70625	1757	586250	6853	2344375	4941	1406250	104	20625	13897	4428125
III L	0	0	0	0	0	0	530	335000	11197	7255000	18938	10694380	1673	633750	32538	18918130
III	0	0	1172	311250	45559	12030000	29781	7523125	1853	456875	253	60625	0	0	78618	20381880
II L3	632	609375	882	807500	3661	1859375	7565	3944375	4069	2008750	949	791875	0	0	17758	10021250
II L2	4417	2706875	2873	2081875	799	437500	142	163125	155	168125	118	130000	0	0	8414	5687500
II L1	4392	4606875	1111	1233125	910	1015625	272	285625	254	278750	34	37500	0	0	6973	7457500
II	30884	11355000	9321	2391250	914	578750	465	396250	198	177500	223	222500	192	169375	43199	15190630
II L	407	356250	1835	1135000	1493	935000	397	320625	595	80625	0	0	70	80625	4297	2928125
TOTAL	40732	19534370	17194	7980000	54919	17581820	60565	23036880	96906	30903130	193946	54716250	13191	5263125	477553	159013500

TABLE - VIIA

SEAM-WISE SECTOR-WISE GROSS INDICATED UNDERGROUND RESERVES IN  
TALAIPALLI BLOCK, DIST. RAIGARH CHHATTISGARH

(RESERVES IN '000 TONNES)

SEAM	SECTOR				TOTAL
	G	H	I	J	
X LA	389.	37.	370.	4.	800.
X LB	357.	34.	426.	5.	822.
X TOP	288.	53.	660.	7.	1008.
X BOT	2633.	172.	2640.	23.	5468.
IX L2	844.	87.	1241.	14.	2186.
IX L1	270.	40.	742.	14.	1066.
IX	2039.	154.	2084.	38.	4315.
VIII	1778.	122.	2218.	39.	4157.
VII	18.	0.	0.	0.	18.
VI TOP	529.	22.	862.	11.	1424.
VI MID	2229.	185.	3063.	41.	5518.
VI BOT	281.	31.	476.	7.	795.
V TOP	395.	40.	774.	17.	1226.
V MID	302.	20.	418.	11.	751.
V BOT	402.	37.	823.	10.	1272.
IV TOP	669.	52.	1130.	48.	1899.
IV MID	1240.	70.	1433.	60.	2803.
IV L	219.	12.	296.	11.	538.
IV BOT	748.	47.	590.	17.	1402.
III L	206.	16.	274.	9.	505.
III	571.	47.	756.	53.	1427.
II L3	46.	2.	145.	7.	200.
II	190.	17.	335.	40.	582.
II L	60.	5.	30.	0.	96.
<b>TOTAL</b>	<b>16703.</b>	<b>1303.</b>	<b>21786.</b>	<b>486.</b>	<b>40278.</b>

**TABLE - VIII**  
**SEAM-WISE DEPTH-WISE GROSS INDICATED UNDERGROUND RESERVES IN**  
**TALAI PALLI BLOCK, DIST. RAJGARH CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	DEPTH												TOTAL
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	
X LA	11.	277.	384.	128.	0.	0.	0.	0.	0.	0.	0.	0.	800.
X LB	0.	217.	423.	182.	0.	0.	0.	0.	0.	0.	0.	0.	822.
X TOP	0.	113.	217.	469.	209.	0.	0.	0.	0.	0.	0.	0.	1008.
X BOT	0.	773.	1621.	2268.	806.	0.	0.	0.	0.	0.	0.	0.	5468.
IX L2	0.	170.	529.	944.	543.	0.	0.	0.	0.	0.	0.	0.	2186.
IX L1	0.	0.	204.	154.	586.	122.	0.	0.	0.	0.	0.	0.	1066.
IX	0.	0.	837.	1369.	1574.	535.	0.	0.	0.	0.	0.	0.	4315.
VIII	0.	0.	292.	1200.	1646.	1019.	0.	0.	0.	0.	0.	0.	4157.
VII	0.	0.	0.	18.	0.	0.	0.	0.	0.	0.	0.	0.	18.
VI TOP	0.	0.	0.	259.	354.	338.	465.	8.	0.	0.	0.	0.	1424.
VI MID	0.	0.	0.	379.	1391.	1142.	2491.	115.	0.	0.	0.	0.	5518.
VI BOT	0.	0.	0.	3.	147.	199.	404.	42.	0.	0.	0.	0.	795.
V TOP	0.	0.	0.	0.	158.	324.	491.	253.	0.	0.	0.	0.	1226.
V MID	0.	0.	0.	0.	85.	222.	256.	188.	0.	0.	0.	0.	751.
V BOT	0.	0.	0.	0.	32.	203.	407.	567.	63.	0.	0.	0.	1272.
IV TOP	0.	0.	0.	0.	0.	394.	411.	778.	316.	0.	0.	0.	1899.
IV MID	0.	0.	0.	0.	0.	307.	1141.	338.	993.	24.	0.	0.	2803.
IV L	0.	0.	0.	0.	0.	49.	217.	53.	211.	8.	0.	0.	538.
IV BOT	0.	0.	0.	0.	0.	33.	576.	282.	470.	21.	0.	0.	1402.
III L	0.	0.	0.	0.	71.	2.	158.	30.	35.	128.	64.	17.	505.
III	0.	0.	0.	0.	0.	201.	0.	435.	117.	332.	247.	95.	1427.
II L3	0.	0.	0.	0.	0.	0.	25.	3.	43.	15.	75.	34.	200.
II	0.	0.	0.	0.	0.	0.	0.	109.	0.	143.	29.	301.	582.
II L	0.	0.	0.	0.	0.	0.	0.	19.	0.	34.	16.	27.	96.
<b>TOTAL</b>	<b>11.</b>	<b>1550.</b>	<b>4507.</b>	<b>7373.</b>	<b>7602.</b>	<b>5110.</b>	<b>7042.</b>	<b>3220.</b>	<b>2248.</b>	<b>705.</b>	<b>431.</b>	<b>479.</b>	<b>40278.</b>

**TABLE - VII-C**  
**SEAM-WISE, GRADE-WISE GROSS INDICATED UNDERGROUND RESERVES WITH AREA IN TALAIपाली BLOCK,**  
**DIST. RAIGARH, CHHATTISGARH**

SEAM	GRADE-A		GRADE-B		GRADE-C		GRADE-D		GRADE-E		GRADE-F		GRADE-G		TOTAL	
	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA
X LA	0	0	0	0	0	0	0	0	0	0	389	485825	211	134375	800	620000
X LB	0	0	0	0	0	0	0	0	0	0	655	489375	167	116875	822	606250
X TOP	0	0	0	0	0	0	0	0	178	152500	830	445625	0	0	1008	598125
X BOT	0	0	0	0	0	0	0	0	0	0	5468	702500	0	0	5468	702500
IX L2	0	0	0	0	0	0	104	41875	2007	641250	75	29375	0	0	2186	707500
IX L1	0	0	0	0	0	0	1056	530000	10	3750	0	0	0	0	1066	533750
IX	0	0	0	0	0	0	65	8750	1457	211250	2798	363125	0	0	4315	583125
VIII	0	0	0	0	0	0	0	0	0	0	3463	528125	492	60625	4157	588750
VII	0	0	0	0	0	0	0	0	0	0	0	0	18	18750	18	18750
VI TOP	0	0	0	0	0	0	0	0	0	0	1109	403750	315	81875	1424	485625
VI MID	0	0	0	0	0	0	0	0	0	0	5518	493125	0	0	5518	493125
VI BOT	0	0	0	0	0	0	0	0	247	136250	548	288750	0	0	795	425000
V TOP	0	0	0	0	0	0	0	0	460	186875	766	300000	0	0	1226	486875
V MID	0	0	0	0	0	0	42	35000	397	288625	312	150625	0	0	751	466250
V BOT	0	0	0	0	0	0	0	0	166	75625	1094	386250	12	5625	1272	467500
IV TOP	0	0	0	0	0	0	0	0	134	68125	1765	324375	0	0	1899	392500
IV MID	0	0	0	0	0	0	126	13125	2381	324375	296	41875	0	0	2803	379375
IV L	0	0	0	0	0	0	0	0	47	40625	491	297500	0	0	538	338125
IV BOT	0	0	0	0	0	0	146	40000	1108	300000	148	31875	0	0	1402	371875
III L	0	0	0	0	0	0	0	1250	194	113750	307	225625	2	1250	505	341875
III	0	0	0	0	1237	240625	190	29375	0	0	0	0	0	0	1427	270000
II L3	0	0	0	0	31	60000	64	66250	84	69375	0	0	0	0	200	195625
II	478	138125	104	30000	0	0	0	0	0	0	0	0	0	0	582	168125
II L	25	23750	30	31250	41	24625	0	0	0	0	0	0	0	0	96	80625
TOTAL	583	261875	134	61250	1339	324250	1799	765625	9871	2604375	26428	5982580	1217	419375	48278	18321250

TABLE - VII

SECTOR-WISE, RATIO-WISE PROVED COAL RESERVES ALONG WITH VOLUME OF OVERBURDEN AND STRIPPING RATIO IN OPENCAST POTENTIAL AREA (UPTO 300 m. DEPTH OF SEAM-IV BOTTOM) IN TALAIPALLI BLOCK, DIST. RAIGARH, CHHATTISGARH

SEAMS : XLA TO 300 M DEPTH OF IV BOTTOM

SECTOR	LIMIT	RATIO	AREA (SQ M)	RESERVES ('000 TONNES)	VOLUME ('000 CU.M)	STRIPPING RATIO (VOLUME OF OB/TONNE)
A	BLOCK BOUNDARY					
	TO	1:1-1:2	53750.	667.	1098.037	1.598
	SEAM-V B	1:2-1:3	351250.	5446.	10360.086	1.902
		1:3-1:4	184375.	3134.	7180.844	2.291
		SUB TOTAL	589375.	9267.	18638.969	2.291
	SEAM-V B					
	TO	1:3-1:4	314375.	6717.	16252.063	2.420
	SEAM-VI B	1:4-1:5	490000.	10311.	32614.586	3.182
		1:5-1:6	1228750.	26993.	62255.131	2.306
		SUB TOTAL	2033125.	44021.	111321.781	2.306
	SEAM-VI B					
	TO	1:4-1:5	481875.	16238.	39232.356	2.416
	SEAM-VIII	1:5-1:6	895000.	25022.	90919.831	3.634
		1:6-1:7	134375.	3581.	14042.199	3.921
		1:7-1:8	124375.	3133.	12179.294	3.887
		1:8-1:9	156250.	4393.	14682.213	3.342
		SUB TOTAL	1791875.	52367.	171055.831	3.342

Contd.



TABLE - VNI  
SEAMS : XLA TO 300 M DEPTH OF IV BOTTOM

SECTOR	LIMIT	RATIO	AREA (SQ.M)	RESERVES (1'000 TONNES)	VOLUME (1'000 CU.M)	STRIPPING RATIO (VOLUME OF OB/TONNE)
SEAM-VIIT						
	TO	1:3-1:4	705000.	38216.	92694.644	2.426
SEAM-X B						
		1:4-1:5	1771250.	80335.	252666.837	3.145
		1:5-1:6	760000.	31698.	114505.787	3.612
		1:6-1:7	310000.	11416.	56223.225	4.925
SUB TOTAL			3546250.	161665	516090.494	4.925
SEAM-X B						
	TO	1:3-1:4	648750.	49563.	105591.056	2.130
OCP LIMIT						
		1:4-1:5	1189375.	75637.	243006.456	3.204
		1:5-1:6	2155625.	133594.	481854.244	3.607
		1:6-1:7	1058750.	55165.	229033.906	4.152
		1:7-1:8	77500.	3622	14267.425	3.939
SUB TOTAL			5130000.	317801.	1073753.088	3.939
SECTOR TOTAL			13090630.	585121.	1890860.163	3.232
		1:4-1:5	13125.	1318.	173.787	.132
		1:5-1:6	153750.	6163.	22404.044	3.635
		1:6-1:7	121250.	4338.	18080.925	4.168
SUB TOTAL			288125.	11819.	40658.756	4.168
SECTOR TOTAL			288125.	11819.	40658.756	3.440

Contd.

TABLE - VNI  
SEAMS : XLA TO 300 M DEPTH OF IV BOTTOM

SECTOR	LIMIT	RATIO	AREA (SQ.M)	RESERVES (1'000 TONNES)	VOLUME (1' 000 CU.M)	STRIPPING RATIO (VOLUME OF OB/TONNE)
<b>D</b>						
	-	1:5-1:6	93750.	4559.	17017.763	3.733
		1:6-1:7	4375.	113.	1570.544	13.899
		SUB TOTAL	98125.	4672.	18588.306	13.899
		SECTOR TOTAL	98125.	4672.	18588.306	3.979
<b>E</b>						
	-	1:4-1:5	625.	10.	122.850	12.285
		1:5-1:6	223750.	11220.	898.000	.080
		SUB TOTAL	224375.	11230.	1020.850	.080
		SECTOR TOTAL	224375.	11230.	1020.850	.091
<b>F</b>						
BLOCK BOUNDARY						
TO		1:3-1:4	25625.	1620	3895.200	2.404
SEAM-X B		1:4-1:5	1132500.	71542.	224481.325	3.138
		1:5-1:6	518750.	32711.	99560.869	3.044
		1:6-1:7	5625.	304.	19505.650	64.163
		SUB TOTAL	1682500.	106177.	347443.044	64.163

Contd.

TABLE - VNI  
SEAMS : XLA TO 300 M DEPTH OF IV BOTTOM

SECTOR	LIMIT	RATIO	AREA (SQ.M)	RESERVES ( '000 TONNES)	VOLUME ( '000 CU.M)	STRIPPING RATIO (VOLUME OF GB/TONNE)
<b>SEAM-X B</b>						
TO	1:3-1:4		341250.	15021.	143.563	.010
OCP LIMIT	1:4-1:5		305625.	13881.	98852.194	7.121
	1:5-1:6		25625.	1062.	7684.788	7.236
<b>SUB TOTAL</b>			672500.	29964.	106680.544	7.236
<b>SECTOR TOTAL</b>			2355000.	136141.	454123.588	3.336
<b>GRAND TOTAL</b>						
	1:1-1:2		53750.	687.	1098.037	1.598
	1:2-1:3		351250.	5446.	10360.088	1.902
	1:3-1:4		2219375.	114291.	225757.369	1.975
	1:4-1:5		5384375.	269472.	891350.394	3.308
	1:5-1:6		6055000.	273022.	897100.456	3.286
	1:6-1:7		1634375.	74917.	338456.388	4.518
	1:7-1:8		201875.	6755.	26446.719	3.915
	1:8-1:9		156250.	4393.	14682.213	3.342
<b>GRAND TOTAL</b>			16056250.	748983.	2405251.663	3.211

TOTAL RESERVES : SEAM\_WISE RESERVES (OCP) 749.314 MILLION TONNES  
CUMULATIVE RESERVES (OCP) AS ABOVE 748.983 MILLION TONNES

DIFFERENCE 0.331 MILLION TONNES

AGREEMENT 99.96%

**TABLE-IX**  
**QUALITY PARAMETERS (on 60% RH & 40°C / Equalibrated basis)**

Seams	Thickness		Moisture%		Ash%		UHV (K.Cal/Kg)		Grade		Dominant Grade
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
X LA	0.20	1.06	3.5	10.3	32.7	49.0	1558	3477	G	E	G&F
X LB	0.30	1.28	3.0	10.3	28.2	44.6	1600	3960	G	E	F
X TOP	0.40	1.60	3.5	11.0	22.8	44.7	1793	4525	G	D	F&E
X BOT	1.60	8.10	3.3	10.4	28.8	47.9	1627	3822	G	E	F
IXL2	1.20	2.55	3.7	13.3	17.7	42.3	2386	5409	G	C	E&D
IXL1	0.36	1.85	3.3	13.3	16.2	42.0	1931	5284	G	C	E&D
IX	0.96	6.96	2.7	10.3	24.0	42.3	2317	4567	G	D	F&E
VIII	2.06	6.64	2.5	9.8	29.2	47.0	1738	3711	G	E	F
VII	0.10	3.90	1.9	8.0	28.7	49.3	1310	3960	G	E	G
VI TOP	0.37	3.42	2.2	8.6	30.1	51.0	1351	4098	G	E	G&F
VI MID	3.09	10.01	3.5	7.7	28.5	49.5	1407	4070	G	E	F
VI BOT	0.48	1.75	2.2	9.7	23.5	48.8	1807	4939	G	D	F&E
V TOP	0.50	3.09	1.4	8.6	19.2	47.4	1959	5892	G	B	E&D
V MID	0.15	3.73	1.9	8.7	25.0	51.1	1324	4677	G	D	F&E
V BOT	0.30	5.40	1.7	8.9	23.50	51.90	1324	4939	G	D	G&F
IV TOP	0.54	5.78	1.3	8.2	27.4	50.4	1324	4387	G	D	G&F
IV MID	0.99	7.24	1.6	7.0	21.3	42.2	2580	5395	F	C	E
IV L	0.23	4.99	1.8	6.7	24.6	50.1	1338	4843	G	D	F&E
IV BOT	0.55	5.67	1.3	6.9	22.3	48.0	1890	5105	G	C	E&D
III L	0.10	3.25	1.4	6.1	26.5	50.1	1448	4567	G	D	F&E
III	0.66	5.97	1.2	7.1	17.6	45.1	2124	5892	G	D	E&D
II L3	0.50	3.09	0.7	6.1	12.8	43.9	2469	6775	F	A	-
II L2	0.07	2.68	1.9	9.5	8.9	39.0	3021	6968	F	A	-
II L1	0.05	1.54	1.7	6.5	6.9	35.9	2152	7285	G	A	-
II	0.13	5.92	1.0	7.2	6.2	51.6	1641	7451	G	A	A
II L	0.05	2.45	2.7	6.7	8.0	48.0	1862	7285	G	A	-
I	0.22	0.55	SEAM NOT WORKABLE								

**GEOLOGICAL REPORT ON DETAILED EXPLORATION FOR COAL  
TALAIPALLI COAL BLOCK  
(ON BEHALF OF NTPC LTD)  
MAND RAIGARH COALFIELD, DISTRICT : RAIGARH, CHHATTISGARH**

**TEXT**

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160B	177B	VII 34	<u>B.H. No. MNRT-74 for sect III L, III, II L, II &amp; II</u>	1:50
160C	177C	VII 35	<u>B.H. No. MNRT-III Bot sect X L A, X L B, X Top, X Bot, IX L 2, IX L 1, IX, VIII, VII, VI Top, VI Mid, VI Bot, V Top, V Mid, V Bot, IV Top, IV Mid, IV L, IV Bot, III L, III</u>	1:50

Sl. No.	DO No.	Plate No.	Description	Scale/ R.F.
			<b>GEOPHYSICAL LOG</b>	
161	178	VIII A	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-3, 4 & 25)	1:500
162	179	VIII B	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-27, 34 & 37)	1:500
163	180	VIII C	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-38, 41 & 43)	1:500
164	181	VIII D	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-45, 46 & 48)	1:500
165	182	VIII E	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-49, 50 & 54)	1:500
166	183	VIII F	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-53, 56 & 57)	1:500
167	184	VIII G	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-58, 59 & 60)	1:500
168	185	VIII H	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-61, 62 & 63)	1:500
169	186	VIII I	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-66, 68 & 67)	1:500
170	187	VIII J	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-68, 69 & 70)	1:500
171	188	VIII K	Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-71, 72 & 73)	1:500



Sl. No.	DO No.	Plate No.	Description	Scale/ R.F.
172	189	VIII L	<u>Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-75, 76 &amp; 77)</u>	1:500
173	190	VIII M	<u>Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-78, 79 &amp; 80)</u>	1:500
174	191	VIII N	<u>Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-81, 83 &amp; 84)</u>	1:500
175	192	VIII O	<u>Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-85, 89 &amp; 90)</u>	1:500
176	193	VIII P	<u>Comparison of visual and description with geophysical interpretation (Borehole No. MNRT-97 &amp; 99)</u>	1:500
			<b>FLOOR CONTOUR PLAN</b>	
177	194	IX A	<u>Scam - X LA</u>	1:5000
178	195	IX B	<u>Scam - X LB</u>	1:5000
179	196	IX C	<u>Scam - X TOP</u>	1:5000
180	197	IX D	<u>Scam - X BOTTOM</u>	1:5000
181	198	IX E	<u>Scam - IX 1.1</u>	1:5000
182	199	IX F	<u>Scam - IX 1.1</u>	1:5000
183	200	IX G	<u>Scam - IX</u>	1:5000
184	201	IX H	<u>Scam - VIII</u>	1:5000
185	202	IX I	<u>Scam - VI TOP</u>	1:5000
186	203	IX J	<u>Scam - VI MIDDLE</u>	1:5000
187	204	IX K	<u>Scam - VI BOTTOM</u>	1:5000
188	205	IX L	<u>Scam - V TOP</u>	1:5000
189	206	IX M	<u>Scam - V MIDDLE</u>	1:5000
190	207	IX N	<u>Scam - V BOTTOM</u>	1:5000

Sl. No.	DO No.	Plate No.	Description	Scale/ R.F.
191	208	IX O	Seam - IV TOP	1:5000
192	209	IX P	Seam - IV MIDDLE	1:5000
193	210	IX Q	Seam - IV BOTTOM	1:5000
194	211	IX R	Seam - III L	1:5000
195	212	IX S	Seam - III	1:5000
196	213	IX T	Seam - II	1:5000
			SEAM FOLIO PLAN	
197	214	X - 1	Seam - X LA	1:5000
198	215	X - 2	Seam - X LB	1:5000
199	216	X - 3	Seam - X TOP	1:5000
200	217	X - 4	Seam - X BOTTOM	1:5000
201	218	X - 5	Seam - IX L2	1:5000
202	219	X - 6	Seam - IX L1	1:5000
203	220	X - 7	Seam - IX	1:5000
204	221	X - 8	Seam - VIII	1:5000
205	222	X - 9	Seam - VII	1:5000
206	223	X - 10	Seam - VI TOP	1:5000
207	224	X - 11	Seam - VI MIDDLE	1:5000
208	225	X - 12	Seam - VI BOTTOM	1:5000
209	226	X - 13	Seam - V TOP	1:5000
210	227	X - 14	Seam - V MIDDLE	1:5000
211	228	X - 15	Seam - V BOTTOM	1:5000
212	229	X - 16	Seam - IV TOP	1:5000
213	230	X - 17	Seam - IV MIDDLE	1:5000
214	231	X - 18	Seam - IV L	1:5000
215	232	X - 19	Seam - IV BOTTOM	1:5000
216	233	X - 20	Seam - III L	1:5000

Sl. No.	DO No.	Plate No.	Description	Scale/ R.F.
217	234	X - 21	Seam - III	1:5000
218	235	X - 22	Seam - II.L1	1:5000
219	236	X - 23	Seam - II.L1	1:5000
220	237	X - 24	Seam - II.L1	1:5000
221	238	X - 25	Seam - II	1:5000
222	239	X - 26	Seam - II.L1	1:5000
223	240 A	X - 27A	Band 1 (Plan showing Thickness Distribution only)	
224	240 B	X - 27B	Band 2 - do -	
225	240 C	X - 27C	Band 2 - do -	
226	240 D	X - 27D	Band 4 - do -	
227	240 E	X - 27E	Band 5 - do -	
228	241	X - 28	Band - do -	
229	242	X - 29	Local - do -	
			<b>DISPARTING OF SEAMS</b>	
230	243	XI - A	Between X.L.A & X.L.B	1:5000
231	244	XI - B	Between X.L.H & X.TOP	1:5000
232	245	XI - C	Between X.TOP & X.BOT	1:5000
233	246	XI - D	Between X.BOT & IX.L1	1:5000
234	247	XI - E	Between IX.L2 & IX.L1	1:5000
235	248	XI - F	Between IX.L1 & IX	1:5000
236	249	XI - G	Between IX & VIII	1:5000
237	250	XI - H	Between VIII & VII	1:5000
238	251	XI - I	Between VII & VI.TOP	1:5000
239	252	XI - J	Between VI.TOP & VI.MIDDLE	1:5000
240	253	XI - K	Between VI.MIDDLE & VI.BOT	1:5000
241	254	XI - L	Between VI.BOT & V.TOP	1:5000
242	255	XI - M	Between V.TOP & V.MIDDLE	1:5000
243	256	XI - N	Between V.MIDDLE & V.BOT	1:5000

Sl. No.	DD No.	Plate No.	Description	Scale/ R.F.
244	257	XI - O	Between V BOT & IV TOP	1:5000
245	258	XI - P	Between IV TOP & IV MIDDLE	1:5000
246	259	XI - Q	Between IV MIDDLE & IV L	1:5000
247	260	XI - R	Between IV L & IV BOT	1:5000
248	261	XI - S	Between IV BOT & III L	1:5000
249	262	XI - T	Between III L & III	1:5000
250	263	XI - U	Between III & III L	1:5000
251	264	XI - V	Between III L & II	1:5000
			<b>GEOLOGICAL CROSS SECTION</b>	
252	265	XII A	Along A-A', B-B', C-C', D-D' and E-E'	1:5000
253	266	XII B	Along G-G', H-H', I-I', J-J', K-K', L-L' & M-M'	1:5000
254	267	X III	ISO-QUARRY DEPTH LINES WITH C:OB RATIO LINES (BASE - IV BOTTOM BEAM)	1:5000
255	268	X IV	ISO-OVERBURDEN LINES WITH C:OB RATIO LINES (BASE - IV BOTTOM BEAM)	1:5000
256	269	X V	TOTAL COAL PLAN (COMBINED BOCHORE OF COAL BEAMS) WITH C:OB RATIO LINES (BASE - IV BOTTOM BEAM)	1:5000

**GEOLOGICAL REPORT ON DETAILED EXPLORATION FOR COAL  
TALAIPALLI COAL BLOCK  
(ON BEHALF OF NTPC LTD)  
MAND RAIGARH COALFIELD, DISTRICT : RAIGARH, CHHATTISGARH**

**CHAPTER - I**

**1.0 INTRODUCTION**

**1.1 GENERAL**

- 1.1.1 A Memorandum of Understanding (MOU) was signed between National Thermal Power Corporation Ltd. (NTPC) and Mineral Exploration Corporation Ltd (MECL) on 12.6.2006 to conduct detailed exploration for coal by MECL, on behalf of NTPC Ltd in three captive blocks allotted to NTPC Ltd for coal mining. These captive blocks are Talapalli block in Mand-Raigarh Coalfield, Dulerga block in B-River Coalfield and Pabri-Barwadih block in North Karampura Coalfield. The exploration work was awarded to MECL, vide LOA No.CS-7014-708-9-CY-LOA-4711 dated 14.07.2006.
- 1.1.2 To meet the increasing demand from the power sector, the demand for coal in the coming years is projected to grow very fast. Hence, the search for both the power grade and superior grade coal has been intensified. This has resulted in the speedy exploration of coal not only in the promising blocks identified for exploration but also in the regional search operation in virgin tracts of different coalfields throughout the country. Mand-Raigarh coalfield was identified as a potential coalfield for priority exploration.
- 1.1.3 The Coalfields of Chhattisgarh - Rewa basin can broadly be grouped into a northern belt and a southern belt. The coalfields falling in northern belt are the Singrauli, Sohagpur, Jharsuli, Sonhat, Raikonda-Tarapur & Bilaspur coalfields while in southern belt are the coalfields of Korba, Hirdo-Arand and Mand-Raigarh coalfields. Further the Gondwana sediments extend south-eastward through Hingra to the B-River Coalfield of Orissa. The northern belt lies along the Son Valley, while the southern one falls mainly in the Mahanadi valley. Linking the two basin belts are the smaller patches of coal measures comprising the Lakhanpur, Parbhilai, Sonbargarh and Dambanwala coalfields.
- 1.1.4 The Mand-Raigarh coalfield basin is bounded by Latitudes 21°45' & 22°42' and Longitudes 83°01' & 83°44' and covers an area of approximately 900 sq. km. & is one of the largest coalfields of Chhattisgarh State. It is situated in the drainage basin of two rivers viz. Mand river, a tributary of Mahanadi and the Kukret river which debouches into Mahanadi river. This coalfield has not received due attention due to the lack of infrastructural facilities.

- 1.1.5 **Mand-Raigarh coalfield** forms the southern part of Mahanadi valley and it is situated mostly in Raigarh district and a smaller part lying in Korba & Bilaspur district of Chattisgarh state. Exploration in this vast coalfield is continuing since long and may continue in future also mainly by MECL, G.S.I. and C.M.P.D.I.L.
- 1.1.6 **Talaipalli Block** lies in the eastern part of Mand-Raigarh coalfield. In this block GSI has drilled 15 Boreholes, very wide spaced boreholes during field seasons 1990 – 1993 involving 6434.55m. drilling in an area of 20 sq. km, and assessed 964.88 million tonnes of coal reserves in indicated category, varying in grade from 'A' to 'F'. Majority of reserves were assessed to be upto 300m. depth.
- 1.1.7 The Ministry of coal allocated Talaipalli Block for exploitation to NTPC Ltd., after conducting the detailed exploration. As mentioned above the block was regionally explored by GSI and estimated 964.88 million tonnes of indicated category coal reserves based on only 15 boreholes data. NTPC Ltd. after receiving letter of award (LOA) from Ministry of Coal, decided that MECL shall carry out detailed exploration in the block by drilling boreholes at 400m x 400m grid interval, involving around 45,000m. drilling in 105 proposed boreholes with related geological work, so as to convert the indicated category of coal reserves to proved category.
- 1.1.8 Thus MECL commenced the task of detailed exploration for coal in Talaipalli block on behalf of NTPC Ltd, on 11.08.2006 by deploying 3 rigs initially. Two projects were opened for the purpose of administrative control and for smooth functioning of drilling and related geological work. Progressively the rigs were increased in these projects to even 13 rigs (during April & May – 2007) to complete the task. Thus by 10.08.2007 a total of 33716.65 m. of drilling was done from 85 boreholes.
- 1.1.9 It was likely that the drilling target in Talaipalli block would have been completely achieved as per schedule, but due to the onset of monsoon and non approachability to drill sites and also stoppage of work by the forest authorities, the exploration activities were temporarily suspended.
- 1.1.10 The drilling operation was resumed on 21/12/2007 after the completion of monsoon and harvesting. A total of 17 boreholes (MNRT-86 to MNRT-102) and two suspended boreholes MNRT-20 (Depth 187.50 – 429.20 = 241.70 m) and MNRT-74 (Depth 329.50 – 523.60 = 194.10 m.) were completed involving 6138.10 m. drilling. Thus in all 39854.75 m. drilling is done in 102 MNRT series boreholes in Talaipalli block by MECL. A grand total of 46289.30 m. drilling has been done by MECL & GSI in 117 boreholes (MNRT & RT series) in Talaipalli block.
- 1.1.11 When MECL recommenced drilling operation in Dec 2007, the two suspended bore holes (MNRT-20 & 74) were taken up and completed. Besides NTPC cleared 12 out of 17 proposed boreholes for drilling by shifting the proposed points along the forest boundary as they were falling within the reserve forest and forest clearance was not available. Thus the suspended boreholes and proposed 12 points were completed by 3.8.2008.

1.1.12 The Draft Geological Report of Talaipalli block was submitted by MECL on 10.8.2008 excluding the analytical data of suspended boreholes which was drilled later. (MNRT-20)

1.1.13 The financial year wise break-up of drilling in Talaipalli block by MECL is given below :

Year 2006-07	:	22433.70 m.
Year 2007-08	:	16615.15 m.
Year 2008-09	:	805.90 m.
<b>Total Drilling</b>	<b>:</b>	<b>39854.75 m.</b>

Due to bad weather conditions and lack of approachability, due to bad weather or non permission of entry by forest authority, the continuity of drilling was hampered, which is shown below :

Drilling Commencement on 11.08.2006 and continued upto 10.8.2007 = 33716.65 m. drilling in 85 boreholes

Recommenced on 21.12.2007 and continued upto 29.5.2008 = 5896.40 m. drilling in 102 BHs excluding suspended boreholes.

Suspended boreholes retaking on 5.07.2008 & closing on 3.08.2008 = 241.70 m. drilling (1 BH)

**Total Drilling = 39854.75 m.drilling**

## 1.2.0 Objective of Exploration:

1.2.1 The detailed exploration in Talaipalli block was carried out with the following objectives: -

1. To prove the lay & disposition of coal seams, by drilling boreholes at 400m x 400m grid interval within the demarcated Talaipalli block boundary.
2. To determine the quality of coal seams and to assess thickness-wise, depth-wise, C:OB ratio-wise and grade-wise proved opencast/underground coal reserves in the block.
3. Geological report in digital format & ore body modelling.

## 1.3.0 Location and Accessibility:

1.3.1 The block derives its name from Talaipalli (Talaipalli) Village situated in the block, falling under administrative control of Raigarh district, Chhattisgarh state. It is bounded by

**Latitudes 22° 13' 35" to 22° 16' 08" N**

**Longitude 83° 25' 49" E to 83° 30' 22" E**

Included in Survey of India toposheet No. 64 N/7 & N/8. The area of Talaipalli block is 20 Sq.km. in which detailed exploration was conducted by drilling boreholes at 400 m. x 400 m. grid interval. Boundary pillars have been erected along the block boundary.

- 1.3.2 Dharamjaygarh is an important town situated at the north eastern periphery of the coalfield. Kharsia and Raigarh railway stations on Howrah – Nagpur section of South Eastern Railway are located in the south eastern periphery of the coalfield. Both the rail heads are connected by two tarred roads with Dharamjaygarh and from Dharamjaygarh, the road leads further north to Ambikapur. The distance from Dharamjaygarh to Raigarh and Kharsia rail heads are 75 kms. and 60 kms. respectively, while the distance between Dharamjaygarh and Ambikapur is 120 kms.
- 1.3.3 Talaipalli block is about 55 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village (22° 14' 27" ; 83° 29' 06" ) is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lelunga road. Gharghoda is about 35 km. North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway. A large part of the area of investigation is practically inaccessible during monsoon. The nearest railway station is Raigarh which is 55 km away from Talaipalli block lying on the Mumbai-Howrah main line of SE railways.
- 1.4.0 **Block Boundary:**
- 1.4.1 Talaipalli block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd., was pillared by Boundary Pillers BP-1 to BP-65 (Plate-I). The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajiagarh and Kudur-Mauha village forming the northern boundary.
- 1.5.0 **Previous Work :**
- 1.5.1 W.T. Blanford examined a part of Mand-Raigarh coalfield in 1870. Shortly afterwards V. Ball (1882) surveyed the coalfield in some detail. This was followed by exploratory drilling carried out under the supervision of W. King assisted by Lala Hiralal (1886) and the result was unattractive for further investigation. Later C.S. Fox (1934) worked out the limits of the coalfield. S.M. Mathur (1949), A.B. Dutt (1953), M.S. Venkatraman, J. Narayana Moorthy and B.N. Sinha (1959) examined part of the coalfield. The Mand Valley area of this belt was geologically mapped on 1:63,360



scale maps between 1961 and 1966 by V.D. Puri, G.P. Deshmukh, A. K. Dey etc. who located the various coal outcrops and worked out the structural frame work of the basin. A concise account of work carried out by different workers in this coalfield was presented by Raja Rao (1983). Systematic geological mapping with special attention on coal resources in parts of North Raigarh coalfield, specially around Talaipalli area, was done by Bandyopadhyay ( 1984 & 85). In the area adjoining Talaipalli area, regional exploration for coal was carried out in Kurumkela (Ray, 1988), Chintapani ( Ray and Roy, 1991), Gare ( Ray & Roy – 1992 ) and Pelma Ray et. al. (1994) areas during the field seasons 1981-82 to 1989-90. During the field season 1990-91 to 1992-93, 15 boreholes were drilled by GSI in Talaipalli block involving meterage of 6434.55m and the report on the regional exploration for coal was submitted in 1998.

- 1.5.2 MECL conducted priority regional exploration in the Trans-Mand Sector located west of Mand river during December'97 to May'2000 over an area of about 435 sq. km. Extending from Syang in the north to Batati-Kolga in the south. The geological report of Syang-Boro block was submitted in June'2000, Chirra-Jabga block in November'2000 covering about 120 sq. km. area.

#### 1.6.0 Topography and Drainage :

- 1.6.1 The coalfield is characterised by undulatory rolling topography consisting of hills interspersed with broad valleys. The general elevation of the ground ranges from 270m. to 300m. above MSL. The slope is either towards southwest or southeast. The hills are relict type and rise about 450m. above MSL. The southerly flowing perennial Mand river with its tributaries constitute the main drainage of the area. The Kelo river, a tributary of Mahanadi, drains the eastern part of the coalfield.

- 1.6.2 The topography of Talaipalli block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolge Pahar in the north and Silot Pahar (580m) in the south. The general ground level elevation of the area varies between 280 m and 340m above MSL. The minimum ground level is 277.48m (borehole MNRT-73) near Kelo river and maximum ground elevation is 335.34m around borehole MNRT-61.

- 1.6.3 Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south.

#### 1.7.0 Environmental Base Line Data :

- 1.7.1 The detailed report on environmental and land use study is dealt in Volume- IV of this report, which has already been submitted to NTPC Ltd. In March 2008. The Talaipalli block is mostly covered by cultivated land. The south-eastern part of the block falls in Reserve & protected forest cover. Some villages such as Talaipalli,

Kudhur-Mauha, Ajjigarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajhepati are located within the block.

- 1.7.2 **Climate** : The area experience a sub- tropical climate with very hot and dry summer. In the summer season from March to June, temperature rises to 45° C during the peak period, mostly upto 42° C in average. The monsoon period extends from mid June to September with an average annual mean rainfall of 1620 mm. The winter season starts from November and continues upto February. During winter the temperature goes down to 18.6° C.
- 1.7.3 **Land use, Flora & Fauna** : Forest cover is found in the eastern and central part of the block. Remaining part of the area is mostly cultivated land. Cultivation and collection of forest products are the main occupation of the people of the area. The soil of the area is having fair to medium range of fertility. The main crops grown in this area are paddy. The commonly found flora in the area are Sal, Teak, Bija, Mango, Neem, Tendu etc. The wild animals found are elephant, wild dog & wild bear etc. Besides a few forest land in the central part are also present.

The population details of the villages in the block is given in Volume-IV.

The sources of surface water in the area are Kelo River and ponds. The dug wells and tube wells are the source of ground water. A tributary with network of small streamlets feeds the Kelo River.

#### 1.8.0 **Scope**

- 1.8.1 This report embodies all the exploration data generated by Geological Survey of India, 6434.55 m drilling in 15 RT series boreholes. The data taken from **Final report on the Regional Exploration for Coal in Talaipali Area** as received from NTPC on 01-02-2007 .
- 1.8.2 The scope of the present work is to estimate the quarriable reserves from the regionally persistent and workable coal seams occurring in Talaipalli block. The quarriable reserves are assessed based on 1-100 thickness and quality, upto 300m. depth line of seam-IV Bottom. Underground reserves have been assessed on 1-30 seam thickness and quality, estimated from 300m. depth onwards to the block limit and for the entire seam spread in the block for those seams occurring below seam-IV Bottom. The structural interpretation like drawing floor contour plan and its interpretation, folio plans, reserve estimation etc. have been carried out by sophisticated MINEX Software Programme of MECL, I.T. Centre. A 3D modelling of the block is evolved through Minex Software and presented along with this report.

## CHAPTER - II

### 2.0 PRESENT INVESTIGATION

#### 2.1 GENERAL

2.1.1 Mineral Exploration Corporation Ltd. carried out detailed exploration in Talapalli Block involving various activities like geological mapping, surveying, drilling, lithological logging, coal sampling, geophysical logging including baseline environmental data collection etc. The quantum of work done under different activities by MECL are summarized in Table 2.1.

**TABLE NO. 2.1**

**QUANTUM OF WORK DONE BY MECL IN TALAPALLI BLOCK**

Sl. No	Item of work	Target as per MOU	Work done
1.	Area of the block	30 Sq. Km	30 Sq. km.
2.	Geological Mapping	30 Sq. Km	30 Sq. Km
3.	Surveying		
	(i) Triangulation	30 Sq. Km.	30 Sq. Km
	(ii) R.L. of BHs	105 Nos.	102 BHs (MNRT series)
	(iii) Co-ordination of BHs.	105 Nos.-	102 BHs (MNRT series)
4.	Exploratory Drilling	45,000 m	39854.75m(MNRT Series)
5.	Geological Core logging	45,000 m	39854.75m.(MNRT Series)
6.	Geophysical Logging	22,500 m	20100.00m.(MNRT Series)
7.	House keeping of BH Samples	1300 Nos	8948 Nos.
8	Preparation of Coal Samples	3500 per/5kg	2545 per/5kg
9	Chemical Analysis		
	(i) Base by Base	6501 m	5965.41 m. (8948 Nos.)
	(ii) Full Proximate analysis	4742 Nos.	1469 Nos
	(iii) Moisture at 60% RH and 40°C	1300 Nos.	
	(iv) Carbon dioxide	1300 Nos.	165 Nos.

Sl. No	Item of work	Target as per MOU	Work done
v)	Gross calorific value	1300 Nos.	455 Nos.
vi)	Carbon (corrected for CO <sub>2</sub> ) (outside Lab).	1300 Nos.	-
vii)	Total Sulphur	1300 Nos.	341 Nos.
viii)	Phosphorus	650 Nos.	127 Nos.
ix)	Chlorine (outside Lab).	650 Nos.	-
x)	Ultimate Analysis.	1300 Nos.	278 Nos.
xi)	Swelling Index	650 Nos.	103 Nos.
xii)	Coke type	650 Nos.	103 Nos.
xiii)	GKLT assay (outside Lab).	650 Nos.	-
xiv)	Distribution of Sulphur	650 Nos.	9 Nos.
xv)	HGI	1300 Nos.	177 Nos.
xvi)	Ash Fusion Temp.	1300 Nos.	178 Nos.
xvii)	Ash Analysis	650 Nos.	99 Nos.
xviii)	Petrography Analysis (Outside lab)	10 Nos.	-
8.	Environmental Studies (10Kms Radius) (Outside lab)	1 No.	1 No.
9.	Geo-Technical Studies (Physico Mechanical) (Outside lab)	2 No.	2 No.
10.	Washability Characteristics	3 BHs	3 BHs
11.	Dove Tailing of Old data	6434.55 m. (15 BHs)	6434.55 m. (15 BHs-RT Series)
12.	Digitization	.	Talaipalli coal block plates.
13.	Ore body Modeling of block	.	Talaipalli Coal block GR.

## 2.2.0 GEOLOGICAL MAPPING

2.2.1 The entire area of Talaipalli block is mostly covered with soil and at few places the outcrops of sandstone, shale & coal can be seen. The geology of the block is therefore, interpreted based on the subsurface data obtained from boreholes. The geological

information i.e. strike & dip of the strata and outcrops wherever available in the block have been mapped and a geological plan showing the incrop of coal seams, faults and other surface geological features have been prepared and depicted in the Plate No. III (1:5000).

### **2.3.0 SURVEYING**

2.3.1 The survey work at Talaipalli block has been carried out in the 20 sq.km area by closed traverse using "Electronic Total Station". Intermittent closed traverses were run for connecting the boreholes and for contouring by using E.D.M and Theodolite.

2.3.2 The location & coordinate of Survey of India / National Pillar from where the coordinates are carried out are (i) Kusmi Bhana Hills - N-919601.36 E - 2936373.98 and RL 413.00 m. (ii) Gharghodi Hills - N-915293.59, E-2925757.94.

2.3.3 The coordinate & R.L. of national grid pillar near Barodh Colliery, which is about 18 km. NW from the exploration block, from where the R.L. has been carried out is given below :

- 1) N - 919530.91 E - 2932538.33, RL - 310.029
- 2) N - 919474.71 E - 2932534.17, RL - 309.828
- 3) N - 919449.61 E - 2932518.33, RL - 309.445.

2.3.4 The baseline has been laid at traverse stations T1 and T2. The distance between T1 and T2 was observed with Total Station and it is 237.7068 mts.

2.3.5 The co-ordinates of T1 was assumed as 916941.0446 Northing (Latitude) and 2943047.8930 Easting (Departure).

2.3.6 The co-ordinates and R.Ls of all the boreholes and traverse stations were determined with the above reference points by running the closed traverse method by using the Total Station/E.D.M./Theodolite and Auto Level.

2.3.7 The surface contouring has been done at 2.0 m Contour interval in 20 sq.kms area with all surface features.

### **2.4.0 LITHOLOGICAL LOGGING**

2.4.1 The drill cores of both coal and non coal strata obtained from boreholes were systematically logged visually, with detailed description of litho-units like grain size, colour, mineral constituent etc. The structural details such as bedding, slickensides, fractures, core dip etc. were also recorded wherever possible. The lithological and structural details are furnished in Annexure-II A & II B. Graphic logs on R.F 1:500 plotted with the help of computers are presented in Plates IVA to IVM.

- 2.4.2 The roof and floor depth delineation of coal seams and their thickness were corrected after the study of the coal quality data on band by band basis in respect of the boreholes for which chemical analysis received. The coal seams of the boreholes which are sent for Geo-Technical Studies and washability test, the roof and floor of seam delineation has been done on the basis of visual logging
- 2.4.3 A total of 785.00m, cores of borehole MNRT-16 & 67, including coal and non coal horizons were sent to out side laboratory (CIMFR, Dhanbad) for carrying out various tests to determine the physico-mechanical properties of various litho units present in the borehole. This has been done as advised by NTPC Ltd. The summarised results of these tests will be directly communicated to N T P C Ltd.

### **2.5.0 GEOPHYSICAL LOGGING**

- 2.5.1 A total of 20100.00 m in 48 BHs, out of 102 boreholes drilled in the block have been geophysical logged using multi parameter probes, the details of which have been given separately in Chapter-VII.

### **2.6.0 SAMPLING AND ANALYSIS**

- 2.6.1 The carbonaceous horizons (coal, shaly coal and carbonaceous shale) of all correlatable coal seams as well as non-combustible bands of significant thickness from the boreholes drilled by MECL in this block were sent for band by band analysis to chemical laboratory, MECL, Nagpur. Before sending it to the laboratory, the samples prepared after crushing at (-) 72 mesh sizes, coking and quartering, packing etc. were done at project level only.
- 2.6.2 A total of 5965.41m of coal sampling in 102 boreholes have been carried out. All the samples have been sent for conducting band by band analysis. The band by band analytical results are presented in Annexure-III.
- 2.6.3 After obtaining band by band analysis, the seam overall analysis at 60% RH & 40 °C for all correlatable coal seams having thickness >0.50 m. were advised for BCS. I-30, I-100 thickness of seams. Some IP seam thickness was also analysed. Two seams were occasionally clubbed some time with above / below bands & result obtained for the combined thickness. Similarly, a few unworkable coal seams / bands were also subjected to overall analysis at 60% RH and 40°C. In addition to the seam overall analysis, special tests such as Ultimate analysis, GCV, AFT, Ash analysis, HGI, Sulphur Distribution, Total Sulphur, Phosphorous content, Swelling Index and Coke Type have also been carried out as per the stipulated norms.
- 2.6.4 The analytical results of band by band analysis are incorporated in Annexure-III A & IIIB, whereas results of seam overall at 60% RH & 40°C are presented in Annexure-IV. The special test results are given in Annexure-VIA to VIG. The seam structure of each individual seam has been plotted seam wise on R.F 1:50 and are presented in

Plate No. VII-1 to VII-32. The coal analysis of MECL boreholes for band by band, seam overall, G.C.V., Phosphorus, Ultimate analysis, Swelling Index, Coke Type, Total Sulphur and Distribution of sulphure, HGI, Ash analysis and Ash fusion temperature have been carried out at MECL Laboratory. Whereas the samples for other test viz. Physico-Mechanical test and Washability were sent to outside laboratories. The result of washability test has been received from ISM, Dhanbad and details of analytical result is given in Annexure-X. The physico-mechanical test result from CIMFR, Dhanbad is yet to be received. The GKI.T Assay, CO<sub>2</sub> & Carbon corrected for CO<sub>2</sub> and chlorine tests are pending to be analysed from outside agencies.

## 2.7.0 EXPLORATORY DRILLING

2.7.1 The detail exploratory drilling in Talaipalli block was commenced on 11.08.2006 as per the work detail given in the Letter of Award (LOA) No. CS-7014-708-9-CY-LOA-4711 dated 14.07.2006.

2.7.2 The exploration activity in the block was suspended during monsoon and recommenced again on 21.12.2007 after harvesting. A total of 33716.65 m of drilling was done in 85 boreholes of MNRT series till 10.08.2007 before suspension of drilling. After recommencement, 17 boreholes and two suspended borehole completed which involves 6138.10 m drilling. Thus a total of 39854.75 m. drilling has been done in 102 boreholes. The year wise breakup of meterage drilled in the block is as follows.

Year 2006 - 07	22,433.70 m
Year 2007 - 08	16,615.15 m
Year 2008 - 09	805.90
<b>Total</b>	<b>39,854.75 m in 102 boreholes</b>

2.7.3 The entire drilling operation was conducted by conventional drilling method aided by wire lines equipments using Drill Max, Vol 300 & Vol. 180 drill machines. Controlled speed, adequate pressure, circulation of bentonite mud with other chemicals etc. were resorted to maximize the core recovery in both coal & non coal horizons. The entire drilling has been carried out in NX/NQ Core size except in the top overburden zone where HX/HQ core size has been used. The recovery in the coal seam have been maintained at more than 90% and in the non coal portion at more than 80% except in areas of structurally weak and disturbed zones and weathered/ friable formations. The depth range of the boreholes drilled in this block by MECL varies from 34.00m (MNRT-82) near seam incrop of seams to 596.00 m. (MNRT-50) in the down dip side.

## CHAPTER-III

### **3.0.0 GEOLOGY AND STRUCTURE**

**3.1.1** Mand-Raigarh Coalfield lies in the drainage basin of Mahanadi, represents a part of the south-eastern periphery of a vast craton of sedimentary terrain, known as Son-Mahanadi Gondwana Master Basin. Mand-Raigarh Coalfield along with B-Hingiri coalfield towards south-east and Korba-Hausla towards west and north-west constitute the large NW-SE trending asymmetrical synformal master basin. The demarcation of individual coalfields has been delineated by arbitrary lines rather than on the basis of geological incongruities. In spite of the favourable geographical location and the fact that the coalfield is known to be coal bearing since long, the economic viability of this coalfield in comparison to its neighboring coalfields is little known due to paucity of sub-surface information about the lay & disposition of the coal seams, their quality and reserves.

**3.1.2** It is only very recently that GSI and MECL have conducted exploration on a regional scale and found encouraging results about coal potential. Udayrajygarh, an important town is situated at the southeastern periphery of the coalfield. The coalfield is characterised by undulatory rolling topography consisting of hills interspersed with broad valleys. The general elevation of the ground ranges from 270m. to 300m. above M.S.L. The slope is either towards southwest or southeast. The hills are relief type and rise about 450m. above the Sea level. The southerly flowing perennial Mand river with its tributaries constitute the main drainage of the area. The Koko river, a tributary of Mahanadi drains the eastern part of the coalfield.

### **3.1.0 Regional Geology**

**3.1.1** The extensive occurrences of Barakar and Upper Barakar rocks amidst isolated Talchir outcrops spread between latitudes  $21^{\circ}45'$  to  $22^{\circ}42'$  and longitudes  $83^{\circ}01'$  to  $83^{\circ}44'$ , constitutes Mand-Raigarh Coalfield. It is situated between B-River Coalfield in the southeast and Korba Coalfield in the southwest with more or less similar stratigraphic and tectonic setting. The coal measures in the Mand-Raigarh basin are exposed in three well defined patches due to erosion of the overlying Karthi rocks along the drainage of the prominent rivers.

**3.1.2** The generalised stratigraphy of Mand-Raigarh Coalfield is enumerated below in table no. 3.01.



Table – 3.01

## Generalised Stratigraphic Succession

Age	Formation	Thickness (m)	Lithology
1	2	3	4
Recent to subrecent			Aluvial soil pebbly to bouldary bed with silty clay band, laterite etc.
Cretaceous to Eocene	Deccan Traps		Basalt flows & dolerite dykes
Lower to Middle Triassic	Kamthi	2851	Poorly sorted, frequently ferruginous, coarse to very coarse grained, locally graded to pebbly, mega cross bedded sandstone containing, brownish grey to buff coloured clay clasts. A fossiliferous red claystone to siltstone bed occurs at the base.
Upper Permian to Lower Permian	Raniganj	180	Mostly fine to medium grained, grayish white, micaceous sandstone and siltstone with claystone, shale, minor coarse grained sandstone and two coal seams of inferior grade.
	Barren Measure	300	Dominantly grey claystone/grey shale with siltstone and iron stone bands; interbanded sequence of fine to medium grained sandstone and shale
	Barakar	425 - 800	Medium to coarse and very coarse grained even gritty, sandstone at the lower part followed upward by fine to medium grained assemblage with grey claystone/shale which become predominant towards the upper part, number of coal seams and carbonaceous shale.
	Karharbari(?)	23	Mottled at places carbonaceous sandstone, frequently associated with pebbles of quartzite granite etc. of various shapes and sizes
Upper Carboniferous to lowermost Permian	Talchir	150+	Very fine to fine grained sandstone with siltstone and shale, occasionally greenish in nature, at places with matrix based variegated polymictic conglomerate.

After GSI.

- 3.2.3 **The geological formations of Mand-Raigarh Coalfield are briefly described below:** (Bull. GST, Ser-A, No.45, Vol -III, 1983)
- 3.2.4 **Precambrian** :The Precambrian rocks comprising granite gneiss, mica schist, phyllites and quartzites along with quartz veins & pegmatites occur along the northern, northeastern periphery. The strike of the foliation varies from E-W to N70°W – 570°E with 50° to 70° dip towards west.
- 3.2.5 **Talchir Formation** : The Talchir sequence begins with tillite at the base and overlies the basement unconformably. It occurs as a continuous strip along the northern periphery of the basin. Along the southern boundary, Talchirs crop out as narrow, elongated discontinuous strips disrupted by faults. The Mand-Raigarh basin shows widespread development of basal tillite pointing to advancement of ice from the surrounding Precambrian uplands.
- 3.2.6 **Karharbari Formation** : Karharbari formation is developed in a limited area. It consists of mottled, at places carbonaceous sandstone, frequently associated with pebbles of quartzite, granite etc. of various shapes and sizes
- 3.2.7 **Barakar Formation** : The Barakar formation conformably overlies the Talchir sediments over the major part of coalfield and covers a large tract within the coalfield. It is represented predominantly by multistoried cross-bedded feldspathic sandstone which are highly kaolinised and friable with subordinate shales, carbonaceous shales and coal seams. The sandstone are mostly medium to very coarse grained and milky white to greyish white in colour. The sandstone is arkosic in nature and often shows pronounced kaolinisation. Exposures of fine-grained sandstone and grey to greyish black shale are very limited.
- 3.2.8 **Barren Measure Formation** : Barren Measure formation overlies conformably over Barakar formation. Barren Measure formation can be traced in the south eastern part between Gharghoda and Gare, besides sporadic occurrence in vicinity of Chhal and Kurekela. This formation comprises of predominantly grey claystone/grey shale with siltstone and iron stone bands and interbanded occurrence of fine to medium grained sandstone & shale.
- 3.2.9 **Raniganj Formation** : Raniganj formation has been demarcated in south-eastern and south-western part, besides patchy occurrence in north-western part. It is represented by mostly fine to medium grained sandstone, siltstone with clay stone, shale, fine to coarse grained sandstone and coal seams / bands of inferior grade.
- 3.2.10 **Kamthi Formation** : The rocks of Kamthi formation are well exposed at higher contours of the flat topped hills. They not only occur in the intervening area between Mand Valley and Hasdo-Arand on the one side and the Raigarh Coalfield on the other, but also occur as irregular patches along the axial region of the Mand Valley. It is represented dominantly by coarse, friable, porous, brownish to red cross bedded sandstone and argillaceous beds. The nature of the contact between Kamthis &

Barakars is variable and is somewhat discordant and at places the Kamthi strata overlap the older units.

- 3.2.11 **Intrusives/Deccan Trap** : A number of basic dykes, sills and flows have been observed in the Uprora-Porea area in the northern part of the coalfield. The basic rock comprise fine grained basalts to coarse grained gabbroid type. The flows at places have been altered to laterite. A dyke exposed north of Amaldih has been traced over a distance of 26.5 Km. in an east-west direction and another dyke exposed 0.8 Km. south of Porea is over 6 Km. length.

### 3.3.0 Coal Seams

- 3.3.1 The regional exploration carried out in the western part of Mand-Raigarh coalfield along the eastern bank of Mand river in northern part of Dharamjaygarh-Khargaon, Ongana - Potia as well as Chhal area have revealed the presence of a number of coal seams in this coalfield. Exploration in the north-western and western part of the coalfield reveals number of coal seams and these have been numbered as I to XXII and so on in ascending order.

- 3.3.2 The coals of this coalfield are generally banded in nature and are not devolatilised. The coals in general, are low in rank, high in volatile and non-coking type.

### 3.4.0 Regional Structure

- 34.1 The Mand-Raigarh Coalfield is an asymmetrical basin with an approximately NW-SE axis. It is a part of Ib-Mand-Korba master basin lying within the Mahanadi graben. It displays a typical half-graben configuration, with the southern boundary marked by a major NW-SE zone of faulting coinciding with the trend of the Mahanadi graben and the northern boundary not faulted over the major part. In the Mand Valley proper, the coal measures lying between Kharsia & Dharamjaygarh display a broad synclinal structure with its axis running just south of Sithra. The northern limb of the Mand river basin is exposed to the north of the Sithra-Dharamjaygarh area where the Barakar beds are found to strike broadly in NW-SE direction. The beds dip at low angle  $5^{\circ} - 7^{\circ}$  towards south-west. In the southern limb, the strike is approximately NW-SE with minor variations and the beds dip towards north-east.

- 3.4.2 The other structural element in this basin belt comprises normal gravity faults. The available surface and sub-surface data indicate that the area lying on both sides of Mand river is traversed by number of sub-parallel faults of considerable linear extent, though the surface expressions of faults are very limited or entirely lacking. Two sets of faults trending WNW-ESE to NW-SE and N-S occur. The former generally has down throws against the dip i.e. towards north while the latter has easterly throw. The amount of throw varies from 10m. to 150m.

## CHAPTER-IV

### 4.00 GEOLOGY OF TALAIPELLI BLOCK

#### 4.1.0 GENERAL.

4.1.1 TalaiPELLI Block is located in the eastern part of Masul-Baigunh Corridor. The geology of the block is in conformity with the regional set up. Major part of TalaiPELLI block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

4.0.1 The geological succession evolved (on the basis of exploration data generated in the block is given in the Table 4.0) while calculating the thickness of different stratigraphic formations, the data generated by boreholes of RT & MNRT series. The intersection details of different formations in the boreholes drilled in this block is presented in Annexure- IIA & IIB and the succession is given below :

TABLE NO. 4.01

**GEOLOGICAL SUCCESSION IN TALAIPELLI BLOCK**

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measure	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakar	30 – 596	Fine, medium and coarse grained siltstone, grey sandstone, micaceous and laminated at places. Grey shale, fine clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 – 54.30	Chalk, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

#### 4.1.0 DESCRIPTION OF FORMATION

4.1.1 Metamorphics : Precambrian metamorphic rock constitute the basement of the basin. The older metamorphic rocks which are exposed on northern parts beyond the block boundary are composed of quartzite, mica-schist, granite gneiss and at places intruded

by pegmatites and vein quartz. The metamorphics have intersected in 7 boreholes (MNRT-53, 62, RT-6, 9, 12, 13 & 14). The thickness of metamorphics as intersected in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-9).

**4.2.2 Talchir Formation :** The rocks of Talchir formation are not exposed within the block boundary. It is encountered in boreholes RT-5,6,9,10,12,13 &14 . The thickness of Talchir as intersected in boreholes varies from 1.20m to 54.30m. Talchir formation consists of greyish white to greenish grey sandstone and shale, occasionally khakke in colour. At place it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite. Talchir formation is not explored in the block the description is based GSI boreholes data. The thickness of this formation as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10)

**4.2.3. Barakar Formation :** The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 30 – 596 m. Barakar formation constitute fine to coarse grained, white to grey feldspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27 coal seams have been encountered in this formation besides a few local seams / hands. Sequence of coal seams is presented in correlation Table (Plate- VA to VH) and are given in table 4.2 below :

**Barren Measure Formation :** This formation has occupied the southern part of the block. Besides a small patch of barren measure is preserved in the northern part of the block due to opposite dip of faults formation of graben. This formation is intersected in 15 borehole viz. RT-1, 3, 4, 8, MNRT-11, 24, 25, 27, 50, 62, 79, 80, 81, 83 and 84. Partial thickness of this formation is intersected in boreholes varies from 18.80 m ( MNRT-27) to 143.00 m (MNRT-24). Barren Measure Formation is represented by predominantly grey shale with minor sandstone and intercalation of sandstone and shale. At places carbonaceous and thin coal bands also occur. On an average argillaceous sediments predominate over arenaceous facies.

**4.2.5 Igneous Intrusives :** The block is free from any igneous intrusives

**4.2.6 Soil & Alluvium :** major part of the block is covered by the layer of soil and alluvium. The weathering has affected all the strata below soil to a varying extent. The thickness of soil ranges from 0.50m (MNRT-7, 8) to 18 m (MNRT-59). The depth of weathered zone varies from 6.00 m (MNRT-34) to 27.30 m (MNRT-5).

#### **4.3.0 STRUCTURE OF THE BLOCK**

**4.3.1** The Talaipalli block is mostly covered with soil, hence the structural interpretation is mainly based on the sub-surface data obtained during the course of exploratory drilling.

- 4.3.2 The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4 to 8 towards South-west.
- 4.3.3 The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which two faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. Ramen Measure Formation is preserved in a limited area in the north-western part of the block. Remaining area is structurally free except two relatively minor faults. All the faults in Talaipalli block have interpreted mostly on intersection in boreholes except F11-F11 and F12-F12 faults, and interpreted on level difference in floor contour plans. Minor slippages at many places cannot be ruled which is reflected in respective plans. The faults details are furnished in Table 4.03

TABLE 4.03

Fault No.	Location	Trend	Nature of fault	Throw	Evidences	Remarks
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20m. – 85 m.	<p>i) In BH No. MNRT-24 inter-sected at 267m., seam III (FF) and II L3, L2 completely faulted. Strata reduction of 85 m.</p> <p>ii) In BH No. MNRT-87 intersected at 211.63 m depth, resulting in strata reduction of 40 m. seam IV Top complete. Faulted &amp; seam IV Mid. Roof faulted.</p> <p>iii) In BH No. MNRT-22 inter-section at 270 m., seam-III (FF) and II L3 completely faulted strata reduction 40 m.</p> <p>iv) In BH No. MNRT-35 inter-sected at 190 m. resulting in strata reduction of 25 m., seam-III L. completely faulted.</p>	Throw of fault increases towards west due to abutment of fault F3, F2 and F5

Fault No.	Location	Trend	Nature of fault	Throw	Evidences	Remarks
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m.	In BH. No. MNRT-30, intersected at 137 m. resulting in faulting of seam IV Top	
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.	i) Intersected in BH No. MNRT-22 at 150 m. resulting in omission of seam-VII, VI Top, Mid.	The throw of fault increases towards MNRT-43 due to the abutment of fault F3 with fault F4
F4-F4	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	30 – 150 m	i) Intersected in BH No. MNRT-31 at 246m. resulting in omission of seam-III. Strata reduction 30 m.	The throw of fault increases due to abutment of fault. F5, F6, F7, F8 & F9.
					ii) Intersected in MNRT-24 at 152 m. resulting in omission of seam-XIA to seam-LX. Strata reduction of 150 m.	
					iii) Intersected in MNRT-62 at 449 m. resulting in omission of U-L3, L2 & L1 and seam-III (FF), the strata reduction of 115 m.	
					iv) Intersected in MNRT-43 at 95 m. omission of seam VI Top, Middle, Bottom and V Top Middle, Bottom. Strata reduction of 60 m.	

Fault No.	Location	Trend	Nature of fault	Throw	Evidences	Remarks
F5-F5	Northern western part through BH. MNRT-62	East-West	Strike fault	35 m	<p>i) The fault is going beyond the block boundary the end part of fault shutting against the fault F4</p> <p>ii) The fault inter-sected in BH MNRT-62 at 426 m. resulting in omission of seam-IV L, IV-Bot &amp; III L</p>	
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 - 25 m.	<p>i) Intersected in BH MNRT-31 at 160 m. strata omission 15 m. resulting in seam-IV Top roof faulted.</p>	
					<p>ii) Floor level difference between MNRT-98 in up-thrown side w.r.t MNRT-99 &amp; 38 is down thrown side.</p>	
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20 m.	<p>i) It is intersected in BH MNRT-11 at 345 m. resulting in 20 m. strata reduction and omission of seam V middle</p>	
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m.	<p>i) It is intersected in BH MNRT-11 at 373 m. resulting in 60 m. strata reduction and omission of seam IV Mid, IV Bot, III L and seam IV Roof faulted</p>	The cumulative throw of fault F7,F8 & F9 resulted in the reduction of 105m of strata in MNRT-5



Fault No.	Location	Trend	Nature of fault	Throw	Evidences	Remarks
					ii) In borehole MNRT-5 the fault intersected at 110 m. resulting in omission of seams XLA to IX L1 and seam IX (R.F.) the total reduction 105 m.	
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike/ Oblique fault	25m	i) It is abutting against fault F4 near MNRT-101 and after merging with fault F8 it is going beyond the block boundary in the west. ii) Intersected in BH MNRT-4 , 11 & 101 resulting in 25 m. reduction of strata. In MNRT-11 seam-III floor faulted including II-L3 faulted. In RT-4 V-Top, Middle & Bottom faulted. In MNRT-101, seam II L1 & seam-II faulted.	
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0 - 10 m.	Intersected in BH RT-7 resulting in omission of 10 m. strata at 90 m; seam-VI Middle roof faulted and seam VI-Top faulted.	
F11-F11	Southern part	NW-SE	Curvilinear	0 - 10 m.	Intersected based on the level difference of floor contour and fault is not intersected in any borehole	
F12-F12	Southern part	NW-SE	Oblique	25 m.	Intersected based on the level difference of floor contour and fault is not intersected in any borehole	

## CHAPTER-V

### **5.00 COAL SEAMS**

#### **5.10 GENERAL**

- 5.1.1 Detailed exploration in Talaspalli Block has revealed the presence of coal bearing horizons belonging to Barakar Formations.
- 5.1.2 Seam XI.A is the top most seam in the block, developed persistently in the southern part of the block over a limited area.
- 5.1.3 Seam-X has split into 4 major sections as X-1.A, X-1.B, X-Top and X-Bottom. X-Bottom seam underlies the X-Top seam and is the thickest coal seam among X group of seam. Similarly seam-IX has 3 sections, (IX-1.2, IX-1.1 & IX) seam-VI has 3 sections, VI-Top, VI-Middle and VI-Bottom, seam-V has 3 splits as V-Top, V-Middle, V-Bottom. Seam-IV has 4 sections, IV-Top, IV-Middle, IV-L & IV-Bottom. Seam-III has two splits as seam-III-L and seam-III. Whereas seam-II has 5 splits, sections as II-L3, II-L2, II-L1, II and II-L. Seam-I is poorly developed in the block and do not attain workable thickness.
- 5.1.4 Altogether 26 workable coal seams are developed in the block. Besides these workable seams there are few non-workable persistent bands occurring throughout the block. Seam-I is developed in patches but it is not workable.
- 5.1.5 All the 26 seams are mainly composed of coal, shaly coal, carbonaceous shale and shale. The coal is dull in appearance high in moisture and is of non-coking type.
- 5.1.6 The coal seams in this block are not affected by any igneous intrusives.

#### **5.20 CORRELATION OF COAL SEAMS**

- 5.2.1 Seam correlation adopted by GSI in the recent geological report in Talaspalli block (August 1998) has been considered as the basis of correlation.
- 5.2.2 To delineate the seams precisely detailed studies have been carried out taking into consideration the thickness, stratigraphic position of seams, nature and thickness of dirt bands and quality etc.
- 5.2.3 The seams have been delineated on the basis of chemical analysis received from chemical laboratory MCL, Nagpur. In case of seams where the chemical analysis is not available such as samples sent for physico-mechanical test and washability, the seams delineation has been done on visual basis and for determination of dirt bands and for quality, these boreholes are not considered.

- 5.2.4 The norms established for non-coking coal have been followed for delineation of coal seams.

Coal	Ash + moisture upto 40%
Shaly coal	Ash + moisture >40% to 55%
Carbonaceous shale	Ash + moisture >55% to 75%
Obvious bands	Ash + Moisture >75%

- 5.2.5 Coal and shaly coal are grouped together to form coal seam. Thus, while demarcating the coal seam shaly coal occurring at roof and floor has been included in the coal seam.
- 5.2.6 Carbonaceous shale band has been considered as combustible dirt band while shale with its facies and sandstone have been treated as obvious bands
- 5.2.7 While delineating the roof and floor of the seam combustible and obvious bands, dirt bands occurring near roof and floor have been included in seam, if the thickness of bands is less than that of coal bands overlying and underlying it.
- 5.2.8 While computing effective thickness of the seam, all the carbonaceous shale bands and obvious bands as well as contiguous dirt bands have been excluded as detailed below :

BCS	Excluding all carb shale & obvious bands irrespective of thickness
1 30	Excluding all carb shale & obvious bands of more than 0.30m thickness.
1 100	Excluding all carb shale & obvious bands of more than 1.00m thickness
1p	Including all carb shale and obvious bands irrespective of thickness

### 5.3.0 SEQUENCE OF COAL SEAMS

- 5.3.1 The variation in thickness of coal seams and their intervening partings intersected in boreholes drilled by MECL & GSI within the block has been given in Table-V.01. Part thickness of seam/intervening parting due to fault/sub crop have not been considered in preparing this table.

TABLE-V.1

## SEQUENCE OF COAL SEAMS AND PARTING IN TALAIPALLI BLOCK

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.00	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
14	V Middle	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bottom	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.45	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Middle	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bottom	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.12	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.93	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			0.50-2.50
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around 35.0 m		
27	I	0.22	0.55			-

#### 5.4.0 BEHAVIOUR OF COAL SEAM

- 5.4.1 Seam-X bottom is the thickest seam, whereas seam VI Middle is the next thickest seam in the block. Seam-II is gradually thinned out and almost not developed towards the eastern part of the block. Seam-I is poorly developed to almost not developed. All the seams are well developed in the western and southern part of the block. A few coal seams are exposed on the surface near Kelo river. .
- 5.4.2 In view of the high interbanding nature of the seams, it was decided to remove some highly interbanded portion and consider the coal seams in splits so that the quality of the coal seam improves.
- 5.4.3 It is observed that the splits of the seam are analysed combining the parting as Ip analysis, the quality of the combined seam becomes un graded.
- 5.4.4 For seams X, VI & IV group of seams, some sections / seams X Top + Bottom, VI Top + Middle and IV Middle + IV L. coal seams, at places, are separated by parting of less than 1m. If these two seams are combined including their parting (as it is less than 1m) it is observed that in most of the cases the quality of the entire seam is becoming degraded. As such to improvement in the quality of the coal seams is visible if the above two splits are considered separately.

#### 5.5.0 QUALITY OF COAL SEAMS

- 5.5.1 To assess the quality of coal seams, coal core samples are sent to analytical laboratories for band-by-band analysis to determine their ash and moisture contents. After receiving the results, the coal samples have further been subjected to overall analysis at 60% RH and 40°C.
- 5.5.2 The seam overall analysis of all seams, a few combined seams and total bands have been determined at 60% RH and 40°C to know the quality. About 50% of boreholes were subjected to overall analysis at 60% RH & 40°C. For remaining boreholes, quality of seams has been assessed by calculating from band-by-band analytical results through weighted average method. The calculated values obtained from band-by-band data on air dried basis have been converted to equilibrated basis by using M100 formula.
- 5.5.3 The UHV for the respective coal seam for all the boreholes were determined using the formula.
- $$\text{UHV} = 8900 - 138(A\% + M\%) \text{ K.Cal/Kg}$$
- 5.5.4 Based on the UHV values the grade of the coal seam was determined as per the following standards.

UHV K.Cal/Kg	Ash% + Moisture %	Grade
6200 and above	19.56	A
6200-5600	19.56-23.91	B
5600-4940	23.91-28.69	C
4940-4200	28.69-34.05	D
4200-3360	34.05-40.14	E
3360-2400	40.14-47.10	F
2400-1300	47.10-55.07	G

- 5.5.5 It has been observed that in some cases, the Moisture% and Ash% of dirt bands have not been determined by analytical methods. In such cases, the determined value has taken for the respective litho types to calculate the seam overall data. Average Moisture% and Ash% of grey shale, sandy shale and sandstone have been taken as 1% and 80%, 1% & 85% and 0.5% and 90% respectively.
- 5.5.6 The calculated as well as the determined proximate analysis, UHV and grade are furnished in Annexure-IV.
- 5.5.7 The structure of coal seams has been drawn (RF 1:50) based on the air dried analysis of coal as received from laboratory. The seam overall analysis (determined and calculated) are presented in table below the structure of coal seam. The determined analysis showing percentage of Moisture, Ash, VM and FC where as calculated overall showing Moisture and Ash%. The coal seams which are sent for geotechnical studies and washability test, the seam structure of such seams are plotted on the basis of visual log. The litho column of 3m on the roof and 1m below the floor has also been drawn on the seam structure plates based on visual logs.

**CHAPTER-VI**

**6.0.0 DESCRIPTION OF COAL SEAMS**

6.1.0 The seams have been described in descending order. While describing the seams the following points have been kept in view.

The GSI correlation of seams I to X major grouping in Talaiyalli block is retained as such. Further each of these major groups of seam is subdivided to units / sections with prefix of the seam group. They are as follows :

Sl. No.	Major Groups	Group Units
1	X	X1A X1B X Top X Bottom
2	IX	IX L2 IX L1 IX
3	VIII	VIII
4	VII	VII
5	VI	VI TOP VI MIDDLE VI BOTTOM
6	V	V TOP V MIDDLE V BOTTOM
7	IV	IV TOP IV MIDDLE IV L IV BOTTOM
8	III	III L III
9	II	II L3 II L2 II L1 II II L
10	I	I



- i) The seams have been described in detail for the entire block. The seams are designated as per GSI correlation
- ii) A total of 27 major coal seams viz. XLA to I occur in Talaipalli Block. Seam IV occur with split sections of 4 Nos. where as, V & VI with split sections each of 3 Nos and seam X and II with splits section of 2 Nos, occur in the block; while Seam I, II L1, II L2, II L3, III L, III, VII, VIII, IX, XLA and XLB have single identity. All the above splits occur distinctly and separate. Hence they are considered as separate seam for description purpose highlighting their stratigraphic position, incrop demarcation, thickness, nature of parting, immediate roof and floor, dirt bands, quality and reserve. Some bands, local seams which are thin, and persistent have also been described in detail. The carbonaceous bands which have patchy development and which are impersistent, have not been incorporated in this report.
- iii) While describing the number of intersections and tabulating various parameters of seams, 102 MECL boreholes (MNRT series) and 15 GSI boreholes (RT series) have been considered. The partings have been described with respect to the underlying seam. The description of lithology of partings between seams and roof & floor of seams indicate the dominant lithounits.
- iv) The part thickness of sections either due to faulting or subcrop have not been considered for drawing isochore, isograde etc. so also parting between seams.
- v) In describing roof characteristics of seam the immediate roof as well as the three metre column above coal seam has been considered. Similarly, the description of floor includes the immediate floor and one metre column below the coal seam. If three metre column above seam and one metre column below the seam is not persisting the parting with the overlying and underlying seam respectively has been taken into consideration for this purpose.
- vi) In case of all the boreholes quality has been described on the basis of overall analysis determined on 60% RH and 40°C (Annexure-IV) , and the boreholes for which overall analysis have not been determined, the quality of seam has been calculated on the basis of equilibration (M100) basis except for boreholes sent for washability studies (MNRT-89,94 & 95) and geo-technical studies (MNRT-16 & 67). In such cases the seam thickness has been considered on visual log for the preparation of seam folio plan and floor contour plan. For quality determination of seams, these boreholes are not considered.

The seams are described in details in the subsequent paragraphs.

## 6.2.0 SEAM XLA

### Reference of documentation :

I. Seam structure	:	Plate No. VII IA & VII IB
II. Floor contour plan	:	Plate No. IXA
III. Seam folio plan	:	Plate No. X-I
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.2.1 Seam XLA is a local seam occurring in Barakar formation as the topmost and youngest seam in the block. It overlies seam XLB (another local seam) with a parting of 5.41 m. to 11.90 m. (prevalent 6.0 to 9.5) Seam XLA is a thin seam and mostly not workable in the entire block except in patches surrounding BH No. MNRT-7, 11, 83, 97 & 101 in the western part of the block.

6.2.2 The statistic parameters viz the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given alongside in statistic parameter table no. VI(1) and graphically depicted in fig-1 (i-vii). The seam description in brief is given below.

6.2.3 The seam XLA has been intersected only in 32 boreholes as the seam incrops almost in the middle part of the block. The full seam thickness varies from 0.20 m. to 1.06 m. (prevalent thickness range is 0.50 m. to 0.90 m. in 63% of boreholes). The seam roof consists dominantly of shale. The floor consists of shale and sandstone argillaceous. The depth of occurrence of seam is from 21.40 m. to 165.78 m. within the block.

6.2.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure IV (on 60% RH and 40<sup>o</sup> C/calculated basis). The Moisture content of XLA seam varies from 3.50% to 10.30% (prevalent M% is 3.5 to 9.0%). The Ash% in seam varies from 32.70% to 49.00% (prevalent Ash% is 34.00 to 42.00%). The UHV varies from 1558 to 3477 K.Cal/Kg. The grade varies from G to E (prevalent grade in G to F). The seam is devoid of bands in all borehole intersections.

**A) Ultimate analysis** : The Ultimate analysis of seam has been determined for 3 samples and it is provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam XLA**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	32.35	2.21	0.45	0.33	5.06
Maximum	41.12	2.38	0.74	0.65	5.66

**B) Total Sulphur :** The total sulphur for the seam has been determined for 4 samples (Annexure VI C). The total sulphur range is given below :

**Total Sulphur in seam XLA**

Range	Total Sulphur
Minimum	0.33
Maximum	0.98

**C) Ash analysis :** The ash analysis has been determined for seam XLA for one sample and result is given below (Annexure VI B)

**Ash Analysis for seam XLA**

Constituent	Value in %
SiO <sub>2</sub>	62.88
Al <sub>2</sub> O <sub>3</sub>	28.83
Fe <sub>2</sub> O <sub>3</sub>	2.62
TiO <sub>2</sub>	1.47
CaO	1.40
MgO	1.27
Na <sub>2</sub> O	0.14
K <sub>2</sub> O	0.12
SO <sub>2</sub>	0.20
P <sub>2</sub> O <sub>5</sub>	0.37

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of XLA seam has been determined for one sample (Annexures VI D).

**Ash Fusion Temperature for seam XLA**

<b>IT</b>	<b>ST</b>	<b>HT</b>	<b>FT</b>
> 1450	>1450	>1450	> 1450

**E) Phosphorous Content :** The Phosphorous content of seam has been determined for one sample and it is <0.03% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for two samples (MNRT-2 & 41). The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI of the seam :** HGI of the seam is determined for 3 samples. the range of values are 58 to 65 (Annexure VI G).

TABLE : VI [1]

SEAM : X LA

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION:	32	MRRT 2, 7, 8, 11, 13, 15, 18, 21, 25, 32, 33, 34, 38, 40, 41, 42, 45, 50, 59, 60, 62, 74, 83, 84, 87, 89, 96, 97, 101
		RT - 1, 4, 15
ii) SEAM FAULTED IN BOREHOLES:	1	MRRT - 24
iii) BH LOCATED UPDIP OF SUBCROP:	63	MRRT 1, 3, 4, 6, 9, 10, 12, 14, 16, 17, 19, 23, 28, 29, 30, 35, 36, 37, 39, 43, 44, 46, 47, 48, 49, 53, 54, 55, 56, 57, 58, 61, 65, 66, 67, 68, 69, 70, 75, 76, 77, 82, 85, 86, 88, 90, 91, 92, 93, 94, 95, 98, 99
		RT 2, 5, 6, 7, 8, 9, 10, 12, 13, 14
iv) SEAM DETERIORATED IN QUALITY:	1	MRRT - 31
v) SEAM NOT DEVELOPED	: 20	MRRT 5, 20, 22, 26, 27, 51, 52, 63, 64, 71, 72, 73, 78, 79, 80, 81, 100, 102
		RT - 3, 11

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST :	21.48 (RT-15 )
ii) DEEPEST :	165.78 (MRRT-11 )

## 3) THICKNESS (M)

e)	SEAM THICKNESS	RCS	T-30	T-100
i) MIN.	.20 (MRRT-25 )	.20 (MRRT-25 )	.20 (MRRT-25 )	.20 (MRRT-25 )
ii) MAX.	1.06 (MRRT-7 )	1.06 (MRRT-7 )	1.06 (MRRT-7 )	1.06 (MRRT-7 )
iii) MEAN	.74	.74	.74	.74
iv) STD. DEVIATION	.22	.22	.22	.22
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
<0.5	5	5	5	5
0.5-0.9	18	18	18	18
0.9-1.0	5	5	5	5
1.0-1.2	4	4	4	4
TOTAL	32	32	32	32

TABLE : VI(1)Contd.

## 4) PARTING WITH THE UNDERLYING BEAM :

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i] Minimum : 5.41 (NBRT-45) MEAN : 8.03  
 ii] Maximum : 11.90 (NBRT-62) S D : 1.80

## 5) ROOF CHARACTERISTICS :

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i] IMMEDIATE : DOMINANT : CSE SUBORDINATE : SHALE  
 ii] 3.0 m Column: DOMINANT : SHALE SUBORDINATE : ARE. SB

TABLE : VI(1) Contd.

## 6) FLOOR CHARACTERISTICS :

-----

i] IMMEDIATE : DOMINANT : SHALE SUBORDINATE : CSE  
 ii] 1.0 m Column: DOMINANT : ARE. SBT SUBORDINATE : ARE. SB

TABLE : VI(1)Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BNS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	27	3.50 MNRT-59	10.30 RT-15	6.74	2.05
ASH (%)	27	32.70 MNRT-62	49.00 MNRT-74	38.98	4.48
HEV (k.cal/kg)	27	1558. MNRT-74	3477. MNRT-50	2591.	506.
GRADE	27	G MNRT-8	R MNRT-50		
C.V (k.cal/k.g)	3	3250. MNRT-38	4700. MNRT-50	3890.	604.

TABLE : VI(1)Contd.

## 8) DIRT BANDS FOR 32 BBS. CONSIDERED

-----  
 1) NO. OF BBS DEVOID OF DIRT BANDS: 32 BBS - 2, 7, 8, 11, 13, 15, 18, 21, 25, 32,  
 33, 34, 38, 40, 41, 42, 45, 50, 59, 60,  
 62, 74, 83, 84, 87, 89, 96, 97, 101

BT - 1, 4, 15

## 9) DIRT BANDS DETAIL : Nil

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### 6.3.0 SEAM XLB

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 2A to VII 2C
II. Floor contour plan	:	Plate No. IXB
III. Seam folio plan	:	Plate No. X-2
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.3.1 Seam XI. B is a thin local seam in X group of seams. Seam XI. B occur in Parakar formation and its depth range of occurrence varies from 14.52 to 177.58 m. within the block. It overlies seam X Top with a parting of 3.37 m. to 14.89 m. (prevalent 4 m. to 6m.). The seam XL B incrops in the south central part of the block, north of BH. No. MNRT- 95 and extends towards west upto BH. No. RT- 5 & MNRT-26. Due to faults F2, F1, F3, F4 & F6 the incrop is displaced. In the western corner it occur near BH. No. MNRT-1 and MNRT-3.
- 6.3.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given alongside in the statistic parameter Table no. VI(2) and graphically depicted in fig-2 (i-vii). The seam description in brief is given below.
- 6.3.3 The seam XLB has been intersected only in 47 boreholes as the seam incrops almost in the middle of the block. The full seam thickness varies from 0.30 m. to 1.28 m. The prevalent seam thickness is 0.50 to 0.90 m. in 77% of boreholes in the southern part of block. In the central (near incrop) and NW part of the block the seam is not workable. The seam roof consists dominantly of sandstone and its floor consist of shale and sandstone local.
- 6.3.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure IV (on 60% RH and 40<sup>o</sup> C/calculated basis). The Moisture content of the seam varies from 3.0% to 11.30% (prevalent M% is 3.5 to 7.0%). The Ash% of seam varies from 28.20% to 44.60% (prevalent Ash% is 33.00 to 42.00%). The LHV varies from 1600 to 3960 K.Cal/Kg. The seam grade is G to E (prevalent grade is F in majority of boreholes). The seam is devoid of dirt bands in 36 boreholes(77%) and only in 11 BHs one Csh band is present.

**A) Ultimate analysis** : The Ultimate analysis of seam has been determined for 7 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam XL B**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	38.03	2.39	0.39	0.61	3.75
Maximum	52.16	3.22	1.20	1.36	8.74

**B) Total Sulphur and Distribution :** The total sulphur of the seam has been determined for 6 samples and sulphur distribution is determined for 1 sample (Annexure VI C) and its range is given below :

**Distribution of Sulphur for seam XL B**

Range	Total Sulphur %	Distribution of Sulphur		
		Pyritic Sulphur %	Inorganic Sulphur %	Organic Sulphur %
Minimum	0.28	-	-	-
Maximum	1.34	41.28	28.32	30.40

**C) Ash analysis :** The ash analysis has been determined for the seam for 3 samples and its range is given below (Annexure VI B)

**Range of Ash Analysis for seam XL B**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	59.48	61.52
Al <sub>2</sub> O <sub>3</sub>	28.68	31.95
Fe <sub>2</sub> O <sub>3</sub>	3.64	6.26
TiO <sub>2</sub>	1.28	1.75
CaO	0.65	0.87
MgO	1.06	1.29
Na <sub>2</sub> O	0.13	0.28
K <sub>2</sub> O	0.11	0.79
SO <sub>3</sub>	0.37	0.70
P <sub>2</sub> O <sub>5</sub>	0.15	0.30

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature of the seam has been determined for one sample (Annexure VI D).

**Ash Fusion Temperature for seam XI. B**

IT	ST	HT	FT
>1450	>1450	>1450	>1450

**E) Phosphorous Content :** The Phosphorous content of seam has been determined for one sample and it is <0.3% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for two samples. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam XI.B is determined for 5 samples, the range of the value is 61 to 74 (Annexure VI G).

TABLE : VI (2)

SEAM : K LB

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 47 MNRT  
 2, 7, 8, 11, 13, 14, 15, 18, 20, 21,  
 27, 32, 33, 34, 38, 40, 41, 42, 45, 51,  
 52, 59, 60, 62, 63, 64, 71, 72, 73, 74,  
 78, 79, 80, 81, 83, 84, 89, 95, 96, 97,  
 101, 102, RT - 1, 3, 4, 5, 15

ii) SEAM FAULTED IN BOREHOLES: 1 MNRT - 24

iii) BH LOCATED UPDIP OF SUBCROP: 59 MNRT  
 1, 3, 4, 6, 9, 10, 12, 16, 17, 19,  
 23, 28, 29, 30, 35, 36, 37, 39, 43, 44,  
 46, 47, 48, 49, 53, 54, 55, 56, 57, 58,  
 61, 65, 66, 67, 68, 69, 70, 75, 76, 77,  
 82, 85, 86, 88, 90, 91, 92, 93, 94, 98, 99,  
 RT - 2, 6, 7, 8, 10, 12, 13, 14

iv) SEAM NOT DEVELOPED : 10 MNRT - 5, 22, 25, 26, 31, 50, 87, 100,

RT - 9, 11

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 14.52 (MNRT-14 )  
 ii) DEEPEST : 177.58 (MNRT-11 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BC6	I-30	I-100
i) MIN.	.30 (MNRT-78 )	.30 (MNRT-78 )	.30 (MNRT-78 )	.30 (MNRT-78 )
ii) MAX.	1.28 (MNRT-95 )	1.10 (MNRT-79 )	1.28 (MNRT-95 )	1.28 (MNRT-95 )
iii) MEAN	.76	.72	.76	.76
iv) STD. DEVIATION	.20	.17	.20	.20

b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS	NO. OF BHS
<0.5	4	5	4	4
0.5-0.9	37	35	35	35
0.9-1.0	1	4	3	3
1.0-1.2	3	3	3	3
1.2-1.5	2	0	2	2
<b>TOTAL</b>	<b>47</b>	<b>47</b>	<b>47</b>	<b>47</b>

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 3.37 (MNRT-20 ) MEAN : 5.71  
 ii) Maximum : 14.89 (MNRT-80 ) S.D . : 2.27

TABLE : VI(2) Contd.

5) ROOF CHARACTERISTICS :		
-----		
i) IMMEDIATE :	DOMINANT : SST	SUBORDINATE : CSR
ii) 3.0 m Column:	DOMINANT : SST	SUBORDINATE : ARG. SST
6) FLOOR CHARACTERISTICS :		
-----		
i) IMMEDIATE :	DOMINANT : ICAL	SUBORDINATE : SHALE
ii) 1.0 m Column:	DOMINANT : ICAL	SUBORDINATE : CLAY

TABLE : VI(2) Contd.

7) QUALITY PARAMETERS (ON 60% RH &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BBS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	42	3.00 MNRT-59	11.30 MNRT-101	6.47	2.11
ASH (%)	42	28.20 MNRT-97	44.60 MNRT-38	36.59	3.79
HEV (k.cal/kg)	42	1600. MNRT-38	3960. MNRT-34	2959.	445.
GRADE	42	G MNRT-2	E MNRT-14		
C.V (k.cal/k.g)	4	3190. MNRT-38	4050. MNRT-73	3683.	313.

TABLE : VI(2) Contd.

## 8) DIRT BANDS FOR 47 BHS. CONSIDERED

i) NO. OF BHS DEVOID OF DIRT BANDS: 36 MHRT

7, 8, 11, 13, 14, 15, 18, 20, 21, 33,  
 34, 40, 41, 42, 45, 51, 52, 59, 60, 64,  
 72, 74, 78, 79, 80, 81, 83, 84, 89, 96,  
 97, 101, 102,  
 RT - 1, 3, 5

ii) NO. OF BHS WITH CSR BANDS:

11 MHRT - 2, 27, 32, 38, 62, 63, 71, 73, 95  
 RT - 4, 15

MHRT-2	- 1 BAND	- .10
MHRT-27	- 1 BAND	- .14
MHRT-32	- 1 BAND	- .11
MHRT-38	- 1 BAND	- .21
MHRT-62	- 1 BAND	- .29
MHRT-63	- 1 BAND	- .21
MHRT-71	- 1 BAND	- .20
MHRT-73	- 1 BAND	- .17
MHRT-95	- 1 BAND	- .26
RT-4	- 1 BAND	- .16
RT-15	- 1 BAND	- .12

9) DIRT BANDS DETAIL : Nil

#### 6.4.0 SEAM X TOP

##### Reference of documentation :

I. Seam structure	:	Plate No. VII 3A to VII 3C
II. Floor contour plan	:	Plate No. IXC
III. Seam folio plan	:	Plate No. X-3
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.4.1 Seam X Top is a thin seam and it occur separately throughout the block as top split of X seam. It overlies seam X B with a parting of 0.70 m. to 3.00 m. (prevalent 1 to 2 m.) The parting between X T and X B reduces to <1.0 also. Hence combined section X (T+B) quality parameters are also obtained for those BH intersections where parting is reduced (Annexure VI page 430). Seam XT incrops in the central part of the block near BH. No. MNRT-94 in the east and extend to BH. No. MNRT-26 in the west. Further it is offset by faults F2, F1, F3, F4, F6 & F10 and occur near BH Nos. MNRT-99, 1 & 3 in the northwestern part.
- 6.4.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(3) and its graphic representation of various quality parameters of the seam in fig-3 (i-vii). The seam description in brief is given below.
- 6.4.3 The seam XT has been intersected in 59 boreholes. The seam incrop lies in the middle part of the block, hence as many as 52 BHs are located updip of the seam. The full seam thickness of the seam varies from 0.40 m. to 1.60 m. (The prevalent seam thickness is 1.0 to 1.50 m. in 54% of boreholes). The seam is not workable (<1.0m.) near incrop. The seam roof consists dominantly of shale and its floor consist of carbonaceous shale. The seam occurs at 10.97 m. to 187.19m. depth within the block.
- 6.4.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / calculated basis). The Moisture content of the seam varies from 3.50% to 11.00% (prevalent M% is 6.5 to 9.5%) and Ash % varies from 22.80% to 44.70% (prevalent Ash% is 27.00% to 30.00%). The UHV varies from 1793 to 4525 K.Cal/Kg. The seam grade varies from G to D (prevalent grade is F to E). The seam has clean coal in majority of boreholes. Only in 3 BHs a csh band is present.



**A) Ultimate analysis :** The Ultimate analysis of seam has been determined for 4 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam XT**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	39.85	2.53	0.48	0.47	4.65
Maximum	48.96	3.35	1.10	1.48	8.33

**B) Total Sulphur and Distribution :** The total sulphur for the seam has been determined for 8 samples and sulphur distribution is determined for 2 samples. (Annexure VI C). The range of total sulphur and distribution of sulphur is given below :

**Total and Distribution of Sulphur in seam XT**

Range	Total Sulphur %	Distribution of Sulphur		
		Pyritic Sulphur %	Inorganic Sulphur %	Organic Sulphur %
Minimum	0.41	29.18	27.42	26.18
Maximum	1.48	39.46	44.64	33.12

**C) Ash analysis :** The ash analysis has been determined for seam XT for 2 samples and its range is given below (Annexure VI B).

(For combined X (T+B) Ash analysis is available for 1 sample)

**Range of Ash Analysis for seam XT**

Constituent	Range in %		Combined
	Minimum	Maximum	
SiO <sub>2</sub>	62.30	63.34	56.60
Al <sub>2</sub> O <sub>3</sub>	29.17	29.43	31.95
Fe <sub>2</sub> O <sub>3</sub>	2.54	3.08	6.26
TiO <sub>2</sub>	1.45	1.47	1.28
CaO	0.63	0.76	0.65
MgO	0.80	1.04	1.06
Na <sub>2</sub> O	0.12	0.26	0.20
K <sub>2</sub> O	0.14	0.14	0.79
SO <sub>3</sub>	0.29	0.78	0.52
P <sub>2</sub> O <sub>5</sub>	0.19	0.30	0.17

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for one sample (Annexures VI D).

**Ash Fusion Temperature for seam XT**

IT	ST	HT	FT
>1450	>1450	>1450	>1450

**E) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for two sample. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam XT is determined for 2 samples (Annexure VI G) and its range is 61 and 69 (Annexure VI G).

TABLE : VI(3)

SEAM : X TOP

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 59 MHRT-

1, 2, 3, 7, 8, 11, 13, 15, 18, 20,  
21, 22, 25, 26, 27, 31, 32, 33, 34, 38,  
40, 41, 42, 45, 50, 51, 52, 59, 60, 62,  
63, 64, 71, 72, 73, 74, 78, 79, 80, 81,  
83, 84, 89, 94, 95, 96, 97, 99, 100, 101,  
102

RT - 1, 3, 4, 5, 8, 9, 11, 15

ii) PART SEAM INTERSECTION: 1 MHRT - 44

iii) SEAM FAULTED IN BOREHOLES: 1 MHRT - 24

iv) BH LOCATED UPDIP OF SUBCROP: 52 MHRT -

4, 6, 9, 10, 12, 16, 17, 19, 23, 28,  
29, 30, 35, 36, 37, 39, 43, 46, 47, 48,  
49, 53, 54, 55, 56, 57, 61, 65, 66, 67,  
68, 69, 70, 75, 76, 77, 82, 85, 86, 88,  
90, 91, 92, 93, 98

RT - 2, 6, 7, 10, 12, 13, 14

v) SEAM NOT DEVELOPED : 8 MHRT - 5, 14, 58, 87

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 10.97 (MHRT-94)

ii) DEEPEST : 187.19 (MHRT-11)

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.40 (MHRT-20)	.40 (MHRT-20)	.40 (MHRT-20)	.40 (MHRT-20)
ii) MAX.	1.60 (MHRT-62)	1.60 (MHRT-62)	1.60 (MHRT-62)	1.60 (MHRT-62)
iii) MEAN	1.06	1.05	1.06	1.06
iv) STD DEVIATION	.28	.28	.28	.28
b) THICK. RANGE (m)	NO. OF BBS	NO. OF BBS	NO. OF BBS	NO. OF BBS
<0.5	1	1	1	1
0.5-0.9	17	17	17	17
0.9-1.0	7	9	7	7
1.0-1.2	13	10	12	12
1.2-1.5	19	21	20	20
1.5-2.0	2	1	2	2
TOTAL	59	59	59	59

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : .60 (MHRT-44) MEAN : 1.67  
ii) Maximum : 2.83 (MHRT-78) S.D. : .55

TABLE : VI (3) Contd.

## 5] ROOF CHARACTERISTICS :

-----

i] IMMEDIATE	:	DOMINANT : ICAL	SUBORDINATE : SHALE
ii] 3.0 m Column:	:	DOMINANT : ICAL	SUBORDINATE : SET

## 6] FLOOR CHARACTERISTICS :

-----

i] IMMEDIATE	:	DOMINANT : CSH	SUBORDINATE : SHALE
ii] 1.0 m Column:	:	DOMINANT : CSH	SUBORDINATE : SHALE

TABLE : VI(3) Contd.

7) QUALITY PARAMETERS (ON 50 % RB &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BBS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	55	3.50 MBRT-59	11.00 MBRT-71	7.78	1.95
ASH (%)	55	22.80 MBRT-22	44.70 MBRT-31	31.44	4.78
HHV (k.cal/kg)	55	1793. MBRT-1	4525. MBRT-22	3488.	636.
GRADE	55	G MBRT-1	D MBRT-13		
C.V (k.cal/k.g)	5	3540. MBRT-38	4860. MBRT-26	4276.	535.

TABLE : VI(3) Contd.

## 8) DIRT BANDS FOR 59 BHS. CONSIDERED :

-----

1) NO OF BHS DEVOID OF DIRT BANDS-56 MERT - 1, 2, 3, 8, 13, 15, 18, 20, 21, 22,  
 25, 26, 27, 31, 32, 33, 34, 38, 40, 41,  
 42, 44, 45, 50, 51, 52, 59, 60, 62, 63,  
 64, 71, 72, 73, 74, 78, 79, 80, 81, 83,  
 84, 89, 94, 96, 97, 99, 100, 101, 102

RT - 1, 3, 4, 5, 8, 9, 11, 15

11) NO.OF BHS WITH CSH BANDS: 3 MERT-7, 11, 95  
 MERT-7 - 1 BAND - .11  
 MERT-11 - 1 BAND - .20  
 MERT-95 - 1 BAND - .13

9) DIRT BANDS DETAIL : Nil

### 6.5.0 SEAM X BOTTOM

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 4A & VII 4B
II. Floor contour plan	:	Plate No. IXD
III. Seam folio plan	:	Plate No. X-4
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.5.1 Seam X Bottom is a prominent seam in the upper column of Barakar formation. It overlies seam IX L2 with a parting of 2.30 m. to 20.15 m. (mostly 3.50 to 16.50 m.). Seam X B incrops in the middle of the block near BH. No. MNRT-94 in the eastern part of the block and extends upto BH. No. MNRT-19 in the western part. It is displaced due to faults in the west central part. Whereas in the NW part of the block the occurrence is found near BH MNRT-44 & north of MNRT-3.

6.5.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(4) and its graphic representation of various quality parameters in fig-4 (i-vii). The seam description in brief is given below :

6.5.3 The seam X B has been fully intersected in 66 boreholes, while 46 BHs are located up dip of the seam incrop. The seam thickness varies from 1.60 m. to 8.10 m. (The prevalent seam thickness is 3.50 to 6.00 m. in 89% of boreholes). The seam roof dominantly consists of carb shale & soil and its floor consist of Csh and intercalations. The seam occurs at depth range of 12.28m. to 192.93 m. depth within the block.

6.5.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / calculated basis). The Moisture content of the seam varies from 3.30% to 10.40% (prevalent M% is 4.00 to 10.0%) and Ash % varies from 28.80% to 47.90% (prevalent range is 35.00% to 42.00%). The UHV varies from 1627 to 3822 K Cal/Kg. The seam grade varies from G to E (prevalent grade is F). The seam contain clean coal in 12 boreholes. Bands 1 to 5 Nus. are present in the seam in majority of boreholes.

**A) Ultimate analysis** : The Ultimate analysis of seam has been determined for 8 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam X BOT**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	38.74	2.16	0.36	0.46	3.77
Maximum	49.00	2.69	0.90	0.59	8.58

**B) Total Sulphur :** The total sulphur for seam X B has been determined for 7 samples (Annexure VI C). The range of total sulphur is given below. The sulphur distribution is not determined as the seam is having low sulphur content (<1.0)

**Total Sulphur in seam X BOT**

Range	Total Sulphur
Minimum	0.19
Maximum	0.81

**C) Ash analysis :** The ash analysis has been determined for seam X Bot for 2 samples and the result are given below (Annexure VI B)

**Range of Ash Analysis for seam X BOT**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	60.66	62.11
Al <sub>2</sub> O <sub>3</sub>	28.04	28.42
Fe <sub>2</sub> O <sub>3</sub>	3.43	4.37
TiO <sub>2</sub>	1.35	1.53
CaO	1.63	1.68
MgO	0.75	0.90
Na <sub>2</sub> O	0.14	0.23
K <sub>2</sub> O	0.10	0.14
SO <sub>2</sub>	0.27	1.41
P <sub>2</sub> O <sub>5</sub>	0.58	0.59



**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for 2 samples (Annexures VI D).

**Ash Fusion Temperature for seam X BOT**

Range	IT	ST	HT	FT
Minimum	1368	>1450	>1450	>1450
Maximum	>1450	>1450	>1450	>1450

**E) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 5 samples. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI E).

**F) HGI :** The HGI for seam X BOT is determined for 3 samples. The HGI values varies from 65 to 71 (Annexure VI G).

TABLE : VI(4)

SEAM : X BOT

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 66 MNRT -

1, 2, 3, 7, 8, 11, 13, 14, 15, 16,  
17, 18, 20, 21, 22, 25, 26, 27, 31, 32,  
33, 34, 38, 40, 41, 42, 44, 45, 50, 51,  
52, 58, 59, 60, 62, 63, 64, 67, 71, 72,  
73, 74, 78, 79, 80, 81, 83, 84, 87, 89,  
94, 95, 96, 97, 99, 100, 101, 102

RT - 1, 3, 4, 5, 8, 9, 11, 15

ii) PART SEAM INTERSECTION: 3 MNRT - 12, 46, RT - 2

iii) SEAM FAULTED IN BOREHOLES. 2 MNRT - 5, 24

iv) BH LOCATED UPDIP OF BOREHOLE: 46 MNRT - 4, 6, 9, 10, 19, 23, 28, 29, 30, 35,  
36, 37, 39, 43, 47, 48, 49, 53, 54, 55,  
56, 57, 61, 65, 66, 68, 69, 70, 75, 76,  
77, 82, 85, 86, 88, 90, 91, 92, 93, 98  
RT - 6, 7, 10, 12, 13, 14

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 12.28 (MNRT-58 )

ii) DEEPEST : 192.93 (MNRT-11 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	1.60 (MNRT-20 )	1.60 (MNRT-20 )	1.60 (MNRT-20 )	1.60 (MNRT-20 )
ii) MAX.	8.10 (MNRT-87 )	7.43 (MNRT-87 )	7.64 (MNRT-87 )	8.10 (MNRT-87 )
iii) MEAN	4.69	4.08	4.29	4.67
iv) STD. DEVIATION	.93	.91	.98	.95
b) TRICK. RANGE (m)	NO. OF BRS	NO. OF BRS	NO. OF BRS.	NO. OF BRS.
1.5-2.0	1	1	1	1
2.0-2.5	0	1	0	0
2.5-3.0	0	4	4	0
3.0-3.5	3	12	10	4
3.5-4.0	10	11	10	10
4.0-5.0	30	28	25	29
5.0-6.0	19	8	14	19
6.0-7.0	2	0	1	2
7.0-8.0	0	1	1	0
8.0-9.0	1	0	0	1
<b>TOTAL</b>	<b>66</b>	<b>66</b>	<b>66</b>	<b>66</b>

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 2.30 (MNRT-3 )      MEAN : 10.13  
ii) Maximum : 20.15 (MNRT-71 )      S.D. : 4.95

TABLE : VI(4)

5] ROOF CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	CSH	SUBORDINATE :
ii] 3.0 m Column:	DOMINANT :	SOIL	SUBORDINATE :
			SHALE
6] FLOOR CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	CSH	SUBORDINATE :
ii] 1.0 m Column:	DOMINANT :	ARE. SH	SUBORDINATE :
			ICAL

TABLE : VI(4)

7] QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BFS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	61	3.30 MNRT-59	10.40 MNRT-102	6.96	1.94
ASH (%)	61	28.80 MNRT-20	47.90 MNRT-18	37.63	3.30
UEV (k.cal/kg)	61	1627. MNRT-18	3822. MNRT-20	2746.	372.
GRADE	61	G MNRT-2	X MNRT-20		
C.V (k.cal/k.g)	5	3710. MNRT-84	4290. MNRT-50	3966.	193.

TABLE : VI(4)

## 8] DIRT BANDS FOR 66 BHS. CONSIDERED

i) NO.OF BHS DEVOID OF DIRT BANDS:		12	MRRT - 1,	12,	20,	42,	46,	67,	71,	78,	81,	83
			RT - 2,	11								
ii) NO.OF BHS WITH OBVIOUS DIRT BANDS:		17	MRRT - 2,	11,	14,	15,	18,	22,	25,	26,	31,	32,
			34,	40,	44,	45,	62,	94,	100			
	*MRRT-2	- 1	BAND	-	.31							
	MRRT-11	- 1	BAND	-	.97							
	MRRT-14	- 1	BAND	-	.67							
	*MRRT-15	- 1	BAND	-	.35							
	MRRT-18	- 4	BAND	-	1.43							
	MRRT-22	- 1	BAND	-	.28							
	MRRT-25	- 2	BAND	-	.63							
	MRRT-26	- 1	BAND	-	.37							
	*MRRT-31	- 1	BAND	-	.17							
	*MRRT-32	- 1	BAND	-	.07							
	*MRRT-34	- 1	BAND	-	.10							
	*MRRT-40	- 1	BAND	-	.30							
	*MRRT-44	- 1	BAND	-	.33							
	*MRRT-45	- 1	BAND	-	.12							
	*MRRT-62	- 1	BAND	-	.31							
	*MRRT-94	- 2	BAND	-	.10							
	*MRRT-100	- 1	BAND	-	.08							
iii) NO.OF BHS WITH CSR BANDS:		51	MRRT- 2,	3,	7,	8,	13,	15,	16,	17,	21,	27,
			31,	32,	33,	34,	38,	40,	41,	44,	45,	50,
			51,	52,	58,	59,	60,	62,	63,	64,	72,	73,
			74,	79,	80,	84,	87,	89,	94,	95,	96,	97,
			99,	100,	101,	102						
			RT - 1,	3,	4,	5,	8,	9,	15			
	*MRRT-2	- 1	BAND	-	.20							
	MRRT-3	- 3	BAND	-	.89							
	MRRT-7	- 4	BAND	-	1.10							
	MRRT-8	- 2	BAND	-	.70							
	MRRT-13	- 2	BAND	-	.73							
	*MRRT-15	- 4	BAND	-	.95							
	MRRT-16	- 5	BAND	-	.68							
	MRRT-17	- 1	BAND	-	.55							
	MRRT-21	- 1	BAND	-	.75							
	MRRT-27	- 3	BAND	-	.67							
	*MRRT-31	- 1	BAND	-	.41							
	*MRRT-32	- 3	BAND	-	.60							
	MRRT-33	- 2	BAND	-	.53							
	*MRRT-34	- 3	BAND	-	.75							
	MRRT-38	- 1	BAND	-	.42							
	*MRRT-40	- 3	BAND	-	.83							
	MRRT-41	- 3	BAND	-	.87							
	*MRRT-44	- 2	BAND	-	.57							
	*MRRT-45	- 2	BAND	-	.59							
	MRRT-50	- 2	BAND	-	.80							
	MRRT-51	- 3	BAND	-	1.03							
	MRRT-52	- 1	BAND	-	.30							
	MRRT-58	- 1	BAND	-	1.04							

TABLE : VI(4) Contd.

MRRT-59	- 1 BAND	- .28
MRRT-60	- 3 BAND	- .53
*MRRT-62	- 2 BAND	- .39
MRRT-63	- 1 BAND	- .35
MRRT-64	- 3 BAND	- .70
MRRT-72	- 2 BAND	- .45
MRRT-73	- 1 BAND	- .37
MRRT-74	- 2 BAND	- .93
MRRT-79	- 3 BAND	- .62
MRRT-80	- 3 BAND	- .89
MRRT-84	- 2 BAND	- .85
MRRT-87	- 2 BAND	- .67
MRRT-89	- 3 BAND	- .45
*MRRT-94	- 4 BAND	- .65
MRRT-95	- 2 BAND	- .55
MRRT-96	- 2 BAND	- .65
MRRT-97	- 3 BAND	- .73
MRRT-99	- 2 BAND	- .53
*MRRT-100	- 1 BAND	- .32
MRRT-101	- 5 BAND	- 1.30
MRRT-102	- 2 BAND	- .46
RT-1	- 1 BAND	- .75
RT-3	- 1 BAND	- .65
RT-4	- 3 BAND	- .60
RT-5	- 2 BAND	- .40
RT-8	- 2 BAND	- .88
RT-9	- 1 BAND	- .35
RT-15	- 4 BAND	- 1.16

9]

1) NO. OF BRG EXCLD CSR & OB (>0.30M): 45 MRRT - 2, 3, 7, 8, 11, 13, 14, 15, 17, 18, 21, 25, 26, 27, 31, 33, 34, 38, 40, 41, 44, 45, 50, 51, 58, 62, 63, 73, 74, 79, 80, 84, 87, 94, 95, 96, 99, 100, 101  
RT - 1, 3, 4, 8, 9, 15

MRRT-2	- 1 BAND	- .31
MRRT-3	- 2 BAND	- .72
MRRT-7	- 1 BAND	- .60
MRRT-8	- 1 BAND	- .54
MRRT-11	- 1 BAND	- .97
MRRT-13	- 1 BAND	- .66
MRRT-14	- 1 BAND	- .67
MRRT-15	- 2 BAND	- .72
MRRT-17	- 1 BAND	- .55
MRRT-18	- 2 BAND	- 1.18
MRRT-21	- 1 BAND	- .75
MRRT-25	- 1 BAND	- .38
MRRT-26	- 1 BAND	- .37
MRRT-27	- 1 BAND	- .35
MRRT-31	- 1 BAND	- .41
MRRT-33	- 1 BAND	- .33
MRRT-34	- 1 BAND	- .45
MRRT-38	- 1 BAND	- .42
MRRT-40	- 1 BAND	- .53
MRRT-41	- 2 BAND	- .74
MRRT-44	- 2 BAND	- .64
MRRT-45	- 1 BAND	- .31
MRRT-50	- 1 BAND	- .60
MRRT-51	- 2 BAND	- .89

TABLE : VI(4) Contd.

MRRT-58	- 1	BAND	- 1.04
MRRT-62	- 1	BAND	- .31
MRRT-63	- 1	BAND	- .35
MRRT-73	- 1	BAND	- .37
MRRT-74	- 2	BAND	- .93
MRRT-79	- 1	BAND	- .31
MRRT-80	- 2	BAND	- .80
MRRT-84	- 2	BAND	- .85
MRRT-87	- 1	BAND	- .46
MRRT-94	- 1	BAND	- .36
MRRT-95	- 1	BAND	- .39
MRRT-96	- 1	BAND	- .40
MRRT-99	- 1	BAND	- .35
MRRT-100	- 1	BAND	- .32
MRRT-101	- 2	BAND	- .81
RT-1	- 1	BAND	- .75
RT-3	- 1	BAND	- .65
RT-4	- 1	BAND	- .40
RT-8	- 1	BAND	- .80
RT-9	- 1	BAND	- .35
RT-15	- 2	BAND	- .80

ii) NO. OF BMS EXCLD. CBR & OB (>1.00): 1 MRRT - 58  
 MRRT-58 - 1 BAND - 1.04

### 6.6.0 SEAM IX L2

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 5A to VII 5D
II. Floor contour plan	:	Plate No. IXE
III. Seam folio plan	:	Plate No. X-5
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.6.1 Seam IX L2 overlies seam IX LJ with a parting of 13.59m. to 21.54 m. (prevalent 17.0 – 18.5 m.). Seam IX L2 incrops in the south central part of the block, south of BH. No. MNRT- 69 in the east near Kelo river and extends to BH. No. MNRT- 16 in the west and abut against fault F2. Further west the incrop is intermittently separated due to faults F2, F1, F3, F4 and F6. It occur north of BH MNRT-3 in the western most corner of the block. The seam occurs at a depth range of 10.78 m. to 225.31 m. within the block.

6.6.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(5) and its graphic representation of various quality parameters of seam is given in fig-5 (i-vii). The seam description in brief is given below.

6.6.3 Seam IX L2 has been intersected in 70 boreholes. The seam is faulted in 2 BHs and 45 borehole are located updip of the seam incrop. The full seam thickness varies from 1.0 m. to 2.55 m. The prevalent seam thickness is 1.20 to 2.00 m. in 84% of boreholes. The seam roof consists dominantly of sandstone and its floor consists of clay and shale.

6.6.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 3.70 % to 13.30 % (prevalent range is 4.0 to 10.0 %) and Ash % varies from 17.70 % to 42.30 % (prevalent Ash% is 20.00 % to 29.00 %). The UHV varies from 2386 to 5409 K.Cal/Kg. The seam grade is G to C (prevalent grade is E to D). Grade C & D coal is available near NW part of the block near incrop and in the southern part near boreholes MNRT-45, 59 & 74. The seam is generally devoid of dirt bands. A obvious / carbshale band occur in 5 borehole intersections

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 8 samples and the results are provided in annexure VIIA and its range is given below :



**Range of Ultimate analysis of seam IX L2**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	40.98	2.73	0.32	0.42	6.39
Maximum	55.91	3.24	1.22	1.87	9.82

**B) Total Sulphur & Distribution :** The total sulphur for seam has been determined for 8 samples while sulphur distribution is determined for one sample (Annexure VI C). The total sulphur and distribution of sulphur range is given below:

**Total and Distribution of Sulphur for seam IX L2**

Range	Total Sulphur %	Distribution of Sulphur		
		Pyritic Sulphur %	Inorganic Sulphur %	Organic Sulphur %
Minimum	0.22			
Maximum	1.87	40.86	31.22	27.92

**C) Ash analysis :** The ash analysis has been determined for seam IX L2 for 3 samples and the result are given below (Annexure VI B)

**Range of Ash Analysis for seam IX L2**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	58.16	60.86
Al <sub>2</sub> O <sub>3</sub>	27.12	30.15
Fe <sub>2</sub> O <sub>3</sub>	2.93	9.15
TiO <sub>2</sub>	1.31	1.77
CaO	0.78	1.00
MgO	1.02	1.28
Na <sub>2</sub> O	0.14	0.25
K <sub>2</sub> O	0.13	0.93
SO <sub>3</sub>	0.43	1.18
P <sub>2</sub> O <sub>5</sub>	0.15	0.29

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for 2 samples (Annexures VI D).

**Ash Fusion Temperature for seam IX L2**

Range	IT	ST	HT	FT
Minimum	> 1450	> 1450	> 1450	> 1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of the seam I sample and it is <0.3% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI of the seam is determined for 7 samples. The HGI values varies from 58 to 95 (Annexure VI G).

TABLE : VI(5)

SEAM : IX 12

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

## i) FULL SEAM INTERSECTION: 70 MNRT -

1, 2, 3, 7, 8, 11, 12, 13, 14, 15,  
16, 17, 18, 19, 20, 21, 22, 25, 26, 27,  
31, 32, 33, 34, 38, 40, 41, 42, 44, 45,  
46, 50, 51, 52, 58, 59, 60, 62, 63, 64,  
67, 71, 72, 73, 74, 78, 79, 80, 81, 83,  
84, 87, 89, 94, 95, 96, 97, 99, 100, 101, 102

RT - 1, 2, 3, 4, 5, 6, 9, 11, 15

## ii) SEAM FAULTED IN BOREHOLES: 2 MNRT - 5, 24

## iii) BR LOCATED UPDIP OF SUBCROP: 45 MNRT -

4, 6, 9, 10, 23, 28, 29, 30, 35, 36,  
37, 39, 43, 47, 48, 49, 53, 54, 55, 56,  
57, 61, 65, 66, 68, 69, 70, 75, 76, 77,  
82, 85, 86, 88, 90, 91, 92, 93, 98

RT - 6, 7, 10, 12, 13, 14

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 22.00 (MNRT-17 )  
ii) DEEPEST : 200.83 (MNRT-11 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	1.00 (MNRT-17 )	.97 (MNRT-95 )	1.00 (MNRT-17 )	1.00 (MNRT-17 )
ii) MAX.	2.55 (MNRT-62 )	2.35 (MNRT-62 )	2.55 (MNRT-62 )	2.55 (MNRT-62 )
iii) MEAN	1.56	1.55	1.56	1.56
iv) STD. DEVIATION	.32	.31	.32	.32
b) THICK. RANGE (m)	NO. OF BRS	NO. OF BRS	NO. OF BRS.	NO. OF BRS.
0.9-1.0	0	1	1	0
1.0-1.2	5	4	4	4
1.2-1.5	30	30	31	31
1.5-2.0	29	30	29	29
2.0-2.5	5	5	5	5
2.5-3.0	1	0	1	1
TOTAL	70	70	70	70

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 13.59 (MNRT-46 )      MEAN : 22.49  
ii) Maximum : 30.41 (MNRT-25 )      S.D . . 4.26

TABLE : VI(5) Contd.

5] ROOF CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	SST	SUBORDINATE :
ii] 3.0 m Column:	DOMINANT :	SST	SUBORDINATE :
			CLAY
6] FLOOR CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	SHALE	SUBORDINATE :
ii] 1.0 m Column:	DOMINANT :	CLAY	SUBORDINATE :
			SHALE

## 7) QUALITY PARAMETERS (ON 60 % RE &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BMS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	65	3.70 MNRT-59	13.30 MNRT-72	8.02	2.65
ASH (%)	65	17.70 MNRT-32	42.30 MNRT-25	25.40	4.06
HHV (k.cal/kg)	65	2386. MNRT-25	5409. MNRT-45	4288.	573.
GRADE	65	G MNRT-25	C MNRT-32		
C.V (k.cal/k.g)	7	4480. MNRT-84	5600. MNRT-50	4927.	432.

## 8) DIRT BANDS FOR 70 BBS. CONSIDERED

i) NO.OF BBS DEVOID OF DIRT BANDS: 65 MNRT

1, 3, 7, 8, 11, 12, 13, 14, 15, 16,  
 17, 18, 19, 20, 21, 22, 25, 26, 27, 31,  
 32, 33, 34, 38, 40, 41, 42, 44, 45, 46,  
 50, 51, 52, 58, 59, 60, 63, 64, 67, 71,  
 72, 73, 74, 78, 79, 80, 81, 83, 84, 87,  
 89, 96, 97, 99, 100, 101, 102

RT- 1, 2, 3, 4, 8, 9, 11, 15

ii) NO.OF BBS WITH OBVIOUS DIRT BANDS: 1 MNRT - 2

MNRT - 2 - 1 BAND - .25

iii) NO.OF BBS WITH CSR BANDS:

4 MNRT - 62, 94, 95, RT - 5

MNRT-62 - 1 BAND - .20

MNRT-94 - 1 BAND - .28

MNRT-95 - 1 BAND - .08

RT-5 - 1 BAND - .10

9) DIRT BANDS DETAIL : Nil

### 6.7.0 SEAM IX L1

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 6A to VII 6D
II. Floor contour plan	:	Plate No. IXF
III. Seam folio plan	:	Plate No. X-6
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.7.1 Seam IX L1 overlies seam IX with a parting of 5.65m. to 11.87 m. (mostly the parting is 6.0 to 8.0 m.). The seam IX L1 incrops in the central part of the block, north of BH. No. MNRT- 69 in the east near Kelo river and extends towards west upto BH. No. MNRT- 23 & 16. Further west the incrop is intermittently separated due to faults F1, F2, F3, F4 and F6. It incrops around borehole RT-7 in the northwest corner.

6.7.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(6) and its graphic representation of various quality parameters of seam is given in fig-6 (i-vii). The seam description in brief is given below.

6.7.3 The seam IX L1 has been intersected in 84 boreholes. It is faulted in 2 BHs and the seam is not developed in one borehole (MNRT-4). The full seam thickness varies from 0.36 m. to 1.85 m. (prevalent seam thickness is 1.20 to 1.85 m. in 88% of boreholes). The seam is not workable (<1.0 m) in the central part of the block near incrop. The seam roof consists dominantly of shale & clay and its floor consists of intercalations.

6.7.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 3.30 % to 13.30 % (prevalent M% range is 7.0 to 11.0 %) and Ash % varies from 16.20 % to 42.00 % (prevalent range is 20.00 % to 27.00 %). The LHV varies from 1931 to 5284 K.Cal/Kg. The seam grade is G to C (mostly E to D). The seam contain good grade coal of C & D in the central part of the block in the east.

**A) Ultimate analysis** : The Ultimate analysis of seam has been determined for 9 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam IX L1**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	40.48	2.86	0.36	0.30	7.00
Maximum	57.32	3.55	1.40	0.97	11.17

**B) Total Sulphur and Distribution :** The total sulphur for seam has been determined for 9 samples and its distribution is determined for one sample (Annexure VI C). The total sulphur range and distribution of sulphur is given below

**Total Sulphur and Distribution for seam IX L1**

Range	Total Sulphur %	Distribution of Sulphur		
		Pyritic Sulphur %	Inorganic Sulphur %	Organic Sulphur %
Minimum	0.32			
Maximum	0.80	42.43	29.37	28.20

**C) Ash analysis :** The ash analysis has been determined for seam IX L1 for 4 samples and the range of Ash analysis is given below (Annexure VI B)

**Range of Ash Analysis for seam IX L1**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	63.21	64.56
Al <sub>2</sub> O <sub>3</sub>	26.98	28.82
Fe <sub>2</sub> O <sub>3</sub>	1.92	4.11
TiO <sub>2</sub>	1.70	1.99
CaO	0.49	0.82
MgO	0.70	0.99
Na <sub>2</sub> O	0.12	0.42
K <sub>2</sub> O	0.11	0.57
SO <sub>3</sub>	0.19	0.49
P <sub>2</sub> O <sub>5</sub>	0.13	0.30



**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for 2 samples (Annexures VI D).

**Ash Fusion Temperature Range for seam IX L1**

Range	IT	ST	HT	FT
Minimum	> 1450	> 1450	> 1450	> 1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of the seam is determined for 3 samples and it is <0.3% for all samples (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI of the seam is determined for 9 samples for the seam IX L1. It varies from 51 to 79 (Annexure VI G).

TABLE : VI(6)

SEAM : IX 11

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 84 MNRT -  
 1, 2, 3, 4, 6, 7, 8, 10, 11, 12,  
 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,  
 23, 25, 26, 27, 31, 32, 33, 34, 35, 38,  
 40, 41, 42, 43, 44, 45, 46, 50, 51, 52,  
 53, 58, 59, 60, 61, 62, 63, 64, 67, 68,  
 69, 71, 72, 73, 74, 77, 78, 79, 80, 81,  
 83, 84, 87, 89, 93, 94, 95, 96, 97, 98,  
 99, 100, 101, 102

RT - 1, 2, 3, 5, 7, 8, 9, 11, 13, 15

ii) SEAM FAULTED IN BOREHOLES: 2 MNRT - 5, 24

iii) BE LOCATED UPDIP OF SUBCROP: 30 MNRT -

9, 28, 29, 30, 36, 37, 39, 47, 48, 49,  
 54, 55, 56, 57, 65, 66, 70, 75, 76, 82,  
 85, 86, 88, 90, 91, 92

RT - 6, 10, 12, 14

iv) SEAM NOT DEVELOPED : 1 MNRT - 4

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 10.79 (MNRT-77 )  
 ii) DEEPEST : 225.31 (MNRT-11 )

## 3) THICKNESS (M)

m)	SEAM THICKNESS			
	BCS	I-30	I-100	
i) MIN.	.36 (MNRT-87 )	.36 (MNRT-87 )	.36 (MNRT-87 )	.36 (MNRT-87 )
ii) MAX.	1.85 (MNRT-81 )	1.85 (MNRT-81 )	1.85 (MNRT-81 )	1.85 (MNRT-81 )
iii) MEAN	1.42	1.35	1.42	1.42
iv) STD. DEVIATION	.27	.26	.27	.27

b) THICK. RANGE (m)	NO. OF BES	NO. OF BES	NO. OF BES	NO. OF BES
<0.5	1	1	1	1
0.5-0.9	6	6	6	6
1.0-1.2	2	9	2	2
1.2-1.5	36	43	35	35
1.5-2.0	39	25	40	40
<b>TOTAL</b>	<b>84</b>	<b>84</b>	<b>84</b>	<b>84</b>

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 5.72 (MNRT-16 ) MEAN : 7.49  
 ii) Maximum : 11.25 (MNRT-43 ) E.D. : 1.51

TABLE : VI(6) Contd.

5) ROOF CHARACTERISTICS :			
-----			
i) IMMEDIATE :	DOMINANT :	SHALE	SUBORDINATE : CSH
ii) 3.0 m Column:	DOMINANT :	CLAY	SUBORDINATE : ICAL
6) FLOOR CHARACTERISTICS :			
-----			
i) IMMEDIATE :	DOMINANT :	ICAL	SUBORDINATE : SHALE
ii) 1.0 m Column:	DOMINANT :	ICAL	SUBORDINATE : SST

TABLE : VI(6) Contd.

7] QUALITY PARAMETERS (ON 60 % RB &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF RES.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	77	3.30 MNRT-46	13.30 MNRT-38	7.98	2.31
LSH (%)	77	16.20 RT-15	42.00 MNRT-77	25.30	4.67
OHV (k.cal/kg)	77	1931. MNRT-77	5284. MNRT-59	4308.	583.
GRADE	77	G MNRT-77	C MNRT-12		
C.V (k.cal/k.g)	7	4520. MNRT-51	5530. MNRT-50	4963.	277.

TABLE : VI(6) Contd.

## 8) DIRT BANDS FOR 84 BHS. CONSIDERED

i) NO. OF BHS DEVOID OF DIRT BANDS: 48 MHRT -

1, 2, 10, 11, 12, 14, 16, 20, 21, 22,  
23, 27, 31, 35, 38, 40, 42, 45, 46, 51,  
52, 58, 59, 61, 64, 68, 69, 71, 72, 73,  
74, 77, 78, 79, 81, 83, 84, 87, 93, 96,  
100, 101, 102

RT - 7, 8, 9, 13, 15

ii) NO. OF BHS WITH OBVIOUS DIRT BANDS: 5 MHRT - 3, 17, 18, 53, 67

MHRT-3 - 1 BAND - .17  
MHRT-17 - 1 BAND - .16  
MHRT-18 - 1 BAND - .23  
MHRT-53 - 1 BAND - .20  
MHRT-67 - 1 BAND - .05

iii) NO. OF BHS WITH CSK BANDS: 32 MHRT -

4, 6, 7, 8, 13, 15, 19, 25, 26, 32,  
33, 34, 41, 43, 44, 50, 60, 62, 63, 67,  
80, 89, 94, 95, 97, 98, 99

RT - 1, 2, 3, 5, 11

MHRT-4 - 1 BAND - .19  
MHRT-6 - 1 BAND - .21  
MHRT-7 - 1 BAND - .15  
MHRT-8 - 1 BAND - .18  
MHRT-13 - 1 BAND - .17  
MHRT-15 - 1 BAND - .19  
MHRT-19 - 1 BAND - .15  
MHRT-25 - 1 BAND - .16  
MHRT-26 - 1 BAND - .15  
MHRT-32 - 1 BAND - .16  
MHRT-33 - 1 BAND - .15  
MHRT-34 - 1 BAND - .25  
MHRT-41 - 1 BAND - .18  
MHRT-43 - 1 BAND - .23  
MHRT-44 - 1 BAND - .17  
MHRT-50 - 1 BAND - .16  
MHRT-60 - 1 BAND - .17  
MHRT-62 - 1 BAND - .22  
MHRT-63 - 1 BAND - .15  
MHRT-67 - 1 BAND - .17  
MHRT-80 - 1 BAND - .15  
MHRT-89 - 1 BAND - .17  
MHRT-94 - 1 BAND - .13  
MHRT-95 - 1 BAND - .18  
MHRT-97 - 1 BAND - .15  
MHRT-98 - 1 BAND - .15  
MHRT-99 - 1 BAND - .15  
RT-1 - 1 BAND - .16  
RT-2 - 1 BAND - .19  
RT-3 - 1 BAND - .16  
RT-5 - 1 BAND - .16  
RT-11 - 1 BAND - .18

9) DIRT BANDS DETAIL : Nil

### 6.8.0 SEAM IX

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 7A to VII 7E
II. Floor contour plan	:	Plate No. IXG
III. Seam folio plan	:	Plate No. X-7
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.8.1 Seam IX is one of the prominent workable coal seam occurring in the block, in the upper column of coal bearing Barakar formation. It overlies seam VIII with a parting of 6.30 m. to 16.15 m. (mostly the parting is 9 m. to 12.00 m.). The seam incrops in the east in the middle of the block, north of BH. No. MNRT- 69 near Kelo river and extends upto BH MNRT-30 in the west. Further west it is displaced by fault F2 and F1. The seam does not incrop in the western part of the block. The seam occurs at a depth range of 11.87 m to 238.02 within the block.
- 6.8.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(7) and its graphic representation of various quality parameters of seam is given in fig-7 (i-vii). The seam description in brief is given below.
- 6.8.3 The full seam has been intersected in 88 boreholes. The seam is faulted in one borehole & part faulted in one BH and 27 borehole are located in the up dip region of the seam incrop. The full seam thickness varies from 0.96 m. to 6.96 m. The prevalent seam thickness is 3.5 to 6.0 m. in 86% of boreholes. The seam roof consists dominantly of shale and its floor consists of shale / clay.
- 6.8.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 2.70 % to 10.30 % (prevalent range is 3.00 to 9.00 %) and Ash % varies from 24.00 % to 42.30 % (prevalent Ash% is 29.00 % to 34.00 %). The UHV varies from 2317 to 4567 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). D grade coal is available in the south central part around boreholes MNRT-18, 45, 51 & 60. Dirt bands, 1 to 3 nos. are present in 55 BHs. The seam has clean coal in 33 borehole intersections.

**A) Ultimate analysis :** The Ultimate analysis of the seam has been determined for 11 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam IX**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	36.20	2.45	0.40	0.43	6.11
Maximum	50.44	3.15	1.17	0.95	20.46

**B) Total Sulphur :** The total sulphur of seam IX has been determined for 9 samples (Annexure VI C). The range of total sulphur is given below. The distribution of sulphur is not determined due to low total sulphur content in the seam.

**Total Sulphur in seam IX**

Range	Total Sulphur %
Minimum	0.18
Maximum	1.02

**C) Ash analysis :** The ash analysis has been determined for seam IX for 4 samples and the results are given below (Annexure VI B)

**Range of Ash Analysis for seam IX**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	58.96	64.62
Al <sub>2</sub> O <sub>3</sub>	25.33	25.94
Fe <sub>2</sub> O <sub>3</sub>	3.18	7.07
TiO <sub>2</sub>	1.55	1.90
CaO	1.80	2.15
MgO	0.67	0.99
Na <sub>2</sub> O	0.13	0.44
K <sub>2</sub> O	0.10	0.65
SO <sub>3</sub>	0.29	1.49
P <sub>2</sub> O <sub>5</sub>	0.89	1.00

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for 3 samples (Annexure VI D).

**Ash Fusion Temperature for seam IX**

Range	IT	ST	HT	FT
Minimum	1278	1325	1335	1349
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam IX has been determined for 3 sample and it is <0.03, 0.11 & 0.13% is given below (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 5 samples. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam IX is determined for 9 samples. The HGI values varies from 55 to 71 (Annexure VI G).



TABLE : VI [7]

SEAM : IX

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 88 MBRT -

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11,  
 12, 13, 14, 15, 16, 17, 18, 19, 20, 21,  
 22, 23, 25, 26, 27, 30, 31, 32, 33, 34,  
 35, 38, 40, 41, 42, 43, 44, 45, 46, 50,  
 51, 52, 53, 58, 59, 60, 61, 62, 63, 64,  
 67, 68, 69, 71, 72, 73, 74, 77, 78, 79,  
 80, 81, 83, 84, 87, 89, 93, 94, 95, 96,  
 97, 98, 99, 100, 101, 102  
 RT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 15

ii) SEAM FAULTED IN BOREHOLES: 1 MBRT -24

iii) SEAM PART FAULTED IN BHS.: 1 MBRT - 5

iv) BE LOCATED UPDIP OF SUBCROP: 27 MBRT -

28, 29, 36, 37, 39, 47, 48, 49, 54, 55,  
 56, 57, 65, 66, 70, 75, 76, 82, 85, 86,  
 88, 90, 91, 92

RT - 10, 12, 14

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 11.87 (MBRT-9 )

ii) DEEPEST : 238.02 (MBRT-11 )

## 3) THICKNESS (M)

a) SEAM THICKNESS

	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.96 (MBRT-30 )	.96 (MBRT-30 )	.96 (MBRT-30 )	.96 (MBRT-30 )
ii) MAX.	6.96 (RT-19 )	5.81 (MBRT-31 )	6.23 (MBRT-31 )	6.23 (MBRT-31 )
iii) MEAN	4.49	4.20	4.28	4.46
iv) STD. DEVIATION	.84	.80	.82	.79

b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
0.9-1.0	1	1	1	1
2.5-3.0	0	2	1	0
3.0-3.5	8	14	13	8
3.5-4.0	12	18	12	12
4.0-5.0	42	38	42	43
5.0-6.0	22	15	18	22
6.0-7.0	3	0	1	2

TOTAL

88

88

88

88

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 6.65 (MBRT-87 ) MEAN : 10.94  
 ii) Maximum : 15.91 (MBRT-11 ) S.D. : 1.84

## 5) ROOF CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : CSR  
ii) 3.0 m Column: DOMINANT : SHALE SUBORDINATE : CLAY

## 6) FLOOR CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : ICAL  
ii) 1.0 m Column: DOMINANT : CLAY SUBORDINATE : ARE. SB

TABLE : VI(7) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BRS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	83	2.70	10.30	6.56	1.68
		MMRT-59	MMRT-72		
ASH (%)	83	24.00	42.30	32.44	3.61
		MMRT-100	MMRT-23		
HEV (k.cal/kg)	83	2317.	4567.	3518.	508.
		MMRT-23	MMRT-60		
GRADE	83	G	D		
		MMRT-23	MMRT-18		
C.V (k.cal/k.g)	9	3960.	5160.	4498.	383.
		MMRT-38	MMRT-51		

TABLE : VI(7) Contd.

## 8) DIRT BANDS FOR 88 BHS. CONSIDERED

1) NO. OF BHS DEVOID OF DIRT BANDS:	33	MMRT - 1, 8, 10, 12, 13, 14, 15, 16, 18, 20, 21, 25, 30, 38, 41, 46, 51, 52, 60, 63, 68, 69, 72, 73, 77, 83, 89, 94, 96, 98, 100,	RT - 1, 3
11) NO. OF BHS WITH OBVIOUS DIRT BANDS:	12	MMRT - 3, 9, 11, 17, 23, 35, 42, 45, 53, 62, 67,	RT - 13
	MMRT-3	- 1 BAND	- .30
	MMRT-9	- 1 BAND	- .25
	*MMRT-11	- 1 BAND	- .32
	MMRT-17	- 2 BAND	- .47
	*MMRT-23	- 1 BAND	- .17
	*MMRT-35	- 1 BAND	- .63
	*MMRT-42	- 1 BAND	- .40
	MMRT-45	- 1 BAND	- .06
	MMRT-53	- 1 BAND	- .43
	*MMRT-62	- 1 BAND	- .43
	*MMRT-67	- 1 BAND	- .20
	*RT-13	- 1 BAND	- 2.80
111) NO. OF BHS WITH CSB BANDS:	50	MMRT - 2, 4, 6, 7, 11, 19, 22, 23, 26, 27, 31, 32, 33, 34, 35, 40, 42, 43, 44, 50, 58, 59, 61, 62, 64, 67, 71, 74, 78, 79, 80, 81, 84, 87, 93, 95, 97, 99, 101, 102	RT - 2, 4, 5, 6, 7, 8, 9, 11, 13, 15
	MMRT-2	- 1 BAND	- .46
	MMRT-4	- 2 BAND	- .32
	MMRT-6	- 2 BAND	- .38
	MMRT-7	- 1 BAND	- .45
	*MMRT-11	- 1 BAND	- .29
	MMRT-19	- 1 BAND	- .23
	MMRT-22	- 1 BAND	- .16
	*MMRT-23	- 1 BAND	- .37
	MMRT-26	- 1 BAND	- .38
	MMRT-27	- 1 BAND	- .35
	MMRT-31	- 2 BAND	- .42
	MMRT-32	- 1 BAND	- .30
	MMRT-33	- 1 BAND	- .41
	MMRT-34	- 1 BAND	- .41
	*MMRT-35	- 2 BAND	- .43
	MMRT-40	- 1 BAND	- .47
	*MMRT-42	- 1 BAND	- .14
	MMRT-43	- 2 BAND	- 1.18
	MMRT-44	- 1 BAND	- .47
	MMRT-50	- 1 BAND	- .10
	MMRT-58	- 1 BAND	- .20
	MMRT-59	- 2 BAND	- .93
	MMRT-61	- 2 BAND	- .66
	*MMRT-62	- 1 BAND	- .10
	MMRT-64	- 1 BAND	- .25
	*MMRT-67	- 1 BAND	- .54
	MMRT-71	- 1 BAND	- .28
	MMRT-74	- 1 BAND	- .42
	MMRT-78	- 1 BAND	- .23
	MMRT-79	- 1 BAND	- .23
	MMRT-80	- 1 BAND	- .40
	MMRT-81	- 1 BAND	- .13
	MMRT-84	- 1 BAND	- .36
	MMRT-87	- 1 BAND	- .39

TABLE : VI(7) Contd.

MMRT-93	- 1 BAND	- .31
MMRT-95	- 1 BAND	- .25
MMRT-97	- 1 BAND	- .40
MMRT-99	- 2 BAND	- .47
*MMRT-101	- 2 BAND	- .52
MMRT-102	- 1 BAND	- .66
RT-2	- 1 BAND	- .20
RT-4	- 1 BAND	- .39
RT-5	- 1 BAND	- .20
RT-6	- 2 BAND	- .90
RT-7	- 2 BAND	- .66
RT-8	- 1 BAND	- .35
RT-9	- 2 BAND	- .50
RT-11	- 1 BAND	- .15
*RT-13	- 1 BAND	- .35
RT-15	- 1 BAND	- .36

9]

i) NO.OF BBS EXCLD.CSR & OB (>0.30M) - 34 MMRT - 2, 7, 11, 17, 23, 26, 27, 33, 34, 35, 40, 42, 43, 44, 53, 59, 61, 62, 67, 74, 80, 84, 87, 93, 97, 99, 101, 102

RT - 4, 6, 7, 8, 13, 15

MMRT-2	- 1 BAND	- .46
MMRT-7	- 1 BAND	- .45
MMRT-11	- 1 BAND	- .61
MMRT-17	- 1 BAND	- .39
MMRT-23	- 1 BAND	- .54
MMRT-26	- 1 BAND	- .38
MMRT-27	- 1 BAND	- .35
MMRT-33	- 1 BAND	- .41
MMRT-34	- 1 BAND	- .41
MMRT-35	- 1 BAND	- .83
MMRT-40	- 1 BAND	- .47
MMRT-42	- 1 BAND	- .40
MMRT-43	- 1 BAND	- .89
MMRT-44	- 1 BAND	- .47
MMRT-53	- 1 BAND	- .43
MMRT-59	- 1 BAND	- .68
MMRT-61	- 1 BAND	- .44
MMRT-62	- 1 BAND	- .43
MMRT-67	- 1 BAND	- .54
MMRT-74	- 1 BAND	- .42
MMRT-80	- 1 BAND	- .40
MMRT-84	- 1 BAND	- .36
MMRT-87	- 1 BAND	- .39
MMRT-93	- 1 BAND	- .31
MMRT-97	- 1 BAND	- .40
MMRT-99	- 1 BAND	- .35
MMRT-101	- 1 BAND	- .32
MMRT-102	- 1 BAND	- .66
RT-4	- 1 BAND	- .39
RT-6	- 1 BAND	- .72
RT-7	- 1 BAND	- .52
RT-8	- 1 BAND	- .35
RT-13	- 2 BAND	- 3.15
RT-15	- 1 BAND	- .36

ii) NO.OF BBS EXCLD.CSR & OB (>1.0M): 1 MMRT - 13  
RT-13 - 1 BAND - 2.80

### 6.9.0 SEAM VIII

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 8A to VII E8
II. Floor contour plan	:	Plate No. IXH
III. Seam folio plan	:	Plate No. X-8
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII I to VIII 23

6.9.1 Seam VIII is a prominent and one of consistently developed seams throughout the block in the upper column of coal bearing Barakar formation. It overlies seam VII with a parting of 17.68 m. to 42.01 m. (mostly the parting is 20 m. to 25.00 m.). The seam incrops in the middle part of the block, south of BH. No. MNRT-76 near Kelo river and extends upto fault F2 near BH. No. MNRT-9. In the west the incrop is displaced by faults F2 & F1 and further west the seam is not incropping i.e. in the NW corner of the block.

6.9.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(8) and its graphic representation of various quality parameters of seam is given in fig-8 (i-vii). The seam description in brief is given below.

6.9.3 The full seam VIII has been intersected in 90 boreholes. The seam is faulted in 2 BHs and 25 borehole are located in the up dip region of the seam incrop. The full seam thickness varies from 2.06 m. to 6.64 m. The prevalent seam thickness is 4.0 to 6.5 m. in 87% of boreholes. The seam roof consists dominantly of shale and coal and its floor consists of carbshale and shale arenaceous. The seam occurs at depth range of 7.95 m. to 256.47 m. within the block.

6.9.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). On I100 analysis basis the moisture content of the seam varies from 2.50 % to 9.80 % (prevalent range is 5.0 to 7.0 %) and Ash % varies from 29.20 % to 47.00 % (prevalent Ash% is 37.0% to 42.00 %). The UHV varies from 1738 to 3711 K.Cal/Kg. The seam grade is G to E (prevalent grade is 'F' over a larger area) Dirt bands (1 to 5 nos.) are present in 68 BHs and in 22 BHs the seam has clean coal.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 11 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam VIII**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	36.32	2.00	0.37	0.31	2.77
Maximum	46.77	3.46	0.90	0.84	9.07

**B) Total Sulphur :** The total sulphur for seam VIII has been determined for 9 samples (Annexure VI C). The total sulphur range is given below. The distribution of sulphur is not determined as total sulphur content in the seam is low (< 1.0%).

**Total Sulphur for seam VIII**

Range	Total Sulphur %
Minimum	0.28
Maximum	0.73

**C) Ash analysis :** The ash analysis has been determined for seam VIII for 3 samples and the result are given below (Annexure VI B)

**Range of Ash Analysis for seam VIII**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	61.76	64.46
Al <sub>2</sub> O <sub>3</sub>	27.97	28.73
Fe <sub>2</sub> O <sub>3</sub>	1.94	4.12
TiO <sub>2</sub>	1.84	2.03
CaO	0.61	1.34
MgO	0.69	0.86
Na <sub>2</sub> O	0.12	0.33
K <sub>2</sub> O	0.12	0.50
SO <sub>x</sub>	0.26	0.65
P <sub>2</sub> O <sub>5</sub>	0.30	0.52

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for 3 samples (Annexures VI D).

**Ash Fusion Temperature for seam VIII**

Range	IT	ST	HT	FT
Minimum	1294	1320	1340	1356
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam 3 sample and its range is <0.30 to 0.13% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam VIII is determined for 9 samples. The HGI values varies from 54 to 75 (Annexure VI G).



TABLE : VI(8)

SEAM : VIII

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

- i) FULL SEAM INTERSECTION: 90 MNRT -  
 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
 11, 12, 13, 14, 15, 16, 17, 18, 19, 20,  
 21, 22, 23, 24, 25, 26, 27, 30, 31, 32,  
 33, 34, 35, 38, 40, 41, 42, 43, 44, 45,  
 46, 50, 51, 52, 53, 58, 59, 60, 61, 62,  
 63, 64, 67, 68, 69, 71, 72, 73, 74, 77,  
 78, 79, 80, 81, 83, 84, 87, 89, 93, 94,  
 95, 96, 97, 98, 99, 100, 101, 102
- RT -  
 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 15
- ii) PART SEAM INTERSECTION: 2 MNRT - 47, 48
- iii) BH LOCATED UPDIP OF SUBCROP: 25 MNRT -  
 28, 29, 36, 37, 39, 49, 54, 55, 56, 57,  
 65, 66, 70, 75, 76, 82, 85, 86, 88, 90,  
 91, 92, RT - 10, 12, 14

## 2) DEPTH RANGE(FLOOR) (M)

- i) SHALLOWEST : 7.95 (MNRT-48 )  
 ii) DEEPEST : 256.42 (MNRT-11 )

## 3) THICKNESS (M)

n)	SEAM THICKNESS			
	BCS	I-30	I-100	
i) MIN.	2.06 (RT-7 )	2.06 (RT-7 )	2.06 (RT-7 )	2.06 (RT-7 )
ii) MAX.	6.64 (RT-3 )	6.61 (MNRT-71 )	6.61 (MNRT-71 )	6.64 (RT-3 )
iii) MEAN	5.18	4.77	5.04	5.15
iv) STD. DEVIATION	1.07	1.07	1.09	1.09
b) THICK. RANGE (M) NO. OF BRS				
2.0-2.5	3	3	3	3
2.5-3.0	5	5	5	5
3.0-3.5	2	3	2	2
3.5-4.0	2	12	6	3
4.0-5.0	17	20	21	18
5.0-6.0	41	39	35	39
6.0-7.0	20	8	18	20
TOTAL	90	90	90	90

## 4) PARTING WITH THE UNDERLYING SEAM -

- i) Minimum : 17.58 (MNRT-94 ) MEAN : 25.12  
 ii) Maximum : 42.01 (MNRT-24 ) S.D. : 4.84

TABLE : VI(8) Contd.

5] ROOF CHARACTERISTICS :		
-----		
i] IMMEDIATE :	DOMINANT : SHALE	SUBORDINATE : GSH
ii] 3.0 m Colonnad:	DOMINANT : ICAL	SUBORDINATE : SOIL
6] FLOOR CHARACTERISTICS :		
-----		
i] IMMEDIATE :	DOMINANT : CBE	SUBORDINATE : SHALE
ii] 1.0 m Colonnad:	DOMINANT : ARE. GE	SUBORDINATE : ICAL

TABLE : VI(8) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BHS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	85	2.50 MNRT-59	9.80 MNRT-102	5.69	1.42
ASH (%)	85	29.20 MNRT-102	47.00 MNRT-17	39.29	2.98
DEW (k.cal/kg)	85	1738. MNRT-3	3711. MNRT-100	2692.	393.
GRADE	85	G MNRT-1	E MNRT-93		
C.V (k.cal/k.g)	7	3750. MNRT-38	4390. MNRT-50	4021.	201.

TABLE : VI(8) Contd.

## 8) DIRT BANDS FOR 90 RES. CONSIDERED

1) NO. OF RES DEVOID OF DIRT BANDS:		22 NHRT - 1, 2, 11, 12, 14, 27, 31, 35, 38, 43, 45, 69, 71, 74, 84, 87, 93, 96, 99, 100, 102, RT - 7	
11) NO. OF RES WITH DEVOIDS DIRTY BANDS:		8 NHRT - 3, 9, 10, 17, 18, 24, 25, 97	
	NHRT-3	- 1 BAND	- .08
	*NHRT-9	- 2 BAND	- .50
	NHRT-10	- 1 BAND	- .18
	NHRT-17	- 2 BAND	- .75
	*NHRT-18	- 1 BAND	- .20
	*NHRT-24	- 1 BAND	- .24
	NHRT-25	- 1 BAND	- .09
	*NHRT-97	- 1 BAND	- .13
111) NO. OF RES WITH CSB BANDS:		64 NHRT - 4, 5, 6, 7, 8, 9, 13, 15, 16, 18, 19, 20, 21, 22, 23, 24, 26, 30, 32, 33, 34, 40, 41, 42, 44, 46, 50, 51, 52, 53, 58, 59, 60, 61, 62, 63, 64, 67, 68, 72, 73, 77, 78, 79, 80, 81, 83, 89, 94, 95, 97, 98, 101	
	RT	- 1, 2, 3, 4, 5, 6, 8, 9, 11, 13, 15	
	NHRT-4	- 2 BAND	- .42
	NHRT-5	- 2 BAND	- .34
	NHRT-6	- 4 BAND	- .35
	NHRT-7	- 1 BAND	- .12
	NHRT-8	- 2 BAND	- .55
	*NHRT-9	- 2 BAND	- .70
	NHRT-13	- 2 BAND	- .30
	NHRT-15	- 4 BAND	- .86
	NHRT-16	- 4 BAND	- .88
	*NHRT-18	- 1 BAND	- .35
	NHRT-19	- 5 BAND	- 1.23
	NHRT-20	- 1 BAND	- .16
	NHRT-21	- 1 BAND	- .50
	NHRT-22	- 2 BAND	- .51
	NHRT-23	- 1 BAND	- .17
	*NHRT-24	- 1 BAND	- .26
	NHRT-26	- 1 BAND	- .20
	NHRT-30	- 2 BAND	- .44
	NHRT-32	- 1 BAND	- .20
	NHRT-33	- 3 BAND	- .53
	NHRT-34	- 1 BAND	- .22
	NHRT-40	- 4 BAND	- 1.03
	NHRT-41	- 3 BAND	- .69
	NHRT-42	- 2 BAND	- 1.06
	NHRT-44	- 3 BAND	- .46
	NHRT-46	- 1 BAND	- .23
	NHRT-50	- 2 BAND	- .54
	NHRT-51	- 2 BAND	- .61
	NHRT-52	- 2 BAND	- .65
	NHRT-53	- 4 BAND	- .85
	NHRT-58	- 3 BAND	- .97

TABLE : VI (8) Contd.

NRRT-59	- 3	BAND	- .49
NRRT-60	- 2	BAND	- .42
NRRT-61	- 1	BAND	- .25
NRRT-62	- 5	BAND	- 1.06
NRRT-63	- 2	BAND	- .35
NRRT-64	- 1	BAND	- .30
NRRT-67	- 3	BAND	- .40
NRRT-68	- 1	BAND	- .26
NRRT-72	- 1	BAND	- .20
NRRT-73	- 2	BAND	- .56
NRRT-77	- 1	BAND	- .21
NRRT-78	- 1	BAND	- .30
NRRT-79	- 1	BAND	- .23
NRRT-80	- 2	BAND	- 1.52
NRRT-81	- 1	BAND	- .25
NRRT-83	- 2	BAND	- .39
NRRT-89	- 2	BAND	- .33
NRRT-94	- 6	BAND	- .99
NRRT-95	- 1	BAND	- .25
*NRRT-97	- 2	BAND	- .33
NRRT-98	- 1	BAND	- .26
NRRT-101	- 4	BAND	- .62
RT-1	- 4	BAND	- 1.64
RT-2	- 6	BAND	- 1.05
RT-3	- 5	BAND	- 1.18
RT-4	- 3	BAND	- .39
RT-5	- 1	BAND	- .15
RT-6	- 3	BAND	- .83
RT-8	- 2	BAND	- .50
RT-9	- 5	BAND	- 1.01
RT-11	- 4	BAND	- .60
RT-13	- 6	BAND	- .89
RT-15	- 1	BAND	- .20

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1) NO. OF BBS EXCLD. CSB &amp; CB (&gt;0.30M): 22 NRRT -

8, 9, 16, 17, 18, 19, 21, 40, 41, 42,  
51, 52, 53, 58, 62, 80

RT - 1, 2, 3, 6, 8, 9

NRRT-8	- 1	BAND	- .32
NRRT-9	- 3	BAND	- 1.10
NRRT-16	- 1	BAND	- .55
NRRT-17	- 1	BAND	- .48
NRRT-18	- 1	BAND	- .35
NRRT-19	- 1	BAND	- .42
NRRT-21	- 1	BAND	- .50
NRRT-40	- 2	BAND	- .68
NRRT-41	- 1	BAND	- .38
NRRT-42	- 1	BAND	- .81
NRRT-51	- 1	BAND	- .36
NRRT-52	- 1	BAND	- .50
NRRT-53	- 1	BAND	- .35
NRRT-58	- 2	BAND	- .81
NRRT-62	- 1	BAND	- .39
NRRT-80	- 1	BAND	- 1.36
RT-1	- 1	BAND	- 1.38
RT-2	- 1	BAND	- .35
RT-3	- 1	BAND	- .51
RT-6	- 1	BAND	- .49

TABLE : VI(8) Contd.

	RT-9	- 1 BAND - .38
	RT-9	- 1 BAND - .40
ii) NO.OF BBS ENCLD.CSH & OS (>1.0M):	2	MMRT - 90, 1
	MMRT-90	- 1 BAND - 1.36
	RT-1	- 1 BAND - 1.38

### 6.10.0 SEAM VII

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 9A to VII 9C
II. Seam folio plan	:	Plate No. X-9
III. Seam Quality	:	Plate No. IV & VII
IV. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.10.1 Seam VII is a **thin seam**. It has not developed and not workable over a large part of the area in the block. It overlies seam VI Top with a parting of 1.08 m. to 17.44 m. (mostly the parting is 4 m. to 14 m.). The seam incrops in the eastern part of the block near BH. No. MNRT- 76 and extends towards west upto fault F1 and near boreholes MNRT-36 and BH MNRT-43 near fault F4.

6.10.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(9) and its graphic representation of various quality parameters of seam is given in fig-9 (i-vii). The seam description in brief is given below.

6.10.3 The full seam has been intersected in 56 boreholes only. The seam is faulted in one borehole and it is not developed in 35 BHs. The seam thickness is <1 m. in 32 boreholes in the central part near incrop region. It has attained workable thickness (1.2 m. to 3.0 m) in 19 boreholes in the southern part. The full seam thickness varies from 0.10 m. to 3.90 m (the prevalent seam thickness is 0.50 to 1.00 m. in 56% of boreholes). The seam roof consists dominantly of shale and its floor consists of shale arenaceous. The seam occurs at depth range of 58.20 m. to 270.08 m. within the block.

6.10.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.90 % to 8.00 % and Ash % varies from 28.7 % to 49.3 %. The UHV varies from 1310 to 3960 K.Cal/Kg. The seam grade is G to E (prevalent grade is 'G')

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 4 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam VII**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	36.87	2.50	0.44	0.45	4.21
Maximum	40.77	3.57	0.74	0.72	9.14

**B) Total Sulphur :** The total sulphur of seam VII has been determined for 3 samples (Annexure VI C). The total sulphur range is given below.

**Total Sulphur in seam VII**

Range	Total Sulphur %
Minimum	0.55
Maximum	0.63

**C) Ash analysis :** The ash analysis has been determined for seam VII for 3 samples and the result are given below (Annexure VI B)

**Range of Ash Analysis for seam VII**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	58.21	60.16
Al <sub>2</sub> O <sub>3</sub>	27.31	30.14
Fe <sub>2</sub> O <sub>3</sub>	4.35	6.04
TiO <sub>2</sub>	1.63	1.89
CaO	1.24	2.14
MgO	0.73	1.04
Na <sub>2</sub> O	0.13	0.16
K <sub>2</sub> O	0.11	0.65
SO <sub>3</sub>	0.18	1.62
P <sub>2</sub> O <sub>5</sub>	0.45	0.90

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for one sample (Annexures VI D).



**Ash Fusion Temperature for seam VII**

Range	IT	ST	HT	FT
Minimum	> 1450	> 1450	> 1450	> 1450
Maximum	-	-	-	-

**E) HGI :** The HGI of seam VII is determined for 2 samples. The HGI values varies from 59 to 66 (Annexure VI G).

TABLE : VI(9)  
SEAM : VII

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 56 MHRT - 1, 3, 7, 10, 15, 16, 20, 21, 24, 25,  
27, 30, 32, 34, 35, 40, 41, 42, 43, 44,  
45, 46, 50, 51, 52, 53, 59, 60, 61, 63,  
64, 67, 68, 71, 73, 74, 78, 79, 80, 81,  
83, 84, 89, 94, 95, 96, 97, 98, 99, 100,  
102

RT - 1, 3, 7, 8, 15

ii) SEAM FAULTED IN BOREHOLES: 1 MHRT - 22

iii) BK LOCATED UPDIP OF SUBCROP: 22 MHRT -

29, 36, 37, 39, 49, 55, 57, 65, 66, 70,  
75, 76, 82, 85, 86, 88, 90, 91, 92

RT - 10, 12, 14

iv) SEAM DETERIORATED IN QUALITY: 3 MHRT - 6, 9, 19

v) SEAM NOT DEVELOPED : 35 MHRT-2, 4, 5, 8, 11, 12, 13, 14, 17, 18,  
23, 26, 28, 31, 33, 38, 47, 48, 54, 56,  
58, 62, 69, 72, 77, 87, 93, 101

RT-2, 4, 5, 6, 9, 11, 13

2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 58.20 (MHRT-30 )  
ii) DEEPEST : 270.08 (MHRT-83 )

3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.10 (MHRT-10 )	.10 (MHRT-10)	.10 (MHRT-10)	.10 (MHRT-10 )
ii) MAX.	3.90 (MHRT-89 )	3.40 (MHRT-89 )	3.90 (MHRT-89)	3.90 (MHRT-89 )
iii) MEAN	1.25	1.06	1.17	1.25
iv) STD. DEVIATION	1.02	.81	.95	1.02
b) THICK. RANGE (m)	NO. OF BRS	NO. OF BRS	NO. OF BRS.	NO. OF BRS.
<0.5	14	17	14	14
0.5-0.9	16	15	16	16
0.9-1.0	1	0	2	1
1.0-1.2	2	4	2	1
1.2-1.5	6	8	8	7
1.5-2.0	6	2	3	6
2.0-2.5	1	5	3	1
2.5-3.0	6	4	5	6
3.0-3.5	1	1	0	1
3.5-4.0	3	0	3	3
<b>TOTAL</b>	<b>56</b>	<b>56</b>	<b>56</b>	<b>56</b>

TABLE : VI(9) Contd.

## 4] PARTING WITH THE UNDERLYING SEAM :

-----  
 i] Minimum : 1.08 (MORT-35)      MEAN : 0.79  
 ii] Maximum : 17.44 (MORT-15)      S.D. : 3.85

## 5] ROOF CHARACTERISTICS :

-----  
 1] IMMEDIATE :      DOMINANT : CSE      SUBORDINATE : SHALE  
 ii] 3.0 m Colonnad :      DOMINANT : CLAY      SUBORDINATE : SHALE

## 6] FLOOR CHARACTERISTICS :

-----  
 i] IMMEDIATE :      DOMINANT : SHALE      SUBORDINATE : CSE  
 ii] 1.0 \* Colonnad :      DOMINANT : ARE. SR      SUBORDINATE : SHALE

TABLE : VI(9) Contd.

7] QUALITY PARAMETERS (ON 60 % RF &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BHS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	39	1.90 MNRT-59	8.00 MNRT-97	5.02	1.65
ASH (%)	39	28.70 MNRT-43	49.30 MNRT-53	43.42	4.42
DEW (k.cal/kg)	39	1310. RT-7	3960. MNRT-43	2193.	563.
GRADE	39	G MNRT-1	E MNRT-43		
C.V (k.cal/k.g)	3	3270. MNRT-73	4170. MNRT-50	3583.	415.

TABLE : VI(9) Contd.

## 8) DIRT BANDS FOR 57 BHS. CONSIDERED

1) NO. OF BHS DEVOID OF DIRT BANDS: 29 MHRT - 1, 3, 7, 10, 15, 20, 21, 35, 41, 42,  
43, 45, 46, 51, 50, 61, 63, 67, 68, 71,  
73, 78, 81, 97, 98

RT - 1, 7, 8, 15

1i) NO. OF BHS WITH OBVIOUS DIRT BANDS: 5 MHRT - 30, 32, 40, 100

RT - 3

MHRT-30 - 1 BAND - .09  
MHRT-32 - 1 BAND - .09  
\*MHRT-40 - 1 BAND - .13  
\*MHRT-100 - 1 BAND - .22  
\*RT-3 - 1 BAND - .07

1ii) NO. OF BHS WITH CSR BANDS: 25 MHRT -16, 24, 25, 27, 34, 40, 44, 50, 52, 53,  
59, 64, 74, 79, 80, 83, 84, 89, 94, 95,  
96, 99, 100, 102,

RT- 3

MHRT-16 - 2 BAND - .16  
MHRT-24 - 1 BAND - .17  
MHRT-25 - 1 BAND - .31  
MHRT-27 - 1 BAND - .69  
MHRT-34 - 1 BAND - .33  
\*MHRT-40 - 1 BAND - .15  
MHRT-44 - 1 BAND - .19  
MHRT-50 - 2 BAND - .35  
MHRT-52 - 1 BAND - .34  
MHRT-53 - 1 BAND - .40  
MHRT-59 - 1 BAND - .37  
MHRT-64 - 1 BAND - .11  
MHRT-74 - 1 BAND - .20  
MHRT-79 - 2 BAND - .57  
MHRT-80 - 2 BAND - .49  
MHRT-83 - 2 BAND - .40  
MHRT-84 - 2 BAND - .51  
MHRT-89 - 2 BAND - .50  
MHRT-94 - 2 BAND - .22  
MHRT-95 - 3 BAND - .86  
MHRT-96 - 3 BAND - .90  
MHRT-99 - 1 BAND - .20  
\*MHRT-100 - 2 BAND - .43  
MHRT-102 - 3 BAND - .63  
\*RT-3 - 1 BAND - .40

9)

i) NO. OF BHS EXCLD. CSR & CD (>0.30M): 11 MHRT - 25, 27, 34, 52, 53, 59, 79, 80,  
95, 101, 102,

RT - 3

TABLE : VI (9) Contd.

NRRT-25	- 1	BAND	-	.31
NRRT-27	- 1	BAND	-	.68
NRRT-34	- 1	BAND	-	.33
NRRT-52	- 1	BAND	-	.34
NRRT-53	- 1	BAND	-	.40
NRRT-59	- 1	BAND	-	.37
NRRT-79	- 1	BAND	-	.40
NRRT-80	- 1	BAND	-	.35
NRRT-93	- 1	BAND	-	.36
NRRT-102	- 1	BAND	-	.48
RT-9	- 1	BAND	-	.40

### 6.11.0 SEAM VI TOP

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 10A to VII 10E
II. Floor contour plan	:	Plate No. IX 1
III. Seam folio plan	:	Plate No. X-10
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.11.1 Seam VI Top is the top split of VI seam and occur separately and distinctly throughout the block in the middle part of coal bearing Barakar formation. It overlies seam VI M with a parting of 0.56 m. to 3.25 m. (mostly the parting is 0.50 m. to 1.50 m.). The seam incrops in the eastern part of the block near Kelo river and near BH Nos. MNRT-91 & 90 and extend upto BH No. RT-10 and abut against fault F1.
- 6.11.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(10) and its graphic representation of various quality parameters of seam is given in fig-10 (i-vii). The seam description in brief is given below.
- 6.11.3 The full seam has been intersected in 92 boreholes. The seam is faulted in 3 BHs and it is not developed in 5 BHs and 17 boreholes are located in the up dip region of the seam incrop. The full seam thickness varies from 0.37 m. to 3.42 m. (the prevalent seam thickness is 1.2 to 3.0 m. in 67% of boreholes). The seam is not workable in 24 BHs scattered in central part near incrop region in the east and NW part of the block. Due to topographical variation the incrop of seam is showing swing in the northern part of the block near borehole MNRT-36 & RT-10. The seam roof consists dominantly of intercalations and its floor consists of carbshale and shale. The seam occurs at depth range of 12.08 m. to 312.32 m. within the block.
- 6.11.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 2.20 % to 8.60 % (prevalent range is 4.00 to 5.00 %) and Ash % varies from 30.10 % to 51.00 % (prevalent range is 37.00 % to 43.00 %). The LHV varies from 1351 to 4098 K.Cal/Kg. The seam grade is G to E (prevalent grade is F) Dirt bands 1 to 3 nos. are present in 54 BHs and in 38 BHs the seam has clean coal devoid of dirt bands.

**A) Ultimate analysis :** The Ultimate analysis of the seam has been determined for 3 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam VI Top**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	37.45	2.21	0.43	0.41	5.85
Maximum	41.24	2.99	0.86	0.61	9.08

**B) Total Sulphur :** The total sulphur in seam VI Top has been determined for 5 samples (Annexure VI C). The range of total sulphur is given below.

**Total Sulphur in seam VI Top**

Range	Total Sulphur %
Minimum	0.33
Maximum	0.61

**C) Ash analysis :** The ash analysis has been determined for seam VI Top for one sample and the result are given below (Annexure VI B). For one sample ash analysis is available for VI (Top+Mid) combined seam.

**Ash Analysis for seam VI Top and VI (Top+Mid)**

SiO <sub>2</sub>	63.12	61.31
Al <sub>2</sub> O <sub>3</sub>	29.34	26.66
Fe <sub>2</sub> O <sub>3</sub>	2.75	5.16
TiO <sub>2</sub>	1.88	2.00
CaO	0.61	0.97
MgO	0.49	0.71
Na <sub>2</sub> O	0.04	0.08
K <sub>2</sub> O	0.08	0.43
SO <sub>3</sub>	0.31	1.51
F <sub>2</sub> O <sub>3</sub>	0.43	0.34



**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature of the seam has been determined for one sample (Annexure VI D).

**Ash Fusion Temperature for seam VI Top**

IT	ST	HT	FT
1356	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam VI Top has been determined for 3 samples and it is 0.05 & 0.08% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for two samples. The swelling index is 'O' and coke type is 'A' (Annexure VI F). For combined VI (T+M) the swelling index is 'O' and coke type is 'A-B'

**G) HGI :** The HGI for seam VI (T+M) Comb. is determined for 8 samples. The HGI values varies from 58 to 65 (Annexure VI G).

TABLE : VI(10)  
SEAM : VI TOP

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION:	92	MRRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 30, 33, 34, 35, 38, 40, 41, 42, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 67, 68, 69, 71, 72, 73, 74, 76, 77, 78, 79, 80, 81, 83, 89, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102,
		RT - 1, 2, 3, 5, 6, 8, 9, 10, 11, 12, 13, 15
ii) SEAM FAULTED IN BOREHOLES:	3	MRRT-22, 43, RT - 7
iii) BH LOCATED UPDIP OF SUBCROP:	17	MRRT-29, 36, 37, 39, 49, 65, 66, 70, 75, 82, 85, 86, 88, 90, 91, 92, RT-14
iv) SEAM NOT DEVELOPED :	5	MRRT-31, 32, 34, 87, RT-4

2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST :	12.08 (RT-10 )
ii) DEEPEST :	312.32 (MRRT-11 )

3) THICKNESS (M)

a)	SEAM THICKNESS	BCB	I-30	I-100
i) MIN.	.37 (MRRT-100)	.37 (MRRT-100)	.37 (MRRT-100)	.37 (MRRT-100)
ii) MAX.	3.42 (MRRT-71 )	3.15 (MRRT-71 )	3.42 (MRRT-71 )	3.42 (MRRT-71 )
iii) MEAN	1.49	1.30	1.40	1.49
iv) STD. DEVIATION	.71	.59	.67	.71

b) THICK. RANGE (M)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
<0.5	5	6	5	5
0.5-0.9	16	18	16	16
0.9-1.0	3	5	4	3
1.0-1.2	5	16	13	5
1.2-1.5	25	17	21	25
1.5-2.0	17	18	15	17
2.0-2.5	9	9	11	9
2.5-3.0	11	2	6	11
3.0-3.5	1	1	1	1
TOTAL	92	92	92	92

4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum :	.63 (MRRT-27 )	MEAN :	1.21
ii) Maximum :	3.25 (MRRT-10 )	S.D . :	.42

5) ROOF CHARACTERISTICS :

i) IMMEDIATE :	DOMINANT : CSB	SUBORDINATE : SHALE
ii) 3.0 m Colonnade:	DOMINANT : ICAL	SUBORDINATE : CLAY

6) FLOOR CHARACTERISTICS :

i) IMMEDIATE :	DOMINANT : CSB	SUBORDINATE : SHALE
ii) 1.0 m Colonnade:	DOMINANT : SHALE	SUBORDINATE : CSB

TABLE : VI(10) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BRS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	82	2.20 MNRT-59	8.60 MNRT-44	4.90	1.26
ASH (%)	82	30.10 RT-12	51.00 MNRT-55	40.86	4.49
HEV (k.cal/kg)	82	1351. MNRT-54	4099. MNRT-60	2584.	571.
GRADE	82	G MNRT-1	E MNRT-12		
C.V (k.cal/k.g)	2	3660. MNRT-38	3900. MNRT-26	3780.	120.

8) DIRT BANDS FOR 92 BBS. CONSIDERED

---

i) NO. OF BBS DEVOID OF DIRT BANDS: 38 MERT - 1, 2, 3, 9, 10, 11, 12, 14, 16, 17,  
18, 19, 25, 30, 33, 35, 38, 44, 46, 48,  
54, 57, 60, 64, 68, 72, 73, 94, 97, 100,  
RT - 1, 5, 6, 8, 10, 12, 13, 15,

ii) NO. OF BBS WITH OBVIOUS DIRT BANDS: 3 MERT 23, 55, 67,  
MERT-23 - 1 BAND - .13  
MERT-55 - 1 BAND - .18  
\*MERT-67 - 2 BAND - .76

iii) NO. OF BBS WITH CSB BANDS: 52 MERT - 4, 5, 6, 7, 8, 13, 15, 20, 21, 24,  
26, 27, 28, 34, 40, 41, 42, 45, 47, 50,  
51, 52, 53, 56, 58, 59, 61, 62, 63, 67,  
69, 71, 74, 76, 77, 78, 79, 80, 81, 83,  
89, 93, 95, 96, 98, 99, 101, 102  
RT - 2, 3, 9, 11  
MERT-4 - 1 BAND - .10  
MERT-5 - 1 BAND - .08  
MERT-6 - 1 BAND - .26  
MERT-7 - 2 BAND - .67  
MERT-8 - 1 BAND - .34  
MERT-13 - 1 BAND - .31  
MERT-15 - 1 BAND - .36  
MERT-20 - 2 BAND - .57  
MERT-21 - 1 BAND - .31  
MERT-24 - 3 BAND - .53  
MERT-26 - 1 BAND - .38  
MERT-27 - 1 BAND - .35  
MERT-28 - 1 BAND - .28  
MERT-34 - 1 BAND - .16  
MERT-40 - 1 BAND - .35  
MERT-41 - 2 BAND - .62  
MERT-42 - 1 BAND - .23  
MERT-45 - 1 BAND - .23  
MERT-47 - 1 BAND - .39  
MERT-50 - 1 BAND - .18  
MERT-51 - 2 BAND - .55  
MERT-52 - 1 BAND - .18  
MERT-53 - 1 BAND - .20  
MERT-56 - 1 BAND - .18  
MERT-58 - 1 BAND - .32  
MERT-59 - 2 BAND - .58  
MERT-61 - 1 BAND - .30  
MERT-62 - 2 BAND - .52  
MERT-63 - 1 BAND - .38  
\*MERT-67 - 1 BAND - .09  
MERT-69 - 1 BAND - .17  
MERT-71 - 1 BAND - .27  
MERT-74 - 1 BAND - .46  
MERT-76 - 1 BAND - .26  
MERT-77 - 1 BAND - .40  
MERT-78 - 1 BAND - .30  
MERT-79 - 1 BAND - .24  
MERT-80 - 1 BAND - .21  
MERT-81 - 2 BAND - .70  
MERT-83 - 2 BAND - .44  
MERT-89 - 3 BAND - .73

TABLE : VI(10) Contd.

MNRT-93	- 1	BAND	- .07
MNRT-95	- 1	BAND	- .30
MNRT-96	- 1	BAND	- .25
MNRT-98	- 1	BAND	- .20
MNRT-99	- 1	BAND	- .35
MNRT-101	- 3	BAND	- .54
MNRT-102	- 1	BAND	- .27
RT-2	- 1	BAND	- .09
RT-3	- 1	BAND	- .15
RT-9	- 1	BAND	- .12
RT-11	- 2	BAND	- .46

9]

1) NO.OF BBS EXCLD.CSH & OB (>0.30M): 21 MNRT 7, 8, 13, 15, 20, 21, 26, 27, 40, 41,  
47, 51, 58, 59, 63, 67, 74, 77, 81, 99,

RT = 11

MNRT-7	- 2	BAND	- .67
MNRT-8	- 1	BAND	- .34
MNRT-13	- 1	BAND	- .31
MNRT-15	- 1	BAND	- .36
MNRT-20	- 1	BAND	- .33
MNRT-21	- 1	BAND	- .31
MNRT-26	- 1	BAND	- .38
MNRT-27	- 1	BAND	- .35
MNRT-40	- 1	BAND	- .35
MNRT-41	- 2	BAND	- .62
MNRT-47	- 1	BAND	- .39
MNRT-51	- 1	BAND	- .33
MNRT-58	- 1	BAND	- .32
MNRT-59	- 1	BAND	- .31
MNRT-63	- 1	BAND	- .38
MNRT-67	- 1	BAND	- .58
MNRT-74	- 1	BAND	- .46
MNRT-77	- 1	BAND	- .40
MNRT-81	- 1	BAND	- .40
MNRT-99	- 1	BAND	- .35
RT-11	- 1	BAND	- .36

### 6.12.0 SEAM VI MIDDLE

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 11A to VII 11E
II. Floor contour plan	:	Plate No. IX J
III. Seam folio plan	:	Plate No. X-11
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII I to VIII 23

- 6.12.1 Seam VI Middle is a prominent and thick seam occurring in the middle column of coal bearing Barakar formation. The seam has workable thickness throughout the block. It overlies seam VI Bottom with a parting of 0.85 m. to 5.98 m. (mostly the parting is 1 m. to 2 m.). The seam incrop is demarcated in the south of BH No. MNRT-91 near Kelo river in the eastern part of the block and it extends upto BH. No. MNRT-36 & RT-10 in the west. It does not crop out further west due to successive down throwing faults.
- 6.12.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(11) and its graphic representation of various quality parameters of seam is given in fig-11 (i-vii). The seam description in brief is given below.
- 6.12.3 The full seam has been intersected in 97 boreholes. The seam is faulted in 2 BHs part faulted in 2 BHs and 16 boreholes are located in the up dip region of the seam incrop in the east. The full seam thickness varies from 3.09 m. to 10.01 m. (the prevalent seam thickness is 5.0 to 9.0 m. in 91% of boreholes). The high thickness (8.0 to 9.0 m.) of the seam is available in the SE part of the block. Due to topographical variation the incrop of seam is showing swing in the northern part of the block near borehole MNRT-36 & RT-10. The seam roof consists dominantly of carb shale, shale and coal and its floor consists of shale. The seam occurs at depth range of 9.96 m. to 321.49 m. within the block.
- 6.12.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 3.50 % to 7.70 % (prevalent range is 5.00 to 7.5 %) and Ash % varies from 28.50 % to 48.90 % (prevalent range is 37.00 % to 43.00 %). The UHV varies from 1407 to 4070 K.Cal/Kg. The seam grade is G to E (prevalent grade is F). Invariably the seam consists, 2 to 5 nos. of carb shale and or obvious dirt bands.

**A) Ultimate analysis :** The Ultimate analysis of the seam has been determined for 5 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam VI Middle**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	38.12	2.39	0.39	0.36	4.81
Maximum	46.17	2.91	0.91	0.58	8.70

**B) Total Sulphur :** The total sulphur for seam VI middle has been determined for 6 samples (Annexure VI C). The range of total sulphur is given below. Due to low sulphur content obtained the sulphur distribution is not determined.

**Total Sulphur in seam VI Middle**

Range	Total Sulphur %
Minimum	0.29
Maximum	0.67

**C) Ash analysis :** The ash analysis has been determined for seam VI M for 2 samples and the result are given below (Annexure VI B)

**Ash Analysis for seam VI Middle**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	60.34	60.68
Al <sub>2</sub> O <sub>3</sub>	28.64	29.85
Fe <sub>2</sub> O <sub>3</sub>	4.03	6.45
TiO <sub>2</sub>	1.78	1.84
CaO	0.46	1.05
MgO	0.48	0.85
Na <sub>2</sub> O	0.07	0.17
K <sub>2</sub> O	0.09	0.18
SO <sub>3</sub>	0.25	0.54
P <sub>2</sub> O <sub>5</sub>	0.26	0.46

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature range of the seam has been determined for 3 samples (Annexures VI D).

**Ash Fusion Temperature for seam VI Middle**

Range	IT	SI	HT	FT
Minimum	> 1450	> 1450	> 1450	> 1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam VI Middle has been determined for 4 samples and it is 0.04 to 0.11% (Annexure VI F).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' and coke type is 'A' (Annexure VI F).

**G) HGI :** The HGI for seam VI (T+M) combined is determined for 8 samples. The HGI values varies from 58 to 65 for the samples (Annexure VI G).



TABLE : VI(11)

SEAM : VI MID

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 97 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
11, 13, 14, 15, 16, 17, 18, 19, 20, 21,  
23, 24, 25, 26, 27, 28, 30, 31, 32, 33,  
34, 35, 38, 39, 40, 41, 42, 44, 45, 46,  
47, 48, 50, 51, 52, 53, 54, 55, 56, 57,  
58, 59, 60, 61, 62, 63, 64, 67, 68, 69,  
71, 72, 73, 74, 76, 77, 78, 79, 80, 81,  
83, 84, 87, 89, 93, 94, 95, 96, 97, 98,  
99, 100, 101, 102  
RT - 1, 2, 3, 4, 5, 6, 8, 9, 10, 11,  
12, 13, 15

1i) SEAM FAULTED IN BOREHOLES: 2 MNRT - 22, 43  
1ii) SEAM PART FAULTED IN BHB.: 2 MNRT - 12, RT - 7  
1v) BE LOCATED UNDFE OF SUBCROP: 16 MNRT - 29, 36, 37, 49, 65, 66, 70, 75, 82, 85,  
86, 88, 90, 91, 92, RT-14

## 2) DEPTH RANGE(FLOOR) (M)

i) SHALLOWEST : 9.96 (MNRT-39 )  
ii) DEEPEST : 321.49 (MNRT-11 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	3.09 (MNRT-16 )	2.17 (RT-12 )	2.51 (MNRT-87 )	3.09 (MNRT-16 )
ii) MAX.	10.01 (MNRT-84 )	8.52 (MNRT-84 )	9.18 (MNRT-84 )	10.01 (MNRT-84 )
iii) MEAN	6.72	5.53	5.90	6.72
iv) STD.DEVIATION	1.15	1.08	1.15	1.15
b) THICK. RANGE (m)	NO. OF BHB	NO. OF BHB	NO. OF BBS.	NO. OF BBS.
2.0-2.5	0	2	0	0
2.5-3.0	0	2	2	0
3.0-3.5	3	1	3	3
3.5-4.0	2	2	1	2
4.0-5.0	3	18	15	3
5.0-6.0	6	40	24	6
6.0-7.0	49	28	42	49
7.0-8.0	25	3	7	25
8.0-9.0	8	1	2	8
9.0-10.0	0	0	1	0
10.0-11.0	1	0	0	1
TOTAL	97	97	97	97

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : .89 (MNRT-24 ) MEAN : 2.09  
ii) Maximum : 5.98 (MNRT-11 ) B.D. : 1.18

## 5) ROOF CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : GSH SUBORDINATE : SHALE  
ii) 3.0 m Column: DOMINANT : DCTLB SUBORDINATE : SHALE

## 6) FLOOR CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : GSH  
ii) 1.0 m Column: DOMINANT : SHALE SUBORDINATE : ARE. SH

TABLE : VI(11) Contd.

7) QUALITY PARAMETERS (ON 60 &amp; RH &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF SRS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	92	3.50	7.70	5.84	.97
ASH (%)	92	28.50	49.50	37.89	3.62
HEV (k.cal/kg)	92	1407.	4070.	2866.	467.
GRADE	92	G	E		
C.V (k.cal/k.g)	4	3400.	4210.	3878.	328.

TABLE : VI(11) Contd.

## 8) DIRT BANDS FOR 97 BHS. CONSIDERED

1) NO. OF BHS DEVOID OF DIRT BANDS. 1 MBRT - 31	
11) NO. OF BHS WITH OBVIOUS DIRT BANDS: 63 MBRT - 4, 5, 9, 10, 11, 13, 15, 17, 18, 19,	
20, 21, 23, 26, 28, 30, 33, 35, 38, 39,	
40, 42, 44, 45, 46, 47, 50, 52, 53, 54,	
55, 56, 57, 58, 62, 63, 64, 67, 69, 71,	
72, 74, 76, 78, 79, 83, 84, 93, 94, 95,	
96, 97, 100, 101, 102	
BT -	1, 2, 3, 5, 9, 10, 12, 13
*MBRT-4	- 1 BAND - .40
*MBRT-5	- 1 BAND - .35
*MBRT-9	- 2 BAND - 1.12
*MBRT-10	- 1 BAND - .58
*MBRT-11	- 1 BAND - .41
*MBRT-13	- 1 BAND - .27
*MBRT-15	- 1 BAND - .16
MBRT-17	- 3 BAND - 1.88
MBRT-18	- 2 BAND - .96
*MBRT-19	- 1 BAND - .45
*MBRT-20	- 1 BAND - .81
*MBRT-21	- 1 BAND - .25
*MBRT-23	- 1 BAND - .80
*MBRT-26	- 1 BAND - .51
*MBRT-28	- 1 BAND - .45
*MBRT-30	- 3 BAND - .95
*MBRT-33	- 1 BAND - .44
MBRT-35	- 5 BAND - 2.54
*MBRT-38	- 1 BAND - .49
MBRT-39	- 2 BAND - .76
*MBRT-40	- 2 BAND - .50
*MBRT-42	- 1 BAND - .45
*MBRT-44	- 2 BAND - .78
*MBRT-45	- 1 BAND - .52
*MBRT-46	- 1 BAND - .41
*MBRT-47	- 1 BAND - .48
*MBRT-50	- 1 BAND - .13
*MBRT-52	- 2 BAND - .63
*MBRT-53	- 2 BAND - .67
*MBRT-54	- 1 BAND - .37
*MBRT-55	- 2 BAND - .54
*MBRT-56	- 1 BAND - .41
*MBRT-57	- 1 BAND - .30
*MBRT-58	- 1 BAND - .32
*MBRT-62	- 2 BAND - .66
*MBRT-63	- 1 BAND - .28
*MBRT-64	- 1 BAND - .46
*MBRT-67	- 1 BAND - .46
*MBRT-69	- 1 BAND - .20
*MBRT-71	- 1 BAND - .26
*MBRT-72	- 1 BAND - .43
*MBRT-74	- 1 BAND - .25
*MBRT-76	- 2 BAND - .56
*MBRT-78	- 1 BAND - .25

TABLE : VI(11) Contd.

*MRT-79	- 1 BAND	- .32
*MRT-83	- 1 BAND	- .25
*MRT-84	- 3 BAND	- .97
*MRT-93	- 2 BAND	- .53
*MRT-94	- 2 BAND	- .38
*MRT-95	- 2 BAND	- 1.13
*MRT-96	- 1 BAND	- .66
*MRT-97	- 1 BAND	- .50
*MRT-100	- 2 BAND	- .82
*MRT-101	- 2 BAND	- .65
*MRT-102	- 1 BAND	- .25
*RT-1	- 1 BAND	- .28
*RT-2	- 2 BAND	- .58
*RT-3	- 2 BAND	- 1.02
*RT-5	- 2 BAND	- .65
*RT-9	- 1 BAND	- .40
*RT-10	- 1 BAND	- .65
*RT-12	- 1 BAND	- .44
*RT-13	- 2 BAND	- .58
111) NO. OF RES WITH CSB BANDS:	92 MRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 19, 20, 21, 23, 24, 25, 26, 27, 28, 30, 32, 33, 34, 38, 40, 41, 42, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 67, 68, 69, 71, 72, 73, 74, 76, 77, 78, 79, 80, 81, 83, 84, 87, 89, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102	
	RT - 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 15	
MRT-1	- 3 BAND	- 1.35
MRT-2	- 3 BAND	- 1.40
MRT-3	- 2 BAND	- 1.11
*MRT-4	- 3 BAND	- .90
*MRT-5	- 4 BAND	- .86
MRT-6	- 4 BAND	- 1.02
MRT-7	- 2 BAND	- 1.05
MRT-8	- 2 BAND	- .90
*MRT-9	- 1 BAND	- .55
*MRT-10	- 1 BAND	- .83
*MRT-11	- 2 BAND	- .72
*MRT-13	- 2 BAND	- .66
MRT-14	- 1 BAND	- .54
*MRT-15	- 5 BAND	- 1.00
MRT-16	- 2 BAND	- .35
*MRT-19	- 4 BAND	- 1.27
*MRT-20	- 3 BAND	- .68
*MRT-21	- 3 BAND	- 1.05
*MRT-23	- 3 BAND	- .51
MRT-24	- 4 BAND	- 1.20
MRT-25	- 1 BAND	- .21
*MRT-26	- 2 BAND	- .49
MRT-27	- 3 BAND	- .90
*MRT-28	- 3 BAND	- .96
*MRT-30	- 2 BAND	- .64
MRT-32	- 3 BAND	- 1.26
*MRT-33	- 2 BAND	- .28
MRT-34	- 2 BAND	- 1.16
*MRT-38	- 1 BAND	- .21

TABLE : VI(11) Contd.

*MRT-40	- 2	BAND	- .65
MRT-41	- 2	BAND	- .64
*MRT-42	- 3	BAND	- .64
*MRT-44	- 2	BAND	- 1.00
*MRT-45	- 2	BAND	- .31
*MRT-46	- 1	BAND	- .22
*MRT-47	- 3	BAND	- .84
MRT-48	- 3	BAND	- 1.80
*MRT-50	- 1	BAND	- .44
MRT-51	- 3	BAND	- 1.00
*MRT-52	- 2	BAND	- .34
*MRT-53	- 4	BAND	- .86
*MRT-54	- 3	BAND	- .95
*MRT-55	- 2	BAND	- .84
*MRT-56	- 3	BAND	- .99
*MRT-57	- 3	BAND	- .90
*MRT-58	- 3	BAND	- .60
MRT-59	- 4	BAND	- 1.28
MRT-60	- 4	BAND	- .89
MRT-61	- 2	BAND	- .50
*MRT-62	- 4	BAND	- .85
*MRT-63	- 3	BAND	- 1.24
*MRT-64	- 4	BAND	- .62
*MRT-67	- 4	BAND	- 1.14
MRT-68	- 2	BAND	- .82
*MRT-69	- 3	BAND	- 1.31
*MRT-71	- 2	BAND	- .76
*MRT-72	- 4	BAND	- 1.68
MRT-73	- 1	BAND	- .38
*MRT-74	- 2	BAND	- .47
*MRT-76	- 1	BAND	- .38
MRT-77	- 3	BAND	- 1.89
*MRT-78	- 3	BAND	- .85
*MRT-79	- 2	BAND	- .56
MRT-80	- 2	BAND	- .70
MRT-81	- 5	BAND	- 1.16
*MRT-83	- 2	BAND	- .42
*MRT-84	- 2	BAND	- .52
MRT-87	- 2	BAND	- 1.06
MRT-89	- 4	BAND	- .91
*MRT-93	- 2	BAND	- .89
*MRT-94	- 3	BAND	- .61
*MRT-95	- 3	BAND	- .62
*MRT-96	- 2	BAND	- .75
*MRT-97	- 2	BAND	- .96
MRT-98	- 2	BAND	- .98
MRT-99	- 1	BAND	- .30
*MRT-100	- 4	BAND	- .62
MRT-101	- 2	BAND	- 0.81
*MRT-102	- 4	BAND	- .74
*RT-1	- 5	BAND	- .90
*RT-2	- 1	BAND	- .14
*RT-3	- 5	BAND	- .79
RT-4	- 5	BAND	- 1.51
*RT-5	- 3	BAND	- .48
RT-6	- 6	BAND	- 1.55
RT-8	- 7	BAND	- 1.56
*RT-9	- 7	BAND	- 2.00

TABLE : VI(11) Contd.

*RT-10	- 3 BAND - .83
RT-11	- 4 BAND - 1.41
*RT-12	- 4 BAND - .74
*RT-13	- 2 BAND - 1.00
RT-15	- 4 BAND - 2.03

9]

1) NO.OF BBS EXCLD.CSB & OB (>0.30M): 88

MVRT - 1,	2,	3,	4,	5,	6,	7,	8,	9,	10,		
	11,	13,	14,	15,	17,	18,	19,	20,	21,	23,	
	24,	26,	27,	28,	30,	32,	33,	34,	35,	38,	
	39,	40,	41,	42,	44,	45,	46,	47,	48,	50,	
	51,	52,	53,	54,	55,	56,	57,	58,	59,	60,	
	62,	63,	64,	67,	68,	69,	71,	72,	73,	76,	
	77,	78,	79,	80,	81,	83,	84,	87,	93,	95,	
	96,	97,	98,	100,	101,	102					
RT - 2,	3,	4,	5,	6,	8,	9,	10,	11,	12,	13,	15

MVRT-1	- 2 BAND - 1.25
MVRT-2	- 2 BAND - 1.20
MVRT-3	- 1 BAND - .83
MVRT-4	- 2 BAND - .90
MVRT-5	- 1 BAND - .48
MVRT-6	- 1 BAND - .41
MVRT-7	- 1 BAND - .85
MVRT-8	- 2 BAND - .90
MVRT-9	- 3 BAND - 1.67
MVRT-10	- 2 BAND - 1.41
MVRT-11	- 3 BAND - 1.13
MVRT-13	- 1 BAND - .48
MVRT-14	- 1 BAND - .54
MVRT-15	- 1 BAND - .43
MVRT-17	- 3 BAND - 1.88
MVRT-18	- 1 BAND - .78
MVRT-19	- 3 BAND - 1.43
MVRT-20	- 1 BAND - .81
MVRT-21	- 1 BAND - .72
MVRT-23	- 1 BAND - .80
MVRT-24	- 2 BAND - .86
MVRT-26	- 1 BAND - .73
MVRT-27	- 2 BAND - .70
MVRT-28	- 2 BAND - 1.18
MVRT-30	- 2 BAND - 1.06
MVRT-32	- 3 BAND - 1.26
MVRT-33	- 1 BAND - .44
MVRT-34	- 1 BAND - .91
MVRT-35	- 3 BAND - 2.25
MVRT-38	- 1 BAND - .49
MVRT-39	- 1 BAND - .68
MVRT-40	- 1 BAND - .55
MVRT-41	- 1 BAND - .49
MVRT-42	- 1 BAND - .45
MVRT-44	- 3 BAND - 1.50
MVRT-45	- 1 BAND - .52
MVRT-46	- 1 BAND - .41
MVRT-47	- 2 BAND - .83
MVRT-48	- 3 BAND - 1.80
MVRT-50	- 1 BAND - .44

TABLE : VI(11) Contd.

MNRT-51	- 1	BAND	- .50
MNRT-52	- 1	BAND	- .45
MNRT-53	- 2	BAND	- .84
MNRT-54	- 2	BAND	- .87
MNRT-55	- 3	BAND	- 1.25
MNRT-56	- 3	BAND	- 1.24
MNRT-57	- 2	BAND	- .71
MNRT-58	- 1	BAND	- .32
MNRT-59	- 2	BAND	- .89
MNRT-60	- 1	BAND	- .44
MNRT-62	- 2	BAND	- .82
MNRT-63	- 2	BAND	- .99
MNRT-64	- 1	BAND	- .46
MNRT-67	- 3	BAND	- 1.17
MNRT-68	- 1	BAND	- .55
MNRT-69	- 3	BAND	- 1.51
MNRT-71	- 1	BAND	- .55
MNRT-72	- 3	BAND	- 1.95
MNRT-73	- 1	BAND	- .38
MNRT-76	- 2	BAND	- .74
MNRT-77	- 3	BAND	- 1.89
MNRT-78	- 1	BAND	- .43
MNRT-79	- 2	BAND	- .70
MNRT-80	- 1	BAND	- .61
MNRT-81	- 1	BAND	- .45
MNRT-83	- 1	BAND	- .47
MNRT-84	- 2	BAND	- .83
MNRT-87	- 1	BAND	- .85
MNRT-93	- 3	BAND	- 1.25
MNRT-95	- 1	BAND	- .88
MNRT-96	- 2	BAND	- 1.26
MNRT-97	- 2	BAND	- 1.46
MNRT-98	- 1	BAND	- .76
MNRT-100	- 1	BAND	- .57
MNRT-101	- 2	BAND	- 1.08
MNRT-102	- 1	BAND	- .40
RT-2	- 1	BAND	- .37
RT-3	- 2	BAND	- 1.02
RT-4	- 2	BAND	- .84
RT-5	- 1	BAND	- .45
RT-6	- 2	BAND	- .90
RT-8	- 1	BAND	- .45
RT-9	- 3	BAND	- 1.75
RT-10	- 2	BAND	- 1.11
RT-11	- 3	BAND	- 1.22
RT-12	- 1	BAND	- .44
RT-13	- 3	BAND	- 1.36
RT-15	- 4	BAND	- 2.03



### 6.13.0 SEAM VI BOTTOM

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 12A to VII 12E
II. Floor contour plan	:	Plate No. IX K
III. Seam folio plan	:	Plate No. X-12
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.13.1 Seam VI Bottom is the bottom split of VI seam occurring in the middle column of coal bearing Barakar formation. It overlies seam V Top with a parting of 2.80 m. to 23.45 m. (mostly the parting is 14.0 m. to 21.0 m.). The seam incrops near Kelo river extending towards west and occur south of BH. Nos. MNRT-91 & 90 and extends upto north of BH No. RT-10 and abut against Fault F1.
- 6.13.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(12) and its graphic representation of various quality parameters of seam is given in fig-12 (i-vii). The seam description in brief is given below.
- 6.13.3 The full seam has been intersected in 92 boreholes. The seam is faulted in 2 BHs, it is not developed in 9 BHs in the SE part of the block and 14 boreholes are located in the up dip region of the seam incrop. The full seam thickness varies from 0.48 m. to 1.75 m. (the prevalent seam thickness is 0.50 to 1.00 m. in 69% of boreholes). The seam attains workable (1.0 to 1.5 m) thickness in 32 BHs (35%). It is not workable (thickness <1.0 m.) in the central strip of the block. Due to topographical variation the incrop of seam is showing swing in the northern part of the block near borehole MNRT-36 & RT-10. The seam roof consists dominantly of shale and its floor consists of shale & local. The seam occurs at depth range of 12.43 m. to 328.50 m. within the block.
- 6.13.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 2.20 % to 9.70 % (prevalent range is 4.00 to 5.0 %) and Ash % varies from 23.50 % to 48.80 % (prevalent range is 30.00 % to 39.00 %). The UHV varies from 1807 to 4939 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). The seam contain dirt bands 1 to 2 nos of Csh bands present in 9 BHs and the seam contains clean coal in 83 boreholes.

**A) Ultimate analysis :** The Ultimate analysis of the seam has been determined for 9 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam VI Bottom**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	41.44	2.31	0.29	0.34	6.76
Maximum	49.06	3.00	0.85	0.64	9.58

**B) Total Sulphur :** The total sulphur for seam VI Bottom has been determined for 8 samples (Annexure VI C). The range of total sulphur is given below.

**Total Sulphur in seam VI Bottom**

Range	Total Sulphur %
Minimum	0.28
Maximum	0.57

**C) Ash analysis :** The ash analysis has been determined for seam VI Bottom for 4 samples and range of results are given below (Annexure VI B)

**Ash Analysis for seam VI Bottom**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	58.01	65.28
Al <sub>2</sub> O <sub>3</sub>	29.06	30.89
Fe <sub>2</sub> O <sub>3</sub>	1.52	7.05
TiO <sub>2</sub>	1.90	2.13
CaO	0.21	0.70
MgO	0.31	0.69
Na <sub>2</sub> O	0.04	0.37
K <sub>2</sub> O	0.06	0.36
SO <sub>3</sub>	0.27	0.70
P <sub>2</sub> O <sub>5</sub>	0.17	0.52

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 2 samples (Annexures VI D).

**Ash Fusion Temperature for seam VI Bottom**

Range	IT	ST	HT	FT
Minimum	> 1450	> 1450	> 1450	> 1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam VI Bottom has been determined for 3 samples and it is <0.03% for all 3 samples.

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' and coke type is 'A' & 'A-B'(Annexure VI F).

**G) HGI :** The HGI for seam VI Bottom is determined for 11 samples. The HGI values varies from 51 to 71 (Annexure VI G).

TABLE : VI (12)  
SEAM : VI BOT

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

1] BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 92 MHRT -1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
11, 12, 13, 14, 16, 17, 18, 19, 20, 21,  
23, 24, 25, 26, 27, 28, 29, 30, 31, 32,  
33, 34, 35, 36, 38, 39, 40, 41, 42, 44,  
45, 46, 47, 48, 50, 51, 52, 53, 54, 55,  
56, 57, 58, 59, 60, 61, 62, 63, 64, 67,  
69, 71, 72, 73, 74, 76, 78, 79, 80, 81,  
83, 84, 87, 89, 93, 94, 95, 97, 99, 100,  
102  
RT- 1, 2, 4, 5, 6, 7, 8, 10, 11, 13, 15

ii) SEAM FAULTED IN BOREHOLES: 2 MHRT 22, 43  
iii) BHS LOCATED UPDIP OF SUBCROP: 14 MHRT 37, 49, 55, 66, 70, 75, 82, 85,  
86, 88, 90, 91, 92, RT-14  
iv) SEAM NOT DEVELOPED : 9 MHRT 15, 68, 77, 96, 98, 101  
RT- 3, 9, 12

2] DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 12.43 (MHRT-39 )  
ii) DEEPEST : 328.50 (MHRT-11 )

3] THICKNESS (M)

a]	SEAM THICKNESS			
	BCS	I-30	I-100	
i) MIN.	.48 (MHRT-27 )	.33 (MHRT-95 )	.48 (MHRT-27 )	.48 (MHRT-27 )
ii) MAX.	1.75 (RT-4 )	1.75 (RT-4 )	1.75 (RT-4 )	1.75 (RT-4 )
iii) MEAN	.94	.93	.94	.94
iv) STD. DEVIATION	.20	.21	.20	.20
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS	NO. OF BHS
<0.5	1	2	1	1
0.5-0.9	43	40	39	39
0.9-1.0	15	21	19	19
1.0-1.2	24	19	23	23
1.2-1.5	8	9	9	9
1.5-2.0	1	1	1	1
TOTAL	92	92	92	92

4] PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 2.80 (MHRT-5 ) MEAN : 17.69  
ii) Maximum : 23.45 (MHRT-79 ) S.D. : 2.90

5] ROOF CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : CSR SUBORDINATE : SHALE  
ii) 3.0 m Column: DOMINANT : SHALE SUBORDINATE : ICAL

6] FLOOR CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : CSR  
ii) 1.0 m Column: DOMINANT : CLAY SUBORDINATE : SHALE

TABLE : VI(12) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-T100)

PARAMETER	NO. OF BHS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	86	2.20	9.70	4.97	1.66
		MRRT-7	MRRT-2		
ASH (%)	86	23.50	48.80	34.69	4.04
		MRRT-12	RT-8		
HEV (k.cal/kg)	86	1807.	4939.	3427.	471.
		RT-8	MRRT-12		
GRADE	86	G	D		
		RT-8	MRRT-12		
C.V (k.cal/k.g)	6	3930.	4890.	4470.	286.
		MRRT-38	MRRT-51		

TABLE : VI(12) Contd.

## 8) DIRT BANDS FOR 92 BBS. CONSIDERED

-----  
 1) NO OF BBS DEVOID OF DIRT BANDS: 83 MERT- 1, 2, 3, 4, 5, 6, 8, 9, 10, 11,  
 12, 13, 14, 17, 18, 19, 20, 21, 23, 25,  
 26, 27, 28, 29, 30, 31, 32, 34, 35, 36,  
 38, 39, 40, 41, 42, 44, 45, 46, 47, 48,  
 50, 51, 52, 53, 54, 55, 56, 57, 58, 59,  
 60, 61, 62, 63, 64, 67, 69, 71, 73, 74,  
 76, 78, 79, 80, 81, 83, 84, 87, 89, 93,  
 94, 97, 99, 100, 102  
 RT - 1, 2, 4, 5, 8, 10, 11, 15

## 11) NO.OF BBS WITH CSR BANDS:

9 MERT - 7, 16, 24, 33, 72, 95  
 RT - 6, 7, 13  
 MERT-7 - 1 BAND - .15  
 MERT-16 - 1 BAND - .16  
 MERT-24 - 1 BAND - .12  
 MERT-33 - 1 BAND - .15  
 MERT-72 - 1 BAND - .13  
 MERT-95 - 2 BAND - .33  
 RT-6 - 1 BAND - .07  
 RT-7 - 2 BAND - .38  
 RT-13 - 1 BAND - .11

## 9) DIRT BANDS DETAIL . M11

#### 6.14.0 SEAM V Top

##### Reference of documentation :

I. Seam structure	:	Plate No. VII 13A to VII 13F
II. Floor contour plan	:	Plate No. IX I.
III. Seam folio plan	:	Plate No. X-13
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.14.1 Seam V Top is a thin seam but occur separately and distinctly throughout the block as top split of V seam. It overlies seam V Mid is a parting of 9.09 m. to 18.94 m. (prevalent 11.5 – 18.5 m.) The seam incrops near Kelo river north of BH. No. MNRT-91 & 88 in the eastern part of the block extending westward, north of BH. No. MNRT-37 near fault F1. Further west the seam is not incropping within the block.
- 6.14.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(13) and the graphic representation of various quality parameters of seam is given in fig-13 (i-vii). The seam description in brief is given below.
- 6.14.3 The full seam has been intersected in 106 boreholes. The seam is faulted in 2 BHs. and 9 BHs are located in the up dip region of the seam incrop. The full seam thickness varies from 0.50 m. to 3.09 m. (the prevalent seam thickness is 0.50 to 1.50 m. in 95% of boreholes). The seam is not workable (thickness <1.0m) in the central part of the block. Due to topographical variation the incrop of seam is showing swing in the northern part of the block near borehole MNRT-36 & RT-10. The roof of seam consists dominantly of carb shale / clay and its floor consists of shale. The seam occurs at depth range of 12.44 m. to 347.15 m. within the block.
- 6.14.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.40 % to 8.60 % (prevalent M% is 3.0 to 6.0 %) and Ash % varies from 19.20 % to 47.40 % (prevalent range is 25.00 % to 34.00 %). The UHV varies from 1959 to 5892 K.Cal/Kg. The seam grade is G to B (prevalent grade is E & D). The seam improves its grade to D to B in the central part of the block near boreholes MNRT-17, 18, 20, 12. Mostly the seam is dirt bands free and one carbshale / obvious dirt hand is present in 9 BHs.

**A) Ultimate analysis :** The Ultimate analysis of the seam has been determined for 13 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam V Top**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	32.98	1.89	0.37	0.43	4.63
Maximum	54.34	3.12	1.15	1.87	10.49

**B) Total Sulphur :** The total sulphur for seam V Top has been determined for 10 samples (Annexure VI C). The total sulphur range is given below. The sulphur distribution is not analysed as total sulphur is low in north of the samples analysed for the seam.

**Total Sulphur for seam V Top**

Range	Total Sulphur %
Minimum	0.36
Maximum	1.10

**C) Ash analysis :** The ash analysis has been determined for seam V Top for 3 samples and the result are given below (Annexure VI B)

**Ash Analysis for seam V Top**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	54.52	59.45
Al <sub>2</sub> O <sub>3</sub>	27.42	29.66
Fe <sub>2</sub> O <sub>3</sub>	6.19	11.87
TiO <sub>2</sub>	1.70	1.97
CaO	0.25	0.80
MgO	0.45	0.65
Na <sub>2</sub> O	0.13	0.18
K <sub>2</sub> O	0.11	0.43
SO <sub>3</sub>	0.18	0.79
P <sub>2</sub> O <sub>5</sub>	0.26	0.48



**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 2 samples (Annexures VI D).

**Ash Fusion Temperature for seam V Top**

Range	IT	ST	HT	FT
Minimum	> 1450	> 1450	> 1450	> 1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam V Top has been determined for 3 samples and it is <0.03 to 0.03% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for three sample. The swelling index is '0' & 0.5 and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam V Top is determined for 4 samples. The HGI values varies from 48 to 57 (Annexure VI G).

TABLE : VI (13)

SEAM : V TOP

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 106 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
 11, 12, 13, 14, 15, 16, 17, 18, 19, 20,  
 21, 22, 23, 24, 25, 26, 27, 28, 29, 30,  
 31, 32, 33, 34, 35, 36, 37, 38, 39, 40,  
 41, 42, 44, 45, 46, 47, 48, 50, 51, 52,  
 53, 54, 55, 56, 57, 58, 59, 60, 61, 62,  
 63, 64, 67, 68, 69, 71, 72, 73, 74, 75,  
 76, 77, 78, 79, 80, 81, 82, 84, 87, 88,  
 89, 90, 91, 93, 94, 95, 96, 97, 98, 99,  
 100, 101, 102

RT - 1, 2, 3, 5, 6, 7, 8, 9, 10, 11,  
 12, 13, 15

ii) SEAM FAULTED IN BOREHOLES: 2 MNRT - 43, RT - 4

iii) BS LOCATED UPDIP OF SUBCROP: 9 MNRT - 49, 65, 66, 70, 82, 85, 86, 92, RT - 14

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 12.44 (MNRT-88 )  
 ii) DEEPEST : 347.15 (MNRT-62 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.50 (MNRT-93 )	.50 (MNRT-93 )	.50 (MNRT-93 )	.50 (MNRT-93 )
ii) MAX.	3.09 (MNRT-62 )	2.33 (MNRT-62 )	2.36 (MNRT-24 )	3.09 (MNRT-62 )
iii) MEAN	1.05	1.03	1.04	1.05
iv) STD. DEVIATION	.35	.27	.28	.35
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
0.5-0.9	30	25	24	24
0.9-1.0	19	24	25	25
1.0-1.2	39	40	39	39
1.2-1.5	12	12	13	12
1.5-2.0	4	3	3	4
2.0-2.5	0	2	2	0
2.5-3.0	1	0	0	1
3.0-3.5	1	0	0	1
TOTAL	106	106	106	106

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 9.25 (MNRT-53 ) MEAN : 14.68  
 ii) Maximum : 20.92 (MNRT-21 ) S.D. : 2.66

TABLE : VI(13) Contd.

## 5) ROOF CHARACTERISTICS :

-----		
i) IMMEDIATE :	DOMINANT : GSH	SUBORDINATE : SHALE
ii) 3.0 m Column:	DOMINANT : CLAY	SUBORDINATE : SHALE

## 6) FLOOR CHARACTERISTICS :

-----		
i) IMMEDIATE :	DOMINANT : SHALE	SUBORDINATE : GSH
ii) 1.0 m Column:	DOMINANT : CLAY	SUBORDINATE : ARE. SH

TABLE : VI(13) Contd.

7] QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BHS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	101	1.40	8.60	4.60	1.55
ASH (%)	101	19.20	47.40	32.27	5.10
UHV (k.cal/kg)	101	1959.	5892.	3812.	698.
GRADE	101	G	B		
C.V (k.cal/k.g)	7	4000.	5136.	4665.	399.

TABLE : VI(13) Contd.

## 8] DIRT BANDS FOR 106 BHS. CONSIDERED

-----	
1) NO.OF BHS DEVOID OF DIRT BANDS: 97	MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40, 41, 42, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 63, 64, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 83, 87, 88, 89, 90, 91, 93, 94, 95, 97, 98, 99, 100, 101
	RT - 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15
11) NO.OF BHS WITH OBVIOUS DIRT BANDS: 3	MNRT - 16, 24, 39
	MNRT-16 - 1 BAND - .06
	*MNRT-24 - 1 BAND - .51
	MNRT-39 - 1 BAND - .08
111) NO.OF BHS WITH CSR BANDS: 7	MNRT - 24, 61, 62, 67, 84, 96, 102
	*MNRT-24 - 1 BAND - .13
	MNRT-61 - 1 BAND - .13
	MNRT-62 - 1 BAND - .76
	MNRT-67 - 1 BAND - .23
	MNRT-84 - 1 BAND - .32
	MNRT-96 - 1 BAND - .15
	MNRT-102 - 1 BAND - .28
9]	
1) NO.OF BHS EXCLD.CSH & CS (>0.30H): 3	MNRT - 24, 62, 84
	MNRT-24 - 1 BAND - .51
	MNRT-62 - 1 BAND - .76
	MNRT-84 - 1 BAND - .32

### 6.15.0 SEAM V Middle

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 14A to VII 14F
II. Floor contour plan	:	Plate No. IX M
III. Seam folio plan	:	Plate No. X-14
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.15.1 Seam V Middle is a thin seam and it has attained workable thickness of >1.0 m. in patches. It overlies seam V B with a parting of 4.55 m. to 15.95 m. The seam incrops near Kelo river in the east and extends northwest wards around BH. Nos. MNRT-49 & 70. Further west the seam incrops outside the block boundary.
- 6.15.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(14) and the graphic representation of various quality parameters of seam is given in fig-14 (i-vii). The seam description in brief is given below.
- 6.15.3 The full seam has been intersected in 107 boreholes. The seam is faulted in 3 BHs. The seam is not developed in BH No. MNRT-49 and 5 BHs are located in the up dip region of the seam incrop. The full seam thickness varies from 0.15 m. to 3.73 m. (the prevalent seam thickness is 0.50 to 2.50 m. in 93% of boreholes). The seam is not workable (thickness <1.0 m.) over a considerable area in the central part of the block near incrop region in the eastern part of the block. The seam roof consists dominantly of shale and its floor consists of carbshale/shale. The seam occurs at depth range of 15.57 m. to 360.80 m. within the block.
- 6.15.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.90 % to 8.70 % (prevalent M% is 4.0 to 7.0 %) and Ash % varies from 25.0 % to 52.10 % (prevalent range is 30.00 % to 38.00 %). The UHV varies from 1324 to 49.39 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). The seam contains dirt hands, 1 to 2 Nos., in 52 BHs and it is devoid of dirt hands in 55 BHs.

A) **Ultimate analysis** : The Ultimate analysis of the seam has been determined for 11 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam V Middle**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	38.50	2.49	0.36	0.20	6.86
Maximum	50.37	3.13	1.07	0.48	9.68

B) **Total Sulphur** : The total sulphur for seam V Middle has been determined in 10 samples (Annexure VI C). The total sulphur range is given below.

**Total Sulphur for seam V Middle**

Range	Total Sulphur %
Minimum	0.28
Maximum	0.86

C) **Ash analysis** : The ash analysis has been determined for seam V Middle for 5 samples and the result are given below (Annexure VI B)

**Ash Analysis for seam V Middle**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	20.88	63.38
Al <sub>2</sub> O <sub>3</sub>	15.36	28.28
Fe <sub>2</sub> O <sub>3</sub>	7.80	58.12
TiO <sub>2</sub>	0.46	1.95
CaO	0.32	0.67
MgO	0.46	1.80
Na <sub>2</sub> O	0.10	0.36
K <sub>2</sub> O	0.07	0.36
SO <sub>3</sub>	0.17	0.61
P <sub>2</sub> O <sub>5</sub>	0.34	1.04

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 3 samples (Annexures VI D).

**Ash Fusion Temperature for seam V Middle**

Range	IT	ST	HT	FT
Minimum	1368	1388	1392	1410
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam V Middle has been determined for 3 samples and it is 0.04 to 0.16% (Annexure-VI E)

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' and coke type is 'A' & 'A-B'(Annexure VI F).

**G) HGI :** The HGI for seam V Middle is determined for 9 samples. The HGI values varies from 54 to 77 (Annexure-VI G).



TABLE : VI(14)

SEAM : V MID

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 107 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102  
RT - 1, 2, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15

i) SEAM FAULTED IN BOREHOLES: 3 MNRT - 11, 43, RT - 4  
iii) BH LOCATED UPDIP OF SUBCROP: 5 MNRT - 65, 66, 82, 83, RT - 14  
iv) SEAM NOT DEVELOPED : 1 MNRT - 49, RT-3

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 15.57 (MNRT-70 )  
ii) DEEPEST : 360.80 (MNRT-62 )

## 3) THICKNESS (M)

*)	SEAM THICKNESS			
	BCH	I-30	I-100	
i) MIN.	.15 (MNRT-6 )	.15 (MNRT-6)	.15 (MNRT-6)	.15 (MNRT-6 )
ii) MAX.	3.73 (MNRT-100)	2.69 (MNRT-35 )	2.80 (MNRT-102)	3.73 (MNRT-100)
iii) MEAN	1.32	1.16	1.24	1.32
iv) STD.DEVIATION	.65	.47	.50	.65
b) THICK. RANGE (m)	NO. OF BKS	NO. OF BKS	NO. OF BKS.	NO. OF BKS.
<0.5	2	2	2	2
0.5-0.9	31	29	26	26
0.9-1.0	5	14	10	10
1.0-1.2	18	19	17	17
1.2-1.5	20	21	22	21
1.5-2.0	16	15	23	16
2.0-2.5	9	2	2	9
2.5-3.0	0	5	5	0
3.0-3.5	5	0	0	5
3.5-4.0	1	0	0	1
TOTAL	107	107	107	107

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 4.55 (MNRT-94 ) MEAN : 9.07  
ii) Maximum : 15.75 (MNRT-89 ) S.D. : 2.94

TABLE : VI(14) Contd.

## 5] ROOF CHARACTERISTICS :

-----  
 i] IMMEDIATE : DOMINANT : SHALE SUBORDINATE : CSH  
 ii] 3.0 m Column: DOMINANT : SHALE SUBORDINATE : CLAY

## 6] FLOOR CHARACTERISTICS :

-----  
 i] IMMEDIATE : DOMINANT : SHALE SUBORDINATE : CSH  
 ii] 1.0 m Column: DOMINANT : SHALE SUBORDINATE : SHALE

TABLE : VI (14) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BBS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	100	1.90	8.70	4.91	1.62
		MBRT-59	MBRT-53		
ASH (%)	100	21.30	52.10	37.03	7.16
		MBRT-10	MBRT-52		
HEV (k.cal/kg)	100	1324.	4939.	3113.	933.
		MBRT-52	MBRT-101		
GRADE	98	G	C		
		MBRT-37	MBRT-101		
C.V (k.cal/k.g)	8	3010.	4820.	3923.	636.
		MBRT-84	MBRT-26		

TABLE : VI (14) Contd.

## B) DIRT BANDS FOR 107 BHS. CONSIDERED

i) NO.OF BHS DEVOID OF DIRT BANDS: 55		MMRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,
		12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 24,
		25, 32, 33, 38, 40, 46, 48, 50, 54, 55,
		56, 57, 58, 61, 74, 75, 76, 77, 79, 80,
		86, 87, 90, 91, 92, 93, 96, 97, 99
	RT - 1, 2, 5, 6, 9	
ii) NO.OF BHS WITH OBVIOUS DIRT BANDS: 24		MMRT - 17, 28, 30, 31, 36, 37, 44, 45, 47, 52,
		59, 67, 70, 72, 73, 78, 81, 83, 84, 94,
		95, 100, 102, RT - 3
MMRT-17	- 1 BAND	- .17
MMRT-28	- 1 BAND	- .10
MMRT-30	- 1 BAND	- .13
MMRT-31	- 1 BAND	- .09
*MMRT-36	- 1 BAND	- .05
MMRT-37	- 1 BAND	- .15
*MMRT-44	- 1 BAND	- .17
*MMRT-45	- 1 BAND	- .50
MMRT-47	- 1 BAND	- .17
*MMRT-52	- 1 BAND	- .52
*MMRT-59	- 1 BAND	- .66
MMRT-67	- 2 BAND	- .64
MMRT-70	- 1 BAND	- .25
MMRT-72	- 1 BAND	- .53
MMRT-73	- 1 BAND	- .50
MMRT-78	- 1 BAND	- .50
*MMRT-81	- 1 BAND	- .51
*MMRT-83	- 1 BAND	- .61
*MMRT-84	- 1 BAND	- .31
*MMRT-94	- 1 BAND	- .33
*MMRT-95	- 1 BAND	- .32
*MMRT-100	- 2 BAND	- .99
*MMRT-102	- 1 BAND	- .39
*RT-3	- 1 BAND	- .52
iii) NO.OF BHS WITH CSN BANDS: 42		MMRT - 23, 26, 27, 29, 34, 35, 36, 39, 41, 42,
		44, 45, 51, 52, 53, 59, 60, 62, 63, 64,
		68, 69, 71, 81, 83, 84, 88, 89, 94, 95,
		98, 100, 101, 102
	RT - 3, 7, 8, 10, 11, 12, 13, 15	
MMRT-23	- 2 BAND	- .25
MMRT-26	- 1 BAND	- .18
MMRT-27	- 2 BAND	- .30
MMRT-29	- 1 BAND	- .10
MMRT-34	- 1 BAND	- .10
MMRT-35	- 1 BAND	- .31
*MMRT-36	- 1 BAND	- .11
MMRT-39	- 1 BAND	- .28
MMRT-41	- 1 BAND	- .18
MMRT-42	- 1 BAND	- .22
*MMRT-44	- 1 BAND	- .14
*MMRT-45	- 1 BAND	- .15
MMRT-51	- 2 BAND	- .22
*MMRT-52	- 2 BAND	- .26
MMRT-53	- 1 BAND	- .16

TABLE : VI(14) Contd.

*MRT-59	- 1 BAND	- .08
MRT-60	- 1 BAND	- .07
MRT-62	- 1 BAND	- .15
MRT-63	- 1 BAND	- .14
MRT-64	- 2 BAND	- .27
MRT-68	- 1 BAND	- .15
MRT-69	- 1 BAND	- .39
MRT-71	- 1 BAND	- .50
*MRT-81	- 1 BAND	- .31
*MRT-83	- 1 BAND	- .20
*MRT-84	- 1 BAND	- .17
MRT-88	- 1 BAND	- .22
MRT-89	- 1 BAND	- .15
*MRT-94	- 2 BAND	- .19
*MRT-95	- 2 BAND	- .20
MRT-98	- 1 BAND	- .09
*MRT-100	- 1 BAND	- .16
MRT-101	- 1 BAND	- .86
*MRT-102	- 1 BAND	- .16
*RT-3	- 3 BAND	- .49
RT-7	- 1 BAND	- .16
RT-8	- 1 BAND	- .13
RT-10	- 1 BAND	- .10
RT-11	- 1 BAND	- .13
RT-12	- 1 BAND	- .15
RT-13	- 1 BAND	- .14
RT-15	- 1 BAND	- .13

9]

1) NO OF BRS EXCLD.CSH & OB (>0.30M): 18 MRT = 35, 45, 52, 59, 67, 69, 71, 72, 73, 78,  
81, 89, 84, 94, 95, 100, 102

RT = 3

MRT-35	- 1 BAND	- .31
MRT-45	- 1 BAND	- .50
MRT-52	- 1 BAND	- .52
MRT-59	- 1 BAND	- .66
MRT-67	- 1 BAND	- .43
MRT-69	- 1 BAND	- .39
MRT-71	- 1 BAND	- .50
MRT-72	- 1 BAND	- .53
MRT-73	- 1 BAND	- .50
MRT-78	- 1 BAND	- .50
MRT-81	- 2 BAND	- .82
MRT-83	- 1 BAND	- .61
MRT-84	- 1 BAND	- .31
MRT-94	- 1 BAND	- .42
MRT-95	- 1 BAND	- .32
MRT-100	- 2 BAND	- .99
MRT-102	- 1 BAND	- .39
RT-3	- 1 BAND	- .52

### 6.16.0 SEAM V Bottom

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 15A to VII 15F
II. Floor contour plan	:	Plate No. IX N
III. Seam folio plan	:	Plate No. X-15
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.16.1 Seam V Bottom is the bottom split of V seam which occurs distinctly and separately throughout the block. It overlies seam IV Top with a parting of 15.16 m. to 30.14 m (mostly the parting is 17.0 to 23.0 m). The seam incrops in the northern part of the block near BH. Nos. MNRT-86 & RT-14 and it is not incropping elsewhere within the block.
- 6.16.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(15) and the graphic representation of various quality parameters of seam is given in fig-15 (i-vii). The seam description in brief is given below.
- 6.16.3 The full seam has been intersected in 109 boreholes. The seam is faulted and part faulted in 3 BHs and 5 BHs are located in the up dip region of the seam incrop. The full seam thickness varies from 0.30 m. to 5.40 m. (the prevalent seam thickness is 0.50 to 2.0 m. in 88% of boreholes). The seam has <1.0 m. thickness in 40 boreholes (37%) in the central and south central part of the block around BHs MNRT-16, 17, 18, 21 and 35. It has attained workable thickness of >1.0 m. in 68 BHs (63%). The seam thickness has increased to >2.0 m. in 13 BHs (12%) in the east around boreholes MNRT-76 & 94 and in southern part around BHs MNRT-50 & 100. The seam roof consists dominantly of shale and its floor consists of shale and clay. The seam occurs at depth range of 22.96 m. to 377.90 m. within the block.
- 6.15.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.70 % to 8.90 % (prevalent M% is 2.0 to 6.0 %) and Ash % varies from 23.50% to 51.9% (prevalent range is 30.00 % to 47.00 %). The UHV varies from 1324 to 4939 K.Cal/Kg. The seam grade is G to D (prevalent grade is G & F). The seam contains 1 to 5 nos. dirt bands in 72 BHs and it contain clean coal in 37 BHs

**A) Ultimate analysis :** The Ultimate analysis of the seam has been determined for 14 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam V Bottom**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	28.62	1.58	0.39	0.28	2.94
Maximum	51.89	3.27	1.15	0.76	11.48

**B) Total Sulphur :** The total sulphur for seam V Bottom has been determined for 9 samples (Annexure VI C). The total sulphur range is given below.

**Total Sulphur in seam V Bottom**

Range	Total Sulphur %
Minimum	0.19
Maximum	0.69

**C) Ash analysis :** The ash analysis has been determined for seam V Bottom in 5 samples and the result are given below (Annexure VI B)

**Ash Analysis for seam V Bottom**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	37.24	72.46
Al <sub>2</sub> O <sub>3</sub>	11.68	27.98
Fe <sub>2</sub> O <sub>3</sub>	1.24	41.74
TiO <sub>2</sub>	0.76	1.89
CaO	0.11	0.88
MgO	0.39	0.86
Na <sub>2</sub> O	0.13	.47
K <sub>2</sub> O	0.11	0.29
SO <sub>3</sub>	0.12	0.43
P <sub>2</sub> O <sub>5</sub>	0.10	0.71

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature of the seam has been determined for 1 sample (Annexure VI D).

**Ash Fusion Temperature for seam V Bottom**

IT	ST	HT	FT
>1450	>1450	>1450	>1450

**E) Phosphorous :** The Phosphorous content of seam V M has been determined for 3 sample and it is 0.03 to 0.05% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' & 0.5 and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam V Bottom is determined for 7 samples. The HGI values varies from 52 to 71 (Annexure VI G).



TABLE : VI(15)

SEAM : V BOT

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

- i) FULL SEAM INTERSECTION: 109 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21,  
22, 23, 24, 25, 26, 27, 28, 29, 30, 32,  
33, 34, 35, 36, 37, 38, 39, 40, 41, 42,  
44, 45, 46, 47, 48, 49, 50, 51, 52, 53,  
54, 55, 56, 57, 58, 59, 60, 61, 62, 63,  
64, 67, 68, 69, 70, 71, 72, 73, 74, 75,  
76, 77, 78, 79, 80, 81, 83, 84, 86, 87,  
88, 89, 90, 91, 92, 93, 94, 95, 96, 97,  
98, 99, 100, 101, 102  
RT - 1, 2, 3, 5, 6, 7, 8, 9, 10,  
11, 12, 13, 15  
ii) SEAM FAULTED IN BOREHOLES: 2 MNRT- 43, RT - 4  
iii) SEAM PART FAULTED IN BHS.: 1 MNRT- 31  
iv) BH LOCATED UPDIP OF SUBCROP: 3 MNRT- 65, 66, 82, 83, RT - 14

## 2) DEPTH RANGE (FLOOR) (M)

- i) SHALLOWEST : 22.96 (MNRT-70 )  
ii) DEEPEST : 377.90 (MNRT-62 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.30 (RT-10 )	.30 (RT-10 )	.30 (RT-10 )	.30 (RT-10 )
ii) MAX.	5.40 (MNRT-100)	4.77 (MNRT-87)	4.77 (MNRT-87 )	4.77 (MNRT-87 )
iii) MEAN	1.51	1.22	1.35	1.49
iv) STD. DEVIATION	1.08	.77	.86	1.03
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
<0.5	5	5	5	5
0.5-0.9	38	40	38	38
0.9-1.0	1	6	3	1
1.0-1.2	4	15	10	4
1.2-1.5	16	24	19	16
1.5-2.0	31	7	21	31
2.0-2.5	1	3	3	1
2.5-3.0	3	3	1	4
3.0-3.5	0	1	4	0
3.5-4.0	2	1	2	1
4.0-5.0	7	2	3	8
5.0-6.0	1	0	0	0
TOTAL	109	109	109	109

## 4) PARTING WITH THE UNDERLYING SEAM :

- i) Minimum : 15.16 (MNRT-67 ) MEAN : 20.88  
ii) Maximum : 30.14 (MNRT-80 ) S.D. : 2.95

TABLE : VI(15) Contd.

5] ROOF CHARACTERISTICS :		
-----		
i] IMMEDIATE :	DOMINANT : GSH	SUBORDINATE : SHALE
ii] 3.0 m Colonnade:	DOMINANT : SHALE	SUBORDINATE : CLAY
6] FLOOR CHARACTERISTICS :		
-----		
i] IMMEDIATE :	DOMINANT : SHALE	SUBORDINATE : GSH
ii] 1.0 m Colonnade:	DOMINANT : SHALE	SUBORDINATE : CLAY

TABLE : VI(15) Contd.

## 7] QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BBS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	99	1.70 MNRT-24	8.90 MNRT-53	4.34	1.65
ASH (%)	99	23.50 MNRT-96	51.90 MNRT-47	39.85	6.56
UHV (k.cal/kg)	99	1324. MNRT-47	4939. MNRT-96	2802.	824.
GRADE	99	G MNRT-2	D MNRT-15		
C.V (k.cal/k.g)	7	2780. MNRT-50	4770. MNRT-84	3819.	677.

TABLE : VI(15) Contd.

ii) DIRT BANDS FOR 100 BHS. CONSIDERED	
-----	
i) NO OF BHS DEVOID OF DIRT BANDS: 37	MMRY - 7, 9, 9, 11, 12, 13, 14, 15, 17, 19, 21, 22, 25, 27, 35, 36, 38, 41, 42, 52, 53, 59, 63, 73, 75, 79, 80, 84, 87, 96, 101 RT - 5, 7, 8, 10, 15
ii) NO. OF BHS WITH DEVOIDS DIRTY BANDS: 22	MMRY-5, 6, 18, 24, 28, 30, 39, 46, 47, 50, 56, 76, 81, 86, 88, 92, 94, 95, 100, 102 RT - 2, 9 *MMRY-5 - 1 BAND - .10 *MMRY-6 - 1 BAND - .12 MMRY-18 - 1 BAND - .10 *MMRY-24 - 1 BAND - .12 MMRY-28 - 1 BAND - .29 MMRY-30 - 1 BAND - .13 MMRY-39 - 1 BAND - .10 MMRY-46 - 1 BAND - .56 MMRY-47 - 2 BAND - 1.16 *MMRY-50 - 1 BAND - 1.01 *MMRY-56 - 2 BAND - .81 *MMRY-76 - 2 BAND - .84 *MMRY-81 - 2 BAND - 1.03 MMRY-86 - 1 BAND - .17 MMRY-88 - 1 BAND - .26 MMRY-92 - 1 BAND - .25 *MMRY-94 - 1 BAND - .92 *MMRY-95 - 1 BAND - .94 MMRY-100 - 1 BAND - 1.23 *MMRY-102 - 1 BAND - .97 *RT-2 - 1 BAND - .12 *RT-9 - 1 BAND - .11
iii) NO. OF BHS WITH CSU BANDS: 62	MMRY - 1, 2, 3, 4, 5, 6, 10, 16, 23, 24, 26, 29, 32, 33, 34, 37, 40, 44, 45, 48, 49, 50, 51, 54, 55, 56, 57, 58, 60, 61, 62, 64, 67, 69, 69, 70, 71, 72, 74, 76, 77, 78, 81, 83, 89, 90, 91, 93, 94, 95, 97, 98, 99, 102 RT - 1, 2, 3, 6, 9, 11, 12, 13 MMRY-1 - 1 BAND - .30 MMRY-2 - 1 BAND - .28 MMRY-3 - 1 BAND - .40 MMRY-4 - 2 BAND - .35 *MMRY-5 - 4 BAND - 2.00 *MMRY-6 - 4 BAND - 1.35 MMRY-10 - 1 BAND - .41 MMRY-16 - 1 BAND - .15 MMRY-23 - 1 BAND - .10 *MMRY-24 - 4 BAND - .69 MMRY-26 - 1 BAND - .09 MMRY-29 - 1 BAND - .10 MMRY-32 - 1 BAND - .37 MMRY-33 - 1 BAND - .09 MMRY-34 - 1 BAND - .12

TABLE : VI(15) Contd.

MMRT-37	- 1 BAND	- .10
MMRT-40	- 1 BAND	- .36
MMRT-44	- 1 BAND	- .23
MMRT-45	- 2 BAND	- .57
MMRT-48	- 1 BAND	- .36
MMRT-49	- 1 BAND	- .20
*MMRT-50	- 1 BAND	- .25
MMRT-51	- 3 BAND	- .49
MMRT-54	- 1 BAND	- .29
MMRT-55	- 1 BAND	- .31
*MMRT-56	- 1 BAND	- .29
MMRT-57	- 1 BAND	- .34
MMRT-58	- 1 BAND	- .26
MMRT-60	- 1 BAND	- .31
MMRT-61	- 1 BAND	- .11
MMRT-62	- 1 BAND	- .91
MMRT-64	- 1 BAND	- .30
MMRT-67	- 1 BAND	- .09
MMRT-68	- 1 BAND	- .38
MMRT-69	- 1 BAND	- .26
MMRT-70	- 1 BAND	- .19
MMRT-71	- 1 BAND	- .18
MMRT-72	- 1 BAND	- .40
MMRT-74	- 1 BAND	- .34
*MMRT-76	- 1 BAND	- .26
MMRT-77	- 2 BAND	- .44
MMRT-78	- 1 BAND	- .35
*MMRT-81	- 2 BAND	- .66
MMRT-83	- 1 BAND	- .32
MMRT-89	- 1 BAND	- .50
MMRT-90	- 1 BAND	- .16
MMRT-91	- 1 BAND	- .26
MMRT-93	- 1 BAND	- .14
*MMRT-94	- 3 BAND	- .61
*MMRT-95	- 4 BAND	- .61
MMRT-97	- 1 BAND	- .39
MMRT-98	- 1 BAND	- .17
MMRT-99	- 1 BAND	- .20
*MMRT-102	- 3 BAND	- .51
RT-1	- 2 BAND	- .18
*RT-2	- 3 BAND	- .55
RT-3	- 4 BAND	- .78
RT-6	- 1 BAND	- .30
*RT-9	- 2 BAND	- .37
RT-11	- 1 BAND	- .40
RT-12	- 1 BAND	- .41
RT-13	- 1 BAND	- .34

9]

i) NO. OF BMS EXCLD. CSH & OB (>0.30M) : 31 MMRT- 3, 6, 10, 24, 32, 40, 46, 47,  
48, 50, 55, 56, 57, 60, 62, 68, 72, 74,  
76, 78, 81, 83, 89, 94, 95, 97, 100, 102  
RT - 11, 12, 13,

TABLE : VI(15) Contd.

KNRT-3	- 1	BAND	- .40
KNRT-6	- 1	BAND	- .90
KNRT-10	- 1	BAND	- .41
KNRT-24	- 1	BAND	- .37
KNRT-32	- 1	BAND	- .37
KNRT-40	- 1	BAND	- .36
KNRT-46	- 1	BAND	- .56
KNRT-47	- 2	BAND	- 1.16
KNRT-48	- 1	BAND	- .36
KNRT-50	- 1	BAND	- 1.01
KNRT-55	- 1	BAND	- .31
KNRT-56	- 1	BAND	- .70
KNRT-57	- 1	BAND	- .34
KNRT-60	- 1	BAND	- .31
KNRT-62	- 1	BAND	- .41
KNRT-68	- 1	BAND	- .38
KNRT-72	- 1	BAND	- .40
KNRT-74	- 1	BAND	- .34
KNRT-76	- 1	BAND	- .60
KNRT-78	- 1	BAND	- .35
KNRT-81	- 2	BAND	- 1.29
KNRT-83	- 1	BAND	- .32
KNRT-89	- 1	BAND	- .50
KNRT-94	- 1	BAND	- .92
KNRT-95	- 1	BAND	- .94
KNRT-97	- 1	BAND	- .39
KNRT-100	- 1	BAND	- 1.23
KNRT-102	- 1	BAND	- .97
RT-11	- 1	BAND	- .40
RT-12	- 1	BAND	- .41
RT-13	- 1	BAND	- .34
11) NO.OF BBS EXCLD.CSR + OB(>1.04) : 2	KNRT-50,	100	
	KNRT-50	- 1	BAND - 1.01
	KNRT-100	- 1	BAND - 1.23

### 6.17.0 SEAM IV Top

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 16A to VII 16F
II. Floor contour plan	:	Plate No. IX O
III. Seam folio plan	:	Plate No. X-16
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.17.1 Seam IV Top is a top split of IV seam, occurring distinctly & separately in the middle column of coal bearing Barakar formation. It overlies seam IV Middle with a parting of 5.30 m. to 20.13 m. (mostly the parting is 6.0 to 10.0 m). The seam incrops in the northern part of the block near BH. Nos. MNRT-65 and 85.

6.17.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(16) and the graphic representation of various quality parameters of seam is given in fig-16 (i-vii). The seam description in brief is given below.

6.17.3 The full seam has been intersected in 110 boreholes. The seam is faulted and part faulted in 3 BHs and 3 BHs are located in the up dip region of the seam incrop. The full seam thickness varies from 0.45 m. to 5.78 m. (the prevalent seam thickness is 2.00 to 5.0 m. in 65% of boreholes). The seam thickness reduce to <1.0 m in 16 BHS (15%) in scattered parts of the block. Elsewhere it has attained workable thickness of >1.0m. The seam roof consists dominantly of clay/shale and its floor consists of shale. The seam occurs at depth range of 10.87 m to 405.19 m within the block.

6.17.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.30 % to 2.1 % (prevalent M% is 3.0 to 6.0 %) and Ash % varies from 27.50% to 52.60% (prevalent range is 40.00 % to 45.00 %). The UHV varies from 1324 to 4387 K.Cal/Kg. The seam grade is G to D (prevalent grade is G & F). Invariably the seam contain carbshale / obvious bands of 1 to 6 Nos in majority of BHs. The seam has clean coal in 17 BHs only.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 19 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam IV Top**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	35.13	1.14	0.39	0.21	3.01
Maximum	52.20	3.09	0.95	0.46	13.61

**B) Total Sulphur :** The total sulphur for seam IV Top has been determined for 10 samples (Annexure VI C). The total sulphur range is given below.

**Total Sulphur for seam IV Top**

Range	Total Sulphur
Minimum	0.26
Maximum	0.53

**C) Ash analysis :** The ash analysis has been determined for seam IV Top for 4 samples and the result are given below (Annexure VI B)

**Range of Ash Analysis for seam IV Top**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	61.34	66.56
Al <sub>2</sub> O <sub>3</sub>	24.01	26.24
Fe <sub>2</sub> O <sub>3</sub>	3.63	10.82
TiO <sub>2</sub>	1.50	1.54
CaO	0.22	0.30
MgO	0.40	0.56
Na <sub>2</sub> O	0.09	0.14
K <sub>2</sub> O	0.09	0.42
SO <sub>3</sub>	0.05	0.34
P <sub>2</sub> O <sub>5</sub>	0.13	0.21



**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 3 samples (Annexure VI D).

**Ash Fusion Temperature Range for seam IV Top**

Range	IT	ST	HT	FT
Minimum	1443	>1450	<1450	>1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam IV Top has been determined for 4 samples and it is <0.03 to 0.06% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 6 samples. The swelling index is '0' & 0.5 and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam IV Top is determined for 8 samples. The HGI values varies from 55 to 74 (Annexure VI G).

TABLE : VI (16)

SEAM : IV TOP

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 110 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,  
23, 24, 25, 26, 27, 28, 29, 32, 33, 34,  
35, 36, 37, 38, 39, 40, 41, 42, 43, 44,  
45, 46, 47, 48, 49, 50, 51, 52, 53, 54,  
55, 56, 57, 58, 59, 60, 61, 62, 63, 64,  
65, 67, 68, 69, 70, 71, 72, 73, 74, 75,  
76, 77, 78, 79, 80, 81, 82, 84, 86, 88,  
89, 90, 91, 92, 93, 94, 95, 96, 97, 98,  
99, 100, 101, 102

RT - 1, 2, 3, 4, 5, 6, 7, 8, 9,  
10, 11, 12, 13, 14, 15

i) SEAM FAULTED IN BOREHOLES: 2 MNRT - 30, 31  
 ii) SEAM PART FAULTED IN BHS.: 1 MNRT - 11  
 iv) BS LOCATED UPDIP OF SUBCROP: 3 MNRT - 66, 82, 85  
 v) BS NOT DRILLED UPTO SEAM: 1 MNRT - 20  
 vi) SEAM NOT DEVELOPED: 1 MNRT - 57

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST: 10.87 (MNRT-65)  
 ii) DEEPEST: 405.19 (MNRT-62)

## 3) THICKNESS (M)

a)	SEAM THICKNESS			
	BCS	I-30	I-100	
i) MIN.	.45 (RT-8)	.45 (RT-8)	.45 (RT-8)	.45 (RT-8)
ii) MAX.	5.78 (MNRT-99)	4.37 (MNRT-49)	4.76 (MNRT-34)	5.78 (MNRT-99)
iii) MEAN	3.13	2.25	2.54	3.11
iv) STD. DEVIATION	1.41	.94	1.11	1.40

b) THICK. RANGE (M)	NO. OF BRS	NO. OF BRS	NO. OF BRS.	NO. OF BRS.
<0.5	2	2	2	2
0.5-0.9	13	13	13	13
0.9-1.0	1	2	1	1
1.0-1.2	2	3	2	2
1.2-1.5	3	3	5	3
1.5-2.0	4	17	10	4
2.0-2.5	7	22	16	8
2.5-3.0	13	25	18	13
3.0-3.5	11	14	21	11
3.5-4.0	17	7	11	17
4.0-5.0	31	2	11	30
5.0-6.0	6	0	0	6
<b>TOTAL</b>	<b>110</b>	<b>110</b>	<b>110</b>	<b>110</b>

TABLE : VI(16) Contd.

## 4) PARTING WITH THE UNDERLYING SEAM :

-----  
 i) Minimum : 5.30 (NMT-95) MEAN : 9.19  
 ii) Maximum : 18.69 (NMT-79) S.D. : 2.62

## 5) ROOF CHARACTERISTICS :

-----  
 i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : GSH  
 ii) 3.0 m Column: DOMINANT : CLAY SUBORDINATE : SHALE

## 6) FLOOR CHARACTERISTICS :

-----  
 i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : GSH  
 ii) 1.0 m Column: DOMINANT : ARE. SH SUBORDINATE : SHALE

TABLE : VI(16) Contd.

7) QUALITY PARAMETERS (ON 60 % RE &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BES.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	103	1.30 MNRT-59	7.10 MNRT-32	4.15	1.23
ASH (%)	103	27.50 MNRT-9	52.60 MNRT-76	42.91	5.82
UHV (k.cal/kg)	103	1324. MNRT-77	4387. MNRT-9	2405.	762.
GRADE	101	G MNRT-1	D MNRT-9		
C.V (k.cal/k.g)	6	2920. MNRT-75	4250. MNRT-50	3427.	451.

TABLE : VI(16) Contd.

## 8) DIRT BANDS FOR 109 BHS. CONSIDERED

i) NO.OF BHS DEVOID OF DIRT BANDS:	17 MNRT - 7, 8, 9, 12, 18, 22, 25, 29, 50, 65, 71, 79, 80, RT - 1, 4, 8, 10
ii) NO.OF BHS WITH OBVIOUS DIRT BANDS:	80 MNRT - 1, 2, 3, 4, 5, 10, 13, 14, 15, 16, 17, 19, 20, 23, 27, 28, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 53, 54, 55, 56, 57, 59, 60, 61, 62, 64, 67, 69, 70, 72, 73, 74, 75, 76, 77, 78, 81, 83, 84, 86, 90, 91, 92, 95, 96, 97, 98, 99, 100, 101, 102 RT - 2, 3, 5, 6, 7, 9, 11, 12, 14, 15
*MNRT-1	- 3 BAND - .81
*MNRT-2	- 2 BAND - .60
*MNRT-3	- 2 BAND - .55
*MNRT-4	- 2 BAND - .49
*MNRT-5	- 1 BAND - .31
MNRT-10	- 1 BAND - .18
MNRT-13	- 2 BAND - .37
*MNRT-14	- 1 BAND - .31
*MNRT-15	- 1 BAND - .37
*MNRT-16	- 1 BAND - .12
MNRT-17	- 1 BAND - .77
*MNRT-19	- 1 BAND - .26
*MNRT-20	- 3 BAND - .82
MNRT-23	- 4 BAND - .82
*MNRT-27	- 1 BAND - .52
*MNRT-28	- 1 BAND - .32
*MNRT-32	- 2 BAND - .74
*MNRT-33	- 1 BAND - .31
*MNRT-34	- 1 BAND - .20
*MNRT-36	- 3 BAND - .61
*MNRT-37	- 1 BAND - .39
*MNRT-38	- 4 BAND - 1.32
*MNRT-39	- 1 BAND - .20
*MNRT-40	- 2 BAND - .68
*MNRT-41	- 3 BAND - .92
*MNRT-42	- 4 BAND - 1.21
*MNRT-43	- 1 BAND - .61
*MNRT-44	- 3 BAND - .55
*MNRT-45	- 2 BAND - .66
*MNRT-46	- 1 BAND - .31
*MNRT-47	- 2 BAND - 1.12
MNRT-48	- 1 BAND - .50
MNRT-49	- 2 BAND - 1.09
*MNRT-51	- 3 BAND - 1.59
*MNRT-52	- 2 BAND - .67
*MNRT-53	- 4 BAND - 1.17
*MNRT-54	- 2 BAND - .61
MNRT-55	- 1 BAND - .65
MNRT-56	- 2 BAND - .37
*MNRT-57	- 1 BAND - .78
*MNRT-59	- 3 BAND - .94
*MNRT-60	- 2 BAND - .64
*MNRT-61	- 2 BAND - .52
*MNRT-62	- 1 BAND - .37
MNRT-64	- 2 BAND - .59
*MNRT-67	- 2 BAND - .38
*MNRT-69	- 2 BAND - .95
*MNRT-70	- 2 BAND - .57

TABLE : VI(16) Contd.

*MNRT-72	- 1	BAND	- .31
*MNRT-73	- 2	BAND	- .47
MNRT-74	- 3	BAND	- 1.59
*MNRT-75	- 4	BAND	- 1.18
MNRT-76	- 1	BAND	- 1.02
*MNRT-77	- 3	BAND	- 1.22
*MNRT-78	- 2	BAND	- 1.03
MNRT-81	- 2	BAND	- .40
MNRT-83	- 2	BAND	- .73
*MNRT-84	- 2	BAND	- .58
MNRT-86	- 1	BAND	- .26
*MNRT-90	- 1	BAND	- .40
MNRT-91	- 1	BAND	- .37
*MNRT-92	- 3	BAND	- .78
*MNRT-95	- 2	BAND	- .77
*MNRT-96	- 1	BAND	- .25
*MNRT-97	- 1	BAND	- .26
*MNRT-98	- 2	BAND	- .73
*MNRT-99	- 3	BAND	- 1.66
*MNRT-100	- 3	BAND	- .89
*MNRT-101	- 3	BAND	- 1.03
*MNRT-102	- 1	BAND	- .67
RT-2	- 2	BAND	- .77
*RT-3	- 2	BAND	- .44
*RT-5	- 2	BAND	- .78
*RT-6	- 1	BAND	- .43
*RT-7	- 2	BAND	- .78
*RT-9	- 2	BAND	- 1.05
*RT-11	- 1	BAND	- .64
*RT-12	- 3	BAND	- .12
RT-14	- 1	BAND	- .45
*RT-15	- 1	BAND	- .78

(11) NO. OF BNS WITH CSE BANDS: 76 MNRT - 1, 2, 3, 4, 5, 6, 14, 15, 16, 19, 20  
 21, 24, 26, 27, 28, 32, 33, 34, 35, 36,  
 37, 38, 39, 40, 41, 42, 43, 44, 45, 46,  
 47, 51, 52, 53, 54, 57, 58, 59, 60, 61,  
 62, 63, 67, 68, 69, 70, 72, 73, 75, 77,  
 78, 84, 88, 89, 90, 92, 93, 94, 95, 96,  
 97, 98, 99, 100, 101, 102

RT - 3, 5, 6, 7, 9, 11, 12, 13, 15

*MNRT-1	- 1	BAND	- .51
*MNRT-2	- 1	BAND	- .40
*MNRT-3	- 1	BAND	- 1.00
*MNRT-4	- 2	BAND	- .73
*MNRT-5	- 3	BAND	- 1.56
MNRT-6	- 2	BAND	- .60
*MNRT-14	- 1	BAND	- .60
*MNRT-15	- 2	BAND	- .45
*MNRT-16	- 2	BAND	- .16
*MNRT-19	- 2	BAND	- .71
*MNRT-20	- 1	BAND	- .35
MNRT-21	- 1	BAND	- .50
MNRT-24	- 4	BAND	- .95
MNRT-26	- 2	BAND	- .81
*MNRT-27	- 3	BAND	- 1.23
*MNRT-28	- 1	BAND	- .23

TABLE : VI(16) Contd.

*MVRT-32	- 2	BAND	- .36
*MVRT-33	- 2	BAND	- .56
*MVRT-34	- 2	BAND	- .94
MVRT-35	- 1	BAND	- .20
*MVRT-36	- 1	BAND	- .10
*MVRT-37	- 1	BAND	- .26
*MVRT-38	- 1	BAND	- .40
*MVRT-39	- 1	BAND	- .54
*MVRT-40	- 1	BAND	- .63
*MVRT-41	- 2	BAND	- .34
*MVRT-42	- 1	BAND	- .17
*MVRT-43	- 2	BAND	- .35
*MVRT-44	- 3	BAND	- .86
*MVRT-45	- 2	BAND	- .49
*MVRT-46	- 2	BAND	- .48
*MVRT-47	- 2	BAND	- .88
*MVRT-51	- 2	BAND	- 1.16
*MVRT-52	- 4	BAND	- .74
*MVRT-53	- 1	BAND	- .20
*MVRT-54	- 1	BAND	- .30
*MVRT-57	- 1	BAND	- .42
MVRT-58	- 1	BAND	- .60
*MVRT-59	- 2	BAND	- .24
*MVRT-60	- 3	BAND	- .83
*MVRT-61	- 2	BAND	- .32
*MVRT-62	- 3	BAND	- .89
MVRT-63	- 2	BAND	- .61
*MVRT-67	- 3	BAND	- .59
MVRT-68	- 1	BAND	- .44
*MVRT-69	- 1	BAND	- .17
*MVRT-70	- 2	BAND	- .62
*MVRT-72	- 2	BAND	- 1.07
*MVRT-73	- 2	BAND	- .58
*MVRT-75	- 1	BAND	- .14
*MVRT-77	- 1	BAND	- .95
*MVRT-78	- 1	BAND	- .12
*MVRT-84	- 1	BAND	- .27
MVRT-88	- 1	BAND	- .35
MVRT-89	- 1	BAND	- .21
*MVRT-90	- 2	BAND	- .88
*MVRT-92	- 1	BAND	- .42
MVRT-93	- 2	BAND	- .53
MVRT-94	- 2	BAND	- .85
*MVRT-95	- 3	BAND	- .41
*MVRT-96	- 5	BAND	- .86
*MVRT-97	- 1	BAND	- .56
*MVRT-98	- 1	BAND	- .23
*MVRT-99	- 2	BAND	- .56
*MVRT-100	- 1	BAND	- .44
MVRT-101	- 3	BAND	- .61
*MVRT-102	- 2	BAND	- .50
*RT-3	- 3	BAND	- 1.06
*RT-5	- 2	BAND	- .28
*RT-6	- 3	BAND	- 1.24
*RT-7	- 4	BAND	- 1.67
*RT-9	- 3	BAND	- .53
*RT-11	- 1	BAND	- .28
*RT-12	- 2	BAND	- 1.30
RT-13	- 1	BAND	- .35
*RT-15	- 4	BAND	- 1.15

TABLE : VI(16) Contd.

9) i) NO.OF BMS EXCLD.CSM & CB (>0.30M): 80

MMRT	1	2	3	4	5	14	15	17	19	20	21	23	26	27	28	32	33	34	37	38	39	40	41	42	43	44	45	46	47	48	49	51	52	53	54	55	57	58	59	60	61	62	63	64	68	69	70	72	73	74	75	76	77	78	83	84	88	90	91	92	93	94	95	97	98	99	100	101	102
RT	2	3	5	6	7	9	11	12	13	14	15																																																										
MMRT-1	-	2	BAND	-	.82																																																																
MMRT-2	-	2	BAND	-	.80																																																																
MMRT-3	-	1	BAND	-	1.00																																																																
MMRT-4	-	2	BAND	-	.84																																																																
MMRT-5	-	3	BAND	-	1.59																																																																
MMRT-14	-	1	BAND	-	.91																																																																
MMRT-15	-	1	BAND	-	.37																																																																
MMRT-17	-	1	BAND	-	.77																																																																
MMRT-19	-	1	BAND	-	.50																																																																
MMRT-20	-	2	BAND	-	.67																																																																
MMRT-21	-	1	BAND	-	.50																																																																
MMRT-23	-	1	BAND	-	.33																																																																
MMRT-26	-	2	BAND	-	.81																																																																
MMRT-27	-	2	BAND	-	1.24																																																																
MMRT-28	-	1	BAND	-	.32																																																																
MMRT-32	-	2	BAND	-	.74																																																																
MMRT-33	-	2	BAND	-	.66																																																																
MMRT-34	-	1	BAND	-	.70																																																																
MMRT-37	-	1	BAND	-	.39																																																																
MMRT-38	-	2	BAND	-	.88																																																																
MMRT-39	-	1	BAND	-	.54																																																																
MMRT-40	-	3	BAND	-	1.31																																																																
MMRT-41	-	1	BAND	-	.35																																																																
MMRT-42	-	3	BAND	-	1.18																																																																
MMRT-43	-	1	BAND	-	.82																																																																
MMRT-44	-	1	BAND	-	.46																																																																
MMRT-45	-	3	BAND	-	.99																																																																
MMRT-46	-	2	BAND	-	.63																																																																
MMRT-47	-	4	BAND	-	2.00																																																																
MMRT-48	-	1	BAND	-	.50																																																																
MMRT-49	-	1	BAND	-	.80																																																																
MMRT-51	-	1	BAND	-	1.02																																																																
MMRT-52	-	2	BAND	-	.67																																																																
MMRT-53	-	2	BAND	-	.68																																																																
MMRT-54	-	1	BAND	-	.32																																																																
MMRT-55	-	1	BAND	-	.39																																																																
MMRT-57	-	2	BAND	-	1.20																																																																
MMRT-58	-	1	BAND	-	.60																																																																
MMRT-59	-	2	BAND	-	.68																																																																
MMRT-60	-	1	BAND	-	.34																																																																
MMRT-61	-	1	BAND	-	.31																																																																
MMRT-62	-	2	BAND	-	.93																																																																
MMRT-63	-	1	BAND	-	.37																																																																
MMRT-64	-	1	BAND	-	.37																																																																
MMRT-68	-	1	BAND	-	.44																																																																
MMRT-69	-	1	BAND	-	.68																																																																
MMRT-70	-	2	BAND	-	.74																																																																
MMRT-72	-	3	BAND	-	1.38																																																																
MMRT-73	-	1	BAND	-	.34																																																																



TABLE : VI(16) Contd.

MNRT-74	- 3	BAND	- 1.59
MNRT-75	- 2	BAND	- .76
MNRT-76	- 1	BAND	- 1.02
MNRT-77	- 3	BAND	- 1.63
MNRT-78	- 1	BAND	- .79
MNRT-83	- 2	BAND	- .75
MNRT-84	- 1	BAND	- .32
MNRT-88	- 1	BAND	- .35
MNRT-90	- 2	BAND	- 1.28
MNRT-91	- 1	BAND	- .37
MNRT-92	- 2	BAND	- .74
MNRT-93	- 1	BAND	- .31
MNRT-94	- 2	BAND	- .85
MNRT-95	- 1	BAND	- .67
MNRT-97	- 1	BAND	- .56
MNRT-98	- 2	BAND	- .73
MNRT-99	- 4	BAND	- 2.02
MNRT-100	- 2	BAND	- 1.03
MNRT-101	- 1	BAND	- .50
MNRT-102	- 2	BAND	- 1.00
RT-2	- 1	BAND	- .52
RT-3	- 2	BAND	- .88
RT-5	- 2	BAND	- .78
RT-6	- 3	BAND	- 1.47
RT-7	- 4	BAND	- 2.10
RT-9	- 1	BAND	- .80
RT-11	- 1	BAND	- .64
RT-12	- 2	BAND	- 1.30
RT-13	- 1	BAND	- .35
RT-14	- 1	BAND	- .45
RT-15	- 3	BAND	- 1.58

11) NO. OF BBS EXCLD. CSB & QB (>1.0M) : 2 MNRT 51, 76,  
 MNRT-51 - 1 BAND - 1.02  
 MNRT-76 - 1 BAND - 1.02

### 6.18.0 SEAM IV Middle

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 17A to VII 17F
II. Floor contour plan	:	Plate No. IX P
III. Seam folio plan	:	Plate No. X-17
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.18.1 Seam IV Middle is a prominent and thick coal seam occurring in the middle column of coal bearing Barakar formation. It overlies seam IV L with a parting of 0.75 m. to 6.95 m (mostly the parting is 3.5 to 5.5 m). The seam incrop extent in the block is limited near the northern boundary, around boreholes MNRT 66 & 82 and the incrop extension of the seams lie beyond the block boundary.

6.18.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(17) and the graphic representation of various quality parameters of seam is given in fig-17 (i-vii). The seam description in brief is given below.

6.18.3 The full seam has been intersected in 115 boreholes. The seam is faulted and part faulted in 2 BHs. The full seam thickness varies from 0.99 m. to 7.24 m. (the prevalent seam thickness is 3.50 to 7.0 m. in 92% of boreholes). The seam roof consists dominantly of sandstone and its floor consists of sandstone argillaceous. The seam occurs at depth range of 19.55 m to 425.07 m within in the block.

6.18.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.60 % to 7.0% (prevalent M% is 3.0 to 5.0 %) and Ash % varies from 21.30% to 42.20% (prevalent range is 29.00 % to 38.00 %). The UHV varies from 2580 to 5395 K.Cal/Kg. The seam grade is F to C (prevalent grade is E). The seam contain one to two dirt bands of carbshale / obvious bands in maximum number of 84 borcholes & 31 borcholes devoid of bands.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 13 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam IV Middle**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	44.10	2.52	0.35	0.21	4.79
Maximum	51.62	3.14	0.97	0.34	9.65

**B) Total Sulphur :** The total sulphur for seam IV Middle has been determined for 10 samples (Annexure VI C). The total sulphur range is given below.

**Total Sulphur in seam IV Middle**

Range	Total Sulphur %
Minimum	0.21
Maximum	0.55

**C) Ash analysis :** The ash analysis has been determined for seam IV Middle for 5 samples and the range is given below (Annexure VI B)

**Range of Ash Analysis for seam IV Middle**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	60.92	63.72
Al <sub>2</sub> O <sub>3</sub>	21.42	24.21
Fe <sub>2</sub> O <sub>3</sub>	7.86	13.22
TiO <sub>2</sub>	1.13	1.58
CaO	0.22	0.44
MgO	0.53	0.65
Na <sub>2</sub> O	0.10	0.34
K <sub>2</sub> O	0.08	0.42
SO <sub>3</sub>	0.06	0.57
P <sub>2</sub> O <sub>5</sub>	0.13	0.31

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 4 samples (Annexures VI D).

**Ash Fusion Temperature Range for seam IV Middle**

Range	IT	ST	HT	FT
Minimum	> 1450	>1450	>1450	>1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam IV Middle has been determined for 4 samples and it is <0.03 to 0.04% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 5 samples. The swelling index is '0' and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam IV Middle is determined for 10 samples. The HGI values varies from 57 to 78 (Annexure VI G).

TABLE : VI(17)

SEAM : IV MID

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 115 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22,  
23, 24, 25, 26, 27, 28, 29, 30, 31, 32,  
33, 34, 35, 36, 37, 38, 39, 40, 41, 42,  
43, 44, 45, 46, 47, 48, 49, 50, 51, 52,  
53, 54, 55, 56, 57, 58, 59, 60, 61, 62,  
63, 64, 65, 66, 67, 68, 69, 70, 71, 72,  
73, 74, 75, 76, 77, 78, 79, 80, 81, 82,  
83, 84, 85, 86, 88, 89, 90, 91, 92, 93,  
94, 95, 96, 97, 98, 99, 100, 101, 102

RT -1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12,  
13, 14, 15

ii) SEAM FAULTED IN BOREHOLES: 1 MNRT - 11  
iii) SEAM PART FAULTED IN BHS.: 1 MNRT - 87

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 19.55 (MNRT-66 )  
ii) DEEPEST : 425.07 (MNRT-62 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.99 (MNRT-13 )	.99 (MNRT-13 )	.99 (MNRT-13 )	.99 (MNRT-13 )
ii) MAX.	7.24 (MNRT-89 )	6.79 (MNRT-97 )	6.79 (MNRT-97 )	7.24 (MNRT-89 )
iii) MEAN	4.66	4.44	4.60	4.66
iv) STD. DEVIATION	1.00	.93	.98	1.00
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
0.9-1.0	1	1	1	1
1.2-1.5	2	2	2	2
1.5-2.0	1	1	1	1
2.5-3.0	2	2	2	2
3.0-3.5	2	3	3	2
3.5-4.0	9	14	10	9
4.0-5.0	59	70	59	59
5.0-6.0	33	19	32	33
6.0-7.0	5	3	5	5
7.0-8.0	1	0	0	1
<b>TOTAL</b>	<b>115</b>	<b>115</b>	<b>115</b>	<b>115</b>

TABLE : VI(17) Contd.

## 4] PARTING WITH THE UNDERLYING SEAM :

-----  
 i] Minimum : .75 (MRT-77)      MEAN : 1.79  
 ii] Maximum : 6.95 (MRT-50)    S.D. : .74

## 5] ROOF CHARACTERISTICS :

-----  
 i] IMMEDIATE :            DOMINANT : SST            SUBORDINATE : CSB  
 ii] 3.0 m Column:        DOMINANT : SST            SUBORDINATE : ICAL

## 6] FLOOR CHARACTERISTICS :

-----  
 i] IMMEDIATE :            DOMINANT : SHALE        SUBORDINATE : CSM  
 ii] 1.0 \* Column:        DOMINANT : ARG. SST      SUBORDINATE : SHALE

TABLE : VI(17) Contd.

7] QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BNS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	110	1.60	7.00	4.00	1.15
ASH (%)	110	21.30	42.20	34.03	3.34
HEV (k.cal/kg)	110	2580.	5395.	3640.	419.
GRADE	110	F	C		
C.V (k.cal/k.g)	8	4400.	5100.	4701.	204.

TABLE : VI(17) Contd.

## B) DIRT BANDS FOR 114 BMS. CONSIDERED

i)	NO. OF BMS DEVOID OF DIRT BANDS: 31	MMRT- 1, 6, 10, 12, 13, 14, 17, 18, 24, 29, 31, 34, 36, 37, 38, 50, 54, 56, 61, 65, 66, 70, 73, 85, 92, 93, 95, 97
		RT - 10, 12, 15
ii)	NO. OF BMS WITH DEVOIDS DIRT BANDS: 15	MMRT-3, 9, 21, 23, 25, 30, 33, 35, 47, 58, 82, 83, 89, 100
		RT - 8
		MMRT-3 - 1 BAND - .18
		MMRT-9 - 1 BAND - .64
		MMRT-21 - 1 BAND - .24
		MMRT-23 - 1 BAND - .16
		MMRT-25 - 1 BAND - .19
		*MMRT-30 - 1 BAND - .49
		*MMRT-33 - 1 BAND - .28
		MMRT-35 - 1 BAND - .23
		MMRT-47 - 1 BAND - .27
		*MMRT-58 - 1 BAND - .33
		*MMRT-82 - 1 BAND - .31
		*MMRT-83 - 1 BAND - .22
		*MMRT-89 - 1 BAND - .55
		MMRT-100 - 1 BAND - .18
		*RT-8 - 1 BAND - .30
iii)	NO. OF BMS WITH CSB BANDS:	76 MMRT - 2, 4, 5, 7, 8, 15, 16, 19, 20, 22, 26, 27, 28, 30, 32, 33, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 51, 52, 53, 55, 57, 58, 59, 60, 62, 63, 64, 67, 68, 69, 71, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 86, 88, 89, 90, 91, 94, 96, 98, 99, 101, 102
		RT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 14
		MMRT-2 - 1 BAND - .20
		MMRT-4 - 1 BAND - .20
		MMRT-5 - 1 BAND - .36
		MMRT-7 - 2 BAND - .82
		MMRT-8 - 1 BAND - .29
		MMRT-15 - 1 BAND - .30
		MMRT-16 - 2 BAND - .33
		MMRT-19 - 1 BAND - .10
		MMRT-20 - 3 BAND - .59
		MMRT-22 - 2 BAND - .54
		MMRT-26 - 1 BAND - .20
		MMRT-27 - 1 BAND - .31
		MMRT-28 - 1 BAND - .31
		*MMRT-30 - 1 BAND - .24
		MMRT-32 - 1 BAND - .30
		*MMRT-33 - 1 BAND - .20
		MMRT-39 - 1 BAND - .20



TABLE : VI(17) Contd.

MMRT-40	- 2	BAND	-	.57
MMRT-41	- 2	BAND	-	.36
MMRT-42	- 1	BAND	-	.26
MMRT-43	- 1	BAND	-	.21
MMRT-44	- 2	BAND	-	.30
MMRT-45	- 1	BAND	-	.32
MMRT-46	- 1	BAND	-	.20
MMRT-48	- 1	BAND	-	.18
MMRT-49	- 2	BAND	-	.38
MMRT-51	- 2	BAND	-	.32
MMRT-52	- 1	BAND	-	.16
MMRT-53	- 1	BAND	-	.24
MMRT-55	- 1	BAND	-	.25
MMRT-57	- 1	BAND	-	.22
*MMRT-58	- 1	BAND	-	.23
MMRT-59	- 1	BAND	-	.20
MMRT-60	- 1	BAND	-	.15
MMRT-62	- 1	BAND	-	.23
MMRT-63	- 2	BAND	-	.36
MMRT-64	- 2	BAND	-	.40
MMRT-67	- 1	BAND	-	.12
MMRT-68	- 1	BAND	-	.12
MMRT-69	- 1	BAND	-	.18
MMRT-71	- 1	BAND	-	.28
MMRT-72	- 1	BAND	-	.20
MMRT-74	- 1	BAND	-	.23
MMRT-75	- 1	BAND	-	.20
MMRT-76	- 1	BAND	-	.21
MMRT-77	- 1	BAND	-	.36
MMRT-78	- 1	BAND	-	.27
MMRT-79	- 1	BAND	-	.27
MMRT-80	- 1	BAND	-	.28
MMRT-81	- 2	BAND	-	.28
*MMRT-82	- 2	BAND	-	.32
*MMRT-83	- 1	BAND	-	.30
MMRT-84	- 1	BAND	-	.20
MMRT-86	- 1	BAND	-	.15
MMRT-88	- 1	BAND	-	.13
*MMRT-89	- 2	BAND	-	.42
MMRT-90	- 1	BAND	-	.13
MMRT-91	- 1	BAND	-	.23
MMRT-94	- 1	BAND	-	.20
MMRT-96	- 1	BAND	-	.20
MMRT-98	- 1	BAND	-	.15
MMRT-99	- 1	BAND	-	.20
MMRT-101	- 1	BAND	-	.15
MMRT-102	- 1	BAND	-	.15
RT-1	- 2	BAND	-	.26
RT-2	- 2	BAND	-	.35
RT-3	- 2	BAND	-	.53
RT-4	- 1	BAND	-	.17
RT-5	- 2	BAND	-	.36
RT-6	- 1	BAND	-	.20
RT-7	- 3	BAND	-	.49
*RT-8	- 1	BAND	-	.10
RT-9	- 1	BAND	-	.20
RT-11	- 2	BAND	-	.35
RT-13	- 1	BAND	-	.23
RT-14	- 1	BAND	-	.25

TABLE : VI(17) Contd.

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1) NO.OF BEG EXCLD.CSB & OB (>0.30M): 14 MNRT 5, 7, 9, 20, 22, 27, 28, 30, 40, 45, 58,  
77, 82, 89

MNRT-5	= 1	BAND	=	.36
MNRT-7	= 2	BAND	=	.82
MNRT-9	= 1	BAND	=	.64
MNRT-20	= 1	BAND	=	.31
MNRT-22	= 1	BAND	=	.32
MNRT-27	= 1	BAND	=	.31
MNRT-28	= 1	BAND	=	.31
MNRT-30	= 1	BAND	=	.49
MNRT-40	= 1	BAND	=	.45
MNRT-45	= 1	BAND	=	.32
MNRT-58	= 1	BAND	=	.33
MNRT-77	= 1	BAND	=	.36
MNRT-82	= 1	BAND	=	.31
MNRT-89	= 1	BAND	=	.55

### 6.19.0 SEAM IV L

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 18A to VII 18E
II. Seam folio plan	:	Plate No. X-18
III. Seam Quality	:	Plate No. IV & VII
IV. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.19.1 Seam IV L is a local band which occur persistently between IV Middle and IV Bottom seams. It is a separate and distinct coal horizon. It overlies seam IV Bottom with a parting of 0.75 m. to 3.51 m (mostly the parting is 0.50 to 2.0 m). The quality of combined IV L + IV B seam was also obtained as the parting is occasional <1.0 m. (Annexure VI). The seam incrop occur only near northern boundary of the block around BH No. MNRT-82 & 66 and it further extends beyond the block boundary.

6.19.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(18) and the graphic representation of various quality parameters of seam is given in fig-18 (i-vii). The seam description in brief is given below.

6.19.3 The full seam thickness has been intersected in 98 boreholes. The seam is faulted in 2 BHs and the seam is not developed in 17 BHs. in the central part of the block around BHs MNRT-6, 9, 12 & 29 and in NW part of the block around BHs MNRT-38 & 97. The full seam thickness varies from 0.23 m to 2.30 m (the prevalent seam thickness is 0.50 to 2.0 m in 90% of boreholes). The seam roof consists dominantly of sandstone and its floor consists of clay. The seam occurs at depth range of 23.28 m to 400.11 m within the block.

6.19.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.80 % to 6.70% (prevalent M% is 2.0 to 5.0 %) and Ash % varies from 24.60% to 50.10% (prevalent range is 31% to 40.0%). The UHV varies from 1338 to 4843 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). Dirt bands, 1 to 2 Nos. are present in 49 BHs and the seam is devoid of dirt bands in 49 boreholes.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 7 samples and the results are provided in annexure VIIA and its range is given below :

**Range of Ultimate analysis of seam IV L**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	39.52	1.84	0.32	0.21	3.67
Maximum	50.38	3.39	0.83	0.76	9.42

**B) Total Sulphur :** The total sulphur for seam IV L has been determined for 6 samples (Annexure VI C). The total sulphur range is given below .

**Total Sulphur for seam IV L**

Range	Total Sulphur %
Minimum	0.27
Maximum	0.53

**C) Ash analysis :** The ash analysis has been determined for seam IV L for 2 samples and the result are given below (Annexure VI B)

**Range of Ash Analysis for seam IV L**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	63.56	67.58
Al <sub>2</sub> O <sub>3</sub>	23.80	25.87
Fe <sub>2</sub> O <sub>3</sub>	4.67	6.29
TiO <sub>2</sub>	1.61	1.65
CaO	0.23	0.33
MgO	0.51	0.61
Na <sub>2</sub> O	0.05	0.10
K <sub>2</sub> O	0.07	0.11
SO <sub>3</sub>	0.30	0.38
P <sub>2</sub> O <sub>5</sub>	0.16	0.21

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature of the seam has been determined for one sample (Annexures VI D).

**Ash Fusion Temperature for seam IV L**

IT	ST	HT	FT
> 1450	>1450	>1450	>1450

**E) Phosphorous :** The Phosphorous content of seam IV L has been determined for 2 samples and it is <0.03 for both samples (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 3 samples. The swelling index is 0 to 0.50 and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam IV Lower is determined for one sample. The HGI values is 70 (Annexure VI G).

TABLE : VI(18)  
SEAM : IVL

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 98 MNRT - 1, 2, 3, 4, 5, 7, 10, 13, 14, 15,  
16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26,  
27, 28, 30, 31, 32, 33, 34, 36, 37, 38,  
39, 40, 41, 42, 43, 44, 45, 46, 47, 49, 50,  
51, 53, 54, 55, 56, 57, 58, 60, 61, 63,  
64, 65, 66, 67, 68, 69, 71, 72, 73, 74,  
75, 76, 77, 78, 81, 82, 83, 84, 85, 86,  
87, 88, 89, 90, 91, 92, 93, 94, 95, 96,  
97, 98, 99, 100, 101, 102  
RT - 1, 2, 3, 5, 6, 9, 12, 13, 14, 15

ii) SEAM FAULTED IN BOREHOLES: 2 MNRT - 11, 62  
iii) SEAM NOT DEVELOPED : 17 MNRT - 6, 8, 9, 12, 29, 35, 48, 52, 59,  
70, 79, 80, RT - 4, 7, 8, 10, 11

2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 23.28 (MNRT-82 )  
ii) DEEPEST : 400.11 (MNRT-50 )

3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.23 (MNRT-7 )	.23 (MNRT-7 )	.23 (MNRT-7 )	.23 (MNRT-7 )
ii) MAX.	2.30 (RT-14 )	1.89 (MNRT-77 )	2.14 (MNRT-77 )	2.30 (RT-14 )
iii) MEAN	1.31	1.16	1.24	1.31
iv) STD. DEVIATION	.49	.37	.43	.49
b) THICK. RANGE (m)	NO. OF BBS	NO. OF BBS	NO. OF BBS.	NO. OF BBS.
<0.5	2	2	2	2
0.5-0.9	21	21	21	21
0.9-1.0	7	7	7	7
1.0-1.2	11	18	11	11
1.2-1.5	21	28	29	21
1.5-2.0	28	22	25	28
2.0-2.5	8	0	3	8
TOTAL	98	98	98	98

4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : .75 (MNRT-69 ) MEAN : 1.40  
ii) Maximum : 3.51 (MNRT-86 ) S.D. : .55

5) ROOF CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : CSH  
ii) 3.0 m Column: DOMINANT : SST SUBORDINATE : ARG, SST

6) FLOOR CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : SHALE SUBORDINATE : CSH  
ii) 1.0 m Column: DOMINANT : CLAY SUBORDINATE : ICAL

TABLE : VI(18)

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF SBS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	91	1.80 MNRT-24	6.70 MNRT-32	3.91	1.12
ASH (%)	91	24.60 MNRT-72	50.10 MNRT-1	37.40	5.85
DHV (k.cal/kg)	91	1338. MNRT-1	4843. MNRT-10	3200.	779.
GRADE	91	G MNRT-1	D MNRT-10		
C.V (k.cal/k.g)	4	3380. MNRT-38	5250. MNRT-50	4685.	758.

TABLE : VI (18)

## 8) DIRT BANDS FOR 96 BRG, CONSIDERED

- i) NO.OF BRG DEVOID OF DIRT BANDS: 49 MMRT - 4, 5, 7, 10, 14, 17, 18, 19, 22, 23, 24, 25, 26, 30, 31, 32, 34, 36, 37, 38, 40, 41, 43, 49, 50, 57, 65, 67, 68, 71, 72, 74, 75, 83, 84, 87, 90, 92, 97, 98, 99, 101, RT - 1, 2, 3, 6, 12, 13, 15
- ii) NO.OF BRG WITH OBVIOUS DIRT BANDS: 36 MMRT-1, 3, 16, 20, 28, 39, 45, 46, 47, 51, 53, 54, 55, 56, 58, 60, 63, 64, 66, 69, 73, 76, 77, 78, 81, 82, 85, 86, 88, 89, 91, 93, 95, 96, 100, RT - 9

*MMRT-1	- 1 BAND	- .40
*MMRT-3	- 1 BAND	- .16
MMRT-16	- 1 BAND	- .36
MMRT-20	- 1 BAND	- .25
MMRT-28	- 1 BAND	- .22
*MMRT-39	- 1 BAND	- .25
MMRT-45	- 1 BAND	- .30
MMRT-46	- 1 BAND	- .26
*MMRT-47	- 1 BAND	- .35
MMRT-51	- 1 BAND	- .31
MMRT-53	- 1 BAND	- .21
MMRT-54	- 1 BAND	- .20
MMRT-55	- 1 BAND	- .24
MMRT-56	- 1 BAND	- .25
MMRT-58	- 1 BAND	- .29
MMRT-60	- 1 BAND	- .25
MMRT-63	- 1 BAND	- .24
MMRT-64	- 1 BAND	- .30
MMRT-66	- 1 BAND	- .28
MMRT-69	- 1 BAND	- .24
MMRT-73	- 1 BAND	- .23
MMRT-76	- 1 BAND	- .25
MMRT-77	- 1 BAND	- .25
MMRT-78	- 1 BAND	- .27
MMRT-81	- 1 BAND	- .26
MMRT-82	- 1 BAND	- .29
MMRT-85	- 1 BAND	- .31
MMRT-86	- 2 BAND	- .92
MMRT-88	- 1 BAND	- .30
MMRT-89	- 1 BAND	- .19
MMRT-91	- 1 BAND	- .25
MMRT-93	- 1 BAND	- .32
MMRT-95	- 1 BAND	- .30
MMRT-96	- 1 BAND	- .20
MMRT-100	- 1 BAND	- .20
RT-9	- 1 BAND	- .32



iii) NO.OF BEB WITH CSM BANDS: 17 MNRT - 1, 2, 3, 13, 15, 21, 27, 33, 39, 42,  
44, 47, 61, 94,102, RT - 5, 14

*MNRT-1	- 1 BAND	- .10
MNRT-2	- 1 BAND	- .30
*MNRT-3	- 1 BAND	- .11
MNRT-13	- 1 BAND	- .37
MNRT-15	- 1 BAND	- .35
MNRT-21	- 1 BAND	- .40
MNRT-27	- 1 BAND	- .37
MNRT-33	- 1 BAND	- .39
*MNRT-39	- 1 BAND	- .18
MNRT-42	- 1 BAND	- .31
MNRT-44	- 1 BAND	- .35
*MNRT-47	- 1 BAND	- .16
MNRT-61	- 1 BAND	- .10
MNRT-94	- 1 BAND	- .25
MNRT-102	- 1 BAND	- .22
RT-5	- 1 BAND	- .36
RT-14	- 1 BAND	- .61

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1) NO.OF BEB EXCLD.CSB & OB (>0.30M): 17 MNRT-1, 13, 15, 16, 21, 27, 33, 42, 44, 47,  
51, 85, 86, 93  
RT - 5, 9, 14

MNRT-1	- 1 BAND	- .40
MNRT-13	- 1 BAND	- .37
MNRT-15	- 1 BAND	- .35
MNRT-16	- 1 BAND	- .36
MNRT-21	- 1 BAND	- .40
MNRT-27	- 1 BAND	- .37
MNRT-33	- 1 BAND	- .39
MNRT-42	- 1 BAND	- .31
MNRT-44	- 1 BAND	- .35
MNRT-47	- 1 BAND	- .35
MNRT-51	- 1 BAND	- .31
MNRT-85	- 1 BAND	- .31
MNRT-86	- 2 BAND	- .92
MNRT-93	- 1 BAND	- .32
RT-5	- 1 BAND	- .36
RT-9	- 1 BAND	- .32
RT-14	- 1 BAND	- .61

### 6.20.0 SEAM IV Bottom

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 19A to VII 19F
II. Floor contour plan	:	Plate No. IX Q
III. Seam folio plan	:	Plate No. X-19
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.20.1 Seam IV Bottom is a prominent and thick seam in the middle column of coal bearing Barakar formation. It overlies seam III L with a parting of 8.05 m. to 21.54 m (mostly the parting is 14.0 to 17.0 m). The seam IV B does not incrop in the block as its incrop lies beyond the block boundary.

6.20.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt hands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(19) and the graphic representation of various quality parameters of seam is given in fig-19 (i-vii). The seam description in brief is given below.

6.20.3 The full seam thickness has been intersected in 115 boreholes. The seam is faulted in 2 BHs. The full seam thickness varies from 0.79 m to 5.67 m (the prevalent seam thickness is 1.50 to 3.50 m in 81% of boreholes) and locally around borehole MNRT-86, its thickness is reduced. The seam roof consists dominantly of clay and its floor consists of shale. The seam occurs at depth range of 28.39 m to 402.70 m within the block.

6.20.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.30 % to 6.90% (prevalent M% is 3.0 to 4.0 %) and Ash % varies from 22.30% to 48.00% (prevalent range is 29.0% to 34.0%) The UHV varies from 1890 to 5105 K.Cal/Kg. The seam grade is G to C (prevalent grade is E to D). The grade improve to D grade in patches in the west and in the eastern part of the block. The seam is devoid of dirt bands in 95 boreholes. A earthshale / obvious band is present in 20 boreholes.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 7 samples and the results are provided in annexure VIA and its range is given below : Also for IV L + IV Bot ultimate analysis is available for one sample.

**Range of Ultimate analysis of seam IV Bottom**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	45.06	2.28	0.31	0.24	4.27
Maximum	57.47	3.38	1.20	0.98	9.48

**B) Total Sulphur :** The total sulphur for seam IV Bottom has been determined for 8 samples (Annexure VI C). The total sulphur range is given below .

**Total Sulphur for seam IV Bottom**

Range	Total Sulphur %
Minimum	0.31
Maximum	0.55

**C) Ash analysis :** The ash analysis has been determined for seam IV Bottom for 2 samples and the result are given below (Annexure VI B). Also for (IV L & IV Bot) combined seam ash analysis is available for one sample

**Range of Ash Analysis for seam IV Bottom**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	64.52	64.80
Al <sub>2</sub> O <sub>3</sub>	25.08	25.95
Fe <sub>2</sub> O <sub>3</sub>	5.18	6.29
TiO <sub>2</sub>	1.65	1.70
CaO	0.28	0.33
MgO	0.52	0.61
Na <sub>2</sub> O	0.08	0.09
K <sub>2</sub> O	0.10	0.10
SO <sub>x</sub>	0.32	0.40
P <sub>2</sub> O <sub>5</sub>	0.16	0.20

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 2 samples (Annexures VI D).

**Ash Fusion Temperature for seam IV Bottom**

Range	IT	ST	HT	FT
Minimum	>1450	>1450	>1450	>1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam IV Bottom has been determined for 4 samples and it is <0.03 to 0.03% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for one sample. The swelling index is 0.50 and coke type is 'B' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam IV Bottom is determined for one sample. The HGI value is 52 (Annexure VI G).

TABLE : VI(19)

SEAM : IV BOT

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 115 MHRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102  
 RT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

ii) SEAM FAULTED IN BOREHOLES: 2 MHRT 11, 62

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 28.39 (MHRT-85 )  
 ii) DEEPEST : 402.70 (MHRT-50 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.79 (MHRT-10 )	.79 (MHRT-10 )	.79 (MHRT-10 )	.79 (MHRT-10)
ii) MAX.	5.67 (MHRT-70 )	4.77 (MHRT-70 )	4.97 (MHRT-70 )	5.67 (MHRT-70)
iii) MEAN	2.51	2.40	2.43	2.51
iv) STD.DEVIATION	.81	.69	.70	.81
b) THICK. RANGE (m)	NO. OF BMS	NO. OF BMS	NO. OF BMS.	NO. OF BMS.
0.5-0.9	1	2	1	1
0.9-1.0	1	2	1	1
1.0-1.2	2	1	2	2
1.2-1.5	6	6	6	6
1.5-2.0	18	20	20	18
2.0-2.5	30	30	30	30
2.5-3.0	35	36	36	35
3.0-3.5	12	10	11	12
3.5-4.0	5	8	4	5
4.0-5.0	3	2	4	3
5.0-6.0	2	0	0	2
<b>TOTAL</b>	<b>115</b>	<b>115</b>	<b>115</b>	<b>115</b>

TABLE : VI (19) Contd.

## 4] PARTING WITH THE UNDERLYING SEAM :

-----

i] Minimum	: 11.37 (MORT-66)	MEAN	: 15.69
ii] Maximum	: 21.54 (MORT-79)	S.D.	: 1.65

## 5] ROOF CHARACTERISTICS :

-----

i] IMMEDIATE	:	DOMINANT : SHALE	SUBORDINATE : CSH
ii] 3.0 m Columns:	:	DOMINANT : CLAY	SUBORDINATE : SHALE

## 6] FLOOR CHARACTERISTICS :

-----

i] IMMEDIATE	:	DOMINANT : SHALE	SUBORDINATE : CSH
ii] 1.0 * Columns:	:	DOMINANT : SHALE	SUBORDINATE : ARE. SH

TABLE : VI (19) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-T100)

PARAMETER	NO. OF BHS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	110	1.30	6.90	3.80	1.16
		MNRT-35	MNRT-32		
ASH (%)	110	22.30	48.00	32.59	5.19
		MNRT-97	MNRT-66		
HEV (k.cal/kg)	110	1890.	5105.	3878.	667.
		MNRT-66	MNRT-35		
GRADE	110	G	C		
		MNRT-41	MNRT-35		
C.V (k.cal/k.g)	8	4450.	5460.	4987.	336.
		MNRT-38	MNRT-68		

TABLE : VI(19) Contd.

## 8] DIRT BANDS FOR 114 BHS. CONSIDERED

1]	NO.OF BHS DEVOID OF DIRT BANDS:	95	NRRT - 1, 2, 3, 4, 5, 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 41, 42, 45, 46, 48, 49, 50, 51, 53, 54, 55, 56, 57, 58, 60, 63, 64, 65, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96, 97, 99, 100, 101, 102, RT-1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 14
ii]	NO.OF BHS WITH OBVIOUS DIRT BANDS:	13	NRRT - 6, 13, 40, 43, 44, 52, 59, 61, 66, 70, 79, 82, 98
			NRRT-6 - 1 BAND - .60
			*NRRT-13 - 1 BAND - .73
			NRRT-40 - 1 BAND - .59
			*NRRT-43 - 1 BAND - .66
			*NRRT-44 - 1 BAND - .71
			NRRT-52 - 2 BAND - 1.17
			NRRT-59 - 2 BAND - .58
			NRRT-61 - 1 BAND - .73
			*NRRT-66 - 1 BAND - .72
			NRRT-70 - 2 BAND - .90
			NRRT-79 - 2 BAND - .58
			*NRRT-82 - 2 BAND - .67
			NRRT-98 - 1 BAND - .50
iii]	NO.OF BHS WITH CSN BANDS:	12	NRRT - 13, 29, 43, 44, 47, 66, 67, 82, 89
			RT - 5, 7, 15
			*NRRT-13 - 1 BAND - .13
			NRRT-29 - 1 BAND - .40
			*NRRT-43 - 1 BAND - .15
			*NRRT-44 - 1 BAND - .10
			NRRT-47 - 1 BAND - .17
			*NRRT-66 - 1 BAND - .12
			NRRT-67 - 2 BAND - .36
			*NRRT-82 - 1 BAND - .15
			NRRT-89 - 2 BAND - .30
			RT-5 - 1 BAND - .14
			RT-7 - 1 BAND - .25
			RT-15 - 3 BAND - 1.00
9]			
1)	NO.OF BHS EXCLD.CSB & QB (>0.30M):	14	NRRT 6, 13, 29, 40, 43, 44, 52, 61, 66, 70, 79, 82, 98, RT - 15
			NRRT-6 - 1 BAND - .60
			NRRT-13 - 1 BAND - .73
			NRRT-29 - 1 BAND - .40
			NRRT-40 - 1 BAND - .59
			NRRT-43 - 1 BAND - .81
			NRRT-44 - 1 BAND - .71
			NRRT-52 - 1 BAND - .87
			NRRT-61 - 1 BAND - .73
			NRRT-66 - 1 BAND - .72
			NRRT-70 - 1 BAND - .70
			NRRT-79 - 1 BAND - .37
			NRRT-82 - 1 BAND - .48
			NRRT-98 - 1 BAND - .50
			RT-15 - 1 BAND - .60



### 6.21.0 SEAM III L

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 20B to VII 20E
II. Floor contour plan	:	Plate No. IX R
III. Seam folio plan	:	Plate No. X-20
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

- 6.21.1 Seam III L is a local seam occurring distinctly and separately throughout the block in the lower column of coal bearing Barakar formation. It overlies seam III with a parting of 24.57 m. to 44.55 m (mostly the parting is 33.0 to 39.0 m). The seam is not incropping in the block and its incrop lies outside the block boundary.
- 6.21.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(20) and the graphic representation of various quality parameters of seam is given in fig-20 (i-vii). The seam description in brief is given below.
- 6.21.3 The full seam thickness has been intersected in 103 boreholes. The seam is faulted in 5 BHs and it is not developed / deteriorated in quality in 7 BHs. The full seam thickness varies from 0.12 m to 3.25 m (the prevalent seam thickness is 0.50 to 1.50 m in 83% of boreholes). The seam thickness is <0.90 in 30 boreholes (29%). It is workable of 0.90 to 3.50 m thickness in 82 boreholes (71%). The not workable area lies in the NW part of the block around boreholes MNRT-2,3 & 53 and another patch in the SW part of the block. The seam roof consists dominantly of sandstone and its floor consists of clay/shale. The seam occurs at depth range of 42.78 m to 421.12 m within the block. The seam is assessed for underground proposition only.
- 6.21.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.40 % to 6.10% (prevalent M% is 2.0 to 5.0 %) and Ash % varies from 26.50% to 50.10% (prevalent range is 31.0% to 40.0%. The LHV varies from 1448 to 4567 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). The seam contains dirt bands in 18 boreholes and in 85 BHs, the coal seam contain clean coal.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 7 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam III L**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	40.51	2.57	0.37	0.33	5.16
Maximum	50.85	3.49	0.94	0.50	10.16

**B) Total Sulphur :** The total sulphur for seam III L has been determined for 9 samples (Annexure VI C). The total sulphur range is given below .

**Total Sulphur in seam III L**

Range	Total Sulphur %
Minimum	0.22
Maximum	1.63

**C) Ash analysis :** The ash analysis has been determined for seam III L for 4 samples and the range of results are given below (Annexure VI B)

**Range of Ash Analysis for seam III L**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	61.86	65.20
Al <sub>2</sub> O <sub>3</sub>	27.54	29.00
Fe <sub>2</sub> O <sub>3</sub>	1.95	5.61
TiO <sub>2</sub>	1.61	1.80
CaO	0.22	0.30
MgO	0.47	0.59
Na <sub>2</sub> O	0.09	0.16
K <sub>2</sub> O	0.08	0.77
SO <sub>3</sub>	0.04	0.39
P <sub>2</sub> O <sub>5</sub>	0.09	0.19

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 4 samples (Annexures VI D).

**Ash Fusion Temperature Range for seam III L**

Range	IT	ST	HT	FT
Minimum	>1450	>1450	>1450	>1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam III L has been determined for 3 samples and it is <0.03 for all samples (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 3 samples. The swelling index is '0' & 0.5 and coke type is 'A' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam III L is determined for 7 samples. The HGI values varies from 51 to 59 (Annexure VI G).

TABLE : VI (20)

SEAM : III 1

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1] BOREHOLE INTERSECTION

- 1) FULL SEAM INTERSECTION: 103 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 45, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 81, 83, 84, 86, 87, 88, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102  
RT - 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15
- ii) SEAM FAULTED IN BOREHOLES: 5 MNRT - 11, 31, 35, 44, 62  
iii) SEAM DEGRADED IN QUALITY: 2 MNRT - 23, 80  
iv) SEAM NOT DEVELOPED : 5 MNRT - 46, 89 RT - 1, 4, 8  
v) BH. NOT DRILLED OPEN SEAM : 2 MNRT - 82, 85

## 2] DEPTH RANGE (FLOOR) (M)

- i) SHALLOWEST : 42.78 (MNRT-66 )  
ii) DEEPEST : 421.12 (MNRT-50 )

## 3] THICKNESS (M)

a]	SEAM THICKNESS	BC9	I-30	I-100
i) MIN.	.12 (MNRT-79 )	.12 (MNRT-79 )	.12 (MNRT-79 )	.12 (MNRT-79 )
ii) MAX.	3.25 (RT-14 )	3.02 (RT-14 )	3.25 (RT-14 )	3.25 (RT-14 )
iii) MEAN	1.08	1.04	1.07	1.08
iv) STD. DEVIATION	.43	.41	.44	.43
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
<0.5	7	8	8	7
0.5-0.9	23	25	22	23
0.9-1.0	11	12	11	11
1.0-1.2	21	21	19	19
1.2-1.5	30	28	32	32
1.5-2.0	10	8	10	10
3.0-3.5	1	1	1	1
TOTAL	103	103	103	103

## TABLE : VI(20) Contd.

## 4] PARTING WITH THE UNDERLYING SEAM :

-----  
 i] Minimum : 24.60 (MORT-99)      MEAN : 35.99  
 ii] Maximum : 44.55 (MORT-89)      S.D . : 3.52

## 5] ROOF CHARACTERISTICS :

-----  
 i] IMMEDIATE :      DOMINANT : SST      SUBORDINATE : CSH  
 ii] 3.0 m Columns:      DOMINANT : SST      SUBORDINATE : SHALE

## 6] FLOOR CHARACTERISTICS :

-----  
 i] IMMEDIATE :      DOMINANT : SHALE      SUBORDINATE : ICAL  
 ii] 1.0 \* Columns:      DOMINANT : CLAY      SUBORDINATE : ARE. SH

TABLE : VI (20) Contd.

7] QUALITY PARAMETERS (ON 60 % RB &amp; AT 40°C. &amp; CALCULATED BASIS-1100)

PARAMETER	NO. OF BBS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	92	1.40	6.10	3.45	1.15
		MNRT-59	MNRT-38		
ASH (%)	92	26.50	50.10	35.84	4.34
		MNRT-98	MNRT-41		
HEV (k.cal/kg)	92	1448.	4567.	3477.	578.
		MNRT-41	MNRT-98		
GRADE	92	G	D		
		MNRT-1	MNRT-38		
C.V (k.cal/k.g)	8	3710.	5160.	4649.	495.
		MNRT-75	MNRT-38		

TABLE : VI(20) Contd.

## 8) DIRT BANDS FOR 102 BHS. CONSIDERED

-----	
i) NO.OF BHS DEVOID OF DIRT BANDS: 85	MMRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, 15, 17, 18, 21, 22, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 36, 37, 38, 42, 45, 47, 49, 50, 52, 53, 54, 55, 57, 58, 59, 60, 61, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 76, 77, 78, 79, 81, 83, 84, 86, 87, 88, 90, 91, 92, 93, 95, 96, 97, 98, 99, 100, 101, 102, RT-2, 3, 5, 6, 7, 9, 12, 15
ii) NO.OF BHS WITH OBVIOUS DIRT BANDS: 2	MMRT - 43, 75
	MMRT-43 - 1 BAND - .10
	MMRT-75 - 1 BAND - .15
iii) NO.OF BHS WITH CSN BANDS: 16	MMRT - 12, 16, 19, 20, 39, 40, 41, 48, 51, 56, 65, 89, 94, RT - 10, 11, 13, 14
	MMRT-12 - 1 BAND - .20
	MMRT-16 - 1 BAND - .25
	MMRT-19 - 1 BAND - .15
	MMRT-20 - 1 BAND - .15
	MMRT-39 - 1 BAND - .18
	MMRT-40 - 1 BAND - .18
	MMRT-41 - 2 BAND - .24
	MMRT-48 - 1 BAND - .20
	MMRT-51 - 1 BAND - .07
	MMRT-56 - 1 BAND - .18
	MMRT-65 - 1 BAND - .13
	MMRT-94 - 1 BAND - .10
	RT-10 - 1 BAND - .20
	RT-11 - 1 BAND - .19
	RT-13 - 1 BAND - .20
	RT-14 - 1 BAND - .23

### 6.22.0 SEAM III

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 21A to VII 21F
II. Floor contour plan	:	Plate No. IX S
III. Seam folio plan	:	Plate No. X-21
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.22.1 Seam III is a prominent, thick and consistently developed seam in the lower column of coal Barakar formation in the block. It overlies seam II L3 with a parting of 31.10 m. to 55.93 m (mostly the parting is 33.0 to 51.0 m). The seam is not incropping in the block

6.22.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(21) and the graphic representation of various quality parameters of seam is given in fig-21 (i-vii). The seam description in brief is given below.

6.22.3 The full seam thickness has been intersected in 110 boreholes. The seam is faulted in 4 BHs and it is not developed in one borehole (RT-6). The full seam thickness varies from 0.66 m to 5.97 m (the prevalent seam thickness is 2.0 to 5.50 m in 86% of boreholes). The seam roof consists dominantly of sandstone and its floor consists of sandstone argil. The seam occurs at depth range of 80.11 m to 466.90 m within the block. The seam III is assessed for underground proposition only.

6.22.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40° C / Calculated basis). The Moisture content of the seam varies from 1.20 % to 7.10% (prevalent M% is 3.0 to 5.0 %) and Ash % varies from 17.60% to 45.10% (prevalent range is 20.0% to 29.0%). The UHV varies from 2124 to 5892 K.Cal/Kg. The seam grade is G to C (prevalent grade is D & C). The grade of coal of seam III improves to C & D grades over major part of the block, especially in the main eastern part. Dirt bands 1 to 2 nos. are present in 49 boreholes and the seam is devoid of dirt bands in 61 boreholes.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 13 samples and the results are provided in annexure VIA and its range is given below :



**Range of Ultimate analysis of seam III**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	44.10	2.49	0.22	0.17	5.93
Maximum	64.76	3.92	1.32	0.58	9.47

**B) Total Sulphur :** The total sulphur for seam III has been determined for 10 samples (Annexure VI C). The total sulphur range is given below .

**Total Sulphur in seam III**

Range	Total Sulphur %
Minimum	0.41
Maximum	0.95

**C) Ash analysis :** The ash analysis has been determined for seam III for 5 samples and the range is given below (Annexure VI B)

**Range of Ash Analysis for seam III**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	59.68	64.20
Al <sub>2</sub> O <sub>3</sub>	26.20	29.73
Fe <sub>2</sub> O <sub>3</sub>	4.03	5.19
TiO <sub>2</sub>	1.61	2.80
CaO	0.30	0.51
MgO	0.55	0.85
Na <sub>2</sub> O	0.07	0.39
K <sub>2</sub> O	0.10	0.70
SO <sub>3</sub>	0.07	0.47
P <sub>2</sub> O <sub>5</sub>	0.09	0.21

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature range of the seam has been determined for 4 samples (Annexures VI D).

**Ash Fusion Temperature Range for seam III**

Range	IT	ST	HT	FT
Minimum	>1450	>1450	>1450	>1450
Maximum	> 1450	> 1450	> 1450	> 1450

**E) Phosphorous :** The Phosphorous content of seam III has been determined for 4 samples and it is <0.03% for all the samples. (Annexure VI E)

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 4 samples. The swelling index is '0' to 0.5 and coke type is 'A' to 'B' (Annexure VI F).

**G) HGI :** The HGI for seam III is determined for 10 samples. The HGI values varies from 42 to 59 (Annexure VI G).

TABLE : VI (21)

SEAM : III

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1] BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 110 MMRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 83, 84, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, RT - 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15,

1i) SEAM PART FAULTED IN BBS : 4 MMRT - 11, 22, 24, 62  
 1ii) SEAM NOT DEVELOPED : 1 MMRT - 6  
 1v) BH. NOT DRILLED OPTQ SEAM : 2 MMRT - 82, 83

## 2] DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 80.11 (MMRT-66 )  
 ii) DEEPEST : 466.90 (MMRT-50 )

## 3] THICKNESS (M)

4]	SEAM THICKNESS	BCS	I-30	I-100
1) MIN.	.66 (MMRT-95 )	.66 (MMRT-95 )	.66 (MMRT-95 )	.66 (MMRT-95 )
1i) MAX.	5.97 (MMRT-32 )	4.93 (MMRT-32 )	5.19 (MMRT-32 )	5.97 (MMRT-32 )
1ii) MEAN	3.21	2.88	2.92	3.12
1v) STD. DEVIATION	1.32	.99	1.03	1.22

b) THICK. RANGE (m)	NO. OF BBS	NO. OF BBS	NO. OF BBS.	NO. OF BBS.
0.5-0.9	5	3	3	3
0.9-1.0	2	4	4	4
1.0-1.2	1	1	1	1
1.2-1.5	2	2	2	2
1.5-2.0	5	5	5	5
2.0-2.5	20	23	22	20
2.5-3.0	20	26	25	20
3.0-3.5	14	14	16	14
3.5-4.0	9	16	14	12
4.0-5.0	18	16	16	22
5.0-6.0	14	0	2	7
TOTAL	110	110	110	110

## 4] PARTING WITH THE UNDERLYING SEAM :

1) Minimum : 31.10 (MMRT-99 ) MEAN : 41.20  
 1i) Maximum : 55.93 (MMRT-79 ) S.D. : 6.83

TABLE : VI(21) Contd.

5] ROOF CHARACTERISTICS :		
-----		
i] IMMEDIATE :	DOMINANT : SST	SUBORDINATE : CSN
ii] 3.0 m Columns:	DOMINANT : SST	SUBORDINATE : ICAL
6] FLOOR CHARACTERISTICS :		
-----		
i] IMMEDIATE :	DOMINANT : ICAL	SUBORDINATE : SHALE
ii] 1.0 m Columns:	DOMINANT : ARG. SST	SUBORDINATE : CLAY

TABLE : VI(21) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BRS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	105	1.20	7.10	3.98	1.19
ASH (%)	105	17.60	45.10	27.27	6.19
UEV (k.cal/kg)	105	2124.	5892.	4588.	802.
GRADE	105	G	B		
C.V (k.cal/k.g)	9	4370.	6310.	5570.	604.

TABLE : VI(21) Contd.

## 8) DIRT BANDS FOR 108 BBS. CONSIDERED

i) NO.OF BBS DEVOID OF DIRT BANDS: 61 MERT - 2, 3, 5, 6, 9, 10, 12, 15, 17, 21,  
23, 25, 29, 29, 31, 33, 35, 37, 38, 39,  
40, 45, 46, 48, 50, 55, 57, 58, 64, 65,  
67, 68, 69, 71, 73, 75, 76, 77, 80, 81,  
83, 84, 87, 91, 92, 93, 94, 95, 96, 97,  
100, 102, RT-3, 5, 8, 9, 10, 11, 12, 13,  
15,  
ii) NO.OF BBS WITH DEVOIDS DIRT BANDS: 21 MERT - 1, 7, 8, 18, 19, 30, 34, 36, 41, 47,  
51, 54, 56, 60, 61, 63, 70, 74, 90, 101,  
RT - 1, 14

MERT-1 - 1 BAND - .86  
MERT-7 - 1 BAND - .72  
MERT-8 - 1 BAND - 1.23  
MERT-18 - 1 BAND - .79  
\*MERT-19 - 1 BAND - 1.20  
MERT-30 - 1 BAND - .70  
\*MERT-34 - 1 BAND - .58  
\*MERT-36 - 1 BAND - .65  
\*MERT-41 - 1 BAND - .81  
\*MERT-47 - 1 BAND - .10  
\*MERT-51 - 1 BAND - .80  
MERT-54 - 2 BAND - .17  
\*MERT-56 - 1 BAND - .32  
\*MERT-60 - 2 BAND - .64  
\*MERT-61 - 1 BAND - .70  
\*MERT-63 - 1 BAND - .50  
MERT-70 - 1 BAND - .30  
MERT-74 - 1 BAND - .75  
MERT-90 - 1 BAND - .51  
RT-1 - 1 BAND - .49  
RT-14 - 1 BAND - .60

iii) NO.OF BBS WITH CSB BANDS: 38 MERT - 4, 13, 14, 16, 19, 20, 26, 27, 32, 34, 36,  
41, 42, 43, 44, 47, 49, 51, 52, 53, 56,  
59, 60, 61, 63, 66, 72, 78, 79, 86, 88,  
89, 98, 99, 101 RT - 2, 4, 7

MERT-4 - 1 BAND - .87  
MERT-13 - 1 BAND - 1.26  
MERT-14 - 1 BAND - .40  
MERT-16 - 1 BAND - 1.05  
\*MERT-19 - 1 BAND - .11  
MERT-26 - 1 BAND - 1.55  
MERT-27 - 1 BAND - .87  
MERT-32 - 2 BAND - 1.04  
\*MERT-34 - 1 BAND - .31  
\*MERT-36 - 1 BAND - .37  
\*MERT-41 - 1 BAND - .30  
MERT-42 - 1 BAND - .81  
MERT-43 - 1 BAND - .87  
MERT-44 - 2 BAND - 1.40  
\*MERT-47 - 1 BAND - .14  
MERT-49 - 1 BAND - .67

TABLE : VI(21) Contd.

*MRT-51	- 1 BAND	- .30
MRT-52	- 1 BAND	- .65
MRT-53	- 2 BAND	- 1.33
*MRT-56	- 1 BAND	- .22
MRT-59	- 1 BAND	- .88
*MRT-60	- 1 BAND	- .65
*MRT-61	- 1 BAND	- .25
*MRT-63	- 1 BAND	- .50
MRT-66	- 1 BAND	- .90
MRT-72	- 1 BAND	- .55
MRT-78	- 2 BAND	- .88
MRT-79	- 1 BAND	- .16
MRT-86	- 1 BAND	- .40
MRT-88	- 1 BAND	- .39
MRT-89	- 1 BAND	- .22
MRT-98	- 1 BAND	- .30
MRT-99	- 1 BAND	- .30
MRT-101	- 1 BAND	- .19
RT-2	- 1 BAND	- .51
RT-4	- 1 BAND	- .15
RT-7	- 2 BAND	- 1.30

9]

1) NO. OF BBS EXCLD. CGH & OB (>0.30M): 39 MRT - 1, 4, 7, 8, 13, 14, 16, 18, 19, 26,  
27, 30, 32, 34, 36, 41, 42, 43, 44, 49,  
51, 52, 53, 56, 59, 60, 61, 63, 66, 72,  
74, 78, 86, 88, 90, RT - 1, 2, 7, 14

MRT-1	- 1 BAND	- .86
MRT-4	- 1 BAND	- .87
MRT-7	- 1 BAND	- .72
MRT-8	- 1 BAND	- 1.23
MRT-13	- 1 BAND	- 1.26
MRT-14	- 1 BAND	- .40
MRT-16	- 1 BAND	- 1.05
MRT-18	- 1 BAND	- .79
MRT-19	- 1 BAND	- 1.20
MRT-26	- 1 BAND	- 1.55
MRT-27	- 1 BAND	- .87
MRT-30	- 1 BAND	- .70
MRT-32	- 1 BAND	- .78
MRT-34	- 1 BAND	- .89
MRT-36	- 2 BAND	- 1.02
MRT-41	- 1 BAND	- .81
MRT-42	- 1 BAND	- .81
MRT-43	- 1 BAND	- .87
MRT-44	- 1 BAND	- 1.14
MRT-49	- 1 BAND	- .67
MRT-51	- 1 BAND	- .80
MRT-52	- 1 BAND	- .65
MRT-53	- 2 BAND	- 1.33
MRT-56	- 1 BAND	- .54
MRT-59	- 1 BAND	- .88
MRT-60	- 2 BAND	- 1.08
MRT-61	- 1 BAND	- .70
MRT-63	- 1 BAND	- 1.00
MRT-66	- 1 BAND	- .90
MRT-72	- 1 BAND	- .95
MRT-74	- 1 BAND	- .75

TABLE : VI(21) Contd.

MNRT-78	- 2	BAND	- .88
MNRT-86	- 1	BAND	- .40
MNRT-88	- 1	BAND	- .39
MNRT-90	- 1	BAND	- .51
RT-1	- 1	BAND	- .49
RT-2	- 1	BAND	- .51
RT-7	- 1	BAND	- 1.06
RT-14	- 1	BAND	- .60

ii) NO.OF BUS EXCLD.CSM & CB (>1.0M): 8 MNRT - 8, 13, 16, 19, 26, 44, 53, 7

MNRT-8	- 1	BAND	- 1.23
MNRT-13	- 1	BAND	- 1.26
MNRT-16	- 1	BAND	- 1.05
MNRT-19	- 1	BAND	- 1.20
MNRT-26	- 1	BAND	- 1.35
MNRT-44	- 1	BAND	- 1.14
MNRT-53	- 1	BAND	- 1.02
RT-7	- 1	BAND	- 1.06



### 6.23.1 SEAM II L3

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 22A to VII 22D
II. Seam folio plan	:	Plate No. X-22
III. Seam Quality	:	Plate No. IV & VI
IV. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.23.1 Seam II L3 is a local seam, occurring as the top split of Seam II in the lower column of coal bearing Barakar formation. It occurs distinctly and separately throughout the block. It overlies seam II L2 with a parting of 13.39 m. to 40.90 m. The seam does not crop in the block.

6.23.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(22) and the graphic representation of various quality parameters of seam is given in fig-22 (i-vii). The seam description in brief is given below.

6.23.3 The full seam thickness has been intersected in 84 boreholes. The seam is faulted in 2 BHs. The seam is not developed in 20 BHs and 11 boreholes are not taken deeper to intersect the seam. The full seam thickness varies from 0.05 m to 3.09 m. The seam thickness is <0.90 m 53 boreholes in the central part of the block. The seam roof consists dominantly of sandstone and its floor consists of clay. The seam occurs at depth range of 115.68 m to 520.84 m within the block.

6.23.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 0.70 % to 8.10% (prevalent M% is 2.0 to 6.0 %) and Ash % varies from 12.80% to 43.9% (prevalent range is 17.0% to 35.0%) The UHV varies from 2469 to 6775 K.Cal/Kg. The seam grade is F to A (prevalent grade is E to C). Grade improves to A and B in the SW part of the block. Dirt bands are present in 15 boreholes and 69 BHs contain clean coal.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 4 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam II L3**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	50.98	2.06	0.26	0.32	4.13
Maximum	60.76	3.96	1.21	0.54	10.02

**B) Total Sulphur :** The total sulphur in seam II L3 has been determined for 4 samples (Annexure VI C). The total sulphur range is given below.

**Total Sulphur in seam II L3**

Range	Total Sulphur %
Minimum	0.25
Maximum	0.39

**C) Ash analysis :** The ash analysis has been determined for seam III L3 for 3 samples and the range is given below (Annexure VI B)

**Range of Ash Analysis for seam II L3**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	57.44	63.14
Al <sub>2</sub> O <sub>3</sub>	27.42	33.59
Fe <sub>2</sub> O <sub>3</sub>	2.44	4.58
TiO <sub>2</sub>	1.68	2.65
CaO	0.28	0.57
MgO	0.43	0.86
Na <sub>2</sub> O	0.09	0.17
K <sub>2</sub> O	0.11	0.12
SO <sub>3</sub>	0.10	0.43
P <sub>2</sub> O <sub>5</sub>	0.20	0.26

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature of the seam has been determined for one sample (Annexures VI D).

**Ash Fusion Temperature for seam II L3**

IT	ST	HT	FT
>1450	>1450	>1450	>1450

**E) Phosphorous :** The Phosphorous content of seam II L3 has been determined for one sample and it is <0.03% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for one sample. The swelling index is 0.5 and coke type is 'B' (Annexure VI F).

**G) HGI :** The HGI for seam II L3 is determined for 3 samples. The HGI values varies from 50 to 58 (Annexure VI G).

TABLE : VI(22)

SEAM : II L3

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 84 MNRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
11, 12, 13, 14, 15, 16, 17, 18, 19, 21,  
23, 25, 26, 27, 28, 29, 30, 31, 32, 33,  
34, 35, 36, 37, 38, 39, 40, 41, 42, 43,  
44, 45, 47, 48, 49, 50, 51, 52, 53, 54,  
55, 56, 57, 58, 59, 60, 61, 63, 64, 65,  
66, 67, 68, 70, 71, 73, 75, 76, 78, 79,  
80, 81, 83, 84, 87, 89, 92, 98, 99  
RT - 7, 8, 10, 14, 15

ii) SEAM FAULTED IN BOREHOLES: 2 MNRT - 24, 62  
iii) SEAM DETERIORATED IN QUALITY: 1 MNRT - 77  
iv) SEAM NOT DEVELOPED : 19 MNRT - 20, 22, 46, 69, 72, 74, 93, 96, 97, 101  
RY - 1, 2, 3, 5, 6, 9, 11, 12, 13,  
v) BH. NOT DRILLED UPED SEAM : 11 MNRT - 82, 85, 86, 88, 90, 91, 94, 95, 100, 102,  
RY - 4

## 2) DEPTH RANGE(FLOOR) (M)

i) SHALLOWEST : 115.68 (MNRT-66 )  
ii) DEEPEST : 520.84 (MNRT-50 )

## 3) THICKNESS (M)

*)	SEAM THICKNESS			
	BCS	I-30	I-100	
i) MIN.	.05 (MNRT-9 )	.05 (MNRT-9 )	.05 (MNRT-9 )	.05 (MNRT-9 )
ii) MAX.	3.09 (MNRT-35 )	2.98 (MNRT-35 )	3.09 (MNRT-35 )	3.09 (MNRT-35 )
iii) MEAN	.92	.88	.91	.92
iv) STD.DEVIATION	.77	.73	.75	.77
b) THICK. RANGE (m)	NO. OF BMS	NO. OF BMS	NO. OF BMS.	NO. OF BMS.
<0.5	31	34	31	31
0.5-0.9	22	18	21	21
0.9-1.0	0	1	1	1
1.0-1.2	3	4	3	3
1.2-1.5	13	14	15	13
1.5-2.0	3	3	2	3
2.0-2.5	9	8	8	9
2.5-3.0	2	2	2	2
3.0-3.5	1	0	1	1
TOTAL	84	84	84	84

TABLE : VI(22) Contd.

4] PARTING WITH THE UNDERLYING SEAM :			
-----			
i] Minimum	: 13.39 (MORT-66)	MEAN	: 39.10
ii] Maximum	: 69.28 (MORT-16)	S.D .	: 16.66
5] ROOF CHARACTERISTICS :			
-----			
i] IMMEDIATE	: DOMINANT : SST	SUBORDINATE	: ICAL
ii] 3.0 m Columns:	DOMINANT : SST	SUBORDINATE	: ICAL
6] FLOOR CHARACTERISTICS :			
-----			
i] IMMEDIATE	: DOMINANT : ICAL	SUBORDINATE	: SHALE
ii] 1.0 * Columns:	DOMINANT : CLAY	SUBORDINATE	: ICAL

TABLE : VI(22) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-T100)

PARAMETER	NO. OF BHS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	50	.70	8.10	4.10	1.32
ASH (%)	50	12.80	43.90	28.20	10.70
HEV (k.cal/kg)	50	2469.	6775.	4576.	1037.
GRADE	50	F	A		
C.V (k.cal/k.g)	4	5050.	6900.	5780.	710.

TABLE : VI(22) Contd.

## B) DIRT BANDS FOR 84 BHS. CONSIDERED

-----	
i) NO.OF BHS DEVOID OF DIRT BANDS: 69	NRRT - 1, 2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 19, 21, 23, 25, 26, 27, 28, 30, 31, 32, 33, 34, 36, 39, 41, 42, 43, 44, 45, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 63, 64, 66, 67, 68, 70, 73, 75, 76, 78, 79, 81, 83, 84, 87, 89, 92, 98, 99, RT - 7, 8, 10, 15
ii) NO.OF BHS WITH OBVIOUS DIRT BANDS: 5	NRRT - 3, 35, 40, 61, 80
	NRRT-3 - 1 BAND - .31
	NRRT-35 - 1 BAND - .21
	NRRT-40 - 1 BAND - .12
	*NRRT-61 - 1 BAND - .30
	NRRT-80 - 2 BAND - .27
iii) NO.OF BHS WITH CSR BANDS: 11	NRRT - 6, 16, 18, 29, 37, 38, 48, 61, 65, 71
	RT - 14
	NRRT-6 - 1 BAND - .17
	NRRT-16 - 2 BAND - .29
	NRRT-18 - 1 BAND - .25
	NRRT-29 - 1 BAND - .18
	NRRT-37 - 1 BAND - .40
	NRRT-38 - 1 BAND - .23
	NRRT-48 - 1 BAND - .22
	*NRRT-61 - 1 BAND - .33
	NRRT-65 - 1 BAND - .17
	NRRT-71 - 1 BAND - .11
	RT-14 - 1 BAND - .10
8)	
i) NO.OF BHS EXCLD.CSR & OB (>0.30M): 3	NRRT 3, 37, 61,
	NRRT-3 - 1 BAND - .31
	NRRT-37 - 1 BAND - .40
	NRRT-61 - 1 BAND - .63

### 6.24.0 SEAM II L2

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 23A & VII 23B
II. Seam folio plan	:	Plate No. X-23
III. Seam Quality	:	Plate No. IV & VI
IV. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.24.1 Seam II L2 is the middle split of Seam II occurring in between II L3 and II L1. It occurs distinctly and separately throughout the block. It overlies seam II L1 with a parting of 5.00 m to 60.39 m (mostly the parting is 5.0 to 35.0 m). The seam II L2 does not crop in the block.

6.24.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(23) and the graphic representation of various quality parameters of seam is given in fig-23 (i-vii). The seam description in brief is given below.

6.24.3 The full seam thickness has been intersected in 44 boreholes. The seam is faulted in one borehole and it is not developed in 61 BHs. The seam is not taken deeper in 11 boreholes as they are not deepened upto the seam. The full seam thickness varies from 0.07 m to 2.68 m (the prevalent seam thickness is <0.50 to 0.90 m in 57% of boreholes) The seam is not workable over major part of the block. It is workable (0.90 to 3.0 m. thickness) in 19 BHs (43%) occurring in the NW and SW parts of the block. The seam occurs at depth range of 129.88 m to 549.50 m within the block. Seam II L2 is assessed for underground potentiality only.

6.24.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>0</sup> C / Calculated basis). The Moisture content of the seam varies from 1.90 % to 9.50% (prevalent M% is 3.0 to 8.0%) and Ash % varies from 8.90% to 39.0% (prevalent range is 10.0% to 18.0%. The UHV varies from 3021 to 6968 K.Cal/Kg. The seam grade is F to A (prevalent grade is B & A). The seam has better grade over the major part of the block. But the seam grade is E & F in the SW part of the block. In a majority of boreholes (41 Nos) the seam does not contain any dirt bands.

**A) Ultimate analysis :** The Ultimate analysis of the seam has been determined for 2samples and the results are provided in annexure VI A and its range is given below :



**Range of Ultimate analysis of seam II L2**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	62.44	2.44	0.36	0.23	4.90
Maximum	66.27	3.58	1.27	0.43	9.98

**B) Total Sulphur :** The total sulphur for seam II L2 has been determined for 4 samples (Annexure VI C). The total sulphur range is given below .

**Total Sulphur in seam II L2**

Range	Total Sulphur %
Minimum	0.32
Maximum	0.54

**C) Ash analysis :** The ash analysis has been determined for seam II L2 for 2 samples and the range is given below (Annexure VI B)

**Range of Ash Analysis for seam II L2**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	60.02	64.70
Al <sub>2</sub> O <sub>3</sub>	25.20	29.60
Fe <sub>2</sub> O <sub>3</sub>	4.93	5.64
TiO <sub>2</sub>	2.24	2.47
CaO	0.41	0.64
MgO	0.35	0.70
Na <sub>2</sub> O	0.07	0.11
K <sub>2</sub> O	0.10	0.10
SO <sub>3</sub>	0.36	0.45
P <sub>2</sub> O <sub>5</sub>	0.17	0.19

**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature of the seam has been determined for one sample (Annexures VI D).

**Ash Fusion Temperature Range for seam II L2**

IT	ST	HT	FT
>1450	>1450	>1450	>1450

**E) Phosphorous :** The Phosphorous content of seam II L2 has been determined for one sample and it is <0.03% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for one sample. The swelling index is '0' and coke type is 'A' (Annexure VI F).

**G) HGI :** The HGI for seam II L2 is determined for 4 samples. The HGI values vary from 58 to 74 (Annexure VI G).

TABLE : VI(23)

SEAM : II L2

-----  
 THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.  
 -----

## 1] BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION: 44 MBRT - 1, 2, 7, 12, 13, 14, 15, 16, 17, 19,  
 21, 26, 32, 40, 41, 42, 44, 50, 52, 53,  
 55, 57, 59, 60, 61, 64, 65, 66, 67, 70,  
 71, 72, 78, 79, 80, 81, 83, 84, 89, 96,  
 97, RT - 1, 7, 8

ii) SEAM FAULTED IN BOREHOLES: 1 MBRT - 62

iii) SEAM NOT DEVELOPED : 61 MBRT - 3, 4, 5, 6, 8, 9, 10, 11, 18, 20, 22,  
 23, 24, 25, 27, 28, 29, 30, 31, 33, 34,  
 35, 36, 37, 38, 39, 43, 45, 46, 47, 48,  
 49, 51, 54, 56, 58, 63, 68, 69, 73, 74,  
 75, 76, 77, 87, 92, 93, 98, 99, 101,  
 RT- 2, 3, 5, 6, 9, 10, 11, 12, 13, 14, 15

iv) BH. NOT DRILLED UPD SEAM : 11 MBRT - 82, 85, 86, 88, 90, 91, 94, 95, 100, 102,  
 RT- 4

## 2] DEPTH RANGE(FLOOR) (M)

i) SHALLOWEST : 129.88 (MBRT-66 )  
 ii) DEEPEST : 549.50 (MBRT-50 )

## 3] THICKNESS (M)

*)	SEAM THICKNESS	BCH			
		I-30	I-100		
i) MIN.	.07 (MBRT-21 )	.07 (MBRT-21 )	.07 (MBRT-21 )	.07 (MBRT-21 )	.07 (MBRT-21 )
ii) MAX.	2.68 (MBRT-80 )	2.68 (MBRT-80 )	2.68 (MBRT-80 )	2.68 (MBRT-80 )	2.68 (MBRT-80 )
iii) MEAN	.89	.89	.89	.89	.89
iv) STD. DEVIATION	.62	.63	.62	.62	.62
b) THICK. RANGE (m) NO. OF BHS NO. OF BHS NO. OF BHS. NO. OF BHS.					
<0.5	13	13	13	13	13
0.5-0.9	12	12	11	11	11
0.9-1.0	2	3	3	3	3
1.0-1.2	5	3	4	4	4
1.2-1.5	3	4	4	4	4
1.5-2.0	7	7	7	7	7
2.0-2.5	1	1	1	1	1
2.5-3.0	1	1	1	1	1
TOTAL	44	44	44	44	44

## 4] PARTING WITH THE UNDERLYING SEAM :

i) Minimum : 5.00 (MBRT-71 ) MEAN : 25.40  
 ii) Maximum : 60.39 (MBRT-70 ) S.D. : 14.77

TABLE : VI(23) Contd.

5] ROOF CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	SST	SUBORDINATE :
ii] 3.0 m Column:	DOMINANT :	SST	SUBORDINATE :
			DCTLE
6] FLOOR CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	ICAL	SUBORDINATE :
ii] 1.0 m Column:	DOMINANT :	ARG. SST	SUBORDINATE :
			ICAL

TABLE : VI(23) Contd.

7] QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BRS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (t)	30	1.90	9.50	5.18	1.84
ASH (t)	30	8.90	39.00	16.24	7.27
UEV (k.cal/kg)	30	3021.	6968.	5945.	983.
GRADE	30	F	A		
C.V (k.cal/k.g)	3	6320.	7020.	6773.	321.

## TABLE : VI(23) Contd.

## 8) DIRT BANDS FOR 44 BHS. CONSIDERED

-----	
i) NO OF BHS DEVOID OF DIRT BANDS: 41	NRRT - 1, 2, 7, 12, 13, 14, 15, 16, 17, 19, 21, 26, 32, 40, 41, 42, 44, 50, 52, 53, 55, 57, 59, 60, 61, 65, 66, 67, 70, 71, 72, 78, 79, 80, 83, 84, 89, 97 RT - 1, 7, 8
ii) NO.OF BHS WITH DEVOIDS DIRTY BANDS:	1 NRRT - 81 NRRT-81 - 1 BAND - .12
iii) NO.OF BHS WITH CSW BANDS:	2 NRRT - 64, 96 NRRT-64 - 1 BAND - .16 NRRT-96 - 1 BAND - .11

## 9) DIRT BANDS DETAIL : Nil

### 6.25.0 SEAM II L1

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 24A to VII 24D
II. Seam folio plan	:	Plate No. X-24
III. Seam Quality	:	Plate No. IV & VI
IV. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.25.1 Seam II L1 is a local band and lower split of Seam II. It occur as a distinct seam / band throughout the block. It overlies seam II with a parting of 1.27 m to 20.59 m (mostly the parting is 3.0 to 14.0 m). It is not intercropping in the block.

6.25.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(24) and the graphic representation of various quality parameters of seam is given in fig-24 (i-vii). The seam description in brief is given below.

6.25.3 The full seam thickness has been intersected in 80 boreholes. The seam is faulted in one borehole. Seam II L1 is not developed in 25 BHs. and 11 BHs are not drilled upto the seam. The full seam thickness varies from 0.05 m to 1.54 m (the prevalent seam thickness is <0.50 to 0.90 m in 88% of boreholes) It has attained workable thickness of 0.90 to 1.54 m in 9 BHs (12%). The seam is mostly unworkable, except in the south central part of the block around BHs MNRT-8, 42, 96 & 18. The seam roof consists dominantly of sandstone and its floor consists of Shale / Clay. The seam occurs at depth range of 185.02 m to 578.05 m within the block. The seam assessed for underground potentialities only.

6.25.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / Calculated basis). The Moisture content of the seam varies from 1.70 % to 6.50% (prevalent M% is 2.0 to 6.0, %) and Ash % varies from 6.90% to 47.20% (prevalent range is 9.0% to 13.0%). The UHV varies from 2152 to 7285 K.Cal/Kg. The quality of the seam is generally A & B grade in the workable parts of the seam. The seam generally contain clean coal (75 BHs.) and only in 5 BHs it has one band.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 3 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam II L1**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	60.14	3.85	1.26	0.19	8.42
Maximum	70.20	4.63	1.52	0.43	9.55

**B) Total Sulphur :** The total sulphur for seam II L1 has been determined for 6 samples (Annexure VI C). The total sulphur range is given below .

**Total Sulphur in seam II L1**

Range	Total Sulphur %
Minimum	0.24
Maximum	0.59

**C) Ash analysis :** The ash analysis has been determined for seam II L1 for 2 samples which are given below (Annexure VI B)

**Range of Ash Analysis for seam II L1**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	55.28	61.14
Al <sub>2</sub> O <sub>3</sub>	32.27	35.88
Fe <sub>2</sub> O <sub>3</sub>	2.95	4.38
TiO <sub>2</sub>	1.60	2.19
CaO	0.33	0.43
MgO	0.58	0.87
Na <sub>2</sub> O	0.15	0.22
K <sub>2</sub> O	0.11	0.18
SO <sub>3</sub>	0.09	0.38
P <sub>2</sub> O <sub>5</sub>	0.19	0.20



**D) Ash Fusion Temperature (AFT) :** Ash Fusion Temperature of the seam has been determined for one sample (Annexures VI D).

**Ash Fusion Temperature for seam II L1**

IT	ST	HT	FT
>1450	>1450	>1450	>1450

**E) Phosphorous :** The Phosphorous content of seam II L1 has been determined for 3 samples and it is <0.03% for all the samples (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 2 samples. The swelling index is '0' & 0.5 and coke type is 'B' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam II L1 is determined for 5 samples. The HGI values varies from 56 to 71 (Annexure VI G).

TABLE : VI(24)

SEAM : II L1

-----  
 THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.  
 -----

## 1] BOREHOLE INTERSECTION

- 1) FULL SEAM INTERSECTION: 80 MNRT - 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 29, 31, 34, 37, 39, 39, 40, 41, 42, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 83, 84, 89, 96, 98, RT - 7, 11, 13, 14, 15
- ii) SEAM FAULTED IN BOREHOLES: 1 MNRT - 62
- iii) SEAM NOT DEVELOPED : 25 MNRT - 4, 22, 23, 30, 32, 33, 35, 36, 43, 49, 87, 92, 93, 97, 99, 101, RT - 1, 2, 3, 5, 6, 8, 9, 10, 12
- iv) BH. NOT DRILLED UP TO SEAM : 11 MNRT - 82, 85, 86, 88, 90, 91, 94, 95, 100, 102, RT - 4

## 2] DEPTH RANGE (FLOOR) (M)

- i) SHALLOWEST : 185.02 (MNRT-66 )  
 ii) DEEPEST : 578.05 (MNRT-50 )

## 3] THICKNESS (M)

#]	SEAM THICKNESS	BCS			
		I-30	I-100		
i) MIN.	.05 (MNRT-80 )	.05 (MNRT-80 )	.05 (MNRT-80 )	.05 (MNRT-80 )	
ii) MAX.	1.54 (MNRT-59 )	1.54 (MNRT-59 )	1.54 (MNRT-59 )	1.54 (MNRT-59 )	
iii) MEAN	.52	.51	.51	.51	
iv) STD.DEVIATION	.31	.29	.30	.31	
b) THICK. RANGE (m)	NO. OF BMS	NO. OF BMS	NO. OF BMS.	NO. OF BMS.	
<0.5	37	37	37	37	
0.5-0.9	33	35	34	33	
0.9-1.0	2	1	2	2	
1.0-1.2	5	5	5	5	
1.2-1.5	2	1	1	2	
1.5-2.0	1	1	1	1	
TOTAL	80	80	80	80	

## 4] PARTING WITH THE UNDERLYING SEAM :

- i) Minimum : 1.27 (MNRT-26 ) MEAN : 9.21  
 ii) Maximum : 20.59 (MNRT-40 ) S.D. : 4.22

TABLE : VI(24) Contd.

5] ROOF CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	SST	SUBORDINATE :
ii] 3.0 m Column:	DOMINANT :	SST	SUBORDINATE :
			CLAY
6] FLOOR CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	SHALE	SUBORDINATE :
ii] 1.0 m Column:	DOMINANT :	CLAY	SUBORDINATE :
			ICAL

TABLE : VI(24)Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BRS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	41	1.70 MNRT-51	6.50 MNRT-44	3.97	1.32
ASH (%)	41	6.90 MNRT-37	47.20 MNRT-51	17.07	8.93
UEV (k.cal/kg)	41	2152. MNRT-51	7285. MNRT-37	5997.	1165.
GRADE	41	G MNRT-51	A MNRT-7		
C.V (k.cal/k.g)	3	6180. MNRT-84	6950. MNRT-68	6500.	328.

TABLE : VI(24)Contd.

## 8] DIRT BANDS FOR 78 BHS. CONSIDERED

-----  
 1) NO.OF BHS DEVOID OF DIRT BANDS: 75 MHRT = 1, 2, 3, 5, 6, 7, 9, 10, 11, 12,  
 13, 14, 15, 16, 17, 18, 19, 20, 21, 24, 25,  
 26, 27, 28, 29, 31, 34, 37, 38, 39, 40,  
 41, 42, 44, 45, 46, 47, 48, 50, 53, 54,  
 55, 56, 57, 58, 59, 60, 61, 63, 64, 65,  
 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76,  
 77, 78, 79, 80, 81, 83, 84, 89

BT - 7, 11, 13, 14, 15

14] NO.OF BHS WITH OBVIOUS DIRT BANDS: 1 MHRT = 51  
 MHRT = 51 - 1 BAND = .35

111] NO.OF BHS WITH CSB BANDS: 4 MHRT = 8, 52, 96, 98

MHRT-8 - 1 BAND - .15  
 MHRT-52 - 1 BAND - .14  
 MHRT-96 - 1 BAND - .10  
 MHRT-98 - 1 BAND - .16

9]

1] NO.OF BHS EXCLD.CSB & OB (>0.30M): 1 MHRT = 51  
 MHRT = 51 - 1 BAND = .35

### 6.26.0 SEAM II

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 25A to VII 25D
II. Floor contour plan	:	Plate No. IX T
III. Seam folio plan	:	Plate No. X-25
IV. Seam Quality	:	Plate No. IV & VII
V. Reserves	:	Plate No. Table : VIII I to VIII 23

6.26.1 Seam II is a prominent seam in the lower column of coal bearing Barakar formation. This is the bottom most workable seam in the block. It overlies seam II L with a parting of 0.37 m to 3.89 m (mostly the parting is 0.50 to 2.0 m). The seam is not incroeping anywhere in the block.

6.26.2 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(25) and the graphic representation of various quality parameters of seam is given in fig-25 (i-vii). The seam description in brief is given below.

6.26.3 The full seam thickness has been intersected in 91 boreholes. The seam is faulted in one borehole, it is not developed in 8 BHs and 17 BHs are not taken deeper to intersect the seam. The full seam thickness varies from 0.13 m to 5.92 m. It has attained thickness of 1.50 to 2.50 m in 30 boreholes. It is not workable (thickness <0.90 m) in 20 boreholes in the eastern part of the block near Kelo river. The seam occurs at depth range of 193.41 m to 591.16 m within the block. The seam is assessed for underground potentials only.

6.26.4 **Quality** : The coal seam quality on I-100, I-30 and BCS analysis basis is given in Annexure VI (on 60% RH and 40<sup>0</sup> C / Calculated basis). The Moisture content of the seam varies from 1.00 % to 7.20% (prevalent M% is 2.0 to 6.0. %) and Ash % varies from 6.20% to 51.60% (prevalent range is 6.50% to 26.0%) The UHV varies from 1641 to 7451 K.Cal/Kg. The seam grade is G to A (prevalent grade is A). The seam grade is mostly 'A' over the block except around borehole nos. MNRI-65 56, 10 & 63 in the eastern part. The seam is devoid of bands in majority of boreholes (63 Nos). A carbshale and obvious band is present in 28 boreholes.

**A) Ultimate analysis** : The Ultimate analysis of the seam has been determined for 10 samples and the results are provided in annexure VI A and its range is given below :

**Range of Ultimate analysis of seam II**

Range	Carbon %	Hydrogen %	Nitrogen %	Sulphur %	Oxygen %
Minimum	31.08	1.99	0.26	0.29	4.34
Maximum	75.21	4.54	1.50	0.42	11.77

**B) Total Sulphur :** The total sulphur in seam II has been determined for 7 samples (Annexure VI C). The total sulphur range is given below .

**Total Sulphur in seam II**

Range	Total Sulphur %
Minimum	0.24
Maximum	0.37

**C) Ash analysis :** The ash analysis has been determined for seam II for 4 samples and the range is given below (Annexure VI B)

**Range of Ash Analysis for seam II**

Constituent	Range in %	
	Minimum	Maximum
SiO <sub>2</sub>	62.66	68.80
Al <sub>2</sub> O <sub>3</sub>	23.16	27.09
Fe <sub>2</sub> O <sub>3</sub>	3.08	6.12
TiO <sub>2</sub>	1.47	2.31
CaO	0.45	0.91
MgO	0.52	1.08
Na <sub>2</sub> O	0.07	0.31
K <sub>2</sub> O	0.11	0.84
SO <sub>x</sub>	0.25	0.90
P <sub>2</sub> O <sub>5</sub>	0.08	0.19

**D) Ash Fusion Temperature Range (AFT) :** Ash Fusion Temperature of the seam has been determined for 3 samples (Annexures VI D).

**Ash Fusion Temperature for seam II**

Range	IT	ST	HT	FT
Minimum	>1450	>1450	>1450	>1450
Maximum	>1450	>1450	>1450	>1450

**E) Phosphorous :** The Phosphorous content of seam II has been determined for 2 samples and it is <0.03% (Annexure VI E).

**F) Swelling Index and Coke Type :** The swelling index and coke type of the seam has been determined for 3 samples. The swelling index is '0' & 0.5 and coke type is 'B' & 'A-B' (Annexure VI F).

**G) HGI :** The HGI for seam II is determined for 7 samples. The HGI values varies from 52 to 76 (Annexure VI G).



TABLE : VI(25)

## SEAM : 11

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 91 MNRT - 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72, 73, 74, 75, 77, 79, 80, 81, 83, 84, 87, 89, 92, 93, 96, 97, 98, 99,  
RT - 2, 5, 6, 7, 10, 14

11) SEAM FAULTED IN BOREHOLES: 1 MNRT - 101  
111) SEAM NOT DEVELOPED : 8 MNRT - 54, 69, 76, 78, 9, 11, 12, 13  
1iv) BS. NOT DRILLED UP TO SEAM : 17 MNRT - 1, 7, 82, 85, 86, 88, 90, 91, 94, 95, 100, 102,  
RT - 1, 3, 4, 8, 15

## 2) DEPTH RANGE(FLOOR) (M)

i) SHALLOWEST : 193.41 (MNRT-66 )  
ii) DEEPEST : 591.16 (MNRT-50 )

## 3) THICKNESS(M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.13 (MNRT-68 )	.13 (MNRT-68 )	.13 (MNRT-68 )	.13 (MNRT-68 )
ii) MAX.	5.92 (MNRT-36 )	5.92 (MNRT-36 )	5.92 (MNRT-36 )	5.92 (MNRT-36 )
111) MEAN	2.08	1.96	1.99	2.09
iv) STD. DEVIATION	1.37	1.27	1.28	1.37
b) THICK. RANGE(m)	NO. OF BBS	NO. OF BBS	NO. OF BBS.	NO. OF BBS.
<0.5	9	10	9	9
0.5-0.9	11	11	11	11
0.9-1.0	1	0	1	1
1.0-1.2	5	4	4	4
1.2-1.5	7	9	9	9
1.5-2.0	18	21	20	18
2.0-2.5	13	12	13	13
2.5-3.0	8	7	6	8
3.0-3.5	4	4	5	4
3.5-4.0	5	6	6	5
4.0-5.0	5	5	4	5
5.0-6.0	5	2	3	5
TOTAL	91	91	91	91

## 4) PARTING WITH THE UNDERLYING SEAM :

i) Minimum : .37 (MNRT-59 ) MEAN : 1.49  
ii) Maximum : 3.89 (MNRT-46 ) S.D. : .97

TABLE : VI(25) Contd.

5] ROOF CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	SST	SUBORDINATE :
ii] 3.0 m Column:	DOMINANT :	CLAY	SUBORDINATE :
			SST
6] FLOOR CHARACTERISTICS :			
-----			
i] IMMEDIATE :	DOMINANT :	ICAL	SUBORDINATE :
ii] 1.0 m Column:	DOMINANT :	ICAL	SUBORDINATE :
			SHALE
			SST

TABLE : VI(25) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-T100)

PARAMETER	NO. OF BHS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	80	1.00 MNRT-63	7.20 MNRT-44	4.08	1.28
ASH (%)	80	6.20 MNRT-75	51.60 MNRT-63	17.06	9.62
DEW (k.cal/kg)	80	1641. MNRT-63	7451. MNRT-5	5981.	1265.
GRADE	80	G MNRT-63	A MNRT-3		
C.V (k.cal/k.g)	7	4960. MNRT-38	7180. MNRT-26	6486.	741.

TABLE : VI(25) Contd.

## 8) DIRT BANDS FOR 99 BHS. CONSIDERED

i) NO. OF BHS DEVOID OF DIRT BANDS: 63	
MNRT - 3,	4, 5, 11, 12, 15, 16, 18, 19, 23,
	24, 25, 26, 27, 28, 32, 33, 34, 36, 37,
	40, 41, 42, 44, 46, 48, 49, 50, 51, 52,
	53, 55, 56, 57, 58, 59, 60, 61, 67, 68,
	70, 71, 72, 73, 74, 75, 77, 79, 80, 83,
	84, 87, 89, 92, 93, 96, 97, 98, 99
RT - 5,	7, 10, 14
ii) NO. OF BHS WITH OBVIOUS DIRT BANDS: 24	
MNRT - 2,	6, 9, 10, 13, 17, 21, 20, 22, 29, 30,
	31, 35, 38, 39, 43, 45, 47, 62, 63, 65, 66
RT - 2,	6

MNRT-2	- 2 BAND	= .71
MNRT-6	- 1 BAND	= .70
MNRT-9	- 1 BAND	= .43
MNRT-10	- 1 BAND	= .10
MNRT-13	- 1 BAND	= .13
MNRT-17	- 1 BAND	= .10
MNRT-20	- 1 BAND	= .32
MNRT-21	- 1 BAND	= .35
MNRT-27	- 2 BAND	= .69
MNRT-29	- 1 BAND	= .20
MNRT-30	- 1 BAND	= .36
MNRT-31	- 1 BAND	= .75
MNRT-35	- 1 BAND	= .62
MNRT-38	- 1 BAND	= .76
MNRT-39	- 1 BAND	= .38
MNRT-43	- 1 BAND	= .30
MNRT-45	- 1 BAND	= .34
MNRT-47	- 1 BAND	= .70
MNRT-62	- 1 BAND	= .28
MNRT-63	- 1 BAND	= .26
MNRT-65	- 1 BAND	= .63
MNRT-66	- 1 BAND	= .65
RT-2	- 1 BAND	= .41
RT-6	- 1 BAND	= .40

iii) NO. OF BHS WITH CSR BANDS: 4		
MNRT-8,	14, 64, 81	
MNRT-8	- 1 BAND	= .25
MNRT-14	- 1 BAND	= .28
MNRT-64	- 1 BAND	= .17
MNRT-81	- 1 BAND	= .14

## 9)

1) NO. OF BHS EXCLD. CSR & DB (>0.30M): 17		
MNRT - 2, 6, 9, 21, 20, 22, 30, 31, 35, 38, 39,	45, 47, 65, 68, RT - 2, 4	
MNRT-2	- 1 BAND	= .46
MNRT-6	- 1 BAND	= .70
MNRT-9	- 1 BAND	= .43
MNRT-20	- 1 BAND	= .32
MNRT-21	- 1 BAND	= .35
MNRT-22	- 1 BAND	= .50
MNRT-30	- 1 BAND	= .36
MNRT-31	- 1 BAND	= .75
MNRT-35	- 1 BAND	= .62

TABLE : VI (25) Contd.

NRRT-38	- 1	BAND	- .76
NRRT-39	- 1	BAND	- .38
NRRT-45	- 1	BAND	- .34
NRRT-47	- 1	BAND	- .70
NRRT-65	- 1	BAND	- .63
NRRT-66	- 1	BAND	- .65
RT-2	- 1	BAND	- .41
RT-6	- 1	BAND	- .40

### 6.27.0 SEAM II L

#### Reference of documentation :

I. Seam structure	:	Plate No. VII 26A & VII 26B
II. Seam folio plan	:	Plate No. X-26
III. Seam Quality	:	Plate No. IV & VII
IV. Reserves	:	Plate No. Table : VIII 1 to VIII 23

6.27.1 Seam II L is the lower split of seam II. It is developed locally in the northwestern part of the block. It overlies seam I with a parting of around 35.0 m.

6.27.2 The full thickness of II L has been intersected in 32 boreholes and it is not developed in 61 BHs. It varies in thickness from 0.05 m to 2.45 m. Seam II L attains workable thickness of 0.90 to 2.50 m in 9 boreholes only. The quality of the seam in the developed part is B and C. The seam occurs at depth range of 241.50 m to 592.44 m within the block.

6.27.3 The statistic parameters viz. the seam thickness, parting, depth range, no. of dirt bands, roof and floor characteristics and coal quality is given along side in the statistic parameter Table no. VI(26) and the graphic representation of various quality parameters of seam is given in fig.-26 (i-vii).

6.27.4 **Quality** : The coal seam quality on I-100, I-30 and Bcs analysis basis is given in Annexure VI (on 60% RH and 40<sup>o</sup> C / calculated basis). The Moisture content of the seam varies from 2.70% to 6.70% (prevalent M% is 4.00 to 6.0%) and Ash % varies from 8.0% to 48.0% (prevalent range is 28% to 32%). The UHV varies from 1862 to 7285 K Cal/Kg. The seam grade varies from G to A (prevalent grade E to A). The seam contain clean coal in 27 boreholes. A band of Csh/OB band is present in 5 BHs.

**A) Ultimate analysis** : The Ultimate analysis of seam has been determined for 4 samples and the results are provided in annexure VIA and its range is given below :

**Range of Ultimate analysis of seam II L**

Range	Carbon%	Hydrogen%	Nitrogen%	Sulphur%	Oxygen%
Minimum	39.65	1.29	0.30	0.14	0.50
Maximum	61.15	3.47	0.55	0.33	6.39

**B) Total Sulphur :** Total sulphur and its distribution is not determined separately. However total sulphur is available in ultimate analysis.

**C) Ash analysis :** The ash analysis has been determined for seam II L for 1 sample and the result is given below (Annexure VI B)

**Range of Ash Analysis for seam II L**

SiO <sub>2</sub>	69.08
Al <sub>2</sub> O <sub>3</sub>	24.12
Fe <sub>2</sub> O <sub>3</sub>	2.44
TiO <sub>2</sub>	1.88
CaO	0.58
MgO	0.28
Na <sub>2</sub> O	0.08
K <sub>2</sub> O	0.12
SO <sub>3</sub>	0.56
P <sub>2</sub> O <sub>5</sub>	0.09

**D) Swelling Index and Coke Type :** The swelling index and coke type of seam II L has been determined for 2 samples. The swelling index is '0' to 0.5 and coke type is 'A' & 'A-B' (Annexure VI F).

TABLE : VI (26)

SEAM : II L

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

i) FULL SEAM INTERSECTION:	32 MNRT - 3, 4, 5, 8, 11, 13, 16, 19, 21, 23, 24, 25, 26, 32, 34, 40, 44, 46, 49, 50, 51, 53, 59, 70, 74, 75, 84, 87, 89, 97, 98, 99
ii) SEAM FAULTED IN BOREHOLES:	1 MNRT - 101
iii) SEAM DETERIORATED IN QUALITY:	1 MNRT - 60
iv) SEAM NOT DEVELOPED :	60 MNRT - 2, 6, 9, 10, 12, 13, 14, 17, 18, 22, 27, 28, 29, 30, 31, 33, 35, 36, 37, 38, 39, 42, 43, 45, 47, 48, 52, 54, 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 68, 69, 71, 72, 73, 76, 77, 78, 79, 80, 81, 83, 96 RT - 5, 6, 7, 9, 10, 11, 12, 13, 14,
v) BH. NOT DRILLED UP TO SEAM :	23 MNRT - 1, 7, 20, 41, 67, 82, 85, 86, 88, 90, 91, 92, 93, 94, 95, 100, 102 RT - 1, 2, 3, 4, 8, 15

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST :	241.50 (MNRT-49 )
ii) DEEPEST :	592.44 (MNRT-50 )

## 3) THICKNESS (M)

w)	SEAM THICKNESS			
	BCS	I-30	I-100	
i) MIN.	.05 (MNRT-50 )	.05 (MNRT-50 )	.05 (MNRT-50 )	.05 (MNRT-50 )
ii) MAX.	2.45 (MNRT-97 )	2.45 (MNRT-97 )	2.16 (MNRT-98 )	2.45 (MNRT-97 )
iii) MEAN	.77	.73	.76	.77
iv) STD. DEVIATION	.75	.67	.71	.75
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
<0.5	15	15	15	15
0.5-0.9	8	8	8	8
1.0-1.2	1	2	1	1
1.2-1.5	1	0	1	1
1.5-2.0	3	6	4	3
2.0-2.5	4	1	3	4
TOTAL	32	32	32	32



TABLE : VI(26) Contd.

## 4] PARTING WITH THE UNDERLYING SEAM :

-----

i] Minimum	: 35.56 (MORT-53)	MEAN	: 35.56
ii] Maximum	: 35.56 (MORT-53)	S.D.	: .00

## 5] ROOF CHARACTERISTICS :

-----

i] IMMEDIATE	:	DOMINANT : ICAL	SUBORDINATE : SHALE
ii] 3.0 m Columns:	:	DOMINANT : DCTLE	SUBORDINATE : ICAL

## 6] FLOOR CHARACTERISTICS :

-----

i] IMMEDIATE	:	DOMINANT : ICAL	SUBORDINATE : SHALE
ii] 1.0 * Columns:	:	DOMINANT : ICAL	SUBORDINATE : ARE. SH

TABLE : VI(26) Contd.

7) QUALITY PARAMETERS (ON 60 % RH &amp; AT 40°C. &amp; CALCULATED BASIS-I100)

PARAMETER	NO. OF BBS.	MINIMUM	MAXIMUM	MEAN	STANDARD DEVIATION
MOISTURE (%)	16	2.70	6.70	4.43	1.01
		MNRT-24	MNRT-32		
ASH (%)	16	8.00	48.00	22.79	10.14
		MNRT-21	MNRT-84		
HEV (k.cal/kg)	16	1862.	7285.	5145.	1348.
		MNRT-84	MNRT-21		
GRADE	16	G	A		
		MNRT-84	MNRT-5		
C.V (k.cal/k.g)	1	3560.	3560.	3560.	0.
		MNRT-84	MNRT-84		

TABLE : VI(26) Contd.

## 8] DIRT BANDS FOR 31 BBS. CONSIDERED

i)	NO.OF BBS DEVOID OF DIRT BANDS:	27	NRRT - 3, 4, 5, 8, 11, 15, 19, 21, 23, 24,
			25, 26, 32, 34, 44, 46, 49, 50, 51, 53,
			59, 70, 74, 75, 84, 89, 99,
ii)	NO OF BBS WITH QUINTOUS DIRT BANDS:	4	NRRT - 16, 40, 87, 97
			*NRRT-16 - 1 BAND - .05
			NRRT-40 - 1 BAND - .28
			NRRT-87 - 1 BAND - .30
			NRRT-97 - 1 BAND - .50
iii)	NO.OF BBS WITH CSB BANDS:	2	NRRT - 16, 98
			*NRRT-16 - 1 BAND - .18
			NRRT-98 - 1 BAND - .14
9]			
i)	NO.OF BBS EXCLD.CSB & OB (>0.30M):	1	NRRT - 97
			NRRT-97 - 1 BAND - .50

### 6.28.0 SEAM I

- 6.28.1 Seam I is a thin seam occurring as the lowest coal horizon in the Barakar column in the block. It has been intersected only in 6 boreholes, in which its thickness is <0.50 m. Majority of boreholes are not deepened upto the seam due to its non potentiality. The seam serves for correlation purpose only. The statistics for the seam is given in table VI-27

TABLE : VI(27)

SEAM : I

THE SALIENT FEATURES OF THE SEAMS ARE AS FOLLOWS.

## 1) BOREHOLE INTERSECTION

1) FULL SEAM INTERSECTION: 6 MHRT - 18, 53, 56, 5, 7, 10  
 ii) SEAM NOT DEVELOPED : 9 MHRT - 49, 62, 96, 6, 9, 11, 12, 13, 14  
 iii) BH. NOT DRILLED UP TO SEAM : 102 MHRT - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10,  
 11, 12, 13, 14, 15, 16, 17, 19, 20, 21,  
 22, 23, 24, 25, 26, 27, 28, 29, 30, 31,  
 32, 33, 34, 35, 36, 37, 38, 39, 40, 41,  
 42, 43, 44, 45, 46, 47, 48, 50, 51, 52,  
 54, 55, 57, 58, 59, 60, 61, 63, 64, 65,  
 66, 67, 68, 69, 70, 71, 72, 73, 74, 75,  
 76, 77, 78, 79, 80, 81, 82, 83, 84, 85,  
 86, 87, 88, 89, 90, 91, 92, 93, 94, 95,  
 97, 98, 99, 100, 101, 102  
 RT - 1, 2, 3, 4, 8, 15

## 2) DEPTH RANGE (FLOOR) (M)

i) SHALLOWEST : 326.35 (RT-10 )  
 ii) DEEPEST : 481.72 (RT-5 )

## 3) THICKNESS (M)

a)	SEAM THICKNESS	BCS	I-30	I-100
i) MIN.	.22 (RT-5 )	.22 (RT-5 )	.22 (RT-5 )	.22 (RT-5 )
ii) MAX.	.55 (RT-10 )	.55 (RT-10 )	.55 (RT-10 )	.55 (RT-10 )
iii) MEAN	.35	.35	.35	.35
iv) STD. DEVIATION	.12	.12	.12	.12
b) THICK. RANGE (m)	NO. OF BHS	NO. OF BHS	NO. OF BHS.	NO. OF BHS.
<0.5	5	5	5	5
0.5-0.9	1	1	1	1
TOTAL	6	6	6	6

## 4) ROOF CHARACTERISTICS :

i) IMMEDIATE : DOMINANT : SST SUBORDINATE :  
 ii) 3.6 m Calcana: DOMINANT : SST SUBORDINATE : ICAL

## 5] FLOOR CHARACTERISTICS :

i] IMMEDIATE : DOMINANT : CLAY SUBORDINATE : SST  
ii] 1.0 m Column: DOMINANT : SHALE SUBORDINATE : CLAY

## 6] DIRT BANDS FOR 6 BRG, CONSIDERED

1) NO-OF BRG DEVOID OF DIRT BANDS: 6 BRG - 18, 53, 56, RT-5, 7, 10

## 7] DIRT BANDS DETAIL : Nil

### 6.29.0 Local Bands

6.29.1 Besides, the 27 seams described in the preceding paragraphs, there are thin coal bands, which are locally developed in the block. These coal bands are less persistent and mostly unworkable. They are as follows (from top to bottom).

Sr. No.	Band Nos.	Occurring between Seams
1	Band-1	VIB & VT
2	Band-2	VT / VIB & V M
3	Band-3	VB & IVT
4	Band-4	IVB & III L
5	Band-5	II L3 & II L2
6	Band	Thin bands not numbered occurring any where in the Barakar coloumn.
7	Local	

All the above 7 to 8 carbonaceous bands are locally developed, less persistent and unworkable. Their thickness development is shown in plates X 27A to X 29 for a few intersection proximate analysis was obtained alongwith special test and they are presented in Annexure VI A to G.

- 6.29.2 **Band 1 (Plate No. X 27A) :** Band-1 occurs between seam VI B & V T. It has been intersected in 37 boreholes occurring in NW, SW & NE parts of the block. The band thickness is <0.90 m in 35 boreholes and 2 boreholes have thicknesses of 1.50 m (MNRT-20) and 1.18 m (MNRT-67).
- 6.29.3 **Band-2 (Plate No. X 27B) :** Band-2 occurs between seams VI B / V T & V M and it has been intersected in 70 boreholes. It is not developed in the northern part of the block. The thickness of the band is <0.90 m in 64 boreholes and its thickness is 0.90 to 1.53 m in 6 boreholes (MNRT-38, 62, 81, 84, 87 & 94).
- 6.29.4 **Band-3 (Plate No. X 27C) :** Band-3 occurs between seams VB & IV T and it has been intersected in 31 boreholes. It occurs in NW & Southern parts of the block. The band thickness is <0.90 m in 24 boreholes and has thickness of 0.91 m to 1.56 in 7 BHs (MNRT-3,31,41,60,74,88 & 99).
- 6.29.5 **Band-4 (Plate No. X 27D) :** Band-4 occurs between seams IV B & III L and it has intersected in 14 boreholes. It has thickness of <0.90 m in all the boreholes.
- 6.29.6 **Band-5 (Plate No. X 27E) :** Band-4 occurs between seams II L3 and II L2. It has been intersected in 4 boreholes only in the NW part of the block. Except in BH MNRT-1 (0.90 m.) it has thickness of <0.90 m in other boreholes.

- 6.29.7 **Band:** Besides the above defined 5 coal bands any other carbonaceous material occurring in the Barakar column are delineated as 'Band'. The thickness of the 'Band' in boreholes is depicted in Plate No. X 28 which is mostly <0.90 m. in majority of boreholes. Its thickness is 0.90 m. to 1.25 m. in boreholes i.e. MNRT 5, 24, 33, 67, 68, 88, 97 & 98.
- 6.29.8 **Local :** To differentiate two bands in a borehole one is designated as 'Band' and other as 'Local'. The local carbonaceous horizon mostly has thickness of <0.90 m in boreholes except in MNRT-24 (thickness 1.24 m) and in MNRT-50 (thickness 1.05 m) and is depicted in Plate no. X 29.

### 6.30.0 Combined seams

- 6.30.1 The coal seams given below sometime have reduced partings between them. In such cases proximate analysis was obtained for such borehole intersections. They are :

X (T+B) Combined	:	X Top & X Bot. Seams
VI (T+M) Combined	:	VI Top & VI Mid. Seams
VI (T+M+B) Combined	:	VI Top, VI Mid & VI Bott Seams
(IV L + IV B) Combined	:	IV L & IV Bott. Seams
(IV M + IV L + IVB) Combined	:	IV Mid, IV Local & IV Bott. Seams

- 6.30.2 Sectional analysis, part seam analysis was also obtained on 60% RH and 40° C whenever required and they are given alongwith seam overall with astrick mark (\*\*) in the respective seam annexures.



## CHAPTER-VII

### **7.0.0 GEOPHYSICAL LOGGING**

#### **7.1.0 Introduction**

7.1.1 The borehole geophysical logging technique is primarily based on measurements of a series of electro-physical parameters made within a borehole and displayed for study on a continuous depth synchronized chart. The measurements usually made are formation density, radioactivity, resistivity, borehole diameter etc.

7.1.2 In order to create a reliable database, it was thought essentially to conduct geophysical logging of at least 1800 m. of the boreholes drilled by MECL in Talaiyath block to supplement the lithological information obtained by core drilling.

7.1.3 The main objective of borehole geophysical logging is to delineate the coal seams along with their depths & thickness for borehole seam correlation. Apart from this water table of ground water in most boreholes has been measured.

#### **7.2.0 Quantum Of Work:**

7.2.1 As per revised LOA, about 50% of boreholes shall be geophysically logged. The geophysical logging with multi parameter probe were undertaken in Forty Eight boreholes involving 20,100.00 m. MECL drilled 102 boreholes in the block out of which about 47% of boreholes have been geophysically logged.

7.2.2 A summarised statement showing the details of geophysical logging work in this block is depicted in Table No.7.01.

**Table No. 7.01**  
**Details of Geophysical Logging carried out by MECL in Talaipalli block**  
**Mand-Raigarh Coalfield Dist. Raigarh, Chhattisgarh**

Sl. No.	Borehole No.	Depth of Borehole (m)	Geophysical Logging depth (m)	Probes used
1	MNRT-3	404.00	403.00	NG, NN, SP, SPR, D
2	MNRT-4	361.40	361.00	NG, NN, SP, SPR, D
3	MNRT-25	575.00	572.00	NG, NN, SP, SPR, D
4	MNRT-27	539.50	538.00	NG, NN, SP, SPR, D
5	MNRT-34	514.50	512.00	NG, NN, SP, SPR, D
6	MNRT-37	262.00	260.00	NG, NN, SP, SPR, D
7	MNRT-38	428.00	426.00	NG, NN, SP, SPR, D
8	MNRT-40	469.60	468.00	NG, NN, SP, SPR, D
9	MNRT-42	509.15	503.00	NG, NN, SP, SPR, D
10	MNRT-45	468.80	466.00	NG, NN, SP, SPR, D
11	MNRT-46	395.50	390.00	NG, NN, SP, SPR, D
12	MNRT-48	334.50	332.00	NG, NN, SP, SPR, D
13	MNRT-49	272.00	270.00	NG, NN, SP, SPR, D
14	MNRT-50	596.00	595.00	NG, NN, SP, SPR, D
15	MNRT-54	325.90	324.00	NG, NN, SP, SPR, D
16	MNRT-55	296.00	295.00	NG, NN, SP, SPR, D
17	MNRT-56	354.50	354.00	NG, NN, SP, SPR, D
18	MNRT-57	316.80	316.00	NG, NN, SP, SPR, D
19	MNRT-58	387.00	387.00	NG, NN, SP, SPR, D
20	MNRT-59	508.00	506.00	NG, NN, SP, SPR, D
21	MNRT-60	470.60	470.00	NG, NN, SP, SPR, D
22	MNRT-61	351.40	350.00	NG, NN, SP, SPR, D
23	MNRT-62	531.00	431.00	NG, NN, SP, SPR, D
24	MNRT-63	475.00	472.00	NG, NN, SP, SPR, D
25	MNRT-64	433.00	433.00	NG, NN, SP, SPR, D
26	MNRT-66	200.00	197.00	NG, NN, SP, SPR, D

SL No.	Borehole No.	Depth of Borehole (m)	Geophysical Logging depth (m)	Probes used
27	MNRT-67	378.00	378.00	NG, NN, SP, SPR, D
28	MNRT-68	343.00	342.00	NG, NN, SP, SPR, D
29	MNRT-69	356.00	354.00	NG, NN, SP, SPR, D
30	MNRT-70	245.00	244.00	NG, NN, SP, SPR, D
31	MNRT-71	434.70	434.00	NG, NN, SP, SPR, D
32	MNRT-72	414.00	413.00	NG, NN, SP, SPR, D
33	MNRT-73	430.50	429.00	NG, NN, SP, SPR, D
34	MNRT-74	523.60	523.00	NG, NN, SP, SPR, D
35	MNRT-75	270.00	269.00	NG, NN, SP, SPR, D
36	MNRT-76	305.00	302.00	NG, NN, SP, SPR, D
37	MNRT-77	346.00	345.00	NG, NN, SP, SPR, D
38	MNRT-78	491.60	490.00	NG, NN, SP, SPR, D
39	MNRT-79	585.00	401.00	NG, NN, SP, SPR, D
40	MNRT-80	551.00	549.00	NG, NN, SP, SPR, D
41	MNRT-81	533.50	531.00	NG, NN, SP, SPR, D
42	MNRT-83	578.50	522.00	NG, NN, SP, SPR, D
43	MNRT-84	568.50	567.00	NG, NN, SP, SPR, D
44	MNRT-87	394.00	392.00	NG, NN, SP, SPR, D
45	MNRT-89	566.60	566.00	NG, NN, SP, SPR, D
46	MNRT-96	541.00	540.00	NG, NN, SP, SPR, D
47	MNRT-97	484.20	484.00	NG, NN, SP, SPR, D
48	MNRT-99	394.40	394.00	NG, NN, SP, SPR, D
		<b>TOTAL</b>	<b>20100.00</b>	

**Abbreviations:** SP = Self - Potential. NG = Natural Gamma.  
 SPR = Single Point Resistance. D = Density  
 NN = Neutron - Neutron

### 7.3.0 Data Acquisition

7.3.1 The borehole geophysical logging has been carried out in this block by a Tata 407 mounted logging unit manufactured by M/S SIE, Geo-Source, Australia with the help of following downhole tools.

- (i) Natural Gamma (NG)
- (ii) Self-Potential (SP) and
- (iii) Single-Point Resistance (SPR)
- (iv) Neutron - Neutron (NN)

7.3.2 From Table No. 7.01, it can be observed that all the boreholes have been logged with three probes, which are sufficient in deciphering the depths & thickness of coal seams without any ambiguity.

7.3.3 Boreholes in this block have been logged geophysically by using probes having diameter sizes of 45 mm to 52 mm ideally suitable to delineate different litho- units intersected in boreholes as extent of lateral penetration by each probe has been more than the borehole diameter.

7.3.4 The SIE unit is basically an analog recording system having an option for digital recording facility. However, analog recording facility has been considered for recording the geophysical logs in this block. The geophysical logs were recorded by a dual pen recorder having full scale overlapping deflection on a 10 cm wide chart roll paper.

7.3.5 For recording the geophysical logs, each probe is lowered carefully into the borehole and the data recorded on the surface only while hoisting the probe. An average speed of 6 m per minute for electrical logging and 2 to 3 m per minute for nuclear logging with vertical scale of 1:200 were maintained for recording the geophysical logs.

7.3.6 Cs-137 of 50 milli curie and AmBe-241 of 3 curie were used as Gamma & Neutron source by following the radiation prevention measures as stipulated by BARC, Trombay. A 220V, 50HZ AC power generator was used for supplying power to the logging unit in the field.

### 7.4.0 Data Processing & Interpretation

7.4.1 Different litho-units have different characteristic log responses and by combining the same, it could be possible to identify the litho-units viz. coal, shaly coal, carb shale, sandstone, sand etc. as encountered in the boreholes with satisfactory confidence level.

7.4.2 The log responses of few prominent and common litho-units in the coal bearing formations are given in Table No.7.02.

**Table No. 7.02**  
**Geophysical log responses of different litho-units**

<b>Litho - units</b>	<b>Resistance (ohm)</b>	<b>Natural Gamma (cps)</b>	<b>Density (cps)</b>
Coal	High	Low	High
Sandstone	Medium	Low	Low
Shale	Low	High	Low

- 7.4.3 **SP & SPR Log :** All the boreholes were logged by this log. Coal seams have been observed to have high (-) SP value & high SPR value against shale.
- 7.4.4 **Natural Gamma Log :** Its response is found to be useful as prime indicator of different litho-units encountered in the borehole. Generally the natural gamma response is low in coal seams and high in shales.
- 7.4.5 **Density with Caliper Log :** This logging technique alongwith Caliper log is generally found to be very useful for possible identification of coal measures, as coal has got unique low density as compared to other sedimentary formations. The log counts across coal seams have been observed to be very high in comparison to other sedimentary rock formations.
- 7.4.6 **Neutron – Neutron :** Coal is identified by the typical low Neutron counts as compared to its surroundings i.e. shale and sandstone.
- 7.4.7 The multiparameter log responses of each borehole have been studied separately for identification of coal seams along with their depths & thickness in the borehole however the depths & thickness of coal seams have been drawn from density log.
- 7.4.8 The geophysical logs along with the interpreted depths & thickness of coal seams vis-à-vis geological coal seam data on visual basis encountered in 48 boreholes are presented in Plates VIII-A to VIII-P.
- 7.5.0 Discussions of Results**
- 7.5.1 All the major coal seams encountered in each borehole in this block could be identified from the combined response of geophysical logs, without any ambiguity.
- 7.5.2 The ground water level could be demarcated in 30 boreholes out of 48 boreholes for which electrical log was undertaken.

**Table No. 7.03**  
**Ground water level as interpreted from Electrical Log**

<b>Sl. No.</b>	<b>Borehole No.</b>	<b>Depth of Water level(m)</b>
1	MNRT-3	Artesian
2	MNRT-27	10.40
3	MNRT-37	12.00
4	MNRT-38	7.20
5	MNRT-40	9.40
6	MNRT-46	8.00
7	MNRT-48	5.00
8	MNRT-49	9.00
9	MNRT-50	12.00
10	MNRT-54	6.40
11	MNRT-55	10.00
12	MNRT-56	2.80
13	MNRT-57	10.00
14	MNRT-59	9.80
15	MNRT-60	1.60
16	MNRT-62	12.20
17	MNRT-63	7.60
18	MNRT-64	1.00
19	MNRT-66	19.00
20	MNRT-67	2.80
21	MNRT-68	2.20
22	MNRT-70	11.40
23	MNRT-75	7.00
24	MNRT-76	11.00
25	MNRT-77	1.00
26	MNRT-78	11.00
27	MNRT-79	4.20
28	MNRT-80	7.40
29	MNRT-81	20.60
30	MNRT-83	16.20
31	MNRT-84	17.60

## **7.6.0 CONCLUSION**

- 7.6.1 **The main objective of borehole geophysical logging was to delineate the coal seams along with their depths and thickness and the same has been achieved from the interpretation of geophysical logs with a very high confidence level. It is found to be useful for borehole seam correlation too.**
- 7.6.2 **The borehole geophysical logging is also useful in interpreting the missing data due to core loss in the drilling.**
- 7.6.3 **On perusal of the results of geophysical logging, it has been observed that in almost all the cases, the findings of the geophysical logging are in conformity within permissible limits with the data generated by core drilling.**

## CHAPTER - VIII

### **8.0 RESERVES**

#### **8.1 GENERAL**

- 8.1.1 The procedure adopted for estimation of reserves of coal in Talapalli Block is fundamentally based on the specific geological facies which determine the extent to which correlation, interpolation of data can be projected for building up a stratigraphic and structural model of the lay and disposition of the coal seams and this concept applied to generate various plans to estimate coal reserves through Minex Software.
- 8.1.2 From the structural 3-D model, various plans viz. vertical cross sections and floor contour plans have been generated. Similarly from the model quality overalls are presented in the individual seam folio plans by using in Minex software. Hence all the plans have been generated by the sophisticated Minex model.
- 8.1.3 The Barakar Formation in the block contains 27 coal seams viz. XLA, XI B, XTOP, X BOTTOM, OCL, IXL, IX, VIII, VII, VI TOP, VI MIDDLE, VI BOTTOM, V TOP, V MIDDLE, V BOTTOM, IV TOP, IV MIDDLE, IV L, IV BOTTOM, III L, III, II L, II L2, II L3, II L3, II L3 & Seam I. Besides, there are a few local bands which have not been taken into cognizance for reserve estimation but its distribution over the block and thickness have given in seam folio plans as Band-1, Band-2, Band-3, Band-4, Band-5, Band & Local.
- 8.1.4 The quarry depth is considered for seams- XLA to IV Bottom, as it has the stable floor. As suggested by NTPC Ltd., reserves for seams up to the floor of seam IV Bottom has been assessed on 1:250 norms.
- 8.1.5 The seams below IV Bottom i.e. III L, III, II L3, II L2, II L1 and Seam-II have been assessed separately on 1:250 norms for underground reserve estimation.
- 8.1.6 The area falling between faults F8, F9, F7, F3 & F4, the reserves have been assessed under 1:250 norms and underground-indicated category as the area is highly disturbed and faulted.
- 8.1.7 In the same area, the seam does not have intersection in any benchhole in such case, the quality of the surrounding area have been considered.
- 8.1.8 The area falling in the reserve forest boundary and the paucity of benchhole data, the reserves have been estimated on proved category based on the projection of benchhole data.



## 8.2.0 BASIC ASSUMPTIONS AND NORMS FOLLOWED

8.2.1 The following norms have been taken into account for reserves calculation:

- i) The isochores, isograde and the floor contours, Iso-OB, Iso depth lines have been generated by Minex Software.
- ii) The open cast reserves have been estimated on the basis of I-100 thickness for the seams from seam XLA to IV Bottom, where all the carbonaceous bands and obvious bands individually or collectively upto 1m. thickness have been included in the seam & >1 m bands have been excluded.
- iii) The reserves have been estimated on I-30 thickness for the seams from III L to II L as underground reserve.
- iv) Reserves are not estimated for BCS, & JP seam thicknesses.
- v) The opencast reserves are estimated for 1 m and above seam thickness & at 1 m thickness interval. For underground reserves estimation minimum workable thickness has been considered as 0.50m, 0.90, 1.2, 1.50 m thickness and onward at 0.50 m thickness interval. The highly disturbed zone between fault F8, F9, F4, F7 and F5 area, the reserve have been estimated in indicated category for all the seams.
- vi) Iso-overburden & Iso-quarry lines are generated through model upto the floor of seam-IV Bottom. The Iso-overburden lines are compared with combined coal thickness to generated C: OB lines, sub sector wise.
- vii) A 60 m barrier zone is left for Kelo River and its tributary as nala.
- viii) All volumes of coal are estimated by Minex Software Model and reserves are estimated as :

$$\begin{aligned} \text{Gross Reserves} &= \text{Area} \times \text{Thickness} \times \text{Sp. Gravity of Coal} \\ \text{(Thousand Tonnes)} &= \text{(Sq.m)} \quad \text{(m)} \quad \text{(Grade-wise)} \end{aligned}$$

- ix) A 10% deduction has been made from the gross proved reserves to arrive at the net-in-situ proved reserves available in the block for open cast potential and underground area where as 100% gross reserves are considered for Indicated category.

## 8.3.0 OVERBURDEN

8.3.1 **Nature of overburden:** Overburden consists of predominantly sandstone with minor amount of shale, carbonaceous shale and thin coal bands. Besides, the overburden also

includes sandy soil, weathered rocks and dirt bands >1m thickness. While computing in-seam burden, dirt-bands of >1m have been excluded to arrive at the effective thickness of the seam.

#### 8.4.0 CALCULATION OF OVERBURDEN

8.4.1 The volume of overburden has been generated by Minex Software Model, as:

$$\text{Volume of overburden (Cu.m)} = \frac{\text{Area (Sq.m)} \times \text{Overburden Thickness (Ratio-wise) (m)}}{1}$$

Overburden upto seam IV Bottom has been calculated from Iso-pachytes plan.

#### 8.5.0 COAL: OVERBURDEN RATIO

8.5.1 The seams namely XLA, XLB, X TOP, X BOT, 1XL2, IXL-1, IX, VIII, VII, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IVL, IV BOT, are considered for open cast up to the 300 m depth line of seam IV Bottom i.e. line of OCP/UG. Beyond this line and the area between F4, F5, F7, F8 & F9 are considered for underground reserve estimation.

8.5.2 The reserves of the seam III L, III, II L3, II L2, II L1, II & II L are assessed separately based on underground norms in the entire area of the block.

#### 8.6.0 STRIPPING RATIO

8.6.1 Stripping ratio is obtained after dividing total volume of overburden by tonnage of coal available in the same area (C:OB ratio wise). Volume of overburden and stripping ratio for different coal to overburden ratio and depth range is given in Tables VIII-2.

#### 8.7.0 CALCULATION OF SPECIFIC GRAVITY

8.7.1 The specific gravity has been calculated seam-wise for each grade by the procedure outlined below:

- 1) The mean of ash percentage is assessed found for each grade and for each seam.
- 2) From this mean ash percentage, average specific gravity was calculated by the formula :

$$\text{Specific Gravity} = 1.28 + 0.01 \times \text{Ash}$$

8.7.2 The grade-wise specific gravity considered for all the coal seams are given below.

**GRADE-WISE AVERAGE SPECIFIC GRAVITY OF COAL SEAMS**

GRADE	SPECIFIC GRAVITY
A	1.42
B	1.45
C	1.50
D	1.55
E	1.60
F	1.68
G	1.76

**8.8.0 METHOD OF GRADE ESTIMATION**

- 8.8.1 The proximate analysis on 60% R.H. & at 40° C of the seams form the basis for grade estimation. Wherever such analyses are not available, the same have been calculated on M-100 basis.
- 8.8.2 The non-coking coals have been classified into seven grades on the basis of the useful heat value (U.H.V.) in K.Cal/Kg. as per the Govt. of India Notification No. 28012/80/CA dated 13.02.1981. The grades of the coal are given below.

**GRADES OF NON-COKING COAL BASED ON U.H.V.**

Grade	Ash%+Moisture % (on 60% RH & 40°C)	Useful heat value (UHV) (In K.cal/Kg)
A	< 19.6	> 6200
B	19.6 - 23.9	>5600 - 6200
C	24.0 - 28.6	>4940 - 5600
D	28.7 - 34.0	>4200 - 4940
E	34.1 - 40.1	>3360 - 4200
F	40.2 - 47.1	>2400 - 3360
G	47.2 - 55.0	>1300 - 2400

### 8.9.0 CATEGORISATION OF RESERVES

8.9.1 The entire reserves of all the coal seams from seam X LA to IV Bottom are grouped under "Proved Opencast" category. Except the highly disturbed area falling between fault F4, F5, F7, F8 & F9 and beyond 300 m depth line of seam IV Bottom for all seams are grouped under underground proved and indicated category.

### 8.10.0 AREA CONSIDERED FOR RESERVES ESTIMATION

8.10.1 For all the seams the updip limit is the floor of incrop of respective seam, the down dip limit and the lateral limit for the purpose of reserve calculation have been defined by the block boundary.

### 8.11.0 SECTORS FOR RESERVE ESTIMATION

8.11.1 The reserves of the coal seam have been estimated sector-wise. For this purpose, the block has been divided into sectors A, B, C, D, E, F, G, H, I & J.

8.11.2 For the purpose of calculating seamwise opencast and underground reserves, are as follows:

Sector	OCP/UG	BOUNDARY / LIMITS OF SECTORS
A	OCP UG	Fault F2, F1 OCP/UG line and block boundary Fault F12, OCP/UG line and Block boundary
B	UG	Fault F12 and Block boundary
C	OCP	Fault F1, F3, F4 and block boundary
D	OCP UG	Fault F3, F4 and OCP/UG line Fault F3, F4 and OCP/UG line
E	OCP	Fault F4, F6 and block boundary
F	OCP UG	Fault F4, F6, F8, F9, OCP/UG line and block boundary Fault F8, F9 and OCP/UG line
G	UG	Fault F4, F8 and F9
H	UG	Fault F4, F7 and F8
I	UG	Fault F4, F5, F7 and F8
J	UG	Fault F4, F5 and block boundary

8.12.0 The Reserves are given in tables VIII-1 to VIII-23

TABLE – VIII-1

**SUMMARY OF CATEGORY-WISE/SECTOR-WISE TOTAL PROVED AND  
INDICATED RESERVES IN TALLAIPALLI BLOCK,  
DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

CATEGORY	SECTOR	PROVED	INDICATED
OCP (Upto 300m depth of Seam-IV Bottom)	A	585362	--
	C	11825	--
	D	4752	--
	E	11234	--
	F	136141	--
	<b>SUB-TOTAL</b>	--	<b>749314</b>
UG (Beyond 300 m. depth of seam-IV Bottom)	A	384816	--
	B	36648	--
	C	4145	--
	D	8596	--
	E	3457	--
	F	39891	--
	G	--	16703
	H	--	1303
	I	--	21786
	J	--	486
<b>SUB-TOTAL</b>	--	<b>477553</b>	<b>40278</b>
<b>TOTAL</b>	--	<b>1226867</b>	<b>40278</b>
<b>BLOCK TOTAL</b>	--		<b>1267145</b>

Soy - 1267.15 Million Tonnes

TABLE - VIII-2

SECTOR-WISE, RATIO-WISE PROVED COAL RESERVES ALONG WITH VOLUME OF OVERBURDEN AND STRIPPING RATIO IN OPENCAST POTENTIAL AREA (UPTO 300 m. DEPTH OF SEAM-IV BOTTOM) IN TALAIPALLI BLOCK, DIST. RAIGARH, CHHATTISGARH

## SEAMS : XLA TO 300 M DEPTH OF IV BOTTOM

SECTOR	LIMIT	RATIO	AREA (SQ.M)	RESERVES ('000 TONNES)	VOLUME ('000 CU.M)	STRIPPING RATIO (VOLUME OF OB/TONNE)
<b>A BLOCK BOUNDARY</b>						
	TO	1:1-1:2	53750.	687.	1098.037	1.598
SEAM-V B		1:2-1:3	351250.	5446.	10360.088	1.902
		1:3-1:4	184375.	3134.	7180.844	2.291
SUB TOTAL			589375.	9267.	18638.969	2.291
SEAM-V B	TO	1:3-1:4	314375.	6717.	16252.063	2.420
SEAM-VI B		1:4-1:5	490000.	10311.	32814.588	3.182
		1:5-1:6	1226750.	26993.	62255.131	2.306
SUB TOTAL			2033125.	44021.	111321.791	2.306
SEAM-VI B	TO	1:4-1:5	481875.	16238.	39232.356	2.416
SEAM-VIII		1:5-1:6	895000.	25022.	90919.831	3.634
		1:6-1:7	134375.	3581.	14042.138	3.921
		1:7-1:8	124375.	3133.	12179.294	3.887
		1:8-1:9	156250.	4393.	14682.213	3.342
SUB TOTAL			1791875.	52367.	171055.831	3.342
SEAM-VIII	TO	1:3-1:4	705000.	38216.	92694.644	2.426
SEAM-X B		1:4-1:5	1771250.	80335.	252666.837	3.145
		1:5-1:6	760000.	31698.	114505.787	3.612
		1:6-1:7	310000.	11416.	56223.225	4.925
SUB TOTAL			3546250.	161665.	516090.494	4.925

TABLE - VIII-2

SECTOR	LIMIT	RATIO	AREA (SQ.M)	RESERVES ('000 TONNES)	VOLUME ('000 CU.M)	STRIPPING RATIO (VOLUME OF DB/TONNE)
SEAN-X B						
	TO	1:3-1:4	648750.	49583.	105591.056	2.130
OCF LIMIT						
		1:4-1:5	1189375.	75837.	243006.456	3.204
		1:5-1:6	2155625.	133594.	481854.244	3.607
		1:6-1:7	1058750.	55165.	229033.906	4.152
		1:7-1:8	77500.	3622.	14267.425	3.939
SUB TOTAL			5130000.	317801.	1073753.088	3.939
SECTOR TOTAL			13090630.	585121.	1890860.163	3.232
C						
		1:4-1:5	13125.	1318.	173.787	.132
		1:5-1:6	153750.	6163.	22404.044	3.635
		1:6-1:7	121250.	4338.	18080.925	4.168
SUB TOTAL			288125.	11819.	40658.756	4.168
SECTOR TOTAL			288125.	11819.	40658.756	3.440
D						
		1:5-1:6	93750.	4559.	17017.763	3.733
		1:6-1:7	4375.	113.	1570.544	13.899
SUB TOTAL			98125.	4672.	18588.306	13.899
SECTOR TOTAL			98125.	4672.	18588.306	3.979

TABLE - VIII-2

SECTOR	LIMIT	RATIO	AREA (SQ.M)	RESERVES ( ' 000 TONNES)	VOLUME ( ' 000 CU.M)	STRIPPING RATIO (VOLUME OF OB/TONNE)
<b>E</b>						
		1:4-1:5	625.	10.	122.850	12.285
		1:5-1:6	223750.	11220.	898.000	.080
SUB TOTAL			224375.	11230.	1020.850	.080
SECTOR TOTAL			224375.	11230.	1020.850	.091
<b>F</b>						
BLOCK BOUNDARY						
TO		1:3-1:4	25625.	1620.	3895.200	2.404
SEAM-X B		1:4-1:5	1132500.	71542.	224481.325	3.138
		1:5-1:6	518750.	32711.	99560.869	3.044
		1:6-1:7	5625.	304.	19505.650	64.163
SUB TOTAL			1682500.	106177.	347443.044	64.163
SEAM-X B						
TO		1:3-1:4	341250.	15021.	143.563	.010
CCP LIMIT		1:4-1:5	305625.	13881.	98852.194	7.121
		1:5-1:6	25625.	1062.	7684.788	7.236
SUB TOTAL			672500.	29964.	106680.544	7.236
SECTOR TOTAL			2355000.	136141.	454123.588	3.336



TABLE - VIII-2

SECTOR	LIMIT	RATIO	AREA (SQ.M)	RESERVES ('000 TONNES)	VOLUME (' 000 CU.M)	STRIPPING RATIO (VOLUME OF OB/TONNE)
GRAND TOTAL						
		1:1-1:2	53750.	687.	1098.037	1.598
		1:2-1:3	351250.	5446.	10360.088	1.902
		1:3-1:4	2219375.	114291.	225757.369	1.975
		1:4-1:5	5384375.	269472.	891350.394	3.308
		1:5-1:6	6055000.	273022.	897100.456	3.286
		1:6-1:7	1634375.	74917.	338456.388	4.518
		1:7-1:8	201875.	6755.	26446.719	3.915
		1:8-1:9	156250.	4393.	14682.213	3.342
GRAND TOTAL			16056250.	748983.	2405251.663	3.211

TOTAL RESERVES :	SEAM_WISE RESERVES (OCP)	749.314 MILLION TONNES
	CUMULATIVE RESERVES (OCP) AS ABOVE	748.983 MILLION TONNES
	DIFFERENCE	0.331 MILLION TONNES
	AGREEMENT	99.96%

TABLE - VIII-3

**SUMMARY OF SEAM-WISE, SECTOR-WISE TOTAL OPENCAST (PROVED)  
RESERVES IN TALAIPELLI BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	SECTOR					TOTAL.
	A	C	D	E	F	
X LA	0.	0.	0.	0.	28.	28.
X LB	444.	0.	0.	0.	182.	626.
X TOP	4246.	0.	0.	0.	2161.	6407.
X BOT	32883.	628.	538.	153.	13906.	48108.
IX L2	12401.	183.	161.	67.	4292.	17104.
IX L1	13595.	150.	113.	442.	4276.	18576.
IX	51268.	1067.	654.	1541.	14366.	68896.
VIII	70311.	1001.	511.	1560.	14219.	87602.
VII	4038.	0.	0.	2.	614.	4654.
VI TOP	16759.	70.	116.	430.	4303.	21678.
VI MID	102356.	2847.	763.	2197.	22853.	131016.
VI BOT	2510.	137.	63.	20.	1807.	4537.
V TOP	5580.	152.	68.	220.	2767.	8787.
V MID	21515.	818.	191.	513.	3274.	26311.
V BOT	28346.	95.	43.	23.	4082.	32589.
IV TOP	59560.	971.	353.	1226.	15149.	77259.
IV MID	87890.	2160.	627.	1554.	18677.	110908.
IV L	23262.	80.	147.	24.	2026.	25539.
IV BOT	48398.	1466.	404.	1262.	7159.	58689.
<b>TOTAL.</b>	<b>585362.</b>	<b>11825.</b>	<b>4752.</b>	<b>11234.</b>	<b>136141.</b>	<b>749314.</b>

**TABLE - VIII-4**  
**SUMMARY OF SEAM-WISE, SECTOR-WISE TOTAL UNDERGROUND (PROVED + INDICATED) RESERVES IN**  
**TALAIPELLI BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	SECTOR										TOTAL
	A	B	C	D	E	F	G	H	I	J	
X LA	2549.	0.	0.	90.	0.	70.	389.	37.	370.	4.	3509.
X LB	2646.	604.	0.	71.	0.	81.	357.	34.	426.	5.	4224.
X TOP	5864.	574.	0.	169.	0.	104.	288.	53.	660.	7.	7719.
X BOT	22904.	2726.	0.	735.	0.	468.	2633.	172.	2640.	23.	32301.
IX L2	7860.	1330.	0.	333.	0.	146.	844.	87.	1241.	14.	11855.
IX L1	8273.	1026.	0.	189.	0.	163.	270.	40.	742.	14.	10717.
IX	24638.	3123.	0.	590.	0.	769.	2039.	154.	2084.	38.	33435.
VIII	31732.	3502.	0.	767.	0.	491.	1778.	122.	2218.	39.	40649.
VII	9984.	1189.	0.	2.	0.	2.	18.	0.	0.	0.	11195.
VI TOP	9815.	1141.	0.	252.	0.	84.	529.	22.	862.	11.	12616.
VI MID	37597.	4669.	0.	882.	0.	1234.	2229.	185.	3063.	41.	49900.
VI BOT	4548.	647.	0.	162.	0.	247.	281.	31.	476.	7.	6399.
V TOP	5705.	824.	0.	274.	0.	195.	395.	40.	774.	17.	8224.
V MID	7963.	845.	0.	135.	0.	152.	302.	20.	418.	11.	9846.
V BOT	7249.	574.	0.	349.	0.	168.	402.	37.	823.	10.	9612.
IV TOP	13363.	434.	0.	432.	0.	435.	669.	52.	1130.	48.	16563.
IV MID	25942.	4277.	0.	543.	0.	1004.	1240.	70.	1433.	60.	34569.
IVL	4824.	27.	0.	118.	0.	85.	219.	12.	296.	11.	5392.
IV BOT	11542.	1420.	0.	306.	0.	629.	748.	47.	590.	17.	15299.
III L	28333.	17.	487.	289.	365.	3047.	206.	16.	274.	9.	33043.
III	58572.	2495.	1417.	905.	1250.	13979.	571.	47.	758.	53.	80045.
II L3	9838.	1295.	675.	98.	624.	5228.	46.	2.	145.	7.	17958.
II L2	4577.	1342.	0.	0.	0.	2495.	0.	0.	0.	0.	8414.
II L1	6553.	0.	0.	0.	132.	288.	0.	0.	0.	0.	6973.
II	29819.	2667.	1452.	773.	694.	6794.	190.	17.	335.	40.	42781.
II L	2126.	0.	114.	132.	392.	1533.	60.	6.	30.	0.	4393.
<b>TOTAL.</b>	<b>384816.</b>	<b>36648.</b>	<b>4145.</b>	<b>8596.</b>	<b>3457.</b>	<b>39891.</b>	<b>16783.</b>	<b>1303.</b>	<b>21786.</b>	<b>486.</b>	<b>517831.</b>

**TABLE - VIII-5**  
**SEAM-WISE, RATIO-WISE NET INSITU PROVED OPENCAST RESERVES IN**  
**TALAIPELLI BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	RATIO								TOTAL
	1:1-1:2	1:2-1:3	1:3-1:4	1:4-1:5	1:5-1:6	1:6-1:7	1:7-1:8	1:8-1:9	
X LA	0.	0.	0.	19.	9.	0.	0.	0.	28.
X LB	0.	0.	399.	227.	0.	0.	0.	0.	626
X TOP	0.	0.	602.	2934.	2657.	214.	0.	0.	6407
X BOT	0.	0.	4602.	16609.	19377.	7087.	433.	0.	48108
IX L2	0.	0.	1574.	6026.	6473.	2839.	192.	0.	17104.
IX L1	0.	0.	2841.	6667.	6556.	2347.	165.	0.	18576.
IX	0.	0.	10953.	26323.	23689.	7505.	426.	0.	68896
VIII	0.	0.	13954.	32844.	30240.	10134.	430.	0.	87602
VII	0.	0.	2198.	1369.	1087.	0.	0.	0.	4654
VI TOP	0.	0.	3692.	8111.	7107.	2433.	150.	185.	21678.
VI MID	0.	0.	18253.	48901.	46642.	14369.	1500.	1351.	131016.
VI BOT	0.	0.	406.	1823.	1801.	339.	91.	77.	4537.
V TOP	0.	0.	1749.	3432.	3014.	503.	61.	28.	8787.
V MID	0.	0.	5186.	8123.	11122.	1239.	296.	345.	26311.
V BOT	0.	0.	7207.	12938.	10965.	1322.	133.	24.	32589
IV TOP	0.	647.	12633.	27601.	28519.	6485.	771.	603.	77259
IV MID	203.	2139.	15455.	39140.	41628.	9926.	1305.	1112.	110908
IV L	131.	1284.	3595.	8202.	9721.	2355.	251.	0.	25539.
IV BOT	353.	1376.	9023.	18262.	22421.	5825.	761.	668.	58689.
<b>TOTAL</b>	<b>687.</b>	<b>5446.</b>	<b>114322.</b>	<b>269551.</b>	<b>273028.</b>	<b>74922.</b>	<b>6965.</b>	<b>4393.</b>	<b>749314.</b>

TABLE – VIII-6

**SEAM-WISE, DEPTH-WISE NET INSITU PROVED OPENCAST RESERVES IN  
TALAIPALLI BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	DEPTH						TOTAL
	UPTO 50	50-100	100-150	150-200	200-250	250-300	
X LA	28.	0.	0.	0.	0.	0.	28.
X LB	619.	7.	0.	0.	0.	0.	626.
X TOP	3453.	2954.	0.	0.	0.	0.	6407.
X BOT	25619.	21722.	767.	0.	0.	0.	48108.
IX L2	7706.	8223.	1175.	0.	0.	0.	17104.
IX L1	6431.	8277.	3838.	30.	0.	0.	18576.
IX	20088.	31157.	16964.	687.	0.	0.	68896.
VIII	15453.	36979.	28638.	6532.	0.	0.	87602.
VII	0.	716.	2129.	1809.	0.	0.	4654.
VI TOP	1682.	4477.	8556.	6796.	167.	0.	21678.
VI MID	16988.	26353.	46913.	36608.	4154.	0.	131016.
VI BOT	173.	1073.	1494.	1320.	477.	0.	4537.
V TOP	621.	582.	2941.	3566.	1077.	0.	8787.
V MID	4032.	2463.	6551.	7456.	5802.	7.	26311.
V BOT	4025.	5367.	6223.	9442.	6494.	1038.	32589.
IV TOP	4748.	11157.	11310.	20785.	19642.	9617.	77259.
IV MID	5490.	14843.	14932.	27055.	28566.	20022.	110908.
IV L	2303.	5595.	3116.	4012.	5608.	4905.	25539.
IV BOT	2217.	9512.	8813.	12559.	14084.	11504.	58689.
<b>TOTAL</b>	<b>121676.</b>	<b>191457.</b>	<b>164360.</b>	<b>138657.</b>	<b>86071.</b>	<b>47093.</b>	<b>749314.</b>

**TABLE - VIII-7**  
**SEAM-WISE, THICKNESS-WISE NET INSITU PROVED OPENCAST RESERVES IN**  
**TALAJPALLI BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	THICKNESS										TOTAL
	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	10.0-11.0	
X LA	28.	0.	0.	0.	0.	0.	0.	0.	0.	0.	28.
X LB	626.	0.	0.	0.	0.	0.	0.	0.	0.	0.	626.
X TOP	6407.	0.	0.	0.	0.	0.	0.	0.	0.	0.	6407.
X BOT	394.	862.	6497.	22702.	15439.	1695.	488.	31.	0.	0.	48108.
IX L2	15724.	1380.	0.	0.	0.	0.	0.	0.	0.	0.	17104.
IX L1	18576.	0.	0.	0.	0.	0.	0.	0.	0.	0.	18576.
IX	88.	168.	15873.	41583.	11263.	121.	0.	0.	0.	0.	68896.
VIII	0.	1257.	8138.	21089.	40145.	16973.	0.	0.	0.	0.	87602.
VII	2178.	1106.	1370.	0.	0.	0.	0.	0.	0.	0.	4654.
VI TOP	18429.	3113.	136.	0.	0.	0.	0.	0.	0.	0.	21678.
VI MID	0.	0.	1501.	4579.	12733.	75376.	30726.	4247.	1634.	220.	131016.
VI BOT	4537.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4537.
V TOP	8607.	180.	0.	0.	0.	0.	0.	0.	0.	0.	8787.
V MID	17468.	5383.	3460.	0.	0.	0.	0.	0.	0.	0.	26311.
V BOT	18618.	6508.	3419.	4044.	0.	0.	0.	0.	0.	0.	32589.
IV TOP	4894.	19675.	33327.	17252.	2111.	0.	0.	0.	0.	0.	77259.
IV MID	151.	885.	10771.	69444.	28042.	1615.	0.	0.	0.	0.	110908.
IVL	20633.	4167.	455.	284.	0.	0.	0.	0.	0.	0.	25539.
IV BOT	7229.	38144.	9866.	2913.	537.	0.	0.	0.	0.	0.	58689.
<b>TOTAL</b>	<b>144587.</b>	<b>92828.</b>	<b>94613.</b>	<b>183890.</b>	<b>110270.</b>	<b>95780.</b>	<b>31214.</b>	<b>4278.</b>	<b>1634.</b>	<b>220.</b>	<b>749314.</b>

**TABLE - VIII-8**  
**SEAM-WISE, GRADE-WISE NET PROVED OPENCAST RESERVES WITH AREA IN TALAIPALI BLOCK,**  
**DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES & AREA IN SQ. MT.)

SEAM	GRADE-C		GRADE-D		GRADE-E		GRADE-F		GRADE-G		TOTAL	
	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA	RESERVES	AREA
XLA	0	0	0	0	0	0	20	12500	8	5000	28	17500
XLB	0	0	0	0	0	11	443	231250	183	115000	626	336250
XTOP	0	0	0	0	1329	831250	4714	2506250	364	193750	6407	3531250
XBOT	0	0	0	0	128	537511	39613	5875000	8367	1055625	48108	6984375
XL2	734	351250	8496	4106250	7051	3238125	823	278125	0	0	17104	7973750
XL1	76	44375	12114	6013125	5228	2619375	1153	570625	0	0	18576	9247500
IX	0	0	4564	706250	26354	4219375	37876	5800000	102	13750	68896	10739380
VIII	0	0	0	0	0	0	74151	9255000	13451	2115000	67602	11370000
VII	0	0	0	0	0	0	152	80000	4502	1445625	4654	1525625
VITOP	0	0	0	0	145	66250	15146	6548750	6387	2863750	21678	9478750
VIMID	0	0	0	0	275	29375	112085	11233750	18656	1896250	131016	13159380
VIBOT	0	0	0	0	940	603125	3540	2168750	57	33750	4537	2805625
VTOP	0	0	1442	950000	4374	264375	2968	1591250	3	1250	8787	5186250
VIMD	0	0	2	1250	3836	2095000	14821	5788750	7600	2506250	26311	10410630
VBOT	0	0	0	0	41	26875	17709	7011250	14839	3979375	32589	11017500
IVTOP	0	0	137	53750	1349	505000	28019	6981250	47614	8128750	77259	15696880
IVMID	64	14375	1572	254375	51838	7794375	57434	7984375	0	0	110908	16047500
IVL	0	0	113	63750	2880	1692500	16878	7008750	5668	2024375	25539	10789380
IVBOT	302	82500	13170	3946875	30821	8488750	13540	3377500	856	160625	58689	16056250
<b>TOTAL</b>	<b>1176</b>	<b>492500</b>	<b>41615</b>	<b>16095630</b>	<b>136589</b>	<b>34906870</b>	<b>441085</b>	<b>84303120</b>	<b>128657</b>	<b>26528120</b>	<b>749314</b>	<b>162373700</b>

TABLE - VIII-9

## SEAM-WISE PROVED OPENCAST RESERVES WITHIN AND OUTSIDE INCROP REGION IN TALAIPELLI BLOCK, DIST. RAIGARH CHHATTISGARH

(RESERVES IN '000 TONNES)

SEAM	WITHIN INCROP	OUTSIDE INCROP	TOTAL
X LA	1.	27.	28.
X LR	8.	618.	626.
X TOP	26.	6381.	6407.
X BOT	752.	47356.	48108.
IX L2	106.	16998.	17104.
IX L1	61.	18515.	18576.
IX	634.	68262.	68896.
VIII	443.	87159.	87602.
VII	0.	4654.	4654.
VI TOP	12.	21666.	21678.
VI MID	876.	130140.	131016.
VI BOT	6.	4531.	4537.
V TOP	15.	8772.	8787.
V MID	29.	26282.	26311.
V BOT	40.	32549.	32589.
IV TOP	27.	77232.	77259.
IV MID	72.	110836.	110908.
IV L	11.	25528.	25539.
IV BOT	0.	58689.	58689.
<b>TOTAL</b>	<b>3119.</b>	<b>746195.</b>	<b>749314.</b>



TABLE - VIII-9(i)

SEAM-WISE NET INSITU PROVED OPEN CAST RESERVES  
WITHIN RIVER/NALA BARRIER IN TALAIPELLI BLOCK  
DISTT. RAIGARH, CHHATTISGARH

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OPENCAST		(RESERVES IN '000 TONNES)					
SEAM		WITHIN BARRIER		OUTSIDE BARRIER		TOTAL	
X LA		9.		19.		28.	
X LB		156.		470.		626.	
X TOP		969.		5438.		6407.	
X BOT		8144.		39964.		48108.	
IX L2		2851.		14253.		17104.	
IX L1		2862.		15714.		18576.	
IX		11569.		57327.		68896.	
VIII		14716.		72886.		87602.	
VII		985.		3669.		4654.	
VI TOP		3863.		17815.		21678.	
VI MID		19443.		111573.		131016.	
VI BOT		425.		4112.		4537.	
V TOP		1308.		7479.		8787.	
V MID		4336.		21975.		26311.	
V BOT		5657.		26932.		32589.	
IV TOP		9692.		67567.		77259.	
IV MID		15073.		95835.		110908.	
IVL		4322.		21217.		25539.	
IV BOT		7444.		51245.		58689.	
TOTAL		113824.		635490.		749314.	

TABLE – VII-10

**SEAM-WISE PROVED OPENCAST RESERVES WITHIN AND OUTSIDE  
PROTECTED / RESERVED FOREST AREA, IN TALAIPALLI BLOCK, DIST.  
RAIGARCH CHHATTISGARH**

(RESERVES IN '000 TONNES)

DEPTH	WITHIN RESERVED FOREST	WITHIN PROTECTED FOREST	OUTSIDE FOREST	TOTAL
X LA	0.	0.	28.	28.
X LB	303.	15.	308.	626.
X TOP	428.	374.	5605.	6407.
X BOT	2255.	2993.	42860.	48108.
IX L2	620	1074.	15410.	17104.
IX L1	951.	1145.	16480.	18576.
IX	3434.	5408.	60054.	68896.
VIII	4808.	6777.	76017.	87602.
VII	1559.	337.	2758.	4654.
VI TOP	1419.	1857.	18402.	21678.
VI MID	9382.	10534.	111100.	131016.
VI BOT	48.	251.	4238.	4537.
V TOP	994.	615.	7178.	8787.
V MID	5734.	2119.	18458.	26311.
V BOT	6687.	3263.	22639.	32589.
IV TOP	8089.	7578.	61592.	77259.
IV MID	11700.	11004.	88204.	110908.
IVL	5241.	2776.	17522.	25539.
IV BOT	5532.	6455.	46702.	58689.
<b>TOTAL</b>	<b>69184.</b>	<b>64575.</b>	<b>615555.</b>	<b>7493143</b>

**NOTE :** The reserves in Reserved Forest area is based on continuity of borehole data.

**TABLE - VIII-11**  
**SEAM-WISE, SECTOR-WISE NET PROVED UNDERGROUND RESERVES IN**  
**TALAI PALLI BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	SECTOR						TOTAL
	A	B	C	D	E	F	
X LA	2549.	0.	0.	90.	0.	70.	2709.
X LB	2646.	604.	0.	71.	0.	81.	3402.
X TOP	5864.	574.	0.	169.	0.	104.	6711.
X BOT	22904.	2726.	0.	735.	0.	468.	26833.
IX L2	7860.	1330.	0.	333.	0.	146.	9669.
IX LI	8273.	1026.	0.	189.	0.	163.	9651.
IX	24638.	3123.	0.	590.	0.	769.	29120.
VIII	31732.	3502.	0.	767.	0.	491.	36492.
VII	9984.	1189.	0.	2.	0.	2.	11177.
VI TOP	9815.	1041.	0.	252.	0.	84.	11192.
VI MID	37597.	4669.	0.	882.	0.	1234.	44382.
VI BOT	4548.	647.	0.	162.	0.	247.	5604.
V TOP	5705.	824.	0.	274.	0.	195.	6998.
V MID	7963.	845.	0.	135.	0.	152.	9005.
V BOT	7249.	574.	0.	349.	0.	168.	8340.
IV TOP	13363.	434.	0.	432.	0.	435.	14664.
IV MID	25942.	4277.	0.	543.	0.	1004.	31766.
IVL	4824.	27.	0.	118.	0.	85.	5054.
IV BOT	11542.	1420.	0.	306.	0.	629.	13897.
III L	28333.	17.	487.	289.	365.	3047.	32538.
III	58572.	2495.	1417.	905.	1250.	13979.	78618.
II L3	9838.	1295.	675.	98.	624.	5228.	17758.
II L2	4577.	1342.	0.	0.	0.	2495.	8414.
II LI	6553.	0.	0.	0.	132.	288.	6973.
II	29819.	2667.	1452.	773.	694.	6794.	42199.
II L	2126.	0.	114.	132.	392.	1533.	4297.
<b>TOTAL</b>	<b>384816.</b>	<b>36648.</b>	<b>4145.</b>	<b>8596.</b>	<b>3457.</b>	<b>39891.</b>	<b>477553.</b>

**TABLE – VIII-12**  
**SEAM-WISE, DEPTH-WISE NET PROVED UNDERGROUND RESERVES IN**  
**TALAI PALL BLOCK, DIST. RAIGARH, CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	DEPTH												TOTAL
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	
X LA	42.	914.	1499.	254.	0.	0.	0.	0.	0.	0.	0.	0.	2709.
X I B	55.	941.	2053.	353.	0.	0.	0.	0.	0.	0.	0.	0.	3402.
X TOP	28.	1226.	3951.	1505.	1.	0.	0.	0.	0.	0.	0.	0.	6711.
X BOT	39.	3232.	15480.	8075.	7.	0.	0.	0.	0.	0.	0.	0.	26833.
IX L2	2.	414.	4228.	4952.	73.	0.	0.	0.	0.	0.	0.	0.	9669.
IX L1	0.	61.	1899.	5504.	2180.	7.	0.	0.	0.	0.	0.	0.	9651.
IX	0.	70.	2900.	15365.	10765.	20.	0.	0.	0.	0.	0.	0.	29120.
VIII	0.	0.	683.	14998.	19669.	1242.	0.	0.	0.	0.	0.	0.	36482.
VII	0.	0.	0.	949.	6166.	4062.	0.	0.	0.	0.	0.	0.	11177.
VI TOP	0.	0.	0.	681.	5394.	5115.	2.	0.	0.	0.	0.	0.	11192.
VI MID	0.	0.	0.	861.	19948.	23011.	582.	0.	0.	0.	0.	0.	44382.
VI BOT	0.	0.	0.	106.	2708.	2655.	125.	0.	0.	0.	0.	0.	5604.
V TOP	0.	0.	0.	11.	1864.	3431.	1689.	3.	0.	0.	0.	0.	6998.
V MID	0.	0.	0.	0.	843.	4886.	3354.	12.	0.	0.	0.	0.	9085.
V BOT	0.	0.	0.	0.	167.	4103.	3686.	384.	0.	0.	0.	0.	8340.
IV TOP	0.	0.	0.	0.	11.	4648.	7674.	2327.	4.	0.	0.	0.	14664.
IV MID	0.	0.	0.	0.	0.	2393.	14199.	14977.	197.	0.	0.	0.	31766.
IV L	0.	0.	0.	0.	0.	299.	2910.	1799.	46.	0.	0.	0.	5054.
IV BOT	0.	0.	0.	0.	0.	411.	7166.	5709.	611.	0.	0.	0.	13897.
III L	588.	5310.	3267.	4032.	6641.	5737.	4188.	2041.	753.	2.	1.	0.	32538.
III	0.	1777.	7244.	7378.	11177.	17630.	12788.	10240.	7904.	2486.	6.	8.	78618.
II L3	0.	0.	2108.	3628.	1915.	3156.	3026.	1009.	319.	1555.	943.	8.	17758.
II L2	0.	0.	126.	8.	27.	165.	1471.	1045.	671.	1475.	3196.	230.	8414.
II L1	0.	0.	0.	141.	782.	549.	681.	798.	1053.	1825.	960.	244.	6973.
II	0.	0.	0.	447.	1797.	4481.	5338.	7782.	6864.	5110.	4726.	5644.	42189.
II L	0.	0.	0.	0.	218.	142.	0.	1850.	791.	1219.	20.	67.	4297.
<b>TOTAL</b>	<b>752.</b>	<b>13945.</b>	<b>45439.</b>	<b>69148.</b>	<b>92353.</b>	<b>88153.</b>	<b>68839.</b>	<b>50016.</b>	<b>19203.</b>	<b>13652.</b>	<b>9852.</b>	<b>6201.</b>	<b>477553.</b>

TABLE - VIII-13

## SEAM-WISE THICKNESS-WISE NET PROVED UNDERGROUND RESERVES IN TALAI PALLI BLOCK, DIST. RAIGARH CHHATTISGARH

(RESERVES IN '000 TONNES)

SEAM	THICKNESS												TOTAL	
	0.5-0.9	0.9-1.2	1.2-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0		9.0-10.0
X LA	2483.	226.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2709.
X LB	3094.	304.	4.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3402.
X TOP	1154.	3850.	1696.	11.	0.	0.	0.	0.	0.	0.	0.	0.	0.	6711.
X BOT	0.	0.	0.	0.	0.	142.	10374.	15354.	893.	63.	7.	0.	0.	26833.
IX L2	0.	6.	3873.	5072.	714.	4.	0.	0.	0.	0.	0.	0.	0.	9669.
IX L1	46.	75.	1810.	7720.	0.	0.	0.	0.	0.	0.	0.	0.	0.	9651.
IX	0.	0.	0.	0.	0.	98.	1687.	23943.	3975.	6.	0.	0.	0.	29120.
VIII	0.	0.	0.	0.	0.	41.	866.	5213.	19422.	10950.	0.	0.	0.	36492.
VII	871.	804.	135.	1975.	2278.	2786.	1328.	0.	0.	0.	0.	0.	0.	11177.
VI TOP	510.	723.	1483.	3268.	2635.	1571.	862.	140.	0.	0.	0.	0.	0.	11192.
VI MID	0.	0.	0.	0.	0.	0.	4.	679.	1954.	29082.	9409.	2936.	318.	44382.
VI BOT	2973.	2209.	363.	58.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5604.
V TOP	185.	5434.	103.	58.	218.	0.	0.	0.	0.	0.	0.	0.	0.	6898.
V MID	226.	1854.	3560.	2563.	454.	408.	0.	0.	0.	0.	0.	0.	0.	9095.
V BOT	1568.	1950.	1540.	970.	860.	407.	813.	231.	0.	0.	0.	0.	0.	8340.
IV TOP	508.	1036.	669.	916.	1363.	2610.	6704.	837.	0.	0.	0.	0.	0.	14664.
IV MID	0.	0.	12.	89.	169.	249.	1087.	14805.	13263.	2092.	0.	0.	0.	31766.
IV L	1652.	1063.	1950.	389.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5054.
IV BOT	0.	200.	735.	3895.	3147.	4431.	1474.	15.	0.	0.	0.	0.	0.	13897.
III L	5400.	11022.	10739.	1670.	541.	701.	2465.	0.	0.	0.	0.	0.	0.	32538.
III	964.	1161.	1096.	2649.	10117.	20430.	28470.	12284.	1447.	0.	0.	0.	0.	78618.
II L3	3369.	2543.	3256.	2940.	4449.	1174.	27.	0.	0.	0.	0.	0.	0.	17758.
II L2	2114.	1146.	1781.	2895.	260.	218.	0.	0.	0.	0.	0.	0.	0.	8414.
II L1	5546.	1126.	288.	13.	0.	0.	0.	0.	0.	0.	0.	0.	0.	6873.
II	1668.	965.	2205.	10133.	7375.	4423.	10041.	3106.	2282.	0.	0.	0.	0.	42199.
II L	1188.	681.	800.	1438.	180.	0.	0.	0.	0.	0.	0.	0.	0.	4297.
<b>TOTAL</b>	<b>36522.</b>	<b>38388.</b>	<b>40148.</b>	<b>48723.</b>	<b>34760.</b>	<b>39894.</b>	<b>86212.</b>	<b>76607.</b>	<b>42638.</b>	<b>42193.</b>	<b>9418.</b>	<b>2938.</b>	<b>318.</b>	<b>477553.</b>

**TABLE - VII-14**  
**SEAM-WISE, GRADE-WISE NET PROVED UNDERGROUND RESERVES WITH AREA IN TALAI PALLI BLOCK,**  
**DIST. RAIGARH, CHHATTISGARH**

SEAM	GRADE-A		GRADE-B		GRADE-C		GRADE-D		GRADE-E		GRADE-F		GRADE-G		TOTAL	
	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA
X LA	0	0	0	0	0	0	0	0	0	0	1962	1863750	747	657500	2709	2521250
X LB	0	0	0	0	0	0	0	0	73	86250	3327	3055000	2	1250	3402	3142500
X TOP	0	0	0	0	0	0	162	134375	3201	2295625	3348	1908750	0	0	6711	4338750
X BOT	0	0	0	0	0	0	0	0	18	3125	26815	4348750	0	0	26833	4351875
LX L2	0	0	0	0	472	241875	5539	2640000	2786	1108750	865	342500	6	2500	9669	4335625
IX L1	0	0	0	0	760	343750	8574	3895625	317	146875	0	0	0	0	9651	4386250
LX	0	0	0	0	0	0	1371	223750	24010	3653750	3739	524375	0	0	29120	4401875
VIII	0	0	0	0	0	0	0	0	543	58750	35931	4313750	18	2500	36492	4375000
VII	0	0	0	0	0	0	0	0	0	0	6880	2511875	4297	1630625	11177	4142500
VI TOP	0	0	0	0	0	0	0	0	11	6875	9141	3623125	2040	580625	11192	4210625
VI MID	0	0	0	0	0	0	0	0	13860	1450000	30522	2956250	0	0	44382	4406250
VI BOT	0	0	0	0	0	0	0	0	1654	1179375	3733	2803750	217	163125	5604	4146250
V TOP	0	0	0	0	0	0	2642	1827500	2445	1501875	1749	973750	162	79375	6998	4382500
V MID	0	0	0	0	0	0	75	72500	1957	1128125	6604	2946875	459	246875	9095	4394375
V BOT	0	0	0	0	0	0	165	123750	1071	757500	6004	2955000	1100	447500	8340	4281750
IV TOP	0	0	0	0	0	0	0	0	1074	381250	12256	3587500	1334	289375	14664	4258125
IV MID	0	0	0	0	198	69375	806	167500	16741	2429375	14021	1768125	0	0	31766	4434375
IV L	0	0	0	0	0	0	422	397500	2471	1945625	1591	890000	570	257500	5054	3490625
IV BOT	0	0	0	0	242	70625	1757	586250	6853	2344375	4941	1406250	104	20625	13897	4428125
III	0	0	0	0	0	0	530	335000	11197	7255000	18938	10694380	1873	633750	32538	18918170
III	0	0	1172	311250	45539	12030000	29781	7523125	1853	456875	253	60625	0	0	78618	20381880
II L3	632	609375	882	807500	3661	1859375	7565	3944375	4069	2008750	949	791875	0	0	17758	10021250
II L2	4417	2706875	2875	2081875	709	437500	142	163125	155	168125	118	150000	0	0	8414	5687500
II L1	4392	4606875	1111	123125	910	1015625	272	255625	254	278750	34	37500	0	0	6973	7457500
II	30884	11255000	9321	2391250	914	578750	463	396250	198	177500	223	222500	192	169375	42199	15190630
II L	407	356250	1835	1155000	1493	935000	397	320625	395	80625	0	0	70	80625	4297	2928125
TOTAL	40732	19534370	17194	7980000	54919	17581880	60665	23096880	96906	30903130	193946	54716250	13191	5263125	477553	159015600

TABLE - VIII-15

## SEAM-WISE PROVED UNDERGROUND RESERVES WITHIN AND OUTSIDE RIVER /NALA BARRIER IN TALAI PALLI BLOCK, DIST. RAIGARH CHHATTISGARH

(RESERVES IN '000 TONNES)

SEAM	WITHIN BARRIER	OUTSID BARRIER	TOTAL
X LA	240.	2469.	2709.
X LB	225.	3177.	3402.
X TOP	382.	6329.	6711.
X BOT	1420.	25413.	26833.
IX L2	443.	9226.	9669.
IX L1	465.	9186.	9651.
IX	1414.	27706.	29120.
VIII	1822.	34670.	36492.
VII	265.	10912.	11177.
VI TOP	546.	10646.	11192.
VI MID	2167.	42215.	44382.
VI BOT	348.	5256.	5604.
V TOP	318.	6680.	6998.
V MID	447.	8648.	9095.
V BOT	279.	8061.	8340.
IV TOP	873.	13791.	14664.
IV MID	1336.	30430.	31766.
IVL	207.	4847.	5054.
IV BOT	731.	13166.	13897.
III L	3884.	28654.	32538.
III	7767.	70851.	78618.
II L3	833.	16925.	17758.
II L2	297.	8117.	8414.
II L1	1169.	5804.	6973.
II	2690.	39509.	42199.
II L.	566.	3731.	4297.
<b>TOTAL.</b>	<b>31134.</b>	<b>446419.</b>	<b>477553.</b>

TABLE - VIII-16

**SEAM-WISE PROVED UNDERGROUND RESERVES WITHIN PROTECTED/  
RESERVED AND OUTSIDE FOREST AREA IN TALAIPALLI BLOCK,  
DIST. RAIGARH CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	WITHIN RESERVED FOREST	WITHIN PROTECTED FOREST	OUTSIDE FOREST	TOTAL
X LA	0.	0.	2709.	2709.
X LB	0.	0.	3402.	3402.
X TOP	0.	5.	6706.	6711.
X BOT	0.	18.	26815.	26833.
IX L2	0.	4.	9665.	9669.
IX L1	0.	6.	9645.	9651.
IX	0.	12.	29108.	29120.
VIII	0.	24.	36468.	36492.
VII	0.	12.	11165.	11177.
VI TOP	0.	3.	11189.	11192.
VI MID	0.	28.	44354.	44382.
VI BOT	0.	4.	5600.	5604.
V TOP	0.	5.	6993.	6998.
V MID	0.	10.	9085.	9095.
V BOT	0.	14.	8326.	8340.
IV TOP	0.	12.	14652.	14664.
IV MID	0.	17.	31749.	31766.
IV L	0.	4.	5050.	5054.
IV BOT	0.	8.	13889.	13897.
III L	4507.	2788.	25243.	32538.
III	2815.	6316.	69487.	78618.
II L3	1941.	1393.	14424.	17758.
II L2	0.	317.	8097.	8414.
II L1	1185.	434.	5354.	6973.
II	54.	2677.	39468.	42199.
II L	0.	146.	4151.	4297.
<b>TOTAL</b>	<b>10502.</b>	<b>14257.</b>	<b>452794.</b>	<b>477553.</b>

NOTE : The reserves in Reserved Forest area is based on continuity of borehole data.



TABLE – VIII-17

**SEAM-WISE SECTOR-WISE GROSS INDICATED UNDERGROUND RESERVES IN  
TALAIPALLI BLOCK, DIST. RAIGARH CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	SECTOR				TOTAL
	G	H	I	J	
X LA	389.	37.	370.	4.	800.
X LB	357.	34.	426.	5.	822.
X TOP	288.	53.	660.	7.	1008.
X BOT	2633.	172.	2640.	23.	5468.
IX L2	844.	87.	1241.	14.	2186.
IX L1	270.	40.	742.	14.	1066.
IX	2039.	154.	2084.	38.	4315.
VIII	1778.	122.	2218.	39.	4157.
VII	18.	0.	0.	0.	18.
VI TOP	529.	22.	862.	11.	1424.
VI MID	2229.	185.	3063.	41.	5518.
VI BOT	281.	31.	476.	7.	795.
V TOP	395.	40.	774.	17.	1226.
V MID	302.	20.	418.	11.	751.
V BOT	402.	37.	823.	10.	1272.
IV TOP	669.	52.	1130.	48.	1899.
IV MID	1240.	70.	1433.	60.	2803.
IVL	219.	12.	296.	11.	538.
IV BOT	748.	47.	590.	17.	1402.
III L	206.	16.	274.	9.	505.
III	571.	47.	756.	53.	1427.
II L3	46.	2.	145.	7.	200.
II	190.	17.	335.	40.	582.
II L	60.	6.	30.	0.	96.
<b>TOTAL</b>	<b>16703.</b>	<b>1303.</b>	<b>21786.</b>	<b>486.</b>	<b>40278.</b>

**TABLE – VIII-18**  
**SEAM-WISE DEPTH-WISE GROSS INDICATED UNDERGROUND RESERVES IN**  
**TALAIPELLI BLOCK, DIST. RAIGARH CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	DEPTH												TOTAL
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	
X LA	11.	277.	384.	128.	0.	0.	0.	0.	0.	0.	0.	0.	800.
X LB	0.	217.	423.	182.	0.	0.	0.	0.	0.	0.	0.	0.	822.
X TOP	0.	113.	217.	469.	209.	0.	0.	0.	0.	0.	0.	0.	1008.
X BOT	0.	773.	1621.	2268.	806.	0.	0.	0.	0.	0.	0.	0.	5468.
IX L2	0.	170.	529.	944.	543.	0.	0.	0.	0.	0.	0.	0.	2186.
IX L1	0.	0.	204.	154.	588.	122.	0.	0.	0.	0.	0.	0.	1066.
IX	0.	0.	837.	1369.	1574.	535.	0.	0.	0.	0.	0.	0.	4315.
VIII	0.	0.	292.	1200.	1646.	1019.	0.	0.	0.	0.	0.	0.	4157.
VII	0.	0.	0.	18.	0.	0.	0.	0.	0.	0.	0.	0.	18.
VI TOP	0.	0.	0.	258.	354.	338.	465.	8.	0.	0.	0.	0.	1424.
VI MID	0.	0.	0.	379.	1391.	1142.	2491.	115.	0.	0.	0.	0.	5518.
VI BOT	0.	0.	0.	3.	147.	199.	404.	42.	0.	0.	0.	0.	795.
V TOP	0.	0.	0.	0.	158.	324.	491.	253.	0.	0.	0.	0.	1226.
V MID	0.	0.	0.	0.	85.	222.	256.	188.	0.	0.	0.	0.	751.
V BOT	0.	0.	0.	0.	32.	203.	407.	587.	63.	0.	0.	0.	1272.
IV TOP	0.	0.	0.	0.	0.	394.	411.	778.	316.	0.	0.	0.	1899.
IV MID	0.	0.	0.	0.	0.	307.	1141.	338.	993.	24.	0.	0.	2803.
IVL	0.	0.	0.	0.	0.	49.	217.	53.	211.	8.	0.	0.	538.
IV BOT	0.	0.	0.	0.	0.	53.	576.	282.	470.	21.	0.	0.	1402.
III L	0.	0.	0.	0.	71.	2.	158.	30.	35.	128.	64.	17.	505.
III	0.	0.	0.	0.	0.	0.	201.	0.	435.	117.	392.	247.	1427.
II L3	0.	0.	0.	0.	0.	0.	25.	3.	43.	15.	75.	39.	200.
II	0.	0.	0.	0.	0.	0.	0.	0.	109.	0.	143.	29.	582.
II L	0.	0.	0.	0.	0.	0.	0.	0.	19.	0.	34.	16.	96.
<b>TOTAL</b>	<b>11.</b>	<b>1550.</b>	<b>4507.</b>	<b>7373.</b>	<b>7802.</b>	<b>5110.</b>	<b>7042.</b>	<b>3220.</b>	<b>2248.</b>	<b>705.</b>	<b>431.</b>	<b>479.</b>	<b>40278.</b>

**TABLE – VIII-19**  
**SEAM-WISE THICKNESS-WISE GROSS INDICATED UNDERGROUND RESERVES IN**  
**TALAJPALLI BLOCK, DIST. RAIGARH CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	THICKNESS												TOTAL
	0.5-0.9	0.9-1.2	1.2-1.5	1.5-2.0	2.0-2.5	2.5-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	
X LA	817.	183.	0.	0	0.	0.	0.	0.	0.	0.	0.	0.	800.
X LB	594.	182.	46.	0	0.	0.	0.	0.	0.	0.	0.	0.	822.
X TOP	295.	199.	419.	95	0.	0.	0.	0.	0.	0.	0.	0.	1008.
X BOT	0.	0.	0.	0.	0.	83.	876.	2200.	2079.	230.	0.	0.	5468.
IX L2	0.	0.	227.	1056.	808.	95.	0.	0.	0.	0.	0.	0.	2186.
IX L1	106.	174.	235.	551.	0.	0.	0.	0.	0.	0.	0.	0.	1066.
IX	0.	0.	0.	0.	0.	0.	179.	3361.	775.	0.	0.	0.	4315.
VIII	0.	0.	0.	0	10.	272.	865.	2455.	555.	0.	0.	0.	4157.
VII	18.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	18.
VI TOP	69.	81.	110.	451	605.	108.	0.	0.	0.	0.	0.	0.	1424.
VI MID	0.	0.	0.	0.	0.	0.	0.	110.	831.	2399.	2078.	100.	5518.
VI BOT	60.	505.	180.	50	0.	0.	0.	0.	0.	0.	0.	0.	795.
V TOP	0.	299.	180.	422.	325.	0.	0.	0.	0.	0.	0.	0.	1226.
V MID	206.	351.	177.	17.	0.	0.	0.	0.	0.	0.	0.	0.	751.
V BOT	0.	153.	413.	202.	308.	117.	79.	0.	0.	0.	0.	0.	1272.
IV TOP	17.	35.	95.	77	158.	284.	1047.	246.	0.	0.	0.	0.	1899.
IV MID	0.	0.	0.	0	33.	90.	459.	831.	1203.	187.	0.	0.	2803.
IV L	222.	206.	94.	18	0.	0.	0.	0.	0.	0.	0.	0.	538.
IV BOT	0.	0.	6.	375	183.	544.	294.	0.	0.	0.	0.	0.	1402.
III L	277.	158.	70.	0.	0.	0.	0.	0.	0.	0.	0.	0.	505.
III	0.	0.	0.	0.	0.	212.	860.	355.	0.	0.	0.	0.	1427.
II L3	200.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	200.
II	0.	0.	0.	23.	419.	27.	109.	4.	0.	0.	0.	0.	582.
II L	54.	22.	11.	9.	0.	0.	0.	0.	0.	0.	0.	0.	96.
<b>TOTAL</b>	<b>2735.</b>	<b>2548.</b>	<b>2203.</b>	<b>3344.</b>	<b>2849.</b>	<b>1832.</b>	<b>4768.</b>	<b>9582.</b>	<b>5443.</b>	<b>2816.</b>	<b>2078.</b>	<b>100.</b>	<b>40278.</b>

**TABLE - VIII-20**  
**SEAM-WISE, GRADE-WISE GROSS INDICATED UNDERGROUND RESERVES WITH AREA IN TALAI PALLI BLOCK,**  
**DIST. RAIGARH, CHHATTISGARH**

SEAM	GRADE-A		GRADE-B		GRADE-C		GRADE-D		GRADE-E		GRADE-F		GRADE-G		TOTAL	
	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA	RES.	AREA
X I.A	0	0	0	0	0	0	0	0	0	0	589	485625	211	134375	800	620000
X LB	0	0	0	0	0	0	0	0	0	0	655	489375	167	116875	822	606250
X TOP	0	0	0	0	0	0	0	0	178	152500	830	445625	0	0	1008	598125
X BOT	0	0	0	0	0	0	0	0	0	0	5468	702500	0	0	5468	702500
IX L2	0	0	0	0	0	0	104	41875	2007	641250	75	24375	0	0	2186	707500
IX L1	0	0	0	0	0	0	1056	530000	10	3750	0	0	0	0	1066	533750
IX	0	0	0	0	0	0	65	8750	1457	211250	2793	363125	0	0	4315	583125
VIII	0	0	0	0	0	0	0	0	0	0	4665	528125	492	60625	4157	588750
VII	0	0	0	0	0	0	0	0	0	0	0	0	18	18750	18	18750
VI TOP	0	0	0	0	0	0	0	0	0	0	1109	403750	315	81875	1424	485625
VI MID	0	0	0	0	0	0	0	0	0	0	5518	493125	0	0	5518	493125
VI BOT	0	0	0	0	0	0	0	0	247	136250	548	288750	0	0	795	425000
V TOP	0	0	0	0	0	0	0	0	460	186875	766	300000	0	0	1226	486875
V MID	0	0	0	0	0	0	42	35000	397	280625	312	150625	0	0	751	466250
V BOT	0	0	0	0	0	0	0	0	166	75625	1094	386250	12	5625	1272	467500
IV TOP	0	0	0	0	0	0	0	0	134	68125	1765	324375	0	0	1899	392500
IV MID	0	0	0	0	0	0	126	13125	2381	324375	296	41875	0	0	2803	379175
IV L	0	0	0	0	0	0	0	0	47	40625	491	297500	0	0	538	338125
IV BOT	0	0	0	0	0	0	146	40000	1108	300000	148	31875	0	0	1402	371875
III L	0	0	0	0	0	0	0	1250	194	113750	307	225625	2	1250	505	341875
III	0	0	0	0	1237	240625	190	29375	0	0	0	0	0	0	1427	270000
II L3	0	0	0	0	51	60000	64	66250	85	69375	0	0	0	0	200	195625
II	478	138125	104	30000	0	0	0	0	0	0	0	0	0	0	582	168125
II L1	25	21750	30	31250	41	25625	0	0	0	0	0	0	0	0	96	80625
<b>TOTAL</b>	<b>503</b>	<b>161875</b>	<b>134</b>	<b>61250</b>	<b>1329</b>	<b>326250</b>	<b>1795</b>	<b>765625</b>	<b>8871</b>	<b>2604375</b>	<b>26429</b>	<b>5982500</b>	<b>1217</b>	<b>419375</b>	<b>40278</b>	<b>10321250</b>

TABLE – VIII-21

**SEAM-WISE GROSS INDICATED UNDERGROUND RESERVES WITHIN AND  
OUTSIDE RIVER / NALA BARRIER IN TALAIPALLI BLOCK, DIST. RAIGARH  
CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	WITHIN BARRIER	OUTSIDE BARRIER	TOTAL
X LA	37.	763.	800.
X LB	32.	790.	822.
X TOP	30.	978.	1008.
X BOT	323.	5145.	5468.
IX L2	108.	2078.	2186.
IX L1	2.	1064.	1066.
IX	212.	4103.	4315.
VIII	166.	3991.	4157.
VII	0.	18.	18.
VI TOP	21.	1403.	1424.
VI MID	216.	5302.	5518.
VI BOT	48.	747.	795.
V TOP	37.	1189.	1226.
V MID	33.	718.	751.
V BOT	46.	1226.	1272.
IV TOP	44.	1855.	1899.
IV MID	129.	2674.	2803.
IV L	18.	520.	538.
IV BOT	89.	1313.	1402.
III L	18.	487.	505.
III	33.	1394.	1427.
II L3	6.	194.	200.
II	9.	573.	582.
II L	9.	87.	96.
<b>TOTAL</b>	<b>1666.</b>	<b>38612.</b>	<b>40278.</b>

TABLE – VIII-22

**SEAM-WISE GROSS INDICATED UNDERGROUND RESERVES WITHIN AND  
OUTSIDE PROTECTED / RESERVED FOREST AREA IN TALAIPALLI BLOCK,  
DIST. RAIGARH CHHATTISGARH**

(RESERVES IN '000 TONNES)

SEAM	WITHIN RESERVED FOREST	WITHIN PROTECTED FOREST	OUTSIDE FOREST	TOTAL
X LA	0.	0.	800.	800.
X LB	0.	0.	822.	822.
X TOP	0.	0.	1008.	1008.
X BOT	0.	0.	5468.	5468.
IX L2	0.	0.	2186.	2186.
IX L1	0.	0.	1066.	1066.
IX	0.	0.	4315.	4315.
VIII	0.	0.	4157.	4157.
VII	0.	0.	18.	18.
VI TOP	0.	0.	1424.	1424.
VI MID	0.	0.	5518.	5518.
VI BOT	0.	0.	795.	795.
V TOP	0.	0.	1226.	1226.
V MID	0.	0.	751.	751.
V BOT	0.	0.	1272.	1272.
IV TOP	0.	0.	1899.	1899.
IV MID	0.	0.	2803.	2803.
IV L	0.	0.	538.	538.
IV BOT	0.	0.	1402.	1402.
III L	0.	0.	505.	505.
III	0.	0.	1427.	1427.
II L3	0.	0.	200.	200.
II	0.	0.	582.	582.
II L	0.	0.	96.	96.
<b>TOTAL</b>	<b>0.</b>	<b>0.</b>	<b>40278.</b>	<b>40278.</b>

**NOTE :** The reserves in Reserved Forest area is based on continuity of borehole data

## CHAPTER - IX

### 9.0.0 CONCLUSION

- 9.1.1 Talaspali block is located in the eastern part of Mand-Raigarh coalfield Dist. Raigarh, Chhattisgarh. The Ministry of Coal, Government of India has allotted this block to NTPC Ltd. for Captive Mining. The exploration work was awarded to MECL as per the letter of award (LOA) No. CS-2014-208-9-Cy-LoA-4711 dated 14.7.2006 by NTPC Ltd. Accordingly MECL commenced exploration in this block. MECL carried out drilling in Talaspali block occupying 20 sq.km area between 11.08.2006 to 03.08.2008 and drilled a total of 39854.75 m or 102 boreholes. The block was explored earlier by Geological Survey of India involving 6034.55 m drilling in 15 boreholes in an area of 20 sq.km. Accordingly the geological report was prepared considering all the boreholes drilled by Geological Survey of India and MEC Ltd. involving 6434.55 m and 39854.75 m. drilling respectively.
- 9.1.2 The block covers an area of about 20 sq.kms. and is located in Raigarh district of Chhattisgarh. It falls in the Survey of India Toposheet No. 64 N7 & N8 bounded by Latitudes (N) 22°13'20" to 22°16'10" and Longitude (E) 83°25'77" to 83°30'20". The area represents undulating in general Kela river flows along the eastern boundary of the block. A network of streamlets spreading over the block joins Kela River.
- 9.1.3 The main objective of the present investigation is:
- i) To prove the lay & disposition of coal seams.
  - ii) To determine the quality of coals seams and to assess the proved opencast and underground coal reserves in the block.
  - iii) Preparation of geological report in digital format and Ore body modeling.
- 9.1.4 Quality data of the 2 boreholes (MNRT-16 & 57) drilled by MECL was not available as the cores were sent to laboratory for physico-chemical study. Similarly the quality of 3 boreholes was not available as the coal core were sent to laboratory for washability test. Therefore, the thickness based on visual logging available for these boreholes has been considered to the extent possible while preparing this report.
- 9.1.5 A total of 5965.4 (m or 102 BHA) of coal samples were analysed for hard by hand and samples of 1469 Nos were analysed for seam overalls, by MECL laboratory, Nagpur.
- 9.1.6 From the sub-surface data acquired through drilling, it is evident that Barakar formation is found in the block. However, metamorphics have been encountered in 2 boreholes drilled by MECL and in 4 boreholes drilled by GSI.

- 9.1.7 Structurally, Talaipalli block is simple in general except the north western part. A total of 12 Nos. of fault varying in throw from 0 m to 150m. The general strike of the bed varies from N W – S E with south westerly  $4^{\circ}$  to  $8^{\circ}$  dip.
- 9.1.8 The exploration in Talaipalli block has revealed the existence of 27 major co relatable coal seam, viz. XLA, XLB, X TOP, X BOT, IX L2, IX L1, IX, VIII, VII, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, II L3, II L2, II L1, II, II L & I.
- 9.1.9 The coal seams are high moisture non-coking type. In general the grade of the seams ranges from D to F.
- 9.1.10 A total of 1267.15M.T of reserves could be established in Talaipalli block out of which 749.31 million tonnes account for open cast proved reserves, 477.56 million tonnes underground proved reserves and 4028 million tonnes underground indicated reserves..
- 9.1.11 A comparison of total reserves by totaling individual seams is made along with composite seam (Cumulative seams thickness).

Total Reserves as per individual seams : 749.314 Million Tonnes

Reserves estimated by cumulative seams thickness : 748.983 Million Tonnes

This comparison is for Seam-IV BOT Quarry for seam XLA to Seam IV BOT. There is 99.96% agreement between the 2 methodologies of reserves assessments.

- 9.1.12 The reserves of Talaipalli block are estimated as proved OCP & UG reserves as drilling has been carried out on 400 x 400 m. grid interval. However prior to mining closer interval boreholes at 200 x 200 m. and 50 x 50 m. is needed particularly in the incrop region of each seam.

A small patch of area in the east near Kelo river falling in 'reserve forest' boundary is considered as proved reserves based on the continuity. But few boreholes are needed to fulfill the data gap.

Also due to structural complexity the area within major faults of UG proposition area in NW is considered as indicated reserves.





NTPC Limited  
New Delhi-110038

IN DUPLICATE

CS-7014-7518-8-CV-COA-0218

24.06.2009

By Courier

Advaan Coal Management and Marketing Pvt. Ltd.  
811/2/1, Rajokri,  
New Delhi-110038

Kind Attn: Y.P. Bajaj, Executive Director

Sub: Letter of Award for Consultancy Services for Preparation of Mine Plan, Feasibility Report, Area Drainage/Water Diversion Study & EIA/EMP studies for Talpalli Coal Mining Block (Bidding Document No. CS-7014-7518-8)

Dear Sir,

1.1.1 This has reference to the following:

1.1.2 Our letter bearing reference no. 01/ CS-7014-7518-8-005 dated 21.12.2008 vide which we have issued the bidding documents for the subject consultancy package as under:

- (i) Conditions of Contract (Vol I)
  - (a) Section-14, Instruction to Bidders
  - (b) Section-1A, General Conditions of Contract,
- (ii) Technical Specifications (Vol-II)
- (iii) Bid Proposal Sheet (BPS) (Vol-III) and

1.1.3 Clarification No. 1 to the bidding documents issued vide our letter bearing ref. no. 01/ CS-7014-7518-8-005 dated 21.01.2009

1.1.4 Clarification No. 2 to the bidding documents issued vide our letter bearing ref. no. 01/ CS-7014-7518-8-005 dated 28.01.2009

1.1.5 Your offer no. ACMA/NTPC/TR/0005 dated 28.01.2009 for the subject consultancy package.

1.1.6 Discussions and meetings held with you on 29.05.2008, 08.06.2008, 08.08.2008 & 18.08.2008 resulting into the Minutes of Meeting (MoM Schedule) and Minutes of



ISO 9001:2008  
Q9106278

Advaan Coal Management & Marketing Pvt. Ltd.

Meeting (Technical) enclosed herein with the Letter of Award as Appendix A & Appendix B to this Letter of Award respectively.

### 2.0.8 SCOPE OF AWARD

2.1.0 We confirm having accepted your proposal bearing ref. No. ACM/NTPC/TF/0000 dated 28.01.2008 read in conjunction with the Technical Specifications, Terms & Conditions of bidding documents issued to you by us and agreed minutes of meeting referred to at para 1.5.0 above and award to you the Contract for Preparation of Mine Plan, Feasibility Report & Area Drainage/Water Diversion Study & EA/EEMP studies for Talpali Coal Mining Block as per Bidding Document No. CS-7014-TS1B-0.

All the documents referred to at para 1.5.0 above shall form an integral part of the Contract in as far as the same are not repugnant to NTPC's bidding documents and the agreed Minutes of Meeting held between NTPC and ACM referred to at para 1.5.0 above.

### 2.0.9 SCOPE OF SERVICES

You shall be responsible for Preparation of Mine plan, Feasibility Report and Area drainage/Water Diversion study & EA/EEMP Studies for Talpali Coal Mining Block and clearance of these reports from the concerned Government authorities/statutory/other bodies. You shall act and represent on behalf of NTPC for such clearances from various Government, statutory and other bodies in respect of this consultancy assignment till such clearances are obtained. For this purpose, NTPC may sign the necessary documents, provide logistic support and be present at various presentations as may be advised by you. The Scope of Services, in brief, includes the following:

#### 2.1.0 MINE PLAN

The Mining Plan document shall be prepared in terms of MMDR Act 1957, Mines and Minerals (Regulation & Development) Act 1957 & MCR (Mineral Conservation Rules) 1960, MCCR (Mineral Conservation and Development Rules) 1988 & Mines Act 1952 based on Geological Report (GR) of the block to be provided by owner. The Mining Plan shall be prepared by a Recognized Qualified Person (RQP) duly authorized as per MCR 1960, to prepare Mining Plan for Coal/Lignite project by Ministry of Coal (MOC). NTPC shall provide one soft copy and one hard copy of the GR for the block prepared by MOC.

The Mining Plan shall be prepared to exploit the mineable reserves by both open cast & underground methods to ensure conservation of coal. Mine shall be designed for optimum capacity and should contain detail analysis for optimization of haul capacity. The Mine Plan shall strictly comply with all the specific conditions of the block allotment letter issued by MOC.

The Mining Plan shall be properly integrated with area drainage to avoid flooding in mine area. The EA/EEMP chapter in the Mining Plan shall cover all aspects to prevent degradation and preserve the ambient environment.

The Mining Plan shall be presented by you before the Expert Committee of MOC for its review. Any comments thereof shall be incorporated by you for final submission. You shall undertake required modifications as per the advice of Expert Committee of MOC and shall prepare technical profile well supported by documents including calculations, plans, sections, etc.

The Mine Plan shall contain the chapters & contents as elaborated in technical specifications. The Mine Plan shall also contain the details not covered above but are necessary to be covered to make it a comprehensive document for obtaining the clearance from the concerned Govt. Authorities, Statutory & other bodies.

### 3.2.0 FEASIBILITY REPORT

You shall prepare the Feasibility Report(FR) based on the Geological Report (GR) provided by NTPC taking into consideration all aspects of coal quality control, various options of coal washing prevailing in the industry and as advised by us and detailed cost accounts for such possible variants. The FR shall contain the chapters & contents as elaborated in technical specifications. The FR shall also contain the details not covered above but are necessary to be covered to make it a comprehensive document for arriving at an acceptable techno-economic decision by NTPC.

You shall give presentations of FR before NTPC after submission of draft FR and shall incorporate the comments. You shall carry out modifications/ alterations in the FR in consultation with NTPC till its final clearance/ sanction from NTPC Board for investment. Further you shall submit a copy of FR to Directorate General of Mine Safety (DGMS) and observations, if any, made by DGMS shall be suitably addressed by you in the FR.

### 3.3.0 AREA DRAINAGE/WALLA DIVERSION STUDY

You shall develop a scheme to conduct the work outlined in Technical specification and will also be responsible to conduct a comprehensive drainage study of Trialson Area to identify both major flooding events and more common 'nuisance' flooding events, followed by field investigations and review of the existing detailed topography and mapping of the drainage structure as part of their Mine planning efforts for addressing problems relating to area drainage and walla diversion, if any.

### 3.4.0 EIA/EMP STUDIES

You shall prepare necessary documents for approval of Terms of Reference, Application Form & Pre Feasibility report to submit to Ministry of Environment and Forest (MOEF) for carrying out EIA study as per gazette notification dated 14.09.2006. You shall establish the existing environmental conditions, predict impacts of mining and associated activities and formulate the Environmental Management Plan (EMP). You shall prepare Environmental Impact Assessment (EIA) report, for organizing Public Consultation through State Pollution Control Board (SPCB) and seeking No Objection Certificate (NOC) from SPCB and Environmental Clearance (EC) from Ministry of Environment & Forests (MOEF).

You have to conduct the EIA study covering all the disciplines of environment and field monitoring in relevant disciplines over one full season of 3 (three) months (excluding monsoon months). The Draft EIA report is to be prepared as per MOEF Notification dated 14.09.2006. After completion of the Public Consultation, you shall address all the environmental concerns expressed during the public consultation process and make appropriate changes in Draft EIA report and submit Final EIA Report. You shall also be required to present the EIA Report before the Public Hearing committee, SPCB and Expert Appraisal Committee (EAC) of MOEF, and submit all clarificatory replies to queries from the SPCB/MOEF.

- 3.3.3 The detailed scope of services is specified in the technical specifications. The Scope of Services under this consultancy assignment as briefly outlined above or in the technical specifications shall also include all activities which have not been listed above but necessarily required to be completed for obtaining the clearance from the concerned Govt. Authorities, Statutory & other bodies without any extra cost to NTPC.
- 3.4.3 The entire scope of services under the Contract shall be performed by you strictly in accordance with our Bidding Documents and the agreed minutes of meeting referred to at para 1.0.0 above. In view of the above, all deviations / stipulations / additional conditions, whether implicit or explicit contained in your proposal and / or in your subsequent communications shall stand withdrawn, in so far as they are inconsistent with or repugnant to what is contained in the Letter of Award, Bidding Documents and Minutes of Meeting referred to at para 1.0.0 above, without any additional cost to NTPC.

#### 4.0.0 CONDITIONS OF AWARD

- 4.1.0 This award is being placed on you on mutually agreed terms & conditions detailed herein read in conjunction with all the specifications, terms & conditions of the bidding documents and Minutes of Meeting referred to in para 1.0.0 above. All other conditions, deviations, variations, stipulations etc., other than those specifically agreed during the meetings held on 29.05.2006, 08.06.2006, 08.06.2006 & 15.06.2006 whether explicit or implicit contained in your proposal and/or in your subsequent communications, which have not been specifically agreed by us and accordingly not incorporated in the Letter of Award, stand automatically withdrawn, without any cost implications to NTPC.

#### 5.0.0 CONTRACT PRICE

- 5.1.0 You shall be paid a lump-sum consultancy fee of Rs. 54,40,000/- (Rupees Fifty four lakhs forty thousand only) for the entire scope of services as per terms & Conditions specified in bidding documents for this consultancy assignment.
- 5.2.0 The aforesaid lump-sum price is firm and shall not be subject to any price adjustment and remain valid for the entire period of the consultancy assignment including any extension granted by the Owner. Further the above lump sum price is inclusive of equipment charges, travel, boarding & lodging expenses, administrative charges, laboratory charges, documentation charges, and any other incidental charges for successful completion of assignment in line with the requirement of the Bidding Document.

The above lump sum price is inclusive of all taxes, duties & levies (including surcharge on taxes, duties & levies), insurance charges, license fees, etc. except the Service Tax, Surcharge & Cess as applicable on direct transaction between you & NTPC.

Service tax, exchange and cess there upon as applicable on direct transaction between the ACMM and NTPC under this consultancy assignment shall be payable/remittable by NTPC as per the provisions stipulated at Clause 7.3 of General Conditions of Contract (VVI-I).

- 8.0.2 As regards income tax, exchange on income tax and other corporate taxes, including cess wherever applicable, you shall be responsible for such payments to the concerned authorities. However, NTPC is entitled to effect EOI (tax deduction at Source) as per the Government's policies/rule and regulations.
- 8.1.0 Tax liability, if any, on disbursement of your Personnel abroad shall be your responsibility and shall also be borne by you as per Tax Laws of India.
- 8.2.0 You shall be liable to take/maintain all necessary insurance at your own cost.

### 7.00 TERMS OF PAYMENT:

- 7.1.0 The lump-sum consultancy fees mentioned at para 5.1.0 above shall be paid as per the Terms of Payment specified in clause 10.0.0 of Conditions of Contract and as brought out in Appendix-III to this letter of Award.

### 9.0.0 TIME- THE ESSENCE OF CONTRACT

It is clearly understood that time is the essence of the contract and it shall be strictly adhered to. You shall be required to complete all activities as per the scope of services under the subject consultancy services as per agreed work schedule specified in Minutes of Meeting for work schedule (Appendix-I to this Letter of Award).

### 9.0.0 LIQUIDATED DAMAGES FOR DELAY IN COMPLETION

- 9.1.0 It is expressly understood and agreed that in case of delays attributable to you, beyond the scheduled period of completion of the entire assignment as per the agreed work schedule, you shall pay to NTPC liquidated damages and not as penalty, an amount worked out at the rate of 10 % (one half of one per cent) of contract price mentioned in para 5.1.0 above for each calendar week of delay or part thereof. However, the total liability of you under this clause shall not exceed 10% of the total Contract Value as awarded.

### 10.0.0 CONTRACT PERFORMANCE GUARANTEE:

- 10.1.0 Towards the successful performance of the entire work covered under this Letter of Award and in line with the requirements laid down under Clause 22.0.0 of Instructions to Bidders, Section-1A of the Bidding documents, you will provide us within 30 days of issuance of this Letter of Award an unconditional and irrevocable bank guarantee from a Bank listed at Annexure-D1 to Conditions of Contract, Vol-I of Bidding documents, in the form prescribed in the Bidding documents initially valid and operative up to and including 23.03.2011 for an amount of Rs. 544,000/- (Rupees Five hundred forty four thousand only), being 10% of the contract Price under this Letter of Award.
- 10.2.0 The Bid Guarantee submitted by you shall be returned only after the Contract Performance Guarantee for Contract is received and accepted by us. Further no payment under the subject consultancy assignment shall be released prior to receipt and acceptance of Contract Performance Guarantee by us.

**11.00 CONTRACT REVIEW MEETINGS/PROGRESS REPORT:**

11.1.0 To review the progress of work and to resolve various outstanding issues, certain review meetings (CRM) shall be held periodically either at your office or our office. Both NTPC and ACOM shall appoint their key personnel for the CRM. During the Review Meetings the progress of work will be reviewed, concerns & their corrective actions will be identified. You shall use the best endeavor to implement the corrective actions as identified. You shall submit fortnightly progress report for various activities as per the Pattern given by NTPC.

**12.0.0 ENGINEER-IN-CHARGE**

12.1.0 For all functional matters pertaining to this consultancy assignment except Settlement of Disputes and Arbitration, the Engineer-in-Charge (EIC) for the Consultancy assignment shall be as under:

M. A.K Dash  
 OGM (Misc Planning & Design)  
 NTPC Ltd.,  
 1<sup>st</sup> Floor, Engg. Office Complex,  
 A-8A, Sector-24, NOIDA - 201 301, U.P.  
 Phone No.: 0120-2410102  
 email: [mdash@npsc.co.in](mailto:mdash@npsc.co.in)

**13.0.0 SETTLEMENT OF DISPUTES AND ARBITRATION**

13.1.0 It is specifically agreed that all disputes or differences whatsoever, arising out of or in connection with this Contract between the parties, whether during the progress of the work or after its completion, shall be settled by the process of settlement and arbitration as specified in clause 3.0 of General Conditions of Contract. For this purpose, the "Dis Adjudicator" shall be as under:

GM (PE-Mech)  
 NTPC Ltd.,  
 4<sup>th</sup> floor, EOC,  
 Sector-24, NOIDA - 201 301, U.P.  
 Ph. No. - 0120-2410213

**14.0.0 EFFECTIVE DATE OF CONTRACT:**

14.1.0 The Contract shall become effective for all purposes and intents from the date of issue of the Letter of Award - i.e. 24.02.2006.

**15.0.0 GOVERNING LAWS AND JURISDICTION**

15.1.0 This Contract shall be governed by and interpreted in accordance with the Indian Laws for the time being in force and the Delhi Courts alone shall have exclusive jurisdiction in all matters arising under the Contract.

15.2.0 The Letter of Award is being issued to you in duplicate. We request you to return the duplicate copy of the Letter of Award duly signed and stamped on each page including all the enclosed Appendices by the authorized signatory of your company as a proof of your acknowledgement and confirmation.

1700 We thank you for the interest shown by you in the development of the Talpalli Coal Mining Block. Please take the necessary action to commence the work and confirm the same.

Yours truly,

For and on behalf of NTPC Ltd



**(Naveen Gupta)**  
**Manager(CS-IV)**

**Enclosures :-**

- (a) Appendix-I Minutes of meeting (Work Schedule)(2 pages)
- (b) Appendix-II- Minutes of meeting (Technical)(39 pages)
- (c) Appendix-III Terms of payment

All payments against the services rendered under the consultancy contract shall be made against submission of invoice as substantiated by the Consultant. The payment of such fee shall be made at the stage-wise completion of the services monthly submitted of the Consultant and subject to acceptance, approval and certification by the Engineer-in-Charge and in accordance with the Terms of Payment as specified below.

Lump sum fee Free for preparation of Mine plan, Feasibility report, Area Strategic Study (division & EIA/EMP of Tasek coal mining block) inclusive of all taxes, duties & levies except Service Tax, surcharge & Educational ERSS (not open to direct transactions between ACMM and MTPC) as specified in ACMM Proposal : Rs. 3445,000/- (Rupees Fifty four lakhs forty thousand only)

(i) Mine Plan for Tasek Coal Mining Block:

Sl. No.	Nature of payment	Stage of total lump-sum consultancy fee	Conditions to be fulfilled
1	Letter Advance	25%	a) Acceptance and certification of Letter of Award. b) Finalization of Metrology for valuation of the relevant part of the assignment and approval here of by MTPC Engineer-in-Charge (E.I.C.) and verification by the Consultant for having received the complete & final Geological Report by Tasek coal mining block. c) Submission of an unconditional Bank Guarantee covering the advance amount from a Bank acceptable to the Employer in the format enclosed as Annexure -C to the Conditions of Contract and valid for 3 months after the completion of contract. The list of Banks acceptable to the Employer is enclosed as Annexure - D1 of Conditions of Contract. d) Submission of Contract Performance Guarantee as per clause 22.0 of Instructions to Bidders.
2	Progressive Payment a) Receipt of Draft Mine Plan  b) Submission of Final Mine Plan to Ministry of Coal (MOC)  c) Approval of Mine Plan by MOC	7%  7%  7%	Certification by Engineer-in-Charge for having received the Draft Mine Plan document of Tasek coal mining block.  Certification by Engineer-in-Charge for having received the final Mine Plan document of Tasek coal mining block as submitted by the Consultant to Ministry of Coal (MOC). (Consultant to provide the evidence of submission to Ministry of Coal if EIC)  Certification by Engineer-in-charge for having received the clearance of Mine Plan for Tasek coal mining block from MOC.
3	Final payment	25%	Certification by Engineer-in-charge for completion of all obligations for finalization of mine plan for Tasek coal mining block by the Consultant under the Contract.



Sl No	Nature of payment	%age of total lump-sum consultancy fees	Conditions to be fulfilled
1	Initial Advance	4%	<p>a) On acceptance and confirmation of letter of Award</p> <p>b) Finalization of Methodology for execution of the relevant part of the Assignment and approval thereof by EIC and upon certification by the Consultant for having received the complete &amp; firm Geological Report for Tilaipalli coal mining block</p> <p>c) On submission of an unconditional Bank Guarantee covering the advance amount from a Bank acceptable to the Employer in the format enclosed as Annexure - C to the Conditions of Contract and valid till 3 months after the completion of contract. The List of Banks acceptable to the Employer is enclosed as Annexure - D1 of Conditions of Contract</p> <p>d) On submission of Contract Performance Guarantee as per clause 22.0 of instructions to Bidders.</p>
2	<b>Progressive Payment</b>		
	a) Receipt of Draft Feasibility Report (FR)	12%	Certification by Engineer in Charge for having received the Draft Feasibility Report for Tilaipalli coal mining block
	b) Receipt of Final Feasibility Report by EIC	12%	Certification by Engineer in Charge for having received the final Feasibility Report for Tilaipalli coal mining block
	c) Approval from NTPC Management	8%	Certification by Engineer-in-charge for having received the approval of FR for Tilaipalli coal mining block from NTPC Management
3	Final payment	4%	Certification by Engineer-in-charge for completion of all obligations for finalization of Feasibility report for Tilaipalli coal mining block by the Consultant under the Contract

## (iii) Area drainage/ Nalla Diversion study for Tilaipalli Coal Mining Block:

Sl No	Nature of payment	%age of total lump-sum consultancy fees	Conditions to be fulfilled
1	Initial Advance	2%	a) On acceptance and confirmation of Letter of

			<p>Accept</p> <p>(b) Finalization of Methodology for execution of the relevant part of the Assignment and approval thereof by DIC and upon certification by the Consultant for having received the complete &amp; free Consented Report for Trawati coal mining block</p> <p>(c) On submission of an unconditional Bank Guarantee covering the advance amount from a Bank acceptable to the Employer in the format enclosed as Annexure - C to the Conditions of Contract and valid till 3 months after the completion of contract. The List of Banks acceptable to the Employer is enclosed as Annexure - D1 of Conditions of Contract.</p> <p>(d) On submission of Contract Performance Guarantee as per clause 23.1 of Instructions to Bidders.</p>
2	<p><b>Progressive Payment</b></p> <p>(i) Receipt of draft report of area storage hole diversion study</p> <p>(ii) Receipt of final report of area storage hole diversion study</p>	<p>25%</p> <p>25%</p>	<p>Certification by Engineer in-Charge for having received the draft report of area storage hole diversion study of Trawati coal mining block.</p> <p>Certification by Engineer in-Charge for having received the final report of area storage hole diversion study of Trawati coal mining block.</p>
3	Final payment	25%	Certification by Engineer in-Charge for completion of all obligations for finalization of area storage hole diversion study for Trawati coal mining block by the Consultant under the Contract.

## (iv) BIA/BMP study for Trawati Coal Mining Block:

Sl. No.	Nature of payment	Stage of total lump-sum consultancy fees	Conditions to be fulfilled
1	Initial Advance	25%	<p>(a) On compliance and submission of Letter of Award</p> <p>(b) Finalization of Methodology for execution of the relevant part of the Assignment and approval thereof by DIC</p> <p>(c) On submission of an unconditional Bank Guarantee covering the advance amount from a Bank acceptable to the Employer in the format enclosed as Annexure - C to the Conditions of Contract and valid till 3 months after the completion of contract. The List of Banks acceptable to the Employer is enclosed as</p>

2	Progressive Payment		Annexure - B1 of conditions of Contract On submission of Contract Performance Guarantee as per clause 22.9 of Instructions to Bidders
	a) Receipt of draft report of EIA/EMP study	12%	Certification by Engineer In Charge for having received the draft EIA/EMP document of Titaipalli coal mining block
	b) Receipt of final report of EIA/ EMP study	4%	Certification by Engineer In-Charge for having received the final EIA/EMP document of Titaipalli coal mining block and submission of final EIA/EMP document by the consultant to SPOB/MOEF
3	Final payment	2%	Certification by Engineer-in-charge for completion of all obligations for finalization of EIA/ EMP study for Titaipalli coal mining block by the Consultant under the Contract
(v)	If the Consultant does not claim the initial advance amount as mentioned above the same shall be proportionally adjusted in the balance payments excluding final payment of each part of the Assignment		

Contract No. 02-2014-7810-01  
 Coal Management & Rehabilitation Pvt. Ltd., New Delhi (ACMM) and  
 NTPC, on 15.06.2015 for Consultancy Services for Preparation of  
 Mine Plan, Feasibility Report & Area Drainage/Water Diversion  
 Study & DRA/DRP studies for Jhansi Coal Mining Block (Mining  
 Document No. 02-2014-7810-01)

107-2

**PRESENT:**

**ACMM**

- 1. Sh. V.P. Singh

**NTPC**

- 1. Sh. V. Chandra
- 2. Sh. A.R. Dahiya
- 3. Sh. Navin Gupta
- 4. Sh. A.K. Singh

1.6. Discussions were held between ACMM and NTPC in respect of activities listed in work schedule for Consultancy Services for Preparation of Mine Plan, Feasibility Report & Area Drainage/Water Diversion Study & DRA/DRP studies for Jhansi Coal Mining Block (Mining Document No. 02-2014-7810-01) as per which ACMM has indicated submission of Draft Mine Plan, Final Mine Plan, Draft PR and Final PR in 5, 6, 7 and 8 months respectively against the specified requirements of 4, 5, 6 and 8 months respectively. Also they have indicated 4 months time for preparation of necessary documents for approval of TORs for DRA/DRP Study against the specified time of 7 months. After contractual discussion, the following revised work schedule was agreed by ACMM:

Activity	Agreed Work Schedule (Duration from issue of Geological Report TOR)
<b>Mining Plan</b>	
Submission of Draft Mining Plan	4 Months
Submission of Final Mining Plan	6 Months
Clearance of Mine Plan from NMC	Final plan 1.1 month
<b>Feasibility Report</b>	
Submission of Draft FR	6 Months
Submission of Final FR	8 Months
<b>Area Drainage/Water diversion study</b>	
Submission of Draft Area Drainage/Water Diversion Study	4 Months
Submission of Final Area Drainage/Water Diversion Study	7 Months

*[Handwritten signatures and initials at the bottom of the page]*

EIA/EMP Study

Activity	Duration from Letter of Award (LOA) to Ministry
Preparation of necessary documents for approval of Terms of Reference. Application form & Pre-Feasibility Report to submit to MOEF for carrying out EIA study as per gazette notification dated 14.03.2004.	2 months
Recommendation, survey, location of detailed methodology and location of sampling locations, definition and identification of Mitigation, monitoring equipment and meteorological station at site & inventory of stocks of equipment destroyed at site etc.	1 Month
Completion of test samplings for Meteorology, Air Quality, Water Quality, Soil and Hydrogeology including Pump Test, Ecology, Hydrogeology, Noise and Traffic.	3 Months
Submission of preliminary draft EIA Report and Executive Summary of Draft EIA Report in English and regional language.	4 Months
Submission of final copies of Draft EIA Report and Executive Summary of Draft EIA Report in English and regional language.	7 Months
Submission of preliminary Final EIA Report	The Preliminary Final EIA Report will be finalized one month after public consultation finishes of meeting is obtained.
Submission of Final EIA Report	Within one month from the date of receipt of public consultation report.

\* The Preliminary Draft EIA Report will be finalized only after the finalisation of Draft Mining Plan.

- 41. In respect of Clearance of Mining Plan, ACMM stated that Clearance of Mining Plan from Ministry of Coal is in line with being of same for presentation by MOEF. However they shall endeavour for early completion of the final clearance of Mining Plan from Ministry of Coal.
- 42. ACMM confirmed and agreed that other than the specific agreements, the entire assignment shall be carried out by them in accordance with the bidding documents. In view of the scope, all other conditions, exceptions, deviations or variations, treated as evoked, contained in the bid of ACMM, which have not been specifically agreed to by NTPC above, shall stand withdrawn by ACMM without any cost implication to NTPC. Further NTPC clarified that the various agreements, understandings & confirmations made during these joint bid discussions would form the basis of award which to be same being approved by the Competent Authority in NTPC. ACMM agreed to the above.

*[Handwritten signature]*  
ACMM

*[Handwritten signature]*  
NTPC

*[Handwritten signature]*  
OK

*[Handwritten signature]*  
NTPC

By Registered Post

No. 34011/(30)/2006-CPAM  
 Government of India  
 Ministry of Coal  
 Shastri Bhawan

New Delhi, the 26<sup>th</sup> June, 2006

To	Bakhtawar Singh Nag, EC-106, Maya Enclave, New Delhi - 110 084
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Subject	Grant of recognition to Bakhtawar Singh Nag, as competent person to prepare Mining Plan for Coal/Lignite block.
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Sr.

I am directed to refer to your letter dated 30.5.2006 on the above mentioned subject and to convey approval of the Central Government to the grant of recognition under Rule 22 (c) of Mineral Concession Rule, 1980 in your favour as competent person to prepare Mining Plan for Coal/Lignite block up to 10 years from the date of issue of this letter.

Your attention is also invited to this Ministry's letter No. 34011/(4)/2004-CPAM dated 26.10.2005 (copy below) for information and compliance.

Yours faithfully

sd/-  
 (Geeta Mishra)  
 Section Officer,  
 Phone No. 23389132

Contents of letter no. 34011(4)/2004-CPAM, dated 26-10-2005. "It has been decided that the additional area beyond the block boundary may be considered in a mining plan subject to condition that proper justification is given in the mining plan and that the additional area is non-coal bearing and does not infringe upon any already allotted or planned coal/lignite block(s)"

Prepared by: ...

sd/-  
 (Sandeep Gupta)  
 Under Secy to the Govt. of India  
 Recognised Person as notified vide 22(C) of 1980  
 Ministry of Coal  
 34

GOVERNMENT OF INDIA  
 NEW DELHI

## ANNEXURE P-4

No.34011/68/2009-CPAII  
 Government of India  
 Ministry of Coal

New Delhi, the 20<sup>th</sup> January, 2010

To

Shri A K Dash,  
 Dy. General Manager (PE-MP&D)  
 M/s NTPC Limited,  
 1<sup>st</sup> Floor, Engineering Office Complex, Sector-24  
 Noida - 201301

Subject :	Presentation of Mining Plan (November, 2009) for Talaiwali Coal Block submitted by M/s NTPC.
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Sir,

I am directed to inform that the Mining Plan presentation to the Technical Members of the Standing Committee constituted under MMDR Act, 1957 of the above mentioned project was held on 29-12-2009 at Ministry of Coal, Shastri Bhavan, New Delhi

The following suggestions were made:

1. There has been considerable delay in submission of the Mining Plan. Reasons for this delay should be explained.
2. As per Annexure (9) the Mining Plan has been prepared under the guidance of RQP. Mining Plan has to be prepared by RQP.
3. The Opencastable Reserves have been shown as 1523.56 in para 1.2 and 1323.45 in para 8.2. The figures should be reconciled.
4. Details of individual Boreholes should be furnished.
5. Quantum of work done in the following activities by MECL/CM DPI and other agencies:
  - a) Survey and Mapping
  - b) Drilling
  - c) Coal Sampling
  - d) Core Logging
  - e) Proximate Analysis / Ultimate Analysis
  - f) Washability Data Generation
  - g) Geo-physical Logging
  - h) Petro-graphic analysis
6. The identification of the Boreholes which have been considered for Geological correlation, Reserves assessment and Preparation of Cross-Sections should be clearly mentioned.
7. 10% deduction has been made from Gross-geological-reserves to arrive at Net Geological Reserves and again a provision of 5% has been made towards mining losses. This should be re-examined in consideration of the fact that bulk of the Block area is free from the geological disturbance.
8. A note on the current status of the linked power station should be

incorporated.

9. In table 7.3 details of the Seams which have not been considered for extraction should also be shown
10. List of Flora and Fauna should be incorporated.
11. Village-wise land use pattern should be shown.
12. R&R issues have not been touched. This should be done.
13. For assessment of Reserves cut-off thickness has been taken as 1.0 mtr for Opencast Mine whereas this has been taken as 0.5 mtrs for underground Mining. This should be looked into.
14. It has been indicated that 100% of the Reserves in indicated category has been taken as Nat Reserves. This should be looked into.
15. Detailed calculation of coal requirement for 4000 MW generation capacity should be furnished.
16. In para 6.5 Apparent Dip has been shown as 6-8°. This should be looked into in consideration of the fact that True Dip has been shown as 4-6°.
17. In para 6.8 it has been stated that Surface Miners cannot work thick seams. This should be re-examined.
18. Consideration should be given to deploying larger sized of equipment to reduce the fleet size & improve energy efficiency.
19. Cut-off thickness for underground Mining should be indicated. Keeping coal Conservation aspects in view.
20. The height of the OB Benches has been shown as 20 Mtrs at para 1.32 and as 15 mtrs in para 6.1.1. This should be reconciled.
21. Provision has been made for only 40% housing satisfaction. This should be reconsidered.
22. There is a 'V' Formation in the Northern Boundary of the Block, reserves from which can be extracted only if 'V' formation is eliminated and the Boundary line made straight. Allottee may make an application for straightening this boundary since almost 12 mill. Tones of coal reserves will get lost otherwise.

It is requested that Mining Plan incorporating above suggestions should be submitted to this Ministry in quadruplicate duly signed by RQP.

Yours faithfully,



(L.S. Janoti)

Section Officer : (CPAM)

Tele : 011 23369132

Fax : 011 23387738

E-mail : socpam-moc@ndc.in





**एनटीपीसी लिमिटेड**  
 (एन सी ई सी २००५)  
**NTPC Limited**  
 (A Govt. of India Enterprise)  
 (Formerly National Thermal Power Corporation Ltd.)  
 इन्डियन नेशनल पावर कॉर्पोरेशन  
 Corporate Centre NOIDA

Ref: CC: PEM: 7014; MP: 04

Date: 05/02/10

To,  
 Section Officer (CPAM)  
 Ministry of Coal,  
 Shastri Bhawan,  
 New Delhi

आइ.टी.पी.सी. लिमिटेड  
 एन सी ई सी २००५  
 इन्डियन नेशनल पावर कॉर्पोरेशन  
 कोयला व बिजली विभाग  
 नई दिल्ली-११००११

डिप्युटी  
 सचिव व संपन्न सचिव,  
 कोयला व बिजली विभाग,  
 नई दिल्ली-११००११

Kind Attention: Sh. L.S. Jandl

Sub: Reply to suggestions of Technical Members of Standing Committee for approval of Mining Plan for Talaspalli Coal Block allocated to NTPC Limited.

Dear Sir,

This has reference to your letter no 34011/ 68/2009-CPAM dated 20/01/2010, regarding our proposal for approval of Mining Plan of Talaspalli Coal Block, Mand Raigarh Coalfield, District- Raigarh, Chhatgarh.

Our replies on the suggestions and Mining Plan incorporating suggestions in four copies, duly certified by the Recognized Qualified Person are submitted herewith.

It is requested that the approval of the Mining Plan may please be accorded.

Thanking You,

Yours Sincerely,

*(Signature)*  
 Dy. General Manager (PE-MP & D)  
 1<sup>st</sup> Floor, Engineering Office Complex, Sector-24  
 NTPC Ltd. NOIDA-201301  
 Telax: 0120-2410400/2850291057  
 Email: skdash@ntpc.co.in

Encl: Four Copies of Mining Plan (Text & drawings)



Engineering Division  
ISO 9001:2008 Certified

एनटीपीसी लिमिटेड, एन सी ई सी २००५, इन्डियन नेशनल पावर कॉर्पोरेशन  
 कोयला व बिजली विभाग, नई दिल्ली-११००११  
 डिप्युटी सचिव व संपन्न सचिव, कोयला व बिजली विभाग,  
 नई दिल्ली-११००११  
 इन्डियन नेशनल पावर कॉर्पोरेशन लिमिटेड, एन सी ई सी २००५, इन्डियन नेशनल पावर कॉर्पोरेशन  
 कोयला व बिजली विभाग, नई दिल्ली-११००११  
 टेलीफोन नं. ०१२०-२४१०४००, २८५०२९१, २८५०२९२, २८५०२९३  
 टेलीफैक्स नं. ०१२०-२४१०४००, २८५०२९१, २८५०२९२, २८५०२९३  
 ईमेल: skdash@ntpc.co.in

**BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW  
DELHI**

**PETITION NO. \_\_\_\_\_/MP/2023**

**IN THE MATTER OF:**

Petition under Regulation 22 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 ("**Tariff Regulations 2019**") read with Regulation 9 (4) of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (Second Amendment) Regulations, 2021 ("**Second Amendment 2021**") seeking condonation of delay of 22.5 months in declaring Commercial Operation Date of Talaipalli Coal Mine and approval of input price of coal supplied from Talaipalli Coal Mine to end use generating station i.e., Lara STPS for the period from Commercial Operation Date i.e., 01.10.2023 to 31.03.2024.

**AND IN THE MATTER OF:**

NTPC Limited ...Petitioner

Versus

Madhya Pradesh Power Management Company Limited & Ors. ...Respondents

**VOLUME-II  
[552-1162]**

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**FILED BY**



**SKV LAW OFFICES**

Advocates for the Petitioner

B-50, Defence Colony, New Delhi-110024

Phone: 011-47099999

Email: [lawyers@skvlawoffices.com](mailto:lawyers@skvlawoffices.com)

Place: New Delhi

Date: 24.11.2023

13016/29/2013-CA-I (Vol. III)  
Government of India,  
Ministry of Coal

New Delhi, the dated 31<sup>st</sup> March, 2010

To

Dy. General Manager (PE-MP&D),  
1<sup>st</sup> Floor, Engineering Office Complex,  
Sector-24, Noida-201301  
(U.P.)

**Subject:** Approval of Mining Plan (February, 2010) in respect of Talapalli Coal Block in Mand Raigarh, in the State of Chhattisgarh for captive mining of coal by M/s. NTPC Ltd.

Sir,

I am directed to refer to your letter No.CC/PEM/7014/MP/02 dated 10.11.2009 submitting therewith Mining Plan (February, 2010) for Talapalli coal block in Mand Raigarh in the State of Chhattisgarh, for captive mining of coal by M/s. National Thermal Power Corporation Ltd. to be read alongwith allottee Company's letter dated 05/02/2010 and to say that the mining plan has been considered in this Ministry and the approval of the competent authority is hereby conveyed under Section 5 (2) (b) of the Mines & Minerals (Development & Regulations) Act, 1957 subject to the following conditions:-

- i) The mining company shall take all necessary precautions regarding safety of mine workings, persons, deployed therein.
- ii) Mining lease to be acquired shall not encroach into any other coal block.
- iii) The approval of mining plan is without prejudice to the requirement of approvals from competent/prescribed authority under the relevant rules/regulations, etc.

2. Two copies of the approved Mining Plan duly signed by the competent authority are returned herewith with request that a copy of the approved mining plan be submitted

---

to the concerned State Government for necessary action and also a photocopy of the approved Mining Plan may be sent to the Coal controller for monitoring the block.

Encas above.

Yours faithfully,

  
(V. S. Raina)

Under Secretary to the Government of India

Copy to:-

1. Under Secretary, CPAM Section, Ministry of Coal, for information and record.
  2. The Coal Controller, 1-Council House Street, Kolkata.
-

**NTPC LIMITED**

**TALAI PALLI**

**OPENCAST AND UNDERGROUND COAL PROJECT  
MAND RAIGARH COALFIELD**

**FINAL MINING PLAN**

**VOLUME I (TEXT)**

**FEBRUARY 2010**

**PREPARED BY:-**

**B.S. NAG**

**RQP NO. 34011/(39)/2006-CRAN**

**Advance Coal Management & Marketing Pvt. Ltd.  
New Delhi**



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20H	Geological log	20H	ACMM/SMK/TL/20H
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 श्री. एच. राजा S. RANA  
 अपर सचिव/UNDER SECRETARY  
 कोयला विभाग/MINISTRY OF COAL  
 भारत सरकार/GOVT. OF INDIA  
 नई दिल्ली/NEW DELHI

Prepared by

Rana,

2006

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वी. एच. शर्मा V.S. RANA  
 जूनियर सचिव UNDER SECRETARY  
 कोयला विभाग MINISTRY OF COAL  
 भारत सरकार GOVT. OF INDIA  
 नई दिल्ली NEW DELHI

RQP NO. 34511/29/2006-CPAM dt. 28.5.06, Advance Coal Management & Marketing Pvt. Ltd.  
 100, Industrial Area, Phase II, Gurgaon, Haryana-122001  
 Phone: 0122-2701111, Fax: 0122-2701112, E-mail: info@acmltd.com

**FINAL MINING PLAN -FOR TALAIPALLI COAL BLOCK**

**Subject: Mining Plan (November, 2009) for Talaipalli Coal Block, Mand-Raigarh Coalfield, District Raigarh, Chhattisgarh of M/s NTPC.**

Mining Plan as submitted in November 2009 was discussed in the Standing Committee of MOC on 29-12-2009. The comments of the Committee were received vide Letter No. 34011/68/2009-CPAM dated 20.01.2010 on the subject. The suggestions made by the Standing Committee have been perused by NTPC & RQP and the reply indicating compliance of all suggestions (S-1 to S-22) from the above committee is placed below:-

**S-1 There has been considerable delay in submission of Mining Plan should be furnished. Reason for this delay should be explained.**

**Reply:**The block was allocated to NTPC vide letter No. 13016/29/2008-CA-1 dt 25-01-2006. NTPC took up with CMPDI for obtaining the GR and CMPDI vide their letter dtd 31.01.2006(copy enclosed), informed that in Talaipalli block Regional exploration by GSI is completed and the GR is available with GSI. NTPC procured the Regional exploration report from GSI on 15.02.2006. To establish the entire block under proved category NTPC undertook exploration work for remaining area through MECL. During the course of exploration, work was hampered due to crops, forest clearance and local problems and MECL was able to submit final GR of the block vide their letter no. G/07/Talaipalli/07-08/1123 dt 29-09-2008. After receiving the GR from MECL, it was submitted by NTPC to CMPDI vide letter no. NTPC/CM & CW/CC/EXPL/CMPDI/08.01 in pursuance of MOC guidelines for vetting. Follow up action for getting the GR vetted by CMPDI also was the part of the process before starting the preparation of Mining Plan. Since adequate in-house expertise is not available, action was taken for appointment of agency for preparation of Mining Plan and Mining Plan prepared by consultant/RQP was submitted to MOC on 10.11.09.

**S-2 As per Annexure A (9) the Mining Plan has been prepared under guidance of RQP. Mining Plan has to be prepared by RQP.**

**Reply:**The Mining Plan has been prepared by the RQP, Annexure A (9) has been rectified accordingly.

**S-3 The Opencastable reserves have been shown as 1323.58 in Para 1.2 and 1323.45 in Para 6.2. The figure should be reconciled.**

**Reply:**There was a typographical error in Para 1.2 which has been rectified. The Opencastable reserve is 1323.45 MT.

For: S. RASIA

For: S. RASIA  
 Director, RQP  
 Advance Coal Management & Marketing Pvt. Ltd.  
 34011/68/2009-CPAM dated 26.6.09

**S-4 Details of Individual Boreholes should be furnished**

*Reply:* Borehole details have now been incorporated by providing Geological logs from plate nos. 20 A to 20 M in the Mining Plan

**S-5 Quantum of work done by MECL/CMPDI or other agencies on the following should be mentioned.**

- |                   |  |
|-------------------|--|
| a) Survey/Mapping | e) Proximate Analysis/Ulimate Analysis |
| b) Drilling       | f) Washability Data Generation         |
| c) Coal sampling  | g) Geo-physical logging                |
| d) Core Logging   |  |

*Reply:* Quantum of work done by MECL/GSI has been incorporated in the mining plan at ~~para~~ 4.1.1

**S-6 The identification of the Boreholes which have been considered for Geological co-relation, Reserves assessment and preparation of Cross-Sections should be clearly mentioned.**

*Reply:* The identification of the Boreholes which have been considered for Geological co-relation, Reserves assessment and Preparation of Cross-Sections has been incorporated in the Mining Plan in Para 4.4.1.

**S-7 10% deduction has been made from Gross-geological reserves to arrive at Net Geological Reserves and again a provision of 5% has been made towards mining losses. This should be re-examined in consideration of the fact that bulk. Of the Block area is free from the geological disturbances.**

*Reply:* 10 % deduction from Gross-geological reserves to arrive at Net Geological Reserves has been made according to the MOC guidelines for detailed exploration to account for unforeseen datum gap, wash out zones, abrupt changes in seam thickness. Provision of 5% has been taken towards mining loss considering the deposit is multi seam (total 27 no. of seams together with splits) of different thickness, mostly thin seams and also inconsistency in thickness of partings.

**S-8 A note on current status of the linked power station should be incorporated.**

*Reply:* The linked and use project for Talaipalli coal block is LARA-STPP (4000 MW), in Raigarh district of Chhattisgarh. Most of the site specific studies like topographical survey, geo-technical investigation, seismic study, railway siding study, Market ash utilization survey etc for the project have been completed and various statutory clearances are under process. FR has been finalized and it is 12<sup>th</sup> Plan Project.

श्री. एन. ए. श्रीवास्तव  
 UNDER SECRETARY  
 कोयला विभाग  
 नई दिल्ली

S-9 In Table 7.3 details of the Seams which have not been considered for extraction should also be shown.

*Reply: Seams II L1 and II L have not been considered for mining because "as per Geological Report the possibility of any belowground mining in Seam III1 and III does not exist due to poor development of the carbonaceous horizons". Table 7.3 has been modified by adding the names of these seams in the table.*

S-10 List of Flora and Fauna should be incorporated.

*Reply: List of Flora and Fauna has been incorporated in para 15.2 of the Mining Plan.*

S-11 Village-wise land use pattern should be shown.

*Reply: Village-wise land use pattern has been incorporated in para 15.5 of the Mining Plan.*

S-12 R&R issues have not been touched. This should be done.

*Reply: R&R issues has been incorporated in the Mining Plan on page no. 15-11*

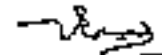
S-13 For assessment of Reserves cut-off thickness has been taken as 1.0 m for Opencast Mine whereas this has been taken as 0.5mtrs for Underground Mining. This should be looked into.

*Reply: At para 4.3 on page 4-35 of the mining plan this has been mentioned based on the G.R. The mining plan has considered seam thickness of 1m & above for opencast working and 1.2m & above for underground working.*

S-14 It has been indicated that 100% of the Reserves in Indicated category has been taken as Net Reserves. This should be looked into.

*Reply: Bulk of the block area is free from the geological disturbances, so, whole reserves have been considered under proved category. Para 4.8.1 has been modified accordingly.*

S-15 Detailed calculation of coal requirement for 4000 mw generation capacity should be furnished.

  
 श्री. एस. सुधीर, S. RAHAR  
 अवर सचिव, कोयला विभाग  
 कोयला विभाग, MINISTRY OF COAL  
 भारत सरकार, GOVT. OF INDIA  
 पिन कोड - 505 011

*Reply: Table indicating allocated block and the end use project indicating production capacity and requirement is placed hereafter:-*

S/No	Coal Blocks	Production capacity (MTPA)	Mineable reserves per Mining (MT)	as the Plan	End Use Projects (MW)	Coal Requirement (MTPA)	Remarks
1	Talaipalli	18	843.68		Lara (4000)	17.6	



**Coal requirement calculation for the linked Power Plant (Lara)**

- 1) Station heat rate : 2350 K Cal/kwh  
 2) Av. Coal Heat Value : 4208 K Cal/Kg  
 3) Specific Consumption : (2350 / 4208) Kg per kwh

4) Power Plant: a) Capacity - 4000 MW b) Plant load factor - 0.9

**Total Coal Requirement per annum (MT) :**

$$\frac{2350 \times 24 \times 365 \times 1000 \times 4000 \times 0.9}{4208 \times 1000 \times 10^6}$$

= 17.6 MT

**S-16** In Para 6.5 Apparent Dip has been shown as 6-8°. This should be looked into in consideration of the fact that True Dip has been shown as 4-8°.

*Reply:* There was a typographical error regarding apparent dip in Para 6.5, which has been modified in the Mining Plan.

**S-17** In Para 6.8 it has been stated that Surface Miners cannot work thick seams. This should be re-examined.

*Reply:* Surface Miner can work thick seams. In fact in this project, it is planned to produce about 40% of coal by surface miner by deploying it in seams X Bot, VI Mid, IV Top & III. All these seams are thick seams having carbonaceous shale bands and obvious bands more than 30cm. It will not be possible to deploy surface miner in all seam as running slope of the mine will be flatter which will lead to increased OB removal in initial years for the same production of coal, which will lead to re-handling of more OB. Para 6.8, of the Mining Plan has now been modified.

**S-18** Consideration should be given to deploying larger sizes of equipment to reduce the fleet size & Improve energy efficiency.

*Reply:* Equipment configuration has been revised as per advice of **श्री. एन. एन. व. S. RANA** (Joint Secretary, Coal India Limited, New Delhi). Rope Shovel has now been considered in combination with 31 mm Drill and 240 T Rear Dumper in Top OB removal in place of 20 cum hydraulic Shovel in combination with 250 mm Drill and 190 T Rear Dumper. List of equipment configuration has been revised in Table 6.5 of the Mining Plan.

**S-19** Cut-off thickness for Underground Mining should be indicated Keeping Coal Conservation aspects in view.

*Reply:* The cut-off thickness for underground mining has been considered at 1.2 m. As underground mining will start after a lapse of over 24 years from commencement of mining activity at the block, it is likely that more efficient equipment become then available and working of seams lesser than 1.2 m (and may be up to 0.5 m thickness) become possible. Such a situation would enhance the life of the mine as also providing better conservation.

**S-20** The height of the OB Benches has been shown as 20 m at para 1.32 and as 15 m in para 8.1 .1. This should be reconciled.

*Reply:* Height of the OB benches was earlier designed 15m. Now as advised by MOC, equipment configuration has been revised as indicated in reply under suggestion 18. Now for main overburden, 35m<sup>3</sup> shovels have been provided. Accordingly, the bench parameters have been revised and modified details have been placed in para 1.3.2 and 1.3.4.

**S-21** Provision has been made for only 40% housing satisfaction. This should be reconsidered.

*Reply:* Provision has now been made for 65% housing satisfaction. Para 14.7 in the Mining Plan has been modified accordingly.

**S-22** There is a 'V' Formation in the Northern Boundary of the Block, reserves from which can be extracted only if 'V' formation is eliminated and the Boundary Line made straight, Allottee may make an application for straightening this boundary since almost 12 million tons of coal reserves will get lost otherwise.

*Reply:* If the 'V' Formation in the Northern Boundary of the Block is removed and the Boundary Line is made straight it would result in additional recovery of coal. By using the geological model for reserve calculation, it has been estimated that an additional reserve of about 4 MT of coal can be recovered by straightening the boundary. As advised by the standing committee, NTPC has already initiated the process by applying to MOC vide letter no. CC/CM&CW/Exp/01/81 dated: 28.01.2010 (Copy enclosed).

*Conclusion:* Final Mining Plan (Text & Plates) in quadruplicate incorporating the above suggestions is being submitted.

*[Signature]*  
 वी. एन. राणा V. S. RAHA  
 अवर सचिव/UNDER SECRETARY  
 कोयला विभाग/MINISTRY OF COAL  
 भारत सरकार/GOVT. OF INDIA  
 नई दिल्ली/NEW DELHI

*[Signature]*  
 B.S.NAG, (RQP)

Prepared by me

*[Signature]*

No.34011/68/2009-CPAII  
 Government of India  
 Ministry of Coal

New Delhi, the 20<sup>th</sup> January, 2010

To

Shri A K Dash,  
 Dy. General Manager (PE-MP&D)  
 M/s NTPC Limited,  
 1<sup>ST</sup> Floor, Engineering Office Complex, Sector-24  
 Noida - 201301

<b>Subject :</b>	Presentation of Mining Plan (November, 2009) for Tataipalli Coal Block submitted by M/s NTPC.
------------------	---

Sir,

I am directed to inform that the Mining Plan presentation to the Technical Members of the Standing Committee constituted under MMDR Act, 1957 of the above mentioned project was held on 29-12-2009 at Ministry of Coal, Shastri Bhavan, New Delhi

The following suggestions were made:

1. There has been considerable delay in submission of the Mining Plan. Reasons for this delay should be explained.
2. As per Annexure (9) the Mining Plan has been prepared under the guidance of RQP. Mining Plan has to be prepared by RQP.
3. The Openable Reserves have been shown as 1323.59 in para 1.2 and 1323.45 in para 8.2. The figures should be reconciled.
4. Details of individual Boreholes should be furnished.
5. Quantum of work done in the following activities by MECL/OMDPI and other agencies:
  - a) Survey and Mapping
  - b) Drilling
  - c) Coal Sampling
  - d) Core Logging
  - e) Proximate Analysis / Ultimate Analysis
  - f) Washability Data Generation
  - g) Geo-physical Logging
  - h) Petro-graphic analysis
6. The identification of the Boreholes which have been considered for Geological correlation, Reserves assessment and Preparation of Cross-Sections should be clearly mentioned.
7. 10% deduction has been made from Gross-geological-reserves to arrive at Net Geological Reserves and again a provision of 5% has been made towards mining losses. This should be re-examined in consideration of the fact that bulk of the Block area is free from the geological disturbance.
8. A note on the current status of the linked power station should be

Incorporated.

9. In table 7.3 details of the Seams which have not been considered for extraction should also be shown
10. List of Flora and Fauna should be incorporated.
11. Village-wise land use pattern should be shown.
12. R&R issues have not been touched. This should be done.
13. For assessment of Reserves cut-off thickness has been taken as 1.0 mtr for Opencast Mine whereas this has been taken as 0.5 mtrs for underground Mining. This should be looked into.
14. It has been indicated that 100% of the Reserves in indicated category has been taken as Net Reserves. This should be looked into.
15. Detailed calculation of coal requirement for 4000 MW generation capacity should be furnished.
16. In para 6.5 Apparent Dip has been shown as 6-8°. This should be looked into in consideration of the fact that True Dip has been shown as 4-8°.
17. In para 6.6 it has been stated that Surface Miners cannot work thick seams. This should be re-examined.
18. Consideration should be given to deploying larger sized of equipment to reduce the fleet size & improve energy efficiency.
19. Cut-off thickness for underground Mining should be indicated. Keeping coal Conservation aspects in view.
20. The height of the OB Benches has been shown as 20 Mtrs at para 1.32 and as 15 mtrs in para 8.1.1. This should be reconciled.
21. Provision has been made for only 40% housing satisfaction. This should be reconsidered.
22. There is a 'V' Formation in the Northern Boundary of the Block, reserves from which can be extracted only if 'V' formation is eliminated and the Boundary line made straight. Allottee may make an application for straightening this boundary since almost 12 mill. Tones of coal reserves will get lost otherwise.

It is requested that Mining Plan incorporating above suggestions should be submitted to this Ministry in quadruplicate duly signed by RQP.

Yours faithfully,



(L.S. Jantoli)

Section Officer : (CPAM)

Tele : 011 23329132

Fax : 011 23397738

E-mail : socpam.moc@nic.in



100/1  
209/1

567

**एन टी पी सी लिमिटेड**  
[प्रायतः सार्वजनिक उद्योग]  
**NTPC लिमिटेड**  
A Govt. of India Enterprise  
(Formerly National Thermal Power Corporation Ltd.)  
केन्द्रीय कार्यालय/Corporate Centre  
नोएडा/NOIDA

REF.No.GC/CM&CW/Exp/101/01

Date: 28.01.2010

The Secretary (Coal)  
Ministry of Coal, Shastri Bhawan  
Dr Rajendra Prasad Marg,  
New Delhi.

209/1

**Sub: Application for straightening of "V" shaped boundary on the northern flank of Talaiwalli Coal Mining Project (NTPC Ltd.)**

Dear Sir,

This is in reference to letter Ref No No34011/68/2009-CPAM dated 20.01.2010, wherein Expert Appraisal Committee(EAC) of MOC have inter alia; suggested for straightening the "V" shaped boundary (Copy placed at Annexure-1), on the north side of Talaiwalli Coal Mining Project. The relevant extract of the letter is as under.

**QUOTE**

*There is a 'V' Formation in the Northern Boundary of the block, reserves from which can be extracted only if 'V' formation is eliminated and the Boundary line made straight. Allottee may make an application for straightening this boundary since almost 12 mill. Tones of coal reserves will get lost otherwise.*

**UNQUOTE**

Based on the preliminary survey the measured area of "V" formation is ~~approx. 10~~ Hectares, which is mostly forest land.

*[Signature]*  
उप सचिव  
अवर सचिव  
नोएडा  
केन्द्रीय कार्यालय  
नोएडा  
उप सचिव  
अवर सचिव  
नोएडा  
केन्द्रीय कार्यालय  
नोएडा

The Mining Plan of the said block has been submitted for approval to MOC on 10.11.2009. In line with the stipulated conditions of the allotment letter (Annexure-2), the block boundary under consideration has been excerpted from Interim GR prepared by Geological Survey of India (GSI) and final GR prepared by Mineral Exploration Corporation Limited (MECL). During the presentation of the Mining Plan on 29.12.2009, EAC observed "V" shape irregularity on the northern flank of the block, by virtue of which substantial coal loss is apprehended.

Prepared by the  
*[Signature]*  
Contd...P...2

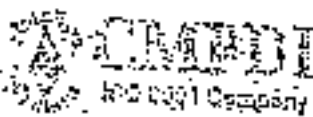
प्रथम तल, आर एच सी ब्लक, 4-8ए, सेक्टर-24, नोएडा-201 301 (उ.प्र.)  
1st Floor, R & O Building, A-8A, Sector-24, NOIDA - 201 301 (U.P.)  
Ph.: (O) +91-120-2410501-520, FAX : +91-120-2410243 / 2410579

Regd. Office : NTPC Bhawan, Seeps Complex, 7 Institutional Area, Lohi Road, New Delhi-110 003  
केन्द्रीय कार्यालय : एन टी पी सी भवन, सीप्स कॉम्प्लेक्स, 7, इन्स्टीट्यूशनल एरिया, लोही रोड, नई दिल्ली-110003

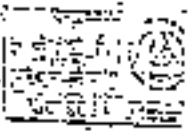
(vi)







केन्द्रीय भूखन कर्मिण एण्ड डिप्लोमेट्स लिमिटेड  
मिन्स विंग, नॉर्थ ब्लाक, ईस्ट - 110 001, (एन.टी.पी.सी.) प्रान्त  
Central Mine Planning & Design Institute Limited  
Sector-14, Okhla Road, Okhla, New Delhi-110 025, India



No. C&MPLD/TS/2566/53/16

Dated 21.01.2006

To  
Shri B.P. Singh  
Executive Director (Coal Mining & Coal Washeries)  
National Thermal Power Corporation Ltd  
NTPC Bhawan, SCOPE Complex  
7, Institutional Area, Lodhi Road  
New Delhi - 110 003

Sub: Allocation of Coal Blocks to NTPC  
and others for mining

Dear Sir,

In continuation of the letter no. C&MPLD/Secy/000180 dated  
20th January, 2006 addressed to Joint Secretary (Coal), Govt. of India,  
Coal Dept. on the aforesaid subject, I am directed to enclose desired  
information (Annexure-I) on the status of exploration in respect of  
blocks proposed for allocation to NTPC as per Summary Record of  
the meeting taken by Principal Secretary to PM on 8.11.2005, in PM's  
PM Office.

*(Signature)*  
S. S. RANA  
JOINT SECRETARY  
MINISTRY OF COAL  
GOVT. OF INDIA  
NEW DELHI

(S. S. Rana)  
Special Manager (TS)

Prepared by me  
*(Signature)*  
16.12.2005  
Prepared by person as approved wrt 22(C) of  
General Administration Rules, 1962 by Ministry  
of Coal, Department of Coal, Govt. of India  
Sd/-  
S. S. Rana  
Special Manager (TS)



**Status of Exploration in respect of Blocks Proposed for Allocation to NTPC**  
*(Ref.: Letter No.31/CK/CM/Mineral dated Jan. 15, 2009 from NTPC)*

Sl. No.	Coalfield	Block (Reserves Mt)	Status of Detailed Exploration	Likely date of commencement of Exploration	Status of Geological Report	Remarks
1	Mela Karanpura	Karandih (228)	Completed		6 months after receipt of chemical analysis data available (1995)	
2		Chalti-Baratu (243)	Completed			
3	Shigraji	Chhabraji (150)	About 2000m of drilling to be completed	3 months from the date of commencement	6 months after completion of drilling	Drilling suspended for want of forest clearance, which is being followed up.
4	Is Valley	Delunga (250)	Some detailed exploration done. About 7000m of drilling to be completed.	Not programmed	Initial GR (2000) available	
5	Mand-Rajgarh	Tilapali (335)	Regional Exploration by GSI completed		GR (1998) by GSI available	
6	Brahmin	Brahmin (190) & Chichro Patimal (356)	Regional Exploration by GSI completed in Brahmin Coalfield (covering Chichro Patimal) and Chichro Patimal separately.		GR of Brahmin Coalfield (1988) and Chichro Patimal (1989) by GSI available.	

Note: Reserves are as per the record of the meeting taken by Principal Secretary to Chief Minister on 8.12.08 regarding Allocation of blocks to NTPC.

S. NARAYAN  
 PRINCIPAL SECRETARY  
 DEPT. OF COAL  
 STATE MINISTRY OF COAL  
 GOVT. OF INDIA  
 NEW DELHI

IS 31/09/09  
 Performance of work as approved vide 28/01/09  
 Memo No. 31/CK/CM/Mineral dated 15/01/09  
 Department of Coal, Govt. of India  
 New Delhi



**SUMMARISED DATA**

## SUMMARISED DATA

## TALAIIPALLI OPENCAST &amp; UNDERGROUND COAL PROJECT

Sl. No	Particulars			
1.	Project Details	Location: Eastern part of Mand-Raigarh Coalfield, Dist- Raigarh, Chhattisgarh Area - 21.13 sq Km		
2.	Reserves (MT)	a) Gross Geological Reserves -1400.58 Net Geological Reserves -1260.52 b) Mineable Reserves*/Extractable-  - Opencast- 849.68 - Under ground- 17.57 c) Reserves blocked in barrier & Batter 336.69 (* Mining Loss(@ 5% ) 44.40		
3.	Quarry Parameters (m)	Max. depth-404 Max. strike length-6690 Min. strike length-1370 Max. dip rise length-4760 Min. dip rise length-3060		
4.	Annual Target Output (MT)	Opencast-18.0 Underground-0.72 ( at 100%) & - 0.60 (at 85%)		
5.	Total Life (Years)	Opencast- Construction -2 Production -52 Underground- Construction - 4 Production - 28		
6.	Seam Details	Thickness (m)		
		Min	Max	Usual
	Seam XLA	0.20	1.04	0.50-0.95
	Seam XLB	0.30	1.28	0.50-0.90
	Seam X Top	0.40	1.60	1.00-1.15
	Seam X Bot	1.60	8.10	3.5-6.0
	Seam IXL2	1.20	2.65	2.2-2.5
	Seam IXL1	0.36	1.85	0.5-1.0
	Seam IX	0.96	6.98	3.5-6.0
	Seam VIII	2.05	6.64	4.0-6.5
	Seam VII	0.10	3.90	0.50-1.0
	Seam VI Top	0.37	3.42	1.2-3.0

## SUMMARISED DATA

## TALAIPELLI OPENCAST &amp; UNDERGROUND COAL PROJECT

	Seam VI Mid	3.09	10.01	5.0-9.0			
	Seam VI Bot	0.48	1.75	0.50-1.0			
	Seam V Top	0.50	3.09	0.50-1.50			
	Seam V Mid	0.15	3.73	0.50-2.50			
	Seam V Bot	0.30	5.4	0.50-2.0			
	Seam IV Top	0.54	5.78	2.5-5.0			
	Seam IV Mid	1.02	7.22	3.5-7.0			
	Seam IV L	0.24	4.97	0.50-2.0			
	Seam IV Bot	0.55	5.67	1.5-3.5			
	Seam III L	0.10	3.21	0.55-1.45			
	Seam III	0.68	5.95	2.0-5.4			
7.	Quality of Coal : Overall Grade - 'F' Non-coking	U.H.V (K.Cal/Kg)		Ash %	Moisture %		
		Min	Max	Min	Max	Min	Max
		1310	5892	17.6	45.1	1.2	11
8.	Average Stripping Ratio Mm <sup>3</sup> /te	4.48					
9.	Specific gravity of coal(Average)	1.65 te/cum					
10.	Method of Mining	Opencast – (Shovel-Dumper combination)/ Surface miner  Underground- Continuous Miner & Shuttle car combination					
11.	Major Equipment (Opencast)	<div style="text-align: right;">           श्री एन. रामधन S. RAMA            एडर सचिव/UNDER SECRETARY            केंद्रिय सचिव/DEPARTMENTAL SECRETARY            कोयला सचिव/DEPARTMENTAL SECRETARY OF COAL            नो. १२०१/२००६/१०००            नो. १२०१/२००६/१०००            नो. १२०१/२००६/१०००         </div>					
A	OB	Size					
1	Electric Hydraulic Shovel	35cum		4			
2	Electric Hydraulic Shovel	20 Cum		08			
3	Electric Hydraulic Shovel	4.5 Cum		11			
4	Rear Dumper	240 T		41			
5	Rear Dumper	190 T		76			
6	Rear Dumper	50 T		92			

## SUMMARISED DATA

## TALAI PALLI OPENCAST &amp; UNDERGROUND COAL PROJECT

7	Elec. Drill	311mm	3
8	Elec. Drill	250 mm	13
9	Diesel Drill	160 mm	9
10	Dozer	450 HP	6
11	Dozer with ripper	850 HP	5
8	Coal	Size	Nos.
1	Electric Hydraulic shovel	12.0 Cum	1
2	Electric Hydraulic shovel	4.5 Cum	3
3	Surface Miner	2200	4
4	Front End Loader	4.5 Cum	4
5	Rear Dumper	35 T	38
6	Rear Dumper	120 T	10
7	Rear Dumper	50 T	26
8	Elec. Drill	250 mm	2
9	Diesel Drill	160 mm	3
10	Dozer	450HP	3
11	Dozer with ripper	850 HP	3
12.	Waste disposal (Mm <sup>3</sup> )	External(inside the lease area)- *264.52 Mm <sup>3</sup>  Internal- 3777.07 Mm <sup>3</sup> Total- 3777.07 Mm <sup>3</sup> * This will be re-handled in to internal dump Dump heights from surface-60m	
13.	Top Soil Mm <sup>3</sup>		25.32

श्री. एन. एच. राना  
ज्येष्ठ सचिव/SECTY  
कोयला मंत्रालय/SECRETARY  
भारत सरकार/GOVT. OF INDIA  
नई दिल्ली/NEW DELHI

Received by me  
13.0.2006

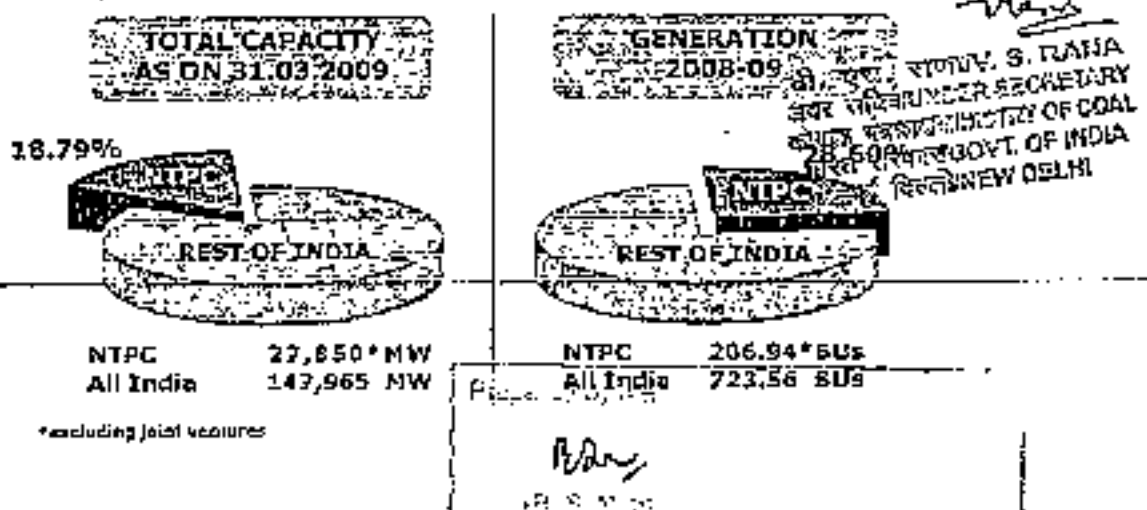
**TEXT**

## CHAPTER- I INTRODUCTION

### 1.1 GENERAL

NTPC Ltd incorporated in 1975, is the leading power generating listed company in the country under Ministry of Power, Govt of India, engaged in generation of Power with existing installed capacity of 30644 MW through its 15 coal based (24395 MW), 7 gas/liquid based (3,955 MW) and four joint ventures (3 coal based & 1 naphtha/LNG based-2294 MW) Projects. At present, Government of India holds 89.5% of the total equity shares of the company. It is one of the "Navratana" Group and has been entrusted with an ambitious programme of increasing its capacity to 51,000 MW by year 2012 and to 75,000 MW by year 2017. Considering NTPC's proven track record and proven corporate excellence during the past years, this ambitious programme, the major part of which is coal based, looks achievable if the coal resource is ensured and made available as per the power plant schedules. NTPC's contribution towards India's power generation as on 31.03.2009 has been presented below:

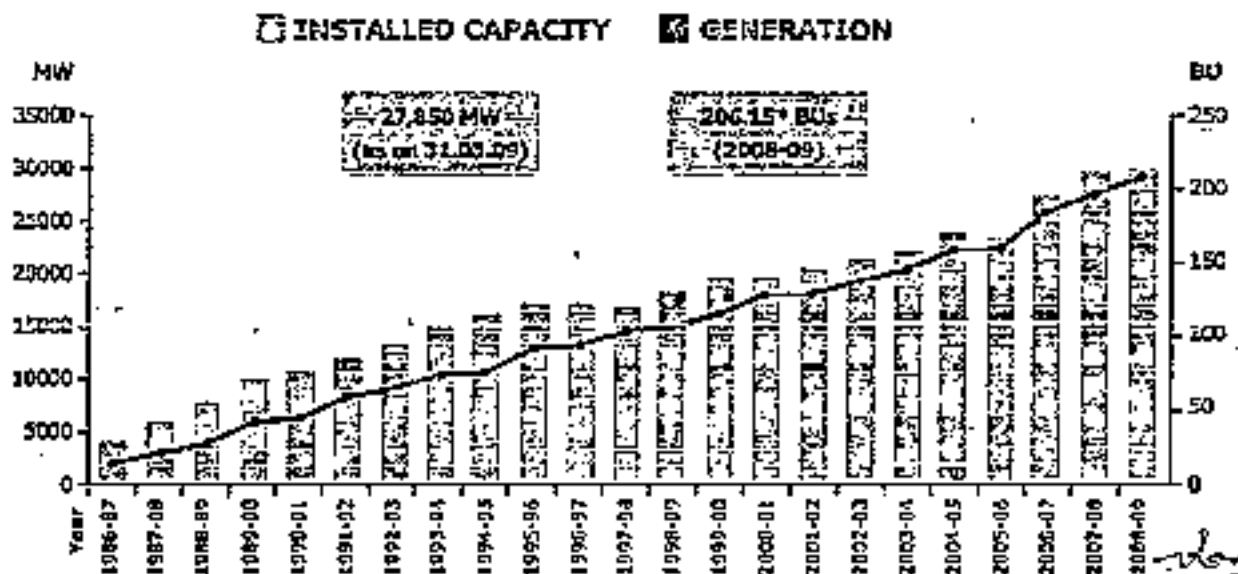
**NTPC contributes more than one-fourth of India's  
total power generation with less than one-fifth capacity**





NTPC is the world's 6th largest in terms of thermal power generation and the second most efficient in terms of capacity utilisation amongst the thermal utilities. The growth of NTPC's installed capacity & generation since 1986-87 is as presented below:

### Growth of NTPC Installed Capacity & Generation



श्री. एच. रामधारी S. RAMA  
 अवर सचिव/UNDER SECRETARY  
 कोयला मंत्रालय/MINISTRY OF COAL  
 भारत सरकार/GOV. OF INDIA

The existing power plants of NTPC are accorded long term coal linkages from CIL and Singareni Collieries Co. Ltd (SCCL). To meet the short term shortages, NTPC is also importing coal. Considering the gap in demand and existing linkages for coal, NTPC has decided to diversify in the coal mining through backward integration and has been allotted coal mining blocks.

Talaipalli coal mining block in the state of Chhattisgarh is one such block allotted to NTPC by Ministry of Coal (MoC), vide letter no.13016/29/2003-CA-1, dated


25.01.2006, for meeting coal requirement for the proposed 4000MW Lara Integrated Power Project.

NTPC has awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi-110038 vide letter no. CS-7014-751B-9-CY-LOA- 5310, dated 24.06.2009.

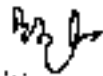
Talaipalli Block lies in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. The block was regionally explored by GSI by drilling 15 holes (6434.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

NTPC Ltd. after receiving Letter of Award (LOA) from Ministry of Coal, Issued Work order to MECL to carry out detailed exploration in the block by drilling 105 boreholes at 400m x 400m grid interval, involving around 45,000m to fully explore the block and reserves assessment in proved category.

MECL has documented the results in "Geological Report on Detailed Exploration for Coal, Talaipalli Coal Block – September-2008".

  
 श्री. एन. राणा V. S. RAHA  
 एक्जिक्यूटिव्ह UNDER SECRETARY  
 कोयला मंत्रालय MINISTRY OF COAL  
 भारत सरकार GOVT OF INDIA  
 नई दिल्ली NEW DELHI

Geological Report (GR) prepared by MECL was submitted to NTPC on 29.09.08. ACMM has been provided with a copy of the G.R. The Mining Plan document has been prepared, based on this G.R.

Approved by  
  
 Director  
 on as approved by 23/01/09  
 (Date) (Signature) (Name)  
 Director  
 (Date) (Signature) (Name)  
 Director

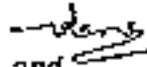
## 1.2 BLOCK DESCRIPTION

Area of Talaipalli coal block is 2113 Ha, wherein boundary pillars have been erected along the block boundary to clearly demarcate the limits of the block. It is included in Survey of India Topo sheet No. 54 N/7 & N/8. This coal block has Tolge Pahar in the north, Palma Coal Block (South Eastern Coalfields Ltd.), Silot Pahar in the south and Chimpatapani Coal Block (South Eastern Coalfields Ltd.)

Talaipalli block is about 55 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda situated on Raigarh-Ambikapur State Highway. The nearest railway station is Raigarh which is 55 km away from Talaipalli block lying on the Mumbai-Howrah main line of SE railways.

Kelo River is flowing through the south-eastern part of the present area; and constitutes the main drainage system.

This coal block has coal seams/splits from XLA to IIL (25 split seams/sections) with gross geological reserves of 1400.58 MT. of power grade coal of varying grades. Dip of seams varying between 4° to 8°. Opencast coal mining has been proposed upto the basal seam III for a total gross geological reserves of 1323.45 MT and the balance 77.13 MT are considered for by below ground method of mining. Since opencast mining ensures much higher percentage of extraction of coal reserves, the proposed strategy is considered best from the point of view of coal conservation. The Opencast Mine will have maximum depth of 404m. Below ground mining development is proposed to commence after about 20 yrs of start of opencast mining.

  
 वी. एस. राणा V. S. RAHA  
 ज्वर सचिव UNDER SECRETARY  
 कोयला मंत्रालय MINISTRY OF COAL  
 भारत सरकार GOVT. OF INDIA  
 DELHI

Station has been indicated at about 18 MTPA, which is projected to be achieved in the Opencast Mine in the 5<sup>th</sup> year of coal production. The proposed opencast mine will have a life of 52 years, including the build-up period of the Project.

The total O.C mineable coal reserves have been estimated as 843.68 Mt at the corresponding OBR of 3777.07 Mm<sup>3</sup> at an average SR of 4.48 m<sup>3</sup>/t.

The capacity of underground mine to be worked through a pair of vertical shafts is assessed at 0.72 MTPA at 100% rated capacity or 0.60 MTPA at 85% level. The life of below ground mine is expected 30 years including development period.

NTPC Intends to mine the entire property in a scientific manner with due regard to the conditions laid out by MOC and with full emphasis on coal conservation and safety.

### 1.3 OPENING THE OPENCAST MINE

As the advance activities proceed and physical possession of land is taken, two entries will be made to reach Seam-III as base seam.

It has been proposed to start mining by driving two access roads on the east side of the North Eastern side and the other on the western side of the property shown in the final stage quarry plan. Advantages of having two entries have been explained in Chapter V. Internal dump will start once sufficient void space gets available from 5<sup>th</sup> year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will be placed as external dump within the mine property. The quarries will merge as a composite Quarry around the 20<sup>th</sup> year.

*[Signature]*  
 श्री. एस. राजा S. RANA  
 अवर सचिव UNDER SECRETARY  
 कोयला विभाग MINISTRY OF COAL  
 नई दिल्ली NEW DELHI

### 1.3.1 DUMP PLANNING

The first guiding principle of designing dump planning has been followed as minimum degradation of existing land asset due to mining operation and accordingly no OB waste is going to be placed in external dump outside the coal block area of 2113 Ha, allocated to NTPC. In the initial years, when sufficient void to the floor of the basal seam III is not created, the OB spoil generated will be temporarily accommodated within the block area to the dip side of the working area and then re-handled back in the void to the floor of the basal seam as internal dump with additional cost to be incurred by NTPC.

The second guiding principle is slope stability of the Dump. Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 60m is above quarry surface. Each tier of OB dump is of 30m height and berm width has been increased to 40m, with the result that the ultimate dump slope is 22 degrees only along the slope line connecting mine floor to the crest of the dump, as opposed to the maximum permissible angle of 27 degrees. This feature has increased overall stability of the dump at its final stage.

Thirdly, in pre-mining stage itself, deep garland drain around Northwest and North will be created with continuous slope to Kelo river to arrest any water from those sides. A wharf wall of 2m height and 1 m wide will be erected along the periphery of the bottom tier at surface level and the slopes and the berms will be vegetated. Gullies will be provided to guide water from higher tiers down on.

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 GENERAL SECRETARY  
 MINISTRY OF COAL  
 GOVT. OF INDIA  
 NEW DELHI

Post-2003/04  
 B. Rana  
 26.6.05  
 2103 of

RQP No. 34011/(39)/2006-CPAM dated 26.6.05, Advance Coal Management & Marketing Pvt. Ltd.  
 CPAM dated

### 1.3.2 O.B. REMOVAL


The following type and size of Shovel-dumper combination has been considered optimum.

- The top OB will be mined and transported by 35m<sup>3</sup> Electric Rope shovel in conjunction with Rear Dumper 240 T.
- The intervening parting will be mined along and transported by 20m<sup>3</sup> Hyd Shovel+ Rear Dumper 190 T. However for thin parting it is proposed to deploy 4.5 m<sup>3</sup> Hyd shovel + Rear Dumper 50T wherever found suitable. It will be also assisted by other auxiliary HEMM.
- The coal and intervening parting benches would be formed parallel to the coal seams and would be mined by inclined slicing method. The top OB benches will be formed horizontally above-roof of top seam and will be mined by horizontal slicing method. However the OB benches immediately above the roof of topmost seams would be formed parallel to the coal seams roof to avoid the formation of triangular rib of OB, which is likely to mix-up with coal after blasting. The maximum top OB benches height would be maintained at 20m and in case of coal and intervening parting benches the height will be equal to thickness of coal seam and thickness of parting.

### 1.3.3 COAL WINNING

The following type and size of Shovel-dumper combination has been considered optimum.

- 12 m<sup>3</sup> hydraulic shovel along with RD-120T is proposed so that the HEMM should be versatile and can be adopted in coal benches. However for thin coal seams & parting smaller size hydraulic shovel i.e.4.5 m<sup>3</sup> hydraulic backhoe with RD 50 T along with auxiliary HEMM are provided in the project.

  
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 भारतीय कोयला निदेशक संस्थान  
 नए दिल्ली  
 NEW DELHI



- |                                   |      |
|-----------------------------------|------|
| 2) Width of the working bench     | -30m |
| 3) Width of the non-working bench | -25m |
| 4) High wall angle of the bench   | -70° |

The above parameters may be modified according to the actual working condition. The high wall angle for the soft OB bench will not be steeper than 45°. In this mining plan report, it has been envisaged that the mine will be worked for 330 days per annum i.e. 7 days per week.

#### 1.4 UNDERGROUND MINING

Underground mining development is proposed to commence after about 20 yrs of start of opencast mining and the production 4 years thereafter. It will be serviced by two vertical shafts. The coal production target is fixed at 0.72 Million Tonnes per annum from the Underground Mine and the expected life of the mine will be 30 years including construction period of 4 years. II Seam, which will be the main seam for UG mining with patches in other seams in the packet of UG mining seams; has general thickness of 0.50m to 2.50m. Two Continuous Miner districts will provide the production. Area for sinking of shafts and for related infrastructure has been excluded from the open pit area.

#### 1.5 POWER SUPPLY

A 40 MVA 132/33 KV Sub Station (S/S) has been commissioned at Bhendre one year back and presently having a peak load of approx. 15 MVA only.

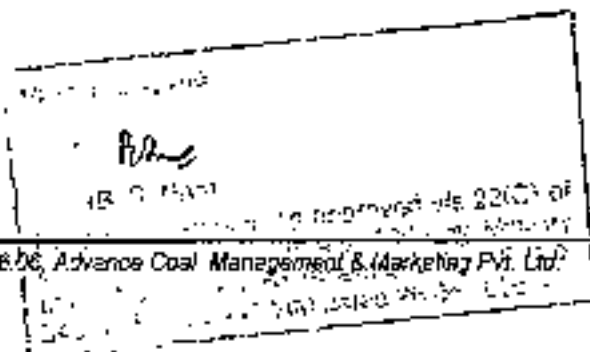
This S/S is fed from Raigarh 220/132 KV grid s/s and is 30 km away from Raigarh. The distance of coal mine from this S/S is 15 km. This S/S is having 6 nos. of 33 KV feeders. It is understood from CSEB that S/S has been planned to



*Final Mining Plan—Talaipalli Opencast and Underground Coal Project, NTPC Limited*

have one more 40 MVA transformer based on load growth in the area. This substation feeds Gharghodia 33/11 KV S/S which in turn feeds the villages around coal block at 11 KV. The substation is having a 33 KV feeder to Lailunga (as an alternate source to Lailunga) in floating condition. This 33 KV line is passing some 5-7 Kms away from coal mine area near Kotrimal and as per CSEB can be tapped, if required, to feed coal mine area.

*[Signature]*  
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 अवर सचिव / UNDER SECRETARY  
 कोयला मंत्रालय / MINISTRY OF COAL  
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 नई दिल्ली / DELHI



ROP No. 34011/39/2006-CPAM dated 26.8.06, Advance Coal Management & Marketing Pvt. Ltd.

## CHAPTER- II

## GENERAL

## 2.1 NAME OF APPLICANT WITH COMPLETE ADDRESS

NTPC Ltd.

(Erstwhile National Thermal Power Corporation Ltd)

(Govt of India Enterprises)

NTPC Bhawan

Scope Complex, 7, Institutional Area

Lodhi Road,


New Delhi-110003

Tel No- 0120-2410333-42/2410116-20

(Engineering Office Complex, Plot No-A-8A, Sector24, NOIDA (UP.))

Fax No- 0120-2410136/37

## 2.2 STATUS OF APPLICANT

  
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 अवर सचिव UNDER SECRETARY  
 कोयला मंत्रालय MINISTRY OF COAL  
 भारत सरकार GOVT. OF INDIA  
 नई दिल्ली NEW DELHI

NTPC Ltd is a public sector company under Ministry of Power, Govt of India,

The Board of Directors of the company consists of :-

Sl. No.	Name	Designation
1	Shri R.S. Shama	Chairman cum Managing Director
2	Shri Chandan Roy	Director (Operation)
3	Shri R.K. Jain	Director (Technical)
4	Shri A.K. Singhal	Director (Finance)
5	Shri R.C. Shrivastav	Director (Human Resources)
6	Shri I.J. Kapoor	Director (Commercial)
7	Shri B.P. Singh	Director (Projects)
8	Shri P.K. Sengupta	Non-official part time Director
9	Shri M.N. Buch	Non-official part time Director
10	Shri Shantii Narain	Non-official part time Director
11	Shri K. Dhamarajan	Non-official part time Director
12	Dr. M. Govinda Rao	Non-official part time Director
13	Shri Adesh Jain	Non-official part time Director

## Final Mining Plan—Tataipalli Opencast and Underground Coal Project, NTPC Limited

14	Shri Santosh Nautiyal	Non-official part time Director
15	Shri Kanwal Nath	Non-official part time Director
16	Shri Arun Kumar Sanwalka	Non-official part time Director
17	Shri I.C.P. Keshari	Government nominee Director
18	Shri Rakesh Jain	Government nominee Director

2.3 MINERAL OR MINERALS WHICH ARE OCCURRING IN THE AREA AND WHICH THE APPLICANT INTENDS TO MINE :

COAL


2.4 ANNUAL COAL REQUIREMENT FOR POWER GENERATION

Capacity in MW	Coal Requirement Mty	Long Term Linkage Mty
	At 95 % PLF	
4000 MW New Lara Power Project	18.00 MT from Tataipalli Coal Mine	Nil

2.5 ANNUAL COAL PRODUCTION TARGET

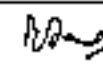
Annual coal production target is 18 Mty.

The year-wise target of coal production has been presented below.

  
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 भारत सरकार GOVT. OF INDIA  
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Year of Production	Target of Coal Production
PC1	(1 <sup>st</sup> Construction Year)
PC2	(2 <sup>nd</sup> Construction Year)
1	1.50
2	4.00
3	8.00
4	13.00
5 (onwards)	18.00

Prepared by SMC

  
 13.5.2006

- 2.6 PERIOD FOR WHICH MINING LEASE IS REQUIRED : 30 yrs initially, to be extended till workable coal reserves are completely exploited.

2.6.1 Name of RQP preparing mining plan

B.S.Nag

C/o ACMM

511/2/1 Rajokri, New Delhi-110038

Regn. No. 34011/(39)/2006-CPAM dated 26.06.2006

2.7 NAME OF PROSPECTING AGENCY

- (a.) Geological Survey of India, Kolkata  
(b.) Mineral Exploration Corporation Limited

2.8 REFERENCE NUMBER AND DATE OF CONSENT LETTER FROM THE STATE GOVT.

Allocation from Ministry of Coal, Govt. of India Order No.-13016/29/2003-CA-1, dated 25<sup>th</sup> January, 2006.

*(Signature)*  
वी. सुल. राणा/V. S. RAMIA  
उप सचिव/UNDER SECRETARY  
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भारत सरकार/GOVT. OF INDIA  
नई दिल्ली/NEW DELHI

RQP No. 34011/(39)/2006-CPAM dated 26.6.06

Adityan Coal Management & Marketing Pvt. Ltd.

## CHAPTER III

## PROJECT SITE INFORMATION

## 3.1 LOCATION

Talaipalli coal block having an area of 2113 ha is bounded by latitude  $22^{\circ} 13' 35''$  &  $22^{\circ} 16' 08''$  N and longitude  $83^{\circ} 25' 49''$  &  $83^{\circ} 30' 22''$  E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaipalli block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd., was pillared by Boundary Pillers BP-1 to BP-65. The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajjigarh and Kudur-Mauha village forming the northern boundary.

Talaipalli block is covered by Survey of India top sheet No. 64N/7 & N/8 (RF 1:50000). The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaipalli, Kudhur-Mauha, Ajjigarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajhepalli are numerous villages located within the block.

## 3.2 COMMUNICATION

Talaipalli block is about 55 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village ( $22^{\circ} 14' 27''$  -  $83^{\circ} 29' 06''$ ) is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Belunga road. Gharghoda is about 35 km North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway. A large part of the area of investigation is practically inaccessible during monsoon. The nearest railway station is Raigarh which

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is 55 km away from Talaipalli block lying on the Mumbai-Howrah main line of SE railways.

### 3.3 PHYSIOGRAPHY AND DRAINAGE

The topography of Talaipalli block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolge Pahar in the north and Silot Pahar (580m) in the south. The general ground level elevation of the area varies between 260 m and 340m above MSL.

Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south.

### 3.4 CLIMATE

The area experiences a sub-tropical climate with very hot and dry summer. In the summer season from March to June, temperature rises to 45° C during the peak period. The monsoon period extends from mid June to September with an average annual mean rainfall of 1620 mm. The winter season starts from November and continues up to February. During winter the temperature goes down to 18.6° C.

### 3.5 LAND USE, FLORA & FAUNA

Forest cover is found in the south eastern part of the block. Small land patches having forest cover are available in central part of the block. Remaining part of the area is mostly cultivated land. Cultivation and collection of forest products are the main occupation of the people of the area. The soil of the area is having fair to medium range of fertility. The main crop grown in this area is paddy. The commonly found flora in the area are Sal, Teak, Bija, Mango, Neem, Tendu-etc. Wild animals found are elephants, wild dogs & bears-etc.

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## CHAPTER IV

## GEOLOGY AND STRUCTURE

## 4.1 MAND RAIGARH COALFIELD

Mand-Raigarh Coalfield lies in the drainage basin of Mahanadi, represents a part of the south-eastern periphery of a vast cauldron of sedimentary terrain, known as Son-Mahanadi Gondwana Master Basin. Mand-Raigarh Coalfield along with Ib-Himgiri coalfield towards south-east and Korba-Hasdo towards west and north-west constitute the large NW-SE trending asymmetrical synformal master basin.

The coalfield is characterized by undulatory rolling topography consisting of hills interspersed with broad valleys. The general elevation of the ground ranges from 270m. to 300m, above M.S.L. The slope is either towards southwest or southeast. The southerly flowing perennial Mand river with its tributaries constitute the main drainage of the area. The Kelo river, a tributary of Mahanadi drains the eastern part of the coalfield.

The Ministry of coal allocated Talaipalli Block for exploitation. Block was regionally explored initially by GSI and had estimated 964.88 million tonnes of indicated coal reserves based on 15 boreholes data. NTPC Ltd. after receiving letter of award (LOA) from Ministry of Coal, deputed MECL to carry out detailed exploration in the block by drilling boreholes at 400m x 400m grid interval. Drilling operations were carried out till 3<sup>rd</sup> August, 2008 wherein 39854.75m additional drilling was done at 102 boreholes. MECL prepared Geological Report of "Talaipalli Coal Block – Mand Raigarh Coalfield – September 2008" based on the analysis of drilling including exploratory drilling earlier carried out by GSI. This document forms the basis of mining plan prepared for approval from Ministry of Coal.

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Generalized stratigraphy of Mand-Raigarh Coalfield is given at Table 4.1

Table - 4.1 - Generalized Stratigraphic Succession

Age	Formation	Thickness (m)	Lithology
1	2	3	4
Recent to subrecent			Aluvial soil pebbly to bouldary bed with silty clay band, laterite etc.
Cretaceous to Eocene	Deccan Traps		Basalt flows & dolerite dykes
Lower to Middle Triassic	Kamthi	2851	Poorly sorted, frequently ferruginous, coarse to very coarse grained, locally graded to pebbly, mega cross bedded sandstone containing, brownish grey to buff coloured clay clasts. A fossiliferous red claystone to siltstone bed occurs at the base.
Upper Permian to Lower Permian	Raniganj	180	Mostly fine to medium grained, grayish white, micaceous sandstone and siltstone with claystone, shale, minor coarse grained sandstone and two coal seams of inferior grade.
	Barren Measure	300	Dominantly grey claystone/grey shale with siltstone and iron stone bands; interbanded sequence of fine to medium grained sandstone and shale
	Barakar	425 - 800	Medium to coarse and very coarse grained even gritty, sandstone at the lower part followed upward by fine to medium grained assemblage with grey claystone/shale which become predominant towards the upper part, number of coal seams and carbonaceous shale.
	Karharbari (?)	23	Mottled at places carbonaceous sandstone, frequently associated with pebbles of quartzite granite etc. in various shapes and sizes...
Upper Carboniferous to lowermost Permian	Talchir	150+	Very fine to fine grained sandstone with siltstone and shale, occasionally greenish in nature, at places with matrix based variegated polymictic conglomerate.



## Final Mining Plan-Talaipalli Opencast and Underground Coal Project, NTPC Limited

	x)	Ultimate Analysis.	1300 Nos.	278 Nos.
	xi)	Swelling Index	650 Nos.	103 Nos.
	xii)	Coke type	650 Nos.	103 Nos.
	xiii)	GKLT assay (outside Lab).	650 Nos.	-
	xiv)	Distribution of Sulphur	650 Nos.	9 Nos.
	xv)	HGI	1300 Nos.	177 Nos.
	xvi)	Ash Fusion Temp.	1300 Nos.	178 Nos.
	xvii)	Ash Analysis	650 Nos.	99 Nos.
	xviii)	Petrography Analysis (Outside lab)	10 Nos.	-
10.		Environmental Studies (10Kms Radius) (Outside lab)	1 No.	1 No.
11.		Geo-Technical Studies (Physico Mechanical) (Outside lab)	2 No.	2 No.
12.		Washability Characteristics	3 BHs	3 BHs
13.		Dove Tailing of Old data	6434.55 m. (15 BHs)	6434.55 m. (15 BHs-RT Series)
14.		Digitization	-	Talaipalli coal block plates.
15.		Ore body Modeling of block	-	Talaipalli Coal block GR.

## 4.2 DESCRIPTION OF GEOLOGICAL FORMATIONS

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The geological formations of Mand-Raigarh Coalfield are briefly described below:

**Precambrian:** The Precambrian rocks comprising granite gneiss, mica schist, phyllites and quartzites along with quartz veins & pegmatites occur along the northern, northeastern periphery. The strike of the

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*RL*

foliation varies from E-W to N70°W – S70°E with 50° to 70° dip towards west.

- Talchir Formation** : The Talchir sequence begins with tillite at the base and overlies the basement unconformably. It occurs as a continuous strip along the northern periphery of the basin. Along the southern boundary, Talchirs crop out as narrow, elongated discontinuous strips disrupted by faults. The Mand-Raigarh basin shows widespread development of basal tillite pointing to advancement of ice from the surrounding Precambrian uplands.
- Karharbari Formation** : Karharbari formation is developed in a limited area. It consists of mottled, at places carbonaceous sandstone, frequently associated with pebbles of quartzite, granite etc. of various shapes and sizes
- Barakar Formation** : The Barakar formation conformably overlies the Talchir sediments over the major part of coalfield and covers a large tract within the coalfield. It is represented predominantly by multistoried cross-bedded feldspathic sandstone which are highly kaolinised and friable with subordinate shales, carbonaceous shales and coal seams. The sandstone are mostly medium to very coarse grained and milky white to greyish white in colour.
- Barren Measure Formation** : Barren Measure formation overlies conformably over Barakar formation. This formation comprises of predominantly grey claystone/grey shale with siltstone and iron stone bands and interbanded occurrence of fine to medium grained sandstone & shale.
- Raniganj Formation** : Raniganj formation has been demarcated in south-eastern and south-western part, besides patchy occurrence in

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north-western part. It is represented by mostly fine to medium grained sandstone, siltstone with clay stone, shale, fine to coarse grained sandstone and coal seams / bands of inferior grade.

- **Kamthi Formation** : The rocks of Kamthi formation are well exposed at higher contours of the flat topped hills. It is represented dominantly by coarse, friable, porous, brownish to red cross bedded sandstone and argillaceous beds. The nature of the contact between Kamthis & Barakars is variable and is somewhat discordant and at places the Kamthi strata overlap the older units.
- **Intrusives/Deccan Trap** : A number of basic dykes, sills and flows have been observed in the Uprora-Porea area in the northern part of the coalfield. The basic rock comprise fine grained basalts to coarse grained gabbroid type. The flows at places have been altered to laterite.

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#### 4.3 GEOLOGY OF TALAIPALLI BLOCK

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. The geology of the block is in conformity with the regional set up. Major part of Talaipalli block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block. The geological succession evolved on the basis of exploration data generated in the block is given in the Table 4.2

Table No. 4.2 - Geological Succession in Talaipalli Block

Formation	Thickness (m)	Prepared by Lithology
Recent	0.50 - 18.00	Soil, alluvium
Barren Measures	18.80 - 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands

Barakars	30 - 596	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, Intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 - 54.30	Khakee, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

#### 4.4 DESCRIPTION OF FORMATIONS IN TALAIPALLI BLOCK

- Metamorphics:** Precambrian metamorphic rock constitute the basement of the basin. These are composed of quartzite, mica-schist, granite gneiss and at places intruded by pegmatites or vein quartz. The metamorphics have been intersected in 7 boreholes (MNRT-53, 62, RT-6, 9, 12, 13 & 14). The thickness of metamorphics in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-9).

- Talchir Formation:** The rocks of Talchir formation are not exposed within the block boundary. It is encountered in boreholes RT-6, 5, 6, 9, 10, 12, 13 & 14. The thickness of Talchir as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10). Talchir formation consists of greyish white to greenish grey sandstone and shale, occasionally khakee in colour. At places it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite.

- Barakar Formation:** The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 30 - 596 m. Barakar formation constitute fine to coarse grained, white to grey felspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27

Prepared by me

as approved on 29/07/06  
 in Rules 136(1) & 136(2)



- b. The following Boreholes have been considered for preparation of Geological sections:

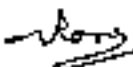
Sections	Boreholes
Section AA'	MNRT 102, 94, 68, 57, 90, 88, 85 and RT 11
Section BB'	MNRT 95, 69, 91 and RT 14
Section CC'	MNRT 71, 54, 55, 86, 82 and RT 13
Section DD'	MNRT 78, 73, 67, 77, 56, 49, 65
Section EE'	MNRT 81, 63, 93, 48, 75, 70 and RT 9
Section FF'	MNRT 52, 72, 46, 10, 28, 39, 92
Section GG'	MNRT 60, 20, 12, 6, 47, 29, 37 and RT 6
Section HH'	MNRT 74, 45, 18, 14, 8, 9, 36
Section (h1)(h1)'	MNRT 84, 59, 51, 64, 17, 4, 30, 35, 43
Section (h2)(h2)'	MNRT 83, 42, 41, 8, 23, 22, 31, 98 and RT 2
Section II'	MNRT 7, 15, 13, 16, 38, 99
Section JJ'	MNRT 33, 26, 24, 11, 40, 32, 44
Section KK'	MNRT 3, 53, 61 and RT 15

- c. Reserve estimation

All boreholes lying inside the block area viz total 105 boreholes of MNRT series from MNRT 1 to MNRT 102 and 15 boreholes of RT series from RT 1 to RT 15 have been considered for reserve estimation.

#### 4.4.2 Structure of the Block

- The Talaipalli block is mostly covered with soil. Hence the structural interpretation is mainly based on the sub-surface data obtained during the course of exploratory drilling.

  
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- The general strike of the bed is NW-SE in the major part of the block which swings to almost east - west in the north-western and western part of the block. The dip of beds varies from 4° to 8° towards South-west.

- A total of 12 numbers of faults have been deciphered from the subsurface data out of which faults F1-F11, F4-F4 and F8-F8 are major

faults. Most of the faults are restricted to the northern part of the block. Remaining area is structurally free except two relatively minor faults. All the faults as interpreted based on intersections in boreholes is detailed at Table 4.3.

Table- 4.3- Details of Faults

Fault No.	Location	Trend	Nature of Fault	Throw	Remarks
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20. - 85m.	Throw of fault increases towards west due to abutment of fault F3, F2 and F5
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 - 10m.	
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.	The throw of fault increases towards west due to abutment of fault F3 with fault F4
F4-F4	Northern part near BH MNRT-31,24, 43 & 62	East-West dipping northerly	Dip fault	30-150m	The throw of fault increases due to abutment of fault F5, F6, F7, F8 & F9
F5-F5	Northern western part through BH. MNRT-62	East-West	Strike fault	35 m	

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F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 - 25 m.	
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20 m.	
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m.	The cumulative throw of fault F7, F8 & F9 resulted in the reduction of 105m of strata in MNRT-5
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East - West to curvilinear	Strike/ Oblique fault	25m	
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0-10 m.	
F11-F11	Southern part	NW-SE	Curvilinear	0 - 10 m.	
F12-F12	Southern part	NW-SE	Oblique	25 m.	

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## 4.6 COAL SEAMS

Detailed exploration in Talaipalli Block has revealed the presence of coal bearing horizons belonging to Barakar Formations. These carbonaceous horizons could be distinctly demarcated as upper, middle and lower columns of Barakar formation. Altogether 26 workable coal seams are developed in the block. Besides these workable seams there are few non workable persistent bands occurring throughout the block. All the 26 seams are mainly composed of coal, shaly coal, carbonaceous shale and shale. The coal is dull in appearance high in moisture and is of non-coking type. The seams are not affected by any igneous intrusives.



Seam XLA is the top most seam in the block, developed persistently in the southern part of the block over a limited area. Seam-X has split into 4 major sections as X-LA, X-LB, X-Top and X Bottom. X Bottom seam underlies the X Top seam and is the thickest coal seam among X group of seam. Similarly seam-IX has 3 sections, (IX-L2, IX-L1 & IX) seam-VI has 3 sections, VI Top, VI Middle and VI Bottom, seam V has 3 splits as V Top, V Middle, V Bottom. Seam IV has 4 sections, IV Top, IV Middle, IV L & IV Bottom. Seam-III has two splits as seam III L and seam III. Whereas seam-II has 5 splits, sections as II L3, II L2, II L1, II and II L. Seam-I is poorly developed in the block and do not attain workable thickness.

#### 4.6.1 Sequence of Coal Seams

The variation in thickness of coal seams and their intervening partings intersected in boreholes drilled by MECL & GSI within the block has been given in table 4.4. Part thickness of seam/intervening parting due to fault/sub crop have not been considered while preparing the referred table.

Table - 4.4. Sequence of Coal Seams and Partings

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.00	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5

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6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.58	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Middle	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bottom	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.45	5.78			2.5-5.0
	Parting			5.30		
17	IV Middle	0.99	7.24			
	Parting			0.75		
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bottom	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.12	3.25		Prepared by me	0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97		(B 5 Part)	2.0-5.5
	Parting				55.93	33.0-54.0

22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			0.50-2.50
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around 35.0 m		
27	I	0.22	0.55			-

#### 4.7 DESCRIPTION OF COAL SEAMS

The seams have been described in descending order.

##### 4.7.1 Seam XLA

Seam XLA is a local seam occurring in Barakar formation as the topmost and youngest seam in the block. It overlies seam XLB (another local seam) with a parting of 5.41 m. to 11.90 m. (prevalent 6.0 to 9.5) Seam XLA is a thin seam and mostly not workable in the block except in patches surrounding BH No. MNRT-7, 11, 83, 97 & 101 in the western part of the block.

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The seam XLA has been intersected only in 32 boreholes as the seam incrops almost in the middle part of the block. The full seam thickness varies from 0.20 m. to 1.06 m. (prevalent thickness range is 0.50 m. to 0.90 m. in 63% of boreholes). The seam roof consists dominantly of shale. The floor consists of shale and sandstone argillaceous. The depth of occurrence of seam is from 21.40 m. to 165.78 m. within the block.

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The Moisture content of XLA seam varies from 3.50% to 10.30% (prevalent M% is 3.5 to 9.0%). The Ash% in seam varies from 32.70% to 49.00% (prevalent Ash% is 34.00 to 42.00%). The UHV varies from 1558 to 3477 K.Cal/Kg. The grade varies from G to E (prevalent grade in G to F). The seam is devoid of bands in all borehole intersections.

#### 4.7.2 Seam XLB

Seam XL B is a thin local seam in X group of seams. Seam XL B occur in Barakar formation and its depth range of occurrence varies from 14.52 to 177.58 m. within the block. It overlies seam X Top with a parting of 3.37 m. to 14.89 m. (prevalent 4 m. to 6m.). The seam XL B incrops in the south central part of the block, north of BH. No. MNRT-95 and extends towards west upto BH. No. RT-5 & MNRT-26. Due to faults F2, F1, F3, F4 & F6 the incrop is displaced. In the western corner (near BH. No. MNRT-1 and MNRT-3).

The seam XLB has been intersected only in 47 boreholes as the seam incrops almost in the middle of the block. The full seam thickness varies from 0.30 m. to 1.28 m. The prevalent seam thickness is 0.50 to 0.90 m. in 77% of boreholes in the southern part of block. In the central (near incrop) and NW part of the block the seam is not workable. The seam roof consists dominantly of sandstone and its floor consist of shale & sandstone.

The Moisture content of the seam varies from 3.0% to 11.30% (prevalent M% is 3.5 to 7.0%). The Ash% of seam varies from 28.20% to 44.60% (prevalent Ash% is 33.00 to 42.00%). The UHV varies from 1600 to 3960 K.Cal/Kg. The seam grade is G to E (prevalent grade is F in majority of boreholes). The seam is devoid of dirt bands in 38 boreholes (77%) and only in 11 BHs one band is present.

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### 4.7.3 Seam X Top (XT)

Seam X Top is a thin seam and occurs separately throughout the block as top split of X seam. It overlies seam X B with a parting of 0.70 m. to 3.00 m. (prevalent 1 to 2 m.) The parting between X T and X B reduces to <1.0 also. Hence combined section X (T+B) quality parameters are also obtained for those BH intersections where parting is reduced. Seam XT incrops in the central part of the block near BH. No. MNRT-94 in the east and extend to BH. No. MNRT-28 in the west.

The seam XT has been intersected in 59 boreholes. The seam incrop lies in the middle part of the block, hence as many as 52 BHs are located updip of the seam. The full seam thickness of the seam varies from 0.40 m. to 1.60 m. (The prevalent seam thickness is 1.0 to 1.50 m). The seam is not workable (<1.0m.) near incrop. The seam roof consists dominantly of shale and its floor consist of carbonaceous shale. The seam occurs at 10.97 m. to 187.19m. depth within the block.

The Moisture content of the seam varies from 3.50% to 11.00% (prevalent M% is 6.5 to 9.5%) and Ash % varies from 22.80% to 44.70% (prevalent Ash% is 27.00% to 30.00%). The UHV varies from 1793 to 4525 K.Cal/Kg. The seam grade varies from G to D (prevalent grade is F to E). The seam in majority of boreholes. Is without any dirt bands.

### 4.7.4 Seam X Bottom

Seam X Bottom is a prominent seam in the upper column of Barakar formation. It overlies seam IX 2 with a parting of 2.30 m. to 20.15 m. (mostly 3.50 to 16.50 m.). Seam X B incrops in the middle of the block near BH. No. MNRT-94 in the eastern part of the block and extends upto BH. No. MNRT-19 in the western part. It is displaced due to faults in the west central part.

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The seam X B has been fully intersected in 68 boreholes, while 46 BHs are located up dip of the seam incrop. The seam thickness varies from 1.60 m. to 8.10 m. (The prevalent seam thickness is 3.50 to 6.00 m. in 89% of boreholes). The seam roof dominantly consists of carb shale & soil and its floor consist of carbshale intercalations. The seam occurs at depth range of 12.28m. to 192.93 m. depth within the block.

The Moisture content of the seam varies from 3.30% to 10.40% (prevalent M% is 4.00 to 10.0%). Ash % varies from 26.80% to 47.90% (prevalent range is 35.00% to 42.00%). The UHV varies from 1627 to 3822 K.Cal/Kg. The seam grade varies from G to E (prevalent grade is F). The seam contain clean coal in 12 boreholes. Bands 1 to 5 Nos. are present in the seam in majority of boreholes.

#### 4.7.5 Seam IX L2

Seam IX L2 overlies seam IX L1 with a parting of 13.59m. to 21.54 m. (prevalent 17.0 - 18.5 m.). Seam IX L2 incrops in the south central part of the block, south of BH. No. MNRT- 69 in the east near Kelo river and extends to BH. No. MNRT- 16 in the west and about against fault F2. Further west the incrop is intermittently separated due to faults F2, F1, F3, F4 and F6. It occur north of BH MNRT-3 in the western most corner of the block. The seam occurs at a depth range of 10.78 m. to 225.31 m. within the block.

Seam IX L2 has been intersected in 70 boreholes. The seam is fauried by 2 BHs and 45 borehole are located up dip of the seam incrop. The full seam thickness varies from 1.0 m. to 2.55 m. The prevalent seam thickness is 1.20 to 2.00 m. in 84% of boreholes. The seam roof consists dominantly of sandstone and its floor consists of clay and shale.

The Moisture content of the seam varies from 3.70 % to 13.30 % (prevalent range is 4.0 to 10.0 %) and Ash % varies from 17.70% to 42.30 % (prevalent Ash% is 20.00 % to 29.00 %). The UHV varies from 2386 to 5409

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K.Cal/Kg. The seam grade is G to C (prevalent grade is E to D). Grade C & D coal is available near NW part of the block near incrop and in the southern part near boreholes MNRT-45, 59 & 74. The seam is generally devoid of dirt bands.

#### 4.7.6 Seam IX L1

Seam IX L1 overlies seam IX with a parting of 5.65m. to 11.87 m. (mostly the parting is 6.0 to 8.0 m.). The seam IX L1 incrops in the central part of the block, north of BH. No. MNRT- 69, in the east near Kelo river and extends towards west upto BH. No. MNRT- 23 & 16. Further west the incrop is intermittently separated due to faults F1, F2, F3, F4 and F6. It incrops around borehole RT-7 in the northwest corner.

Seam IX L1 has been intersected in 84 boreholes. The full seam thickness varies from 0.36 m. to 1.85 m. (prevalent seam thickness is 1.20 to 1.85 m. in 88% of boreholes). The seam is not workable (<1.0 m) in the central part of the block near incrop. The seam roof consists dominantly of shale & clay and its floor consists of intercalations.

Moisture content of the seam varies from 3.30 % to 13.30 % (prevalent M% range is 7.0 to 11.0 %). Ash % varies from 16.20 % to 42.00 % (prevalent range is 20.00 % to 27.00 %). The UHV varies from 1931 to 5284 KCal/Kg. Seam grade is G to C (mostly E to D). Seam contains good grade coal & D in the central & eastern parts of the block.

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#### 4.7.7 Seam IX

Seam IX is one of the prominent workable coal seam occurring in the block, in the upper column of coal bearing Barakar formation. It overlies seam VIII with a parting of 6.30 m. to 16.15 m. (mostly the parting is 9 m. to 12.00 m.). Seam incrops in the east in the middle of the block, north of BH. No. MNRT-69 near Kelo river and extends upto BH MNRT-30 in the west. Further west it is displaced by fault F2 and F1. The seam does not incrop in the western

part of the block. Seam occurs at a depth range of 11.87 m to 238.02 within the block.

Full seam has been intersected in 88 boreholes. The full seam thickness varies from 0.96 m. to 6.96 m. The prevalent seam thickness is 3.5 to 6.0 m. in 86% of boreholes. Roof of the seam consists dominantly of shale and its floor consists of shale / clay.

The Moisture content of the seam varies from 2.70 % to 10.30 % (prevalent range is 3.00 to 9.00 %) and Ash % varies from 24.00 % to 42.30 % (prevalent Ash% is 29.00 % to 34.00 %). The UHV varies from 2317 to 4567 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). D grade coal is available in the south central part around boreholes MNRT-18, 45, 51 & 60. Dirt bands, 1 to 3 nos. are present in 55 BHs. The seam has clean coal in 33 borehole intersections.

#### 4.7.8 Seam VIII

Seam VIII is one of consistently developed seams throughout the upper column of coal bearing Barakar formation. It overlies seam VII with a parting of 17.68 m. to 42.01 m. (mostly the parting is 20 m. to 25.00 m.). The seam incrops in the middle part of the block, south of BH. No. MNRT-76 near Kelo river and extends upto fault F2 near BH. No. MNRT-9. In the west the incrop is displaced by faults F2 & F1 and further west the seam is not incropping.

Seam VIII has been intersected in 90 boreholes. The full seam thickness varies from 2.06 m. to 6.64 m. The prevalent seam thickness is 4.0 to 6.5 m. in 87% of boreholes. The seam roof consists dominantly of shale and its floor consists of carbshale and shale arenaceous. The seam occurs at depth range of 7.95 m. to 256.47 m within the block.

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Moisture content of the seam varies from 2.50 % to 9.80 % (prevalent range is 5.0 to 7.0 %) Ash % varies from 29.20 % to 47.00 % (prevalent Ash% is 37.0% to 42.00 %). The UHV varies from 1738 to 37.11 K.Cal/Kg. The seam grade is G to E (prevalent grade is 'F' over a larger area) Dirt bands (1 to 5 nos.) are present in 68 BHs and in 22 BHs the seam has clean coal.

#### 4.7.9 Seam VII

Seam VII is a thin seam. It has not developed and not workable over a large part of the area in the block. It overlies seam VI Top with a parting of 1.08 m. to 17.44 m. (mostly the parting is 4 m. to 14.m.). The seam incrops in the eastern part of the block near BH. No. MNRT- 76 and extends towards west upto fault F1 and near boreholes MNRT-36 and BH MNRT-43 near fault F4.

The full seam has been intersected in 56 boreholes. The seam thickness is <1 m. in 32 boreholes in the central part near incrop region. It has attained workable thickness (1.2 m. to 3.0 m) in 19 boreholes in the southern part. The seam roof consists dominantly of shale and its floor consists of shale arenaceous. The seam occurs at depth range of 58.20 m. to 270.08 m. within the block.

Moisture content of the seam varies from 1.90 % to 8.00 % Ash % varies from 28.7 % to 49.3 %. The UHV varies from 1310 to 3960 K.Cal/Kg. The seam grade is G to E (prevalent grade is 'G').

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#### 4.7.10 Seam VI Top

Seam VI Top is the top split of VI seam and occur separately and distinctly throughout the block in the middle part of coal bearing Barakar formation. It overlies seam VI M with a parting of 0.56 m. to 3.25 m. (mostly the parting is 0.50 m. to 1.50 m.). The seam incrops in the eastern part of the block near Kelo river and near BH Nos. MNRT-91 & 90 and extend upto BH No. RT-10 and abut against fault F1.

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The full seam has been intersected in 92 boreholes. The full seam thickness varies from 0.37 m. to 3.42 m. (the prevalent seam thickness is 1.2 to 3.0 m. in 67% of boreholes). The seam is not workable in 24 BHs scattered in central part near incrop region in the east and NW part of the block. Due to topographical variation the incrop of seam is showing swing in the northern part of the block near borehole MNRT-36 & RT-10. The seam roof consists dominantly of intercalations and its floor consists of carbshale and shale. The seam occurs at depth range of 12.08 m. to 312.32 m. within the block.

Moisture content of the seam varies from 2.20 % to 8.60 % (prevalent range is 4.00 to 5.00 %). Ash % varies from 30.10 % to 51.00 % (prevalent range is 37.00 % to 43.00 %). The UHV varies from 1351 to 4098 K.Cal/Kg. The seam grade is G to E (prevalent grade is F) Dirt bands 1 - 3 nos. are present in 54 BHs and in 38 BHs the seam is clean & devoid of dirt bands.

#### 4.7.11- Seam VI Middle

Seam VI Middle is a prominent and thick seam occurring in the middle column of coal bearing Barakar formation. The seam has workable thickness throughout the block. It overlies seam VI Bottom with a parting of 0.85 m. to 5.98 m. (mostly the parting is 1 m. to 2 m.). The seam incrop is demarcated in the south of BH No. MNRT-91 near Kelo river in the eastern part of the block and it extends upto BH. No. MNRT-36 & RT-10 in the west. It does not crop out further west due to successive down throwing faults.

The full seam has been intersected in 97 boreholes. The full seam thickness varies from 3.09 m. to 10.01 m. (the prevalent seam thickness is 5.0 to 9.0 m. in 91% of boreholes). The high thickness (8.0 to 9.0 m.) of the seam is available in the SE part of the block. Due to topographical variation the incrop of seam is showing swing in the northern part of the block near borehole MNRT-36 & RT-10. seam roof consists dominantly of carb shale.

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shale and its floor consists of shale. Seam occurs at depth range of 9.96 m. to 321.49 m. within the block.

Moisture content of the seam varies from 3.50 % to 7.70 % (prevalent range is 5.00 to 7.5 %). Ash % varies from 28.50 % to 48.90 % (prevalent range is 37.00 % to 43.00 %). The UHV varies from 1407 to 4070 K.Cal/Kg. The seam grade is G to E (prevalent grade is F). Seam is having 2 - 5 nos. of carb shale and/or obvious dirt bands.

#### 4.7.12 Seam VI Bottom

Seam VI Bottom is the bottom split of VI seam occurring in the middle column of coal bearing Barakar formation. It overlies seam V Top with a parting of 2.80 m. to 23.45 m. (mostly the parting is 14.0 m. to 21.0 m.). The seam incrops near Kelo river extending towards west and occur south of BH. Nos. MNRT-91 & 90 and extends upto north of BH No. RT-10 and abut against Fault F1.

The full seam has been intersected in 92 boreholes. The full seam thickness varies from 0.48 m. to 1.75 m. (the prevalent seam thickness is 0.50 to 1.00 m. in 69% of boreholes). The seam attains workable (1.0 to 1.5 m) thickness in 32 BHs (35%). It is not workable in the central strip of the block. Due to topographical variations, the incrop of seam is showing swing in the northern part of the block. MNRT-36 & RT-10. The roof of the seam consists dominantly of shale and its floor consists of shale & lcal. The seam occurs at depth range of 12.43 m. to 328.50 m. within the block.

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 The moisture content of the seam varies from 2.20 % to 9.70 % (prevalent range is 4.00 to 5.0 %) Ash % varies from 23.50 % to 48.80 % (prevalent range is 30.00 % to 39.00 %). The UHV varies from 1502 to 4939 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). Seam has clean coal

in 83 boreholes while in remaining boreholes presence of 1-2 carb shale bands is there.

#### 4.7.13 Seam V Top

Seam V Top is a thin seam occurring distinctly throughout the block as top split of V seam. It overlies seam V Mid with a parting of 9.09 m. to 18.94 m. (prevalent range 1.5 – 18.5 m.) The seam incrops near Kelo river north of BH. No. MNRT-91 & 88 in the eastern part of the block extending westward, north of BH. No. MNRT-37 near fault F1.

The full seam has been intersected in 106 boreholes. The full seam thickness varies from 0.50 m. to 3.09 m. (the prevalent seam thickness is 0.50 to 1.50 m. in 95% of boreholes). The seam is not workable (thickness <1.0m) in the central part of the block. The roof of seam consists dominantly of carb shale / clay and its floor consists of shale. The seam occurs at depth range of 12.44 m. to 347.15 m. within the block.

Moisture content of the seam varies from 1.40 % to 8.60 % (prevalent range is 3.0 to 6.0 %), Ash % varies from 19.20 % to 47.40 % (prevalent range is 25.00 % to 34.00 %). The UHV varies from 1959 to 5892 K.Cal/Kg. The seam grade is G to B (prevalent grade is E & D). Mostly the seam is dirt bands free and one carbshale / obvious dirt band is present in 9 BHs.

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## 4.7.14 Seam V Middle

Seam V Middle is a thin seam and it has attained workable thickness of >1.0 m. in patches. It overlies seam V B with a parting of 4.55 m. to 15.95 m. The seam incrops near Kelo river in the east and extends northwest wards around BH. Nos. MNRT-49 & 70

Full seam has been intersected in 107 boreholes. The full seam thickness varies from 0.15 m. to 3.73 m. (the prevalent seam thickness is 0.50 to 2.50 m. in 93% of boreholes). The seam is not workable (thickness <1.0 m.) over a considerable area in the central part of the block near incrop region in the eastern part of the block. The seam roof consists dominantly of shale and its floor consists of carbshale/shale. The seam occurs at depth range of 15.57 m. to 360.80 m. within the block.

The Moisture content of the seam varies from 1.90 % to 8.70 % (prevalent M% is 4.0 to 7.0 %) and Ash % varies from 25.0 % to 52.10 % (prevalent range is 30.00 % to 38.00 %). The UHV varies from 1324 to 49.39 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). The seam contains 1-2 dirt bands, in 52 BHs and it is devoid of dirt bands in another 55 BHs.

## 4.7.15 Seam V Bottom

Seam V Bottom is the bottom split of V seam which occurs distinctly and separately throughout the block. It overlies seam IV Top with a parting of 15.16 m. to 30.14 m (mostly the parting is 17.0 to 23.0 m). The seam incrops in the northern part of the block near BH. Nos. MNRT-86 & RT-14.

The full seam has been intersected in 109 boreholes. The full seam thickness varies from 0.30 m. to 5.40 m. (the prevalent seam thickness is 0.50 to 2.0 m. in 88% of boreholes). The seam has 1.0 m. thickness in 40 boreholes (37%) in the central and south central part of the block around

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BHs MNRT-16, 17, 18, 21 and 35. It has attained workable thickness of >1.0 m. in 68 BHs (63%). The seam thickness has increased to >2.0 m. in 13 BHs (12%) in the east around boreholes MNRT-76 & 94 and in southern part around BHs MNRT-50 & 100. The seam roof consists dominantly of shale and its floor consists of shale & clay. The seam occurs at depth range of 22.95 m. to 377.90 m. within the block.

Moisture content of the seam varies from 1.70 % to 8.90 % (prevalent M% is 2.0 to 6.0 %), Ash % varies from 23.50% to 51.9% (prevalent range is 30.00 % to 47.00 %). The UHV varies from 1324 to 4939 K.Cal/Kg. The seam grade is G to D (prevalent grade is G & F). The seam contains 1 to 5 nos. dirt bands in 72 BHs and is free from such bands in another 37 BHs.

#### 4.7.16 Seam IV Top

Seam IV Top is top split of IV seam, occurring distinctly & separately in the middle column of coal bearing Barakar formation. It overlies seam IV Middle with a parting of 5.30 m. to 20.13 m. (mostly the parting is 6.0 to 10.0 m). The seam incrops in the northern part of the block near BH. Nos. MNRT-65 and 85.

The full seam has been intersected in 110 boreholes. The full seam thickness varies from 0.45 m. to 5.78 m. (the prevalent seam thickness is 2.00 to 5.0 m. in 65% of boreholes). The seam thickness reduce to <1.0 m in 16 BHS (15%) in scattered parts of the block. Elsewhere it has attained workable thickness of >1.0m. The seam roof consists dominantly of clay/shale and its floor consists of shale. The seam occurs at depth range of 10.87 m to 405.19 m within the block.

Moisture content of the seam varies from 1.30 % to 2.1 % (prevalent M% is 3.0 to 6.0 %). Ash % varies from 27.50% to 52.60% (prevalent range is 40.00 % to 45.00 %). The UHV varies from 1324 to 4387 K.Cal/Kg. The

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seam grade is G to D (prevalent grade is G & F). Invariably the seam contains 1-6 numbers of carbshale / obvious bands in majority of BHs.

#### 4.7.17 Seam IV Middle

Seam IV Middle is a prominent and thick coal seam occurring in the middle column of coal bearing Barakar formation. It overlies seam IV L with a parting of 0.75 m. to 6.95 m (mostly the parting is 3.5 to 5.5 m). The seam incrop extent in the block is limited near the northern boundary, around boreholes MNRT 66 & 82 and the incrop extension of the seam lie beyond the block boundary.

Full seam has been intersected in 115 boreholes with varying thickness, varies from 0.99 m. to 7.24 m. (prevalent seam thickness being 3.50 - 7.0 m. in 92% of boreholes). Seam roof consists dominantly of sandstone and its floor consists of argillaceous sandstone argillaceous. Seam occurs at depth range of 19.55 m to 425.07 m within in the block.

The Moisture content of the seam varies from 1.80 % to 7.0% (prevalent M% is 3.0 to 5.0 %). Ash % varies from 21.30% to 42.20% (prevalent range is 29.00 % to 38.00 %). The UHV varies from 2580 to 5395 K.Cal/Kg. The seam grade is F to C (prevalent grade is E). The seam contain one to two dirt bands of carbshale / obvious bands in maximum number of 84 boreholes & 31 boreholes are devoid of bands.

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#### 4.7.18 Seam IV L

Seam IV L is a separate & distinct coal horizon which occur persistently between IV Middle and IV Bottom seams. It overlies seam IV Bottom with a parting of 0.75 m. to 3.51 m (mostly parting is 0.50 to 2.0 m). The quality of combined IV L + IV B seam was also obtained as the parting is occasionally <1.0 m. The seam incrop occur only near northern boundary of the block

around BH No. MNRT-82 & 66 and it further extends beyond the block boundary.

Full seam thickness has been intersected in 98 boreholes. The full seam thickness varies from 0.23 m to 2.30 m (the prevalent seam thickness is 0.50 to 2.0 m in 90% of boreholes). The seam roof consists dominantly of sandstone and its floor consists of clay. The seam occurs at depth range of 23.28 m to 400.11 m within the block.

Moisture content of the seam varies from 1.80 % to 6.70% (prevalent M% is 2.0 to 5.0 %), Ash % varies from 24.60% to 50.10% (prevalent range is 31% to 40.0%). UHV varies from 1338 to 4843 K.Cal/Kg. The grade is G to D (prevalent grade is F & E). Dirt bands, 1 to 2 Nos. are present in 49 BHs and the seam is devoid of dirt bands in 49 boreholes.

#### 4.7.19 Seam IV Bottom

Seam IV Bottom is a prominent and thick seam in the middle column of coal bearing Barakar formation. It overlies seam III L with a parting of 8.05 m. to 21.54 m (mostly the parting is 14.0 to 17.0 m). The seam IV B does not incrop in the block.

Full seam thickness has been intersected in 115 boreholes where thickness varies from 0.79 m to 5.67 m (prevalent seam thickness is 1.50 to 3.50 m in 81% of boreholes). The seam roof consists dominantly of clay and its floor consists of shale. The seam occurs at depth range of 28.39 m to 462.70 m within the block.

Moisture content of the seam varies from 1.30 % to 6.90% (prevalent M% is 3.0 to 4.0 %), Ash % varies from 22.30% to 48.00% (prevalent range is 29.0% to 34.0%). UHV varies from 1890 to 5105 K.Cal/Kg. Seam grade is G to C (prevalent grade E to D). The seam is devoid of dirt bands in 95 boreholes while a carbshale / obvoid's band is present in 20 boreholes.



## 4.7.20 Seam III L

Seam III L is occurring distinctly and separately throughout the block in the lower column of coal bearing Barakar formation. It overlies seam III with a parting of 24.57 m. to 44.55 m (mostly the parting is 33.0 to 39.0 m). The seam is not incropping in the block.

Full seam thickness has been intersected in 103 boreholes wherein thickness varies from 0.12 m to 3.25 m (the prevalent thickness is 0.50 to 1.50 m in 83% of boreholes). The seam thickness is <0.90 in 30 boreholes (29%). The seam roof consists dominantly of sandstone and its floor consists of clay/shale. The seam occurs at depth range of 42.78 m to 421.12 m within the block.

Moisture content of the seam varies from 1.40 % to 6.10% (prevalent M% is 2.0 to 5.0 %) and Ash % varies from 26.50% to 50.10% (prevalent range is 31.0% to 40.0%). The DHV varies from 1448 to 4567 K.Cal/Kg. The seam grade is G to D (prevalent grade is F & E). The seam contains dirt bands in 18 boreholes and in 85 BHs, the coal seam contain clean coal.

## 4.7.21 Seam III

Seam III is a prominent, thick and consistently developed seam in the lower column of coal bearing Barakar formation in the block. It overlies seam II L3 with a parting of 31.10 m. to 55.93 m (mostly the parting is 33.0 to 51.0 m). The seam is not incropping in the block. Mechanized opencast mining is being recommended up to floor of this seam.

Full seam thickness has been intersected in 110 boreholes. The full seam thickness varies from 0.66 m to 5.97 m (the prevalent seam thickness is 2.0 to 5.50 m in 86% of boreholes).

The seam roof consists dominantly of sandstone and its floor consists of clay/shale.

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sandstone and its floor consists of sandstone argil. The seam occurs at depth range of 80.11 m to 466.90 m within the block.

Moisture content of the seam varies from 1.20 % to 7.10% (prevalent M% is 3.0 to 5.0 %), Ash % varies from 17.60% to 45.10% (prevalent range is 20.0% to 29.0%), UHV varies from 2124 to 5892 K.Cal/Kg. The seam grade is G to C (prevalent grade is D & C). The grade of coal of seam III improves to C & D grades over major part of the block, especially in the main eastern part. Dirt bands 1 - 2 nos. are present in 49 boreholes and the seam is devoid of dirt bands in balance 61 boreholes.

#### 4.7.22 Seam II L3

Seam II L3 is a local seam, occurring as the top split of Seam II in the lower column of coal bearing Barakar formation. It occurs distinctly and separately throughout the block. It overlies seam II L2 with a parting of 13.39 m. to 40.90 m. The seam does not crop in the block.

The full seam thickness has been intersected in 84 boreholes. The full seam thickness varies from 0.05 m to 3.09 m. The seam thickness is <0.90 m 53 boreholes in the central part of the block. The seam is considered workable from thickness & quality angles in NW and SW portions of the coal blocks by a suitable belowground method of mining. The seam roof consists dominantly of sandstone and its floor consists of clay. The seam occurs at depth range of 115.68 m to 520.84 m within the block.

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Moisture content of the seam varies from 0.70 % to 8.10% (prevalent M% is 2.0 to 6.0 %), Ash % varies from 12.80% to 43.9% (prevalent range is 17.0% to 35.0%). The UHV varies from 2469 to 6775 K.Cal/Kg. The seam grade is F to A (prevalent grade is E to C). The grade improves to A and B in the SW part of the block. Dirt bands are present in 15 boreholes and 69 BHs contain clean coal.

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## 4.7.23 Seam II L2

Seam II L2 is the middle split of Seam II occurring in between II L3 and II L1. It occurs distinctly and separately throughout the block. It overlies seam II L1 with a parting of 5.00 m to 50.39 m (mostly the parting is 5.0 to 35.0 m). The seam II L2 does not crop in the block.

The full seam thickness has been intersected in 44 boreholes. The seam is faulted in one borehole and it is not developed in 61 BHs. The full seam thickness varies from 0.07 m to 2.68 m (the prevalent seam thickness is <0.50 to 0.90 m in 57% of boreholes). The seam is not workable over major part of the block. It is workable (0.90 to 3.0 m. thickness) in 19 BHs (43%) occurring in the NW and SW parts of the block. The seam occurs at depth range of 129.88 m to 549.50 m within the block. Seam II L2 is assessed for underground potentiality only.

Moisture content of the seam varies from 1.90 % to 9.50% (prevalent M% is 3.0 to 8.0%). Ash % varies from 8.90% to 39.0% (prevalent range is 10.0% to 18.0%). UHV varies from 3021 to 6968 K.Cal/Kg. The seam grade is F to A (prevalent grade is B & A). The seam has better grade over the major portion of NW part. But the seam grade is E & F in the SW part of the block. Generally, the seam is free from any inert dirt bands.

## 4.7.24 Seam II L1

Seam II L1 is a local band and lower split of Seam II. It occur as a distinct seam./ band throughout the block. It overlies seam II with a parting of 1.27 m to 20.59 m (mostly the parting is 3.0 to 14.0 m). It is not cropping in the block.

The full seam thickness has been intersected in 80 boreholes. The full seam thickness varies from 0.05 m to 1.54 m (the prevalent seam thickness is <0.50 to 0.90 m in 88% of boreholes). It has attained workable thickness

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of 0.90 to 1.54 m in 9 BHs (12%). The seam is mostly unworkable, except in the south central part of the block around BHs MNRT-8, 42, 96 & 18. The seam roof consists dominantly of sandstone and its floor consists of Shale / Clay. The seam occurs at depth range of 185.02 m to 578.05 m within the block. The seam was assessed for underground potentialities only.

Moisture content of the seam varies from 1.70 % to 6.50% (prevalent M% is 2.0 to 6.0. %). Ash % varies from 6.90% to 47.20% (prevalent range is 9.0% to 13.0%). UHV varies from 2152 to 7285 K.Cal/Kg. The quality of the seam is generally A & B grade in the workable parts of the seam. The seam generally contain clean coal (75 BHs.) and only in 5 BHs it has one band.

#### 4.7.25 Seam II

Seam II is a prominent seam in the lower column of coal bearing Barakar formation. This is the bottom most workable seam in the block. It overlies seam II L with a parting of 0.37 m to 3.89 m (mostly the parting is 0.50 to 2.0 m). The seam is not in-cropping anywhere in the block.

The full seam thickness has been intersected in 91 boreholes. The full seam thickness varies from 0.13 m to 5.92 m. It has attained thickness of 1.50 to 2.50 m in 30 boreholes. It is not workable (thickness <0.90 m) in 20 boreholes in the eastern part of the block near Kelo river. The seam occurs at depth range of 193.41 m to 591.16 m within the block. The seam is assessed for underground potential only.

Moisture content of the seam varies from 1.00 % to 7.20% (prevalent M% is 2.0 - 6.0. %). Ash % varies from 6.20% to 51.80% (prevalent range is 6.50% - 26.0%). UHV varies from 1841 to 7451 K.Cal/Kg. The seam grade is mostly 'A' over the block except around borehole nos. MNRT-65 56, 10 & 83 in the eastern part. The seam is devoid of bands in majority of boreholes (63 Nos). A carbshale and obvious band is present in 28 boreholes.

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#### 4.7.26 Seam II L

Seam II L is the lower split of seam II. It is developed locally in the northwestern part of the block. It overlies seam I with a parting of around 35.0 m. Parting against upper seam II varies from 0.37 m to 3.89m. General thickness of seam is less than 0.9m. Therefore, the geological report has not considered workable possibility of this seam.

Moisture content of the seam varies from 2.70% to 6.70% (prevalent M% is 4.00 to 6.0%). Ash % varies from 8.0% to 48.0% (prevalent range is 28% to 32%). The UHV varies from 1862 to 7285 K.Cal/Kg. The seam grade varies from G to A (prevalent grade E to A). The seam contain clean coal in 27 boreholes. A band of Csh/OB band is present in 5 BHs.

#### 4.7.27 Seam I

Seam I is a thin seam occurring as the lowest coal horizon in the Barakar column in the block. It has been intersected only in 6 boreholes, in which its thickness is <0.50 m.

#### 4.8 COAL RESERVES

The procedure adopted for estimation of reserves of coal in Talaipalli Block is fundamentally based on the specific geological factors which determine the extent to which correlation, interpolation of data can be projected for building up a stratigraphic and structural model of the lay and disposition of the coal seams and this concept applied to generate various plans to estimate coal reserves through Minex Software.

From the structural 3-D model, various plans (viz. vertical cross sections and floor contour plans) have been generated. Similarly from the model, quality overalls are presented in the individual seam folio plans by taking in Minex

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software. Hence all the plans have been generated by the sophisticated Minex model.

#### 4.8.1 Basic Assumptions

- The quarry depth is considered for seams- XLA III, as it has the stable floor. Reserves for seams up to the floor of seam III has been assessed on I<sub>100</sub> norms.
- The seams below III Bottom i.e. II L3, II L2 and Seam-II have been assessed separately on I<sub>30</sub> norms for underground reserve estimation.
- The area falling between faults F8, F9, F7, F5 & F4 is highly disturbed and faulted. The reserves have been assessed under I<sub>30</sub> norms.
- The opencast reserves are estimated for 1 m and above seam thickness & at 1 m thickness interval. For underground reserves estimation minimum workable thickness has been considered as 0.50m, 0.90, 1.2, 1.50m thickness and onward at 0.50 m thickness interval. A 60 m barrier zone is left for Kelo River and its tributary as nala. 10% deduction has been made from the gross proved reserves to arrive at the net-in-situ proved reserves available in the block for open cast potential and underground area.

Based on above, the gross geological reserves of coal, in the allocated coal block, are detailed depth-wise and grade-wise at **Table 4.8.1** respectively.

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Recognised person as approved vide 2010 of Mineral Concession Rules - 1950 by Ministry of Coal & Mines, Government of India, New Delhi. No. 34011/2006-CPAM dated 26.8.06.

## 4.9 OVERBURDEN

Overburden consists of predominantly sandstone with minor amount of shale, carbonaceous shale and thin coal bands. Besides, the overburden also includes sandy soil, weathered rocks and dirt bands >1m thickness. While computing in-seam burden, dirt-bands of >1m have been excluded to arrive at the effective thickness of the seam.

Overburden upto seam III has been calculated from Iso-pachyte plans.

Table 4.5 - Seam-wise depth-wise Gross Geological Reserves

(in M. Tce)

Seam	Depth (m)												Total
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600	
X LA	0.09	1.32	2.09	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.93
X LB	0.75	1.30	2.76	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.40
X TOP	3.88	4.72	4.71	2.20	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.74
X BOT	28.60	28.88	19.92	11.53	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.94
IX L2	8.59	9.82	6.61	6.57	0.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.28
IX L1	7.17	9.29	6.62	6.34	3.08	0.14	0.00	0.00	0.00	0.00	0.00	0.00	32.65
IX	22.37	34.78	22.61	19.85	13.74	0.62	0.00	0.00	0.00	0.00	0.00	0.00	113.98
VIII	17.22	41.20	32.99	25.21	23.75	2.62	0.00	0.00	0.00	0.00	0.00	0.00	142.88
VII	0.00	0.80	2.38	3.03	5.98	4.54	0.00	0.00	0.00	0.00	0.00	0.00	17.73
VI TOP	1.86	5.00	8.56	8.65	6.61	8.10	0.52	0.01	0.00	0.00	0.00	0.00	38.34
VI MID	18.94	28.38	52.30	42.19	28.42	28.93	3.40	0.13	0.00	0.00	0.00	0.00	201.88
VI BOT	0.18	1.20	1.67	1.60	3.72	3.20	0.69	0.05	0.00	0.00	0.00	0.00	12.21
V TOP	0.69	0.65	3.28	3.99	3.46	4.19	2.43	0.29	0.00	0.00	0.00	0.00	18.97
V MID	4.48	2.74	7.29	8.29	7.21	5.96	4.01	0.22	0.00	0.00	0.00	0.00	60.24
V BOT	4.48	5.97	6.93	10.61	7.45	6.95	4.98	1.06	0.07	0.00	0.00	0.00	49.98
IV TOP	5.28	12.41	12.66	23.11	21.85	16.30	8.99	3.45	0.36	0.00	0.00	0.00	106.33
IV MID	6.12	16.66	16.65	30.16	31.85	25.33	17.10	17.07	1.33	0.03	0.00	0.00	142.18
IV BOT	2.56	6.23	3.47	4.45	6.24	6.85	3.48	2.06	0.29	0.01	0.00	0.00	34.64
III L	0.66	5.95	3.66	4.52	7.53	6.43	4.85	2.92	0.88	0.15	0.07	0.02	37.05
III	0.00	2.03	8.17	8.32	12.60	20.10	14.42	12.04	9.04	3.15	0.29	0.12	90.26
III L3	0.00	0.00	2.01	3.46	1.63	3.01	2.61	1.05	0.59	1.50	0.97	0.04	17.14
III L2	0.00	0.00	0.12	0.01	0.03	0.25	1.40	1.90	0.64	1.41	3.05	0.22	6.03
III L1	0.00	0.00	0.00	0.13	0.75	0.52	0.65	0.70	1.00	1.74	0.82	0.23	6.65
II	0.09	0.00	0.00	0.43	1.71	4.28	5.09	7.54	6.55	5.01	4.54	5.67	40.83
II L	0.00	0.00	0.00	0.00	0.22	0.14	0.00	0.81	0.80	1.28	0.04	0.00	4.48
Total	136.43	230.68	238.19	239.57	208.63	155.60	83.04	57.57	22.50	14.30	9.87	6.40	1400.58

Table 4.6 - Grade-wise Gross Geological Reserves

(in M.Tes)

SEAM	GRADE (non-coking)							Total
	A	B	C	D	E	F	G	
<b>Opencast</b>								
X LA	0.00	0.00	0.00	0.00	0.60	2.88	1.07	3.93
X LB	0.00	0.00	0.00	0.00	0.08	4.83	0.38	5.40
X TOP	0.00	0.00	0.00	0.18	5.25	9.90	0.40	15.74
X BOT	0.00	0.00	0.00	0.00	0.16	80.18	9.90	89.64
IX L2	0.00	0.00	1.35	15.77	13.18	1.97	0.01	32.28
IX L1	0.00	0.00	0.94	24.25	6.18	1.28	0.00	32.65
IX	0.00	0.00	0.00	6.88	57.81	49.38	0.11	113.98
VIII	0.00	0.00	0.00	0.00	0.61	126.76	15.51	142.88
VII	0.00	0.00	0.00	0.00	0.00	7.88	8.84	17.73
VI TOP	0.00	0.00	0.00	0.00	0.17	28.41	8.76	38.34
VI MID	0.00	0.00	0.00	0.00	15.91	166.04	20.73	201.68
VI BOT	0.00	0.00	0.00	0.00	3.17	8.73	0.31	12.21
V TOP	0.00	0.00	0.00	4.57	8.11	6.11	0.19	18.97
V MID	0.00	0.00	0.00	0.13	6.80	24.22	8.98	40.21
V BOT	0.00	0.00	0.00	0.18	1.43	27.63	17.73	46.98
IV TOP	0.00	0.00	0.00	0.16	2.65	46.92	54.40	104.33
IV MID	0.00	0.00	0.29	2.79	78.13	79.98	0.00	162.18
IV L	0.00	0.00	0.00	0.60	8.02	21.08	6.94	34.64
IV BOT	0.00	0.00	0.61	16.77	43.21	20.75	1.07	82.40
III L	0.00	0.00	0.00	0.58	12.77	21.58	2.10	37.05
III	0.00	1.30	52.77	33.61	2.08	0.28	0.00	90.25
<b>Total Opencast</b>	<b>0.00</b>	<b>1.30</b>	<b>55.86</b>	<b>106.48</b>	<b>286.04</b>	<b>735.85</b>	<b>158.82</b>	<b>1323.45</b>
<b>Underground</b>								
II L3	0.60	0.84	3.54	7.28	3.99	0.91	0.00	17.16
II L2	4.22	2.74	0.88	0.14	0.15			8.13
II L1	4.19	1.08	0.87	0.26	0.24			6.65
II	29.93	8.99	0.87	0.44	0.19			40.83
II L	0.41	1.78	1.46	0.38	0.35	0.08	0.07	4.48
<b>Total Underground</b>	<b>39.35</b>	<b>16.42</b>	<b>7.42</b>	<b>8.50</b>	<b>4.92</b>	<b>1.27</b>	<b>0.25</b>	<b>77.13</b>
<b>TOTAL</b>	<b>39.35</b>	<b>16.72</b>	<b>63.38</b>	<b>114.98</b>	<b>289.96</b>	<b>737.12</b>	<b>159.07</b>	<b>1400.58</b>



## CHAPTER-IV

## MINING STRATEGY

## 5.1 GENERAL

Availability of numerous seams/splits at comparatively shallow depth as also reasonable coal overburden ratio presents a very favourable situation for having an extensive mechanized opencast mine in the coal block under reference.

The Geological Report document has considered amenability of working all seams upto and including seam-IV by opencast method of mining. The report suggested working of further lower coal seams by belowground method of mining. However, during study of the geological model prepared by using Minex Software, it is seen that working of Seam-III (combined or various splits) by opencast method gives higher value addition both in terms of quantity of coal and also in financial terms than if working of this seam (III) is considered by belowground method of mining. It is revealed that only about 41% of the coal reserves in this seam could be won when worked by belowground method compared to about 70% while working with opencast exploitation. As such opencast mine workings have been suggested with floor of seam-III to act as the floor of the quarry workings within the allocated coal block. With such approach all workable coal seams/splits upto III seam have been considered to be worked by mechanized opencast method.

For making main mine openings needed for the belowground-mine, an undisturbed area (where no opencast activity will be carried) has been

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identified on the northern edge of the block almost in the midst of east-west dimension of the coal block. The suggested size of the area would be 250m x 200m considered essential for locating two vertical shafts along with needed surface infrastructure of the "belowground mine". Such a site blocks minimum quantum of opencastable coal reserves.

Non-coal bearing land for creation of external overburden dumps is not available in near vicinity of the coal block. As such dumping of overburden/interburden has to be carried out on land within the block where excavation activity is not contemplated during first 10 years of mine operation. Such waste material would need to be re-handled during the course of mining operation at the project when possibility of back dumping in de-coaled area would be created after 4<sup>th</sup> years of mine working. Part quantity of overburden would be backfilled from 5<sup>th</sup> year and only from 9<sup>th</sup> year onwards, entire overburden would be backfilled. At this stage re-handling of earlier dump overburden within the block would commence.

The allocated coal block is linked to proposed Lara Power Project to come up about 60 kms away from the coal block. The capacity of the power project is indicated at 4000 MW and coal requirement per year at 95% plant load factor has been spelt at 18 MTPA. Possibility of producing more than the requirement of Lara Power Plant has also been studied. This could have been possible by opening another quarry of about 5 MTPA capacity at Northern extremity in the midst of the strike EW direction. The working possibility poses insurmountable problem of planning about additional 150 Mm<sup>3</sup> of overburden for which surface area does not permit. The existence of highly faulted area in the vicinity poses another obstruction in such endeavour. Accordingly, the projected capacity of opencast project at 100% rated capacity is planned at 18 MTPA to match with the requirement. To ensure availability of adequate quantity of coal, it has been planned to

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commence mechanized mining operations by having two independent opencast mines at eastern & western extremities. Both the quarries would advance towards southwards as also towards each other to finally merge into one entity after about 20 years of mine operation.

In the initial years, simultaneous working of mechanized opencast mine and the projected belowground mine may pose operational problems due to massive production from the opencast unit. Directorate General of Mines Safety may also impose restriction on development/working of belowground mine within 300 m of the site of main entries of belowground mine. As such, it is considered prudent to start underground mine work after opencast workings have moved sufficiently away from the main projected openings of the U.G. mine after about 20 years of opencast mining activity. It is to be borne in mind that at least four years period of time would be needed to sink the proposed mine shafts & their equipping for hoisting of men/mineral.

The topography of Talaipalli block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolge Pahar in the north and Silot Pahar in the south. General ground elevation of the area varies between 280m and 340m. Kelo River flowing through the south-eastern part of the block constitute the main drainage system. Main subsidiary stream drains the block from north-west to south-east and joins Kelo River at the extreme south-eastern part of the block. This subsidiary stream is fed by number of small tributaries rising from hills both from north and south. The streams are flowing from north-west to south-east towards Kelo River over the mining block, a drain 5-6m deep and of adequate width (to be designed based on hydrogeology findings) has to be constructed all along the northern boundary. As catchment area's drainage is through the block, so this drain has to be constructed as an advance action to the project. The drain will be pitched and will have embankments on either side. The width of embankment

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at top will be about 1.5m and the height will be about 3m above the ground level. The construction of the embankment will be carried out by using hard material dug out of the opencast mine and with due compaction of layers of laid material.

It is proposed to mine maximum area leaving a statutory barrier of 7.5m on surface from block boundary. It is also proposed to leave barrier of 60m from Kelo river on the eastern side of the block. With the barriers as detailed above, the delineated mine boundaries are considered as follows:-

(a) For Mechanized Open Cast

**North:** The surface limit of the mine is 7.50 m away from the block boundary and then the resultant floor boundary has been envisaged

**West:** the surface limit of the mine is 7.50m away from the block boundary and then the resultant floor boundary has been envisaged.

**East:** The surface limit of the mine is 60/7.5m away from the Kelo river as well as block boundary and then the resultant floor boundary has been envisaged.

**South:** The surface limit of the mine is 7.50m away from the block boundary and then the resultant floor boundary has been envisaged.

Based on above basic assumptions, the mine parameters for opencast mine are given at Table 5.1

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Recognized Person as approved wrt 22(C) of Mineral Concessions Rules, 1950 by Ministry

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Table 5.1, Opencast Mine Main Parameters

Sl. No.	Parameters	Unit	Value
1	Maximum depth	m	404
2	Maximum strike length: along the Mine Floor	Km	6.02
	along the Mine Surface	Km	6.69
3	Minimum strike length: along the Mine Floor	Km	0.75
	along the Mine Surface	Km	1.37
4	Maximum dip rise length: on the Mine Floor	Km	4.12
	on the Mine Surface	Km	4.75
5	Minimum dip rise length: on the Mine Floor	Km	2.60
	on the Mine Surface	Km	3.06
6	Area: On the Mine Floor	ha	1438.00
	On the Mine Surface	ha	2079.34

## (b) For Underground Mine

Entire allocated block area leaving a vertical statutory barrier of 7.5m width along the boundary of the block. No precaution needs to be taken against Kelo river as seams projected for belowground exploitation have not developed into workable thickness anywhere within 60m of banks of such water channels.

## 6.2 COAL CONSERVATION &amp; PHASING OF WORKING UNITS


For improving coal conservation aspect, it is suggested that High Wall Mining could be considered to extract coal blocked in the high wall barriers, to maximize recoverable coal which otherwise cannot be mined by surface or underground methods. The rate of production and quantum of available coal is not indicated at this stage as such situation would arise


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more than four decades later, when advances in technology are likely to bring in improved recovery. However, the presently available equipment could be used to have a production rate of around 1.0 Million Tonne Per Annum in various seams in this coal block with mining heights ranging from 1.2 m up to 9m in multiple seam environment. Entry depths of over 400 metres/or up to the boundary of the blocks would be worked.

Commencement of development work for belowground mine use has been suggested after about 20 years from O.C. activity commencement so that with the envisaged capacity of opencast and belowground (detailed data in appropriate chapter) mine units, the reserves are exhausted almost at the same period of time, thereby utilizing developed infrastructure most efficiently over the life of the project.

  
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Received by, and Approved by, as approved vide 22(C) of Ministry of Coal Rules 1964 by Ministry of Coal, Government of India on No 34011(39)/2005-CFAM dated 26.6.06, at Coal, Management & Marketing Dept 34011(39)

## CHAPTER- VI

## OPENCAST MINING

## 6.1 GEOLOGICAL AND MINING CHARACTERISTICS

The Geological & Mining characteristics of the quarriable block for the proposed Talaipalli OCP is given in table 6.1. Total 21 workable splits contained in 8 seams i.e. Seam-III to Seam X are considered for open cast mining. The general strike of the beds is NW -SE with south westerly dip of  $4^{\circ}$  to  $8^{\circ}$

The local variation in dip and strike of the seam is mainly due to rolls or increase/decrease in the intervening partings between the coal seams.

Table 6.1- Mining and geological characteristics of the Quarriable Block

S. No.	Particulars	Thickness (m)		Avg Thickness (m)
		Minimum	Maximum	
I	Coal Seam			
	X LA	0.20	1.04	0.50-0.95
	X LB	0.30	1.28	0.50-0.90
	X Top	0.40	1.60	1.00-1.15
	X Bot	1.60	8.10	3.5-6.0
	IX L2	1.20	2.55	1.2-2.0
	IX L1	0.96	1.85	1.2-2.0
	IX	0.98	6.98	3.5-6.0
	VIII	2.06	6.64	4.0-5.5
	VII	0.10	3.90	0.50-1.95
	VI Top	0.37	3.42	1.2-3.0
	VI Mid	3.09	10.01	5.0-9.0
	VI Bot	0.48	1.75	0.50-1.0
	V Top	0.50	8.09	0.50-1.50
	V Mid	0.16	8.73	0.50-2.50
	V Bot	0.3	5.4	0.50-2.0
	IV Top	0.54	5.78	2.5-5.0
	IV Mid	1.02	7.22	3.5-7.0
	IV L	0.24	4.97	0.50-2.0
	IV Bot	0.55	5.67	1.5-3.5

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	III L	0.10	3.21	0.55-1.45
	III	0.68	5.95	2.0-5.4
II	Thickness of Parting			
	Parting XLA & XLB	5.41	11.7	6.0-9.3
	Parting XLB & X TOP	3.37	14.80	4.0-6.0
	Parting X TOP & X BOT	0.80	2.98	1.0-2.0
	Parting X BOT & IX L2	2.30	20.15	3.5-16.5
	Parting IX L2 & IX L1	13.59	21.54	17.0-18.5
	Parting IX L1 & IX	5.65	11.87	6.0-6.0
	Parting IX & VIII	6.30	16.15	9.0-12.0
	Parting VIII & VII	17.68	42.01	20.0-25.0
	Parting VII & VI TOP	1.08	17.44	4.0-14.0
	Parting VI TOP & VI MID	0.56	3.25	0.5-1.5
	Parting VI MID & VI BOT	0.95	5.98	1.0-2.0
	Parting VI BOT & V TOP	2.80	23.45	14.0-21.0
	Parting V TOP & V MID	9.09	18.94	11.5-16.6
	Parting V MID & V BOT	4.55	16.95	0.50-12.0
	Parting V BOT & IV TOP	15.16	30.14	17.0-23.0
	Parting IV TOP & IV MID	5.30	20.13	6.0-10.0
	Parting IV MID & IV L	0.75	6.96	3.5-5.5
	Parting IV L & IV BOT	0.70	4.55	0.50-2.0
	Parting IV BOT & III L	8.05	21.54	14.0-17.0
	Parting III L & III	24.57	44.55	33.0-39.0

## 6.2 MINEABLE COAL RESERVES - VOLUME OF OBR AND STRIPPING RATIO

The total opencastable mineable reserves are estimated as 843.69 Mt. The corresponding OBR has been envisaged as 3777.07 Mcum at an average stripping ratio of 4.48 cum/t.

The detailed break up of gross geological reserves (सर्वोच्च ग्रेड-बी) in the block are given in the Table 6.2.

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Table No. 6.2

Seam	Grade A	Grade B	Mineable Geological reserve (mt)					Total Geological reserve
			Grade C	Grade D	Grade E	Grade F	Grade G	
XLA						0.72	0.42	1.14
XLB					0.23	5.10	0.41	1.73
XTOP				0.01	4.41	5.80	0.62	10.73
XBOT					1.88	73.36	12.70	87.94
XL2			1.37	14.53	12.97	0.57		29.45




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IXL1		0.58	18.38	7.54	0.49		26.98
IX			4.86	59.88	31.86	0.10	96.51
VII				0.94	102.94	13.79	117.64
VII					0.58	4.98	5.56
VITOP				0.35	18.83	7.27	26.44
VIMID				4.03	132.22	19.22	155.47
VIBOT				3.38	3.00	0.01	6.39
VTOP			2.61	6.58	1.86	0.10	11.14
VMID				6.20	13.18	7.87	27.05
VBOT				0.86	20.30	12.43	33.59
IVTOP				3.28	30.91	46.45	80.64
IVMID		0.07	1.33	87.50	20.11		109.01
IVL			0.14	6.68	16.91	3.46	25.20
IVBOT		0.15	13.68	38.88	6.37	0.67	59.78
III			0.24	10.97	7.46	1.07	19.73
III	0.42	15.18	20.85	16.83	2.47	0.12	54.88
Total	0.42	17.42	76.24	271.55	489.99	131.37	986.76

Net geological reserve has been arrived by taking geological loss of 10 %. Mining loss of 5 % has been taken to arrive at the opencastable mineable reserves.


Due to multiple seams of different thickness, mining Loss has been estimated for each seam separately to arrive at Mineable Coal reserves. Mining Loss depends on:

- Loss of coal in roof and floor of seam
- Loss of coal while cleaning roof of bench
- Loss of coal during selective mining for >1m
- Loss of coal during transportation

  
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## Summary of Coal Reserves

A. Gross Geological Reserve	1400.58 Mt
B. Gross Underground Geological Reserve	77.13 Mt
C. Gross Opencastable Geological Reserve (upto Seam III)	1323.45 Mt

  
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 Ministry

D.	Gross Geological Reserves blocked in barrier and Batter and not considered for mining	336.69 Mt
E.	Available Gross Geological reserve for opencast	986.76 Mt
F.	Geological loss @ 10%	98.68 Mt
G.	Net Geological Reserves for opencast	888.08 Mt
H.	Mining Losses @ 5 %	44.40 Mt
I.	Opencastable Mineable reserves	843.68 Mt

### 6.3 OPENCAST MINE DESIGN

#### 6.3.1 Relevant factors considered for Mine design

- i) Multiseam deposit.
- ii) Frequent movement of equipment from one bench to other.
- iii) Inconsistency in thickness of partings.
- iv) Non availability of land for external dump.

#### 6.3.2 Rated Capacity

Talaipalli opencast project has been prepared for a rated capacity of 18 Mtpa of ROM Coal. This output is prima facie considered technically feasible because of its favourable geo-mining conditions like:

- (i) Thickness of various seams,
- (ii) Their disposition & its splits,
- (iii) Comparatively long strike length (6 km) and with deployment of higher size HEMM
- (iv) Free from major geological disturbances
- (v) Sufficient mineable coal reserves etc.

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### 6.3.3 Design Criteria for Operations

(i.e. Based on Indian Practice & Norms and Equipment as per Mining Plan)

The design criteria adopted in this project is as follows: -

- |                                  |   |     |
|----------------------------------|---|-----|
| • Number of annual working days  | — | 330 |
| • Number of dally shifts /day    | — | 3   |
| • Duration of each shift (hours) | — | 8   |

The opencast mine would be worked on the 3-shift/day and seven days/week round the year for coal extraction and overburden removal.

### 6.4 LIFE OF MINE

For the rated output of 18.0 Mtpy, the life of the mine has been estimated as 52 years including built up period of four years & reducing trend of coal production (i.e. production phase out) in start and finishing years of the mine. Before first year, there will be construction period. During construction period, basic infrastructure facility like approach road, drinking water, electricity, etc will be established.

### 6.5 MINING SYSTEM

Considering the following geo-mining condition as given below

- Gradient of  $4^{\circ}$ - $8^{\circ}$  of the coal seams.
- Multiple coal seams. (21 No. of Coal Horizons)
- Long strike length.
- Presence of medium thick coal seams along with thin seams.
- Variable thickness of OB/partings

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Mining Rules 1985 by Ministry  
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## 6.6 SEQUENCE OF MINING & OPENING OF MINEFIELD

### 6.6.1 Sequence of Mining

Before first year, there will be construction period. During this period, following construction activities will be taken up:

- (vi) making approach road,
- (vii) land acquisition,
- (viii) Bringing power line to the project and construction of electrical sub-station, power supply
- (ix) Infrastructure like office, store, workshop, coal handling plant etc
- (x) Statutory clearance
- (xi) Colony (essential Residential Buildings)
- (xii) Railway siding and construction of MGR for coal dispatch.
- (xiii) Preparation of NIT document.

The strike length of proposed Talaipalli OCP is about 6 km and quarry is envisaged to be worked in one quarry.

It is envisaged to make two quarry entry into the mine one on the east side of the North Eastern side and one on the western side of the property shown in the final stage quarry plan Two entry has been proposed due to following reasons

- i) Two entries will be useful in case of re-handling as multiple entries will have more flexibility for transporting equipment.
- ii) Two entries will aid in fast production built up as there are multiple seams in-cropping at different places in the block.
- iii) Mine production and coal evacuation will have more flexibility as large area is covered with reserve and protected forest.

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- iv) Two entry will also aid in reducing the lead as the mine advances in the dip direction. In the northern part of the block due to its geography and the dense forest area, it is difficult to have a mine entry in the northern part and that too a single entry.
- v) Will help in optimizing in the internal dump. (If there is one entry with central haul road then the amount of area lost due to the formation of "V" is equivalent to two tier of 30m each)

It is necessary to create internal dumping space in the decoaled area of the proposed quarry to accommodate maximum OB dumps. With this objective, quarry with two entry would be worked to create space for internal dumping. Access trench will be prepared initially.

#### 6.6.2. Opening of Mine field

As the advance activities proceed and physical possession of land is taken, two entry will be made to reach Seam-III as base seam with the help of 35 cum Electric Rope Shovel and RD 240 T & 20 Cum. Elec. Hyd. Backhoe and RD 190T dumpers as well as 4.5 Cum. Elec. Hyd. Backhoe and RD 50T dumpers and other auxiliary HEMM. During 1<sup>st</sup> year, 1.5 Mt of coal will be extracted and 7.65 M cum of OB will be removed.

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During second year of mine operation, 20 Cum. Elec. Hyd. Backhoe and RD 190T dumpers as well as 4.5 Cum. Elec. Hyd. Backhoe and RD 50T dumpers and other auxiliary HEMM will be deployed for OB removal and 12 Cum. Elec. Hyd. Backhoe and RD 120T dumpers as well as 4.5 Cum. Elec. Hyd. Backhoe and RD 50T dumpers and other auxiliary HEMM will be deployed for coal extraction. During 2nd year, 4 Mt of coal will be extracted and 19.04 M cum of OB will be removed.

Prepared by ms

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In fourth year of mine operation, in addition to above mentioned equipment two nos. of surface miner will be introduced for coal extraction. During this year, 13 Mt of coal will be extracted and 55.25 M cum of OB will be removed.


During 5<sup>th</sup> year of mine operation, mine will reach to 18 Mty capacity and overburden removal in this year will be 76.50 M cum. In this year, two more surface miner will be introduced.

Internal dump will start once sufficient void space gets available from 5<sup>th</sup> year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will be placed at two external dump shown in surface plan. For first four year of mine operation, OB will be accommodated in external dump only. In 5<sup>th</sup> year, majority of the OB will be dumped in external dump and only 12.29 M cum will be accommodated in internal dump.

The stage plan of pit operations for 1<sup>st</sup> to 5<sup>th</sup> yr and final stage are given along with dumping plan in the drawings.

## 6.7 CALENDAR PLAN OF EXCAVATION AND PRODUCTION PROGRAMME

The summarized calendar programme of excavation is given in Table 6.3 which has been developed based on adopted sequence of open cast mine development at optimum condition of mining operation in the block.

  
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For and on behalf of the Director, NTPC Limited  
 Director, NTPC Limited  
 NTPC Limited, New Delhi

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Table 5.3

Year	Coal Mt	Cumm coal MT	Natural		Running	Avg	Adjusted		Running	Avg
			OB	Cumm OB	SR	SR	OB	Cumm OB	SR	SR
			Meum	Meum	Cum/t	Cum/t	Meum	Meum	Cum/t	Cum/t
1	1.50	1.50	6.00	6.00	4.00	4.00	7.65	7.65	5.10	5.10
2	4.00	5.50	16.99	21.89	4.00	4.00	19.04	26.89	4.76	4.85
3	8.00	13.50	31.98	53.97	4.00	4.00	34.00	60.89	4.25	4.50
4	13.00	26.50	51.97	105.94	4.00	4.00	55.25	115.94	4.25	4.36
5	18.00	44.50	71.95	177.80	4.00	4.00	76.50	192.44	4.25	4.32
6	18.00	62.50	71.91	249.81	3.99	4.00	76.50	268.94	4.25	4.30
7	18.00	80.50	71.47	321.27	3.97	3.99	76.50	345.44	4.25	4.29
8	18.00	98.50	71.47	392.74	3.97	3.99	76.50	421.94	4.25	4.28
9	18.00	116.50	71.47	464.21	3.97	3.98	76.50	498.44	4.25	4.28
10	18.00	134.50	71.47	535.67	3.97	3.98	76.50	574.94	4.25	4.27
11	18.00	152.50	70.05	605.72	3.89	3.97	76.50	651.44	4.25	4.27
12	18.00	170.50	68.86	676.58	3.88	3.86	76.50	727.94	4.25	4.27
13	18.00	188.50	68.86	745.44	3.88	3.95	76.50	804.44	4.25	4.27
14	18.00	206.50	68.86	815.30	3.88	3.95	76.50	880.94	4.25	4.27
15	18.00	224.50	68.86	885.16	3.88	3.94	76.50	957.44	4.25	4.28
16	18.00	242.50	68.86	955.02	3.88	3.94	76.50	1033.94	4.25	4.26
17	18.00	260.50	75.30	1030.32	4.18	3.95	78.30	1112.24	4.35	4.27
18	18.00	278.50	76.91	1107.24	4.27	3.98	78.30	1190.54	4.35	4.27
19	18.00	296.50	76.91	1184.15	4.27	3.99	78.30	1268.84	4.35	4.28
20	18.00	314.50	76.91	1261.06	4.27	4.01	78.30	1347.14	4.35	4.28
21	18.00	332.50	76.91	1337.98	4.27	4.02	78.30	1425.44	4.35	4.29
22	18.00	350.50	76.91	1414.89	4.27	4.04	78.30	1503.74	4.35	4.29
23	18.00	368.50	76.91	1491.80	4.27	4.05	78.30	1582.04	4.35	4.29
24	18.00	386.50	76.91	1568.72	4.27	4.06	78.30	1650.34	4.35	4.30
25	18.00	404.50	76.91	1645.63	4.27	4.07	78.30	1738.64	4.35	4.30
26	18.00	422.50	76.91	1722.54	4.27	4.08	78.30	1816.94	4.35	4.30
27	18.00	440.50	74.91	1797.45	4.16	4.08	80.10	1897.04	4.45	4.31
28	18.00	458.50	74.90	1872.35	4.16	4.08	80.10	1977.14	4.45	4.31
29	18.00	476.50	74.90	1947.26	4.16	4.08	80.10	2057.24	4.45	4.32
30	18.00	494.50	74.90	2022.16	4.16	4.09	80.10	2137.34	4.45	4.32
31	18.00	512.50	74.90	2097.06	4.16	4.09	80.10	2217.44	4.45	4.33
32	18.00	530.50	79.58	2176.65	4.42	4.10	80.10	2297.54	4.45	4.33
33	18.00	548.50	82.28	2258.92	4.57	4.12	80.10	2377.64	4.45	4.33
34	18.00	566.50	82.28	2341.20	4.57	4.13	80.10	2457.74	4.45	4.34
35	18.00	584.50	82.28	2423.48	4.57	4.15	80.10	2537.84	4.45	4.34
36	18.00	602.50	82.28	2505.75	4.57	4.16	80.10	2617.94	4.45	4.35
37	18.00	620.50	84.07	2589.83	4.67	4.17	80.10	2698.04	4.45	4.35
38	18.00	638.50	87.35	2677.18	4.85	4.18	87.84	2785.88	4.85	4.35
39	18.00	658.50	87.35	2764.52	4.85	4.21	87.84	2873.72	4.85	4.35
40	18.00	674.50	87.35	2851.87	4.85	4.23	87.84	2951.56	4.85	4.39
41	18.00	692.50	87.35	2939.22	4.85	4.24	87.84	3049.40	4.85	4.40
42	18.00	710.50	88.54	3025.76	4.81	4.25	87.84	3137.24	4.85	4.42



43	18.00	729.50	85.60	3111.37	4.78	4.27	87.84	3225.09	4.88	4.43
44	18.00	745.50	85.60	3186.97	4.76	4.28	87.84	3312.92	4.88	4.44
45	18.00	764.50	85.60	3282.57	4.76	4.29	87.84	3400.76	4.88	4.45
46	18.00	782.50	82.56	3365.13	4.59	4.30	87.84	3488.60	4.88	4.46
47	18.00	800.50	73.64	3438.87	4.10	4.30	87.84	3576.44	4.88	4.47
48	15.00	815.50	61.53	3500.50	4.10	4.29	73.20	3648.64	4.88	4.48
49	10.00	826.50	41.02	3541.52	4.10	4.29	48.00	3897.64	4.80	4.48
50	7.00	832.50	26.52	3638.04	13.79	4.37	32.41	3730.05	4.63	4.48
51	6.03	838.50	74.52	3712.58	12.42	4.43	25.98	3756.03	4.33	4.48
52	5.18	843.69	64.51	3777.07	12.42	4.48	21.04	3777.07	4.05	4.48
<b>Total</b>	<b>843.69</b>		<b>3777.07</b>				<b>3777.07</b>			

It is envisaged to make two quarry entry into the mine one on the east side of the North Eastern side and one on the western side of the property shown in the final stage quarry plan. Year wise coal extraction from east and west quarry for initial five year is summarized in table below:

YEAR	COAL(Mt)		OB(Mcum)		Total Coal (Mt)	Total OB (Mcum)
	East	West	East	West		
1	0.45	1.05	2.45	5.20	1.50	7.65
2	1.03	2.97	5.18	13.86	4.00	19.04
3	1.68	6.32	7.06	26.94	8.00	34.00
4	2.13	10.87	8.93	46.32	13.00	55.25
5	5.48	12.52	23.04	59.46	18.00	76.50

The total mineable coal reserves have been estimated as 843.69 Mt at the corresponding OBR of 3777.07 Mm<sup>3</sup> at an average SR of 4.48 m<sup>3</sup>/t.

The rated output of 18 Mty would be achieved in 5th year of quarry excavation(excluding construction period).

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## 6.8 EQUIPMENT SELECTION

The following options have been considered for selection of equipment for the project

- 1) Drag'line
- 2) Surface miners
- 3) Shovel dumper combination

Prepared by me

*[Signature]*

As approved by 22/01/06

### Deployment of Dragline

The possibility of deploying dragline(s) at the project was examined for the inter burden between III seam and III L Seam (Parting around 35m). Dragline deployment has not been considered feasible due to:-

- (i) Volume of internal dump will be less in dragline operation as compared to Shovel-Dumper combination. Internal dump volume is less as more space has to be left between toe of internal dump and bottom most bench and it will take time to start dumping by shovel dumper combination on the dump created by dragline. So external dump volume and re-handling volume will be more which results into more cost of production on account of re-handling.
- (ii) This mine is multi seam operational mine. To achieve target production of 18 Mt., all benches should advance at same pace. If dragline will go under major breakdown (possibility of which can not be ruled out), advance of bottommost seam will get effected. Position of toe of internal dump will not make any advance which will increase external dump and re-handling of external dump.
- (iii) It is considered more prudent to have common fleet of equipment for such multi seam mine operation.
- (iv) There will be two quarries and strike length for deployment of dragline will be available only in one quarry (eastern) from fifth year. Dragline deployment in second quarry will not be possible until both quarries get merged. So parting between Seam III and seam III L could be worked in one quarry by Dragline operation and in another quarry by Shovel Dumper combination. Once both quarries will merge, shovels deployed in between

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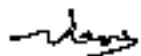
Seam III and seam III L will be unutilized. There will be operational problem to merge both quarries due to difference in bench parameter.

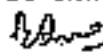
As such, use of dragline has been ruled out.

#### • Deployment of Surface Miner for Coal Mining

Surface miner is suitable for flat seams. The limiting gradient is 1 in 10 or flatter. Because of the moderate gradient, the use of Surface Miners is favoring for this deposit. But application of Surface Miner in all seams gets ruled out mainly because of presence of multiple thin to medium thick coal seams which will not permit large coal exposure in a single seam, which is a necessary pre-requisite for application of this technology.

Ideally, Surface Miner requires regular working space of about 400 meters long and 60 meters wide for its optimum use. The high wall angle will be at 45 degree in this case. This bench geometry will make overall working angle flatter which will generate much more OB compared to Shovel-Dumper combination. So, it will not be possible to deploy surface miner in all seam as running slope of the mine will be flatter which will lead to increased OB removal in initial years for the same production of coal, which will lead to re-handling of more OB.

  
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it is planned to produce about 40% of coal by surface mine by deploying it in seams X Bot, VI Mid; IV Top & III. All these seams have carbonaceous shale bands and obvious bands more than 30cm. Surface Miners have capability to remove bands more than 30 cm. Due to removal of bands, the quality of these seams will improve. 

## Shovel Dumper Combination

This option considers use of shovel dumper combination with inclined slicing pattern for mining mass i.e. coal and intervening parting. This will also facilitate water drainage to sump formed along with haul road. The top OB benches above the mining mass would be worked in horizontal slicing method.

The system is flexible and can be used in conditions of varying thickness of seams and partings and also steep gradients. The flexibility of the operations enables geological disturbances to be negotiated without much loss of efficiency. Shovel-dumper system is very flexible and also offers convenient mining operations to deal with sudden occurrences of unworkable or poor quality patches. It also offers flexibility for easy transition to any other technology or equipment configuration. The technology is well known and advantageous to get skilled manpower. Given the geological conditions of the block, this system suits best and has, therefore, been adopted in this project.

## 6.9 EXCAVATION EQUIPMENT

### 6.9.1 O.B. Removal

The following type and size of Shovel-dumper combination has been considered optimum.

The top OB will be mined and transported by 35 m<sup>3</sup> shovel in conjunction with Rear Dumper 240 T and rest by 20 m<sup>3</sup> shovel in conjunction with Rear dumper 190 T.

Prepared by me

(6 S. Har)

Reviewed & approved via 22401 of  
Mineral Development Rules 1980 by Director  
of Coal Development Department, NTPC Ltd. No.  
34011/39/2008-CPAM dated 26.6.06.

The intervening parting will be mined along and transported by 20m<sup>3</sup> Hyd Shovel+ Rear Dumper 190 T. However for thin parting it is proposed to deploy 4.5 m<sup>3</sup> Hyd shovel + Rear Dumper 50T wherever found suitable. It will be also assisted by other auxiliary HEMM.

The coal and Intervening parting benches would be formed parallel to the coal seams and would be mined by inclined slicing method. The top OB benches will be formed horizontally above roof of top seam and will be mined by horizontal slicing method. However the OB benches immediately above the roof of topmost seams would be formed parallel to the coal seams roof to avoid the formation of triangular rib of OB, which is likely to mix-up with coal after blasting. The maximum top OB benches height would be maintained at 20m and in case of coal and intervening parting benches the height will be equal to thickness of coal seam and thickness of parting.

### 6.9.2 Coal Winning

12 m<sup>3</sup> hydraulic shovel along with RD-120T is proposed so that the HEMM should be versatile and can be adopted in coal benches. However for thin coal seams & parting smaller size hydraulic shovel i.e.4.5 m<sup>3</sup> hydraulic backhoe with RD 50 T along with auxiliary HEMM are provided in the project.

In addition to Shovel dumper combination, Surface Miner in combination with 4.5 cum front end loader and 35 T rear dumper has also envisaged to extract 400000 coal production.

The above combination of equipments for coal extraction will provide smooth extraction and supply of coal.

Some major system parameters for both coal winning & OB removal are given below:-

Prepared by me

*[Signature]*

(S. S. Naji)

Mineral & Surveying Deptt. - 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

a) For 35 m<sup>3</sup> E- Rope shovel to be deployed for removal of overburden.

- 1) Height of the bench - 20 m
- 2) Width of the working bench - 50 m
- 3) Width of the non-working bench - 30 m
- 4) High wall angle of the bench -70° to the horizontal

b) For 20 m<sup>3</sup> Hydraulic shovel to be deployed for removal of overburden.

- 1) Height of the bench - 15m
- 2) Width of the working bench - 50m
- 3) Width of the non-working bench - 30m
- 4) High wall angle of the bench -70° to the horizontal

c) For 12 m<sup>3</sup> hydraulic shovel working in the thick seam and thick parting.

- 1) Height of the bench -15m
- 2) Width of the working bench -40m
- 3) Width of the non-working bench -25m
- 4) High wall angle of the bench - 70°

d) For 4.5 M<sup>3</sup> hydraulic shovel working in the thin seam and thin parting.

- 1) Height of the bench-equal to thickness of coal seam and thickness of parting
- 2) Width of the working bench -30m
- 3) Width of the non-working bench -25m
- 4) High wall angle of the bench -70°

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The above parameters may be modified according to the actual working condition. The high wall angle for the soft OB bench will not be steeper than 45°.

In this mining plan report, it has been envisaged that the mine will be worked for 330 days per annum i.e. 7 days per week.

(S S Naei)

Recognised Person as approved u/s 22(C) of Mineral Development Act, 1957 by Ministry of Coal, Government of India. Mine No. 330111/25/2008-CPAM dated 25.6.06.

## 6.10 Annual productivity of Shovel &amp; Dumpers

The lead of coal and lead of partings/OB have been considered as 2.0-3.0 Km. The annual productivity of shovel with matching dumper combination adopted in this project as per the prevalent norm in Indian coal Industry is given below on 330 working days basis. The productivity has been calculated as per the design criteria mentioned.

Sl No.	Particulars	Materials to be removed	Annual Productivity (M.Cum)
1	35 Cum Elec. Rope Shovel + 240 T Rear Dumper	OB	6.27
2	20 Cum Diesel Hydraulic Shovel + 190 T Rear Dumper	OB	4.99
3	4.5 Cum Diesel Hydraulic Shovel + 50 T Rear Dumper	OB	1.11
4	12 Cum Diesel Hydraulic Shovel + 120 T Rear Dumper (Mech. drive)	Coal	3.24
5	4.5 Cum Diesel Hydraulic Shovel + 50 T Rear Dumper	Coal	1.18
6	2200/3800 mm Surface miner	coal	2.42

Productivity of Rear dumpers with matching shovels for OB and coal at different lead in km is given in Table 6.4.

Table-6.4, Productivity of dumpers with matching shovels

Dumpers	Annual Productivity (M.Cum) for various lead in km						
	1	1.5	2	2.5	3	3.5	4
240 T Rear Dumper + 35 Cum Elec. Rope Shovel in O.B.	1.513	1.276	1.131	1.033	0.997	0.862	0.603
190 T Rear Dumper + 20 Cum Hyd. Shovel in O.B.			0.8474	0.5806	0.5253	0.4829	

Prepared as per the Rules of the Ministry of Coal, Government of India.

50 T Rear Dumper + 4.5 Cum Hyd. Shovel in O.B.	0.2126	0.1801	0.1603	0.1471	0.1335	0.1232	0.1129
120 T Rear Dumper + 12 Cum Hyd. Shovel in coal	0.5346	0.4537	0.4047	0.3718	0.3380	0.3120	0.2859
50 T Rear Dumper + 4.5 Cum Hyd. Shovel in coal	0.2192	0.1855	0.1651	0.1515	0.1375	0.1269	0.1163

## 6.11 LIST OF MAJOR HEMM

The list of major mining machineries up to target achieving year is given table 6.5.

Table-6.5, List of HEMM

Sl. No.	Equipment	Size	No	Year-wise Phasing				
				1st	2nd	3rd	4th	5th
A	Overburden							
1	Electric Shovel	35 cum	4	0	0	0	2	4
2	Electric Hydraulic Shovel	20 Cum	8	1	2	5	7	8
3	Electric Hydraulic Shovel	4.5 Cum	11	3	8	8	8	11
4	Rear Dumper	240 T	41	0			21	41
5	Rear Dumper	190T	76	8	18	43	67	76
6	Rear Dumper	50 T	92	21	61	61	67	92
7	Electric Drill	311 mm	3				1	3
8	Elec. Drill	250 mm	13	2	4	8	11	13
9	Diesel Drill	160 mm	9	2	3	5	7	9
10	Dozer	450 hp	6	2	5	6	6	6
11	Dozer with ripper	850 hp	5	1	2	3	4	5
B	Coal							
1	Diesel Hydraulic Shovel	12 Cum	1	1				
2	Diesel Hydraulic Shovel	4.5 Cum	3	1	2	3	3	3
3	Surface Miner	2200	2	0	0	0	1	4
4	Front end loader	4.5 cum	4				2	4
5	Rear Dumper	35 T	38				19	38
6	Rear Dumper	120T	10				10	10
7	Rear Dumper	50 T	26	8	16	18	26	26
8	Elec. Drill	250 mm	2			1	2	2
9	Diesel Drill	160 mm	3	2	3	3	3	3



10	Dozer	450 hp	3	1	1	2	3	3
11	Dozer with ripper	850 hp	3			1	3	3
<b>C Common</b>								
1	Grader	280 hp	8	2	4	6	7	8
2	Hydraulic Shovel	6.5 Cum	2	0	1	2	2	2
3	Crane	100 T	4	1	2	3	3	4
4	Crane	30 T	4	0	1	2	2	4
5	Crane	8 T	6	1	2	2	4	6
6	Crane	5 T	4	0	1	2	3	4
7	Diesel Back hoe	1.0 Cum	6	2	3	4	5	6
8	FE Loader	5-6 Cum	3	1	2	2	3	3
9	FE Loader	1-2 Cum	4	2	2	3	4	4
10	Diesel Drill	100 mm	4	1	1	2	4	4
11	Dozer	450 hp	4	1	2	3	3	4
12	Diesel bowser		8	3	4	5	7	6
13	Fire tender		3	1	2	3	3	3
14	Boom truck		3	0	1	3	3	3
15	Heavy duty toe truck		3	1	3	3	3	3
16	Fork lift truck	8 T	3	1	3	3	3	3
17	Line Truck		2	1	2	2	2	2
18	Tipping truck	8 T	6	2	4	6	6	6
19	Vibratory compactor		4	1	2	4	4	4
20	Tyre handler		4	1	3	3	4	4
21	Mobile maintenance Van		5	1	3	5	5	5
22	Water sprinkler	28kl	10	2	4	6	8	10
<b>D Reclamation</b>								
1	Grader	280 hp	2					2
2	Dozer	410 hp	2					2
3	Water sprinkler	28kl	2					
4	Farm Truck		2					

## 6.12 LAND REQUIREMENT

2113.00 Ha of land is proposed for the Opencast project, which would be utilized for different purposes to carry out the operations as stated in Table- 6.6

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 Ministry, Coal Mines Rules, 1957

RQP No. 34011/39/2005-CPAM dated 26.6.05, Advance Coal Management & Marketing Pvt. Ltd.  
 34011/39/2005-CPAM dated 26.6.05

Table- 6.6, Break- up of Land

(Figure in Ha)


Particulars	Internal Dump	Void	Others	Total
Mine Excavation including Infrastructure	1767	230.96	115.04	2113
Total Land to be acquired				2173*

\* 60 ha land would be needed for colony &amp; surface infrastructure etc.

The total area of 2113.00 Ha includes approximately 709.42 hectares of forest land and balance non-forest land.

There will not be any requirement of additional land for OB dump as it is proposed to dump OB on the coal bearing land of the block which will be re-handled back into the de-coaled area of the pit commencing from 9<sup>th</sup> year of mining operation to 20<sup>th</sup> year when entire coal bearing area of the block would be available for carrying out the opencast mining activity.

It is proposed to develop Infrastructure facility like MGR, Workshop, store, Sub-station, office etc. on the South-Western corner of the property. At the end of the mining operation, it is proposed to dismantle all infrastructure facility on the South-Western corner of the property to extract blocked coal below infrastructure facilities.

  
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(H. S. Rana)

 Reviewed & Prepared as approved by 22(C) of  
 Mineral Conservation Rules, 1925

## CHAPTER-VII

## UNDERGROUND MINING

## 7.1 GENERAL

Mechanized opencast mining of various coal seams commencing from the topmost X seam to III seam has been planned. The various coal seams/splits available below III seam and the partings between various such horizons is detailed at Table 7.1.

Table – 7.1 - Thickness of Seams/Partings below III Seam

Coal Seams	Seam (m)		Parting (m)		Dominant Thickness (m)
	Minimum	Maximum	Minimum	Maximum	
Parting			31.1	55.93	33.0-51.0
II L3	0.5	3.09			<0.90
Parting			13.39	40.9	28.0-38.0
II L2	0.07	2.68			<0.90
Parting			5	60.39	35
II L1	0.05	1.54			<0.90
Parting			1.27	20.59	3.0-14.0
II	0.13	5.92			0.50-2.50
Parting			0.37	3.89	0.50-2.0
II L	0.05	2.45			<0.90
Parting			Around 35.0 m		
I	0.22	0.55			

From the above table, it is clear that Seam II has the best potential to be mined by underground mining operation as this seam has developed thickness amenable to convenient workability compared to other splits. Detailed study of the Geological Report has revealed that possibility of any belowground mining in Seam III L1 and III L does not exist due to poor development of the carbonaceous horizons. Seam II has developed to working thickness in the block barring

eastern side. Seam IIL2 & Seam IIL3 have attained workable thickness in north west and south west areas of the coal block. Keeping this in mind, main development of mine roadways are planned in Seam II. Mineable areas in two overlying seams would be carried out by driving suitable drifts to touch such workable areas from Seam II. Based on the developed seam thickness, Seam-II, Seam II L2 and Seam II L3 have been proposed to be worked out by underground method.

The layout of seam II shows the sites of drifts from Seam II to Seam II L2 and Seam II L3. These drifts from Seam II would be initially upto Seam II L2 and then would be driven from galleries in Seam II L2 to Seam II L3 as shown in layouts of Seam II L2 & Seam II L3.

## 7.2 EXTRACTABLE RESERVES

The distribution of geological reserves in Seam II, seam II L2 and seam II L3 in various thickness zones more than 1.2 m are as given in Table-7.2.

Table-7.2 - Thickness-wise Geological Reserves

Coal seam	Thickness Zone (m)	Reserves (MT)	Remarks
II L3	1.2-1.5	3.26	Workable in two areas.
	1.5-1.8	2.94	
	>1.8	5.65	
II L2	1.2-1.5	1.78	-do-
	1.5-1.8	2.89	
	>1.8	0.48	
II L1	1.2-1.5	0.29	Non-workable
	1.5-1.8	0.01	
	>1.8		
II	1.2-1.5	2.21	Workable
	1.5-1.8	7.74	
	>1.8	28.29	
II L	1.2-1.5	0.80	Non-workable due to low parting
	1.5-1.8	1.43	
	>1.8		
I	<0.5		Non-potential

The Mineable and extractable reserves, excluding fault barriers, panel barriers and boundary barriers, are given at Table-7.3.

**Table-7.3 - Mineable & Extractable Reserves vis-à-vis Geological Reserves**

(Million Tonnes)

SN	Coal Seam	Geological Reserves	Mineable Reserves	Extractable Reserves	Extraction (%)
1	Seam II	38.24	28.68	11.47	40
2	Seam II L2	5.15	4.62	1.85	
3	Seam II L3	11.85	10.63	4.25	
4	Seam II L1	6.65	Seam not considered for mining		
5	Seam II L	4.48	Seam not considered for mining		
	<b>TOTAL</b>	<b>66.37</b>	<b>43.93</b>	<b>17.57</b>	<b>40</b>

### 7.3 MAIN MINE ENTRIES

The mine entries for developing an underground mine could be through either by :-

Pair of inclines or  
 Combination of Incline & shaft or  
 Pair of shafts

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The location of main mine entries has been primarily guided by the fact that upper seams in the coal block have to be worked by mechanized opencast mine and seam II proposed for belowground working is available at a depth over 200 m. The choice of mine openings as also their location has to be such that minimum coal reserves are blocked for preserving these openings till end of mining activity in the coal block. It is also to be

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simultaneously ensured that smooth operation of opencast mine being planned for a massive production capacity does not get hampered.

Though it is ideal to locate such mine openings around middle of the area considered for belowground workings, yet existence of opencast mining operations does not permit to have such a choice. Possibility of working by belowground method through two independent mine units, so as to get higher production capacity was also considered. It is found that sizeable coal reserves of opencast mine get blocked as also the opencast mine operations would be constrained by such planning. Therefore, only one belowground mine unit has been considered at this project.

Selection of inclines as the main mine openings block much larger coal reserves of upper seams due to anticipated long length of such incline ways. The best choice of working the belowground reserves without interference in functioning of mechanized opencast units seems by providing mine openings in the form of vertical shafts at the northern limit of the block. At least two vertical shafts need to be sunk upto Seam-II from surface. Undisturbed strata from surface to the bottom of the shafts would be needed as the shaft pillar to last till the reserves for belowground exploitation are recovered. These shafts would be about 290m deep and need to have an internal finished diameter of 7.5m.

One of these shafts would function as return air & coal raising and the other shaft would be used as main intake airway & winding over men/material.

Shaft construction is a critical activity in UG mines and the time taken in this activity has an effect on cash flow of the mine. Four main variants of technology are available.

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34011/39/2006-CPAM dated 26.6.06

- i) **Manual drilling, blasting and mucking method:** This method is the simplest method in which the shaft bottom is drilled and blasted. The blasted rock is filled into buckets by hand shoveling, which in turn are hoisted out of the shaft by a winder. This method is very slow and the average rate of progress varies from 8-14m per month.
- ii) **Semi-mechanized method:** This method is an advanced form of manual method in which the loading operation is performed by a grab, which is operated by a small movable cabin suspended from the scaffold. The maximum rate of progress achieved in CIL by this method is 83m in a month at Jhanjra project of ECL.
- iii) **Shaft boring in conjunction with pilot borehole:** In this method, shaft boring is performed in two stages. A large diameter borehole is initially drilled in the center of the proposed shaft. Later, the sides of the borehole are reamed to the required shaft diameter. The average rate of progress achieved is in the range of 5 – 10m per day.
- iv) **Full face shaft boring:** This is a further advancement of the shaft boring method with the borehole at the center. In this technology, a giant machine cuts the full diameter of the whole shaft with elaborate arrangements for muck removal and simultaneous lifting. With this technology, a very high-speed rate of advanced ranging from 8 – 10 m per day can be achieved.

Construction of head gear, furnishing of shafts and construction of insets are time consuming activities which need to be synchronized

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with the speed of shaft sinking so that the total time taken in the shaft commissioning is minimized.

#### 7.4 SELECTION OF MINING TECHNOLOGY

Winning of the deep coal reserves or the calorific heat value available in these carbonaceous horizons could be through Gasification or adoption of extraction by mechanized/semi-mechanized/manual means. Gasification of the coal seams is not considered possible since consequent to winning of upper seams by opencast mining, the area would be backfilled. It will not be possible to drill holes through the backfilled strata essential to carry out gasification technology. Utilization of such coal reserves would therefore, need to be carried out by adopting underground mining operations.

The technology of underground mining could be adoption of either Longwall or Bord & Pillar method of mining. Adoption of Longwall method of mining could certainly provide a higher capacity of the mine. The winding capacity of coal raising as also the quantity of air which could be made available at the workings would restrict utilization of the costly Longwall equipment. Adoption of bord & pillar technology would be a cheaper proposition with better utilization of resources. Manual working or semi-mechanized operations would need blasting operations and likely human drudgery. Blasting operations would consume sizeable quantity of air for clearing the blasting fumes. It is, therefore, proposed to have fully mechanized mode using Continuous Miner, shuttle cars, feeder breaker and belt conveyor system taking the coal to pit bottom bunker from where this would be hoisted up by cage winding.

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of Coal & Mines Administration, New Delhi.



Fully mechanized mining has been recommended to obtain numerous advantages on count of following:-

- i) Requirement of minimum manpower as to conserve ventilation;
- ii) Avoidance of blasting operations thereby creating healthy working conditions at the faces;

## 7.5 MINE CAPACITY AND LIFE OF THE MINE

Use of one set of Continuous Miner in seam thickness of about 2.0m with provision of adequate gate/trunk transport is likely to produce on an average of about 0.3 MTPA at 85% rated capacity. The limitation of ventilation and winding at the mine would permit a maximum of two working districts simultaneously. Accordingly, the mine capacity is suggested at 0.6 MTPA at 85% capacity or 0.72 MTPA at 100% capacity.

The extractable coal reserves of about 17.57 MT are therefore, expected to last about 30 years including construction period of about four years.

## 7.6 MINE LAYOUT

As already mentioned, the belowground workings are proposed to be opened through a pair of shafts to be located at the northern boundary of the block. These shafts would be sunk at a distance of 40m centre to centre and with a finished internal diameter of 7.5m.

The fully mechanized Continuous Mining Technology is proposed for both development and depillaring operations. In this method a suitable Continuous miner will be deployed with a complement of two matching shuttle cars. The Continuous Miner will have a cutting cycle of 12m in

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each heading before moving to the next heading. After the withdrawal of the Continuous Miner, the roof will be systematically bolted by a roof bolter to secure the roof.

The actual trunk development in seam II will be carried out on basis of five heading districts about 160m wide advancing southwards up to the southern limit of the block. Five heading panels shall be developed on the flanks both towards west and towards east up to the working thickness of the coal seam. The overall strategy would be to work two panels and to commence depillaring operations from the working boundaries to conserve ventilation air.

#### 7.6.1 Proposed Method of Development

Schematic layout showing the dip development as also lateral development of the five heading panels in seam II has been shown on the plate. The likely position of stone drifts to enter upper seam IIL2 & IIL3 are also shown in the said plate.

The suggested Continuous Miner development operations consists of five heading developments, with the main conveyor and feeder breaker positioned in the central roadway. This provides working areas to carry out all the main development functions as follows:-

- One heading for the Continuous Miner to do cutting
- One heading being roof bolted,
- One heading being cleaned out by the LHD,
- One heading being the ventilation & direction lines extended, and
- One heading ready for cutting

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34071, Coal Management & Marketing Pvt. Ltd.

Efficient sequencing is a prime requirement of high productivity. Moves of the machines must be as short as possible to ensure highest efficiency. The cut sequences must be designed to minimize move times and shuttle car haul distances. Operations must be carried out with a view to minimizing cable handling and ventilation rerouting. Cuts should be sequenced so that operators can follow an easily remembered pattern.

A typical sequence of operation is to cut out 12 m beyond the last row of roof bolts. Operator controls the Continuous Miner using hand held radio remote control device thereby standing under supported ground behind the machine at all times. Once this cut is completed, Continuous Miner is trammed to the adjacent heading to commence the cutting cycle again. A mobile bolting machine is then trammed into the mined out heading and systematically support the whole area. In this manner the Continuous Miner and roof bolter operate independently giving greater flexibility for both cutting & bolting operations.

The coal from the faces is unloaded by the miner onto cable reeled shuttle cars which ferry the coal to a feeder breaker connected to the district/gate conveyor belt discharging on to the trunk belt conveyor system to the bunker located at the pit bottom.


### 7.6.2 Depillaring with Continuous Miner

Pillar extraction would be started from the mine boundary. Before commencement of depillaring operations, permission from DGMS would be needed. Pillars will be extracted in straight line method instead of conventional diagonal line. The straight line method is suggested since with fully mechanized equipment, the tramping distance and cable length handling is reduced resulting in improved efficiency/safety levels. (The

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sequence of operation in pillar extraction is indicated in the drawing – Mechanized depillaring and the system would comprise of :-

- Cutting of a pillar in the middle, to cut out 12 m beyond the already roof bolted original development rise/dip roadway. Once this cut is completed (cut-1), the Continuous Miner would be trammed to adjacent pillar to complete similar cutting cycle (cut-2) in the middle of the adjacent pillar.
- The mobile bolting machine is then trammed into the mined out 12 m long split of cut-1 and systematically supports the whole area.
- Continuous Miner and bolting machine then interchange their position and cut-1 is further extended (cut-3) to split the pillar completely. This is then fully supported by repeating the process while the Continuous Miner wins coal in the cut at adjacent pillar (cut-4).
- The split galleries are thus fully supported and secured.
- Flanking cuts-5,6&7 are then taken from the cover of the supported split gallery of the pillar (formed by cuts-1 & 3). Additional support is no necessary in the flanking cuts.
- Additional coal may be judiciously extracted from the "ribs" (remnant portion of the coal pillar) as the Continuous Miner is retreated.

  
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- Remaining flanking cuts in other half of the pillar i.e. cuts-8,9,10 are taken in similar manner from the cover of the adjacent original fully supported development heading.
- Extraction of the pillar would be completed after covering all the items detailed above.

### 7.6.3 Functions of different machines deployed :

**Continuous Miner** - equipped with radio cord remote control, dust scrubber and methane monitor cuts & loads coal in single operation.

**Shuttle Car** - transports the mined coal from the loading conveyor of the continuous miner to the feeder breaker..

**Roof bolting machine/Roof Bolter** - Tyre/track mounted equipment provided with temporary roof support system and able to drill holes dry/wet for insertion of roof bolts per approved Systematic Support Rules (SSR).

**Load Haul Dumper** - has multipurpose operation for cleaning of spillage coal from shuttle cars, cleaning & sweeping the headings during development/splitting operations for increasing operational efficiency of the miner, transport materials & consumable store items and moving switch gears etc.

**Feeder Breaker** - mounted on tracks to size and feed the coal from the shuttle car onto the conveyor at controlled rate.

Prior DGMS approval, for the use of machineries in underground workings like continuous miner, shuttle car, roof bolting machine, etc. and also for the proposed extraction method, supporting system of roof has to be obtained.

Recognition of use as approved by DGMS in  
Mandatory Safety Rules 1960 by Ministry  
of Coal, Government of India  
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Total manpower for underground mine for working two districts has been assessed at 434 to produce 0.6 MTPA at 85% rated capacity to give a productivity of 5.22 t. The break-up of the manpower on macro level in to executives, monthly paid and daily rated work persons is given at Table-7.5.

**Table-7.5-Underground Mine Manpower**

Sl.No.	Particulars	No. of Persons
1	Executives	31
2	Monthly rated	67
3	Dally rated	336
	<b>Total</b>	<b>434</b>

## 7.7 MINE VENTILATION

The working belowground mines in Mand-Raigarh Coalfield are placed in Degree-I category of gassiness. It is, therefore, expected that the proposed underground mine workings at Talapalli Coal block would also fall in same Degree-I of gassiness. Accordingly, ventilation provisions in this mining plan are based on Degree-I gassiness. These provisions may need medication if any change in degree of gassiness is found on actual determination as required by statute.

Exhaust ventilation system is considered for the proposed mine workings of the shafts provided with a main mechanical ventilator with suitably designed air lock arrangements & evasee.

Considering the extent of the mine workings it would be essential to have large diameter boreholes (greater than 1m dia) at the barriers of the coal block connected to the workings in Seam-II to assist the ventilation circuit

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- at the mine. Six such locations for the large diameter boreholes have been shown on the plate detailing layout of workings in Seam-II.

As fully mechanized mining has been suggested, the statutory maximum requirement of air would be on basis of  $2.5\text{m}^3/\text{minute}$  on daily production from the mine.

Considering efficiency of ventilation at 0.6, a mechanical ventilator to produce about  $6500\text{ m}^3/\text{min.}$  of air at about 85 mm water gauge is considered adequate.

## 7.8 COAL & MATERIAL TRANSPORT

### 7.8.1 Coal Transport

Coal transport in the belowground workings could be considered comprising of face transport, gate transport, trunk transport up to shaft bottom and winding to surface. Equipped with radio cord remote control, dust scrubber & methane monitor, continuous miner will cut and load coal in single operation on to the shuttle car via the loading conveyor of the miner. Shuttle car would tram and unload coal on the sizer/feeder breaker to size coal to (-) 200 mm for feeding the gate belt conveyor at a consistent controlled rate. Gate belt would discharged on to the trunk conveyor through a properly designed hopper/chute to carry the coal in to a ground bunker built at the shaft bottom. The capacity of the bunker should be adequate to accommodate about two days production. Suitable arrangement for loading of mine carts would be built at the pit bottom and loaded mine carts would be wound up to the surface for onward dispatch to the coal off take system of the mine.

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### 7.8.2 Material Transport

Various materials needed for the production would be brought to the pit bottom and then transported to the working areas in suitable trolleys through a system of endless haulages.

### 7.8.3 Men Transport

With the suggested degree of mechanization, the strength of manpower for any shift remains limited. Considering the long travel distances it is suggested that a suitable Man riding facility duly approved by DGMS could be considered to ensure that the workforce loses least energy & time.

## 7.9 WATER MANAGEMENT

The proposed belowground workings would be below the backfilled area consequent to winning of coal in upper seams through mechanized opencast mine. The barakar measures containing the coal seams for belowground exploitation are likely to provide make of water in the workings. A main sump to hold water would be provided by sinking the two shafts about 10m below the floor of seam-II. While at this stage it is not possible to assess the quantity of water required to be handled at the mine, this may be possible on completion of the hydrogeological study during the working of the opencast mine.


Suitable sump of adequate capacity will be constructed at the dip most workings near the southern boundary of the block. Water at the workings faces would be managed through small pumps of capacity 6lps and 20-25m head.

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Continuous miners would need filtered supply of water for cooling of the motors and for the dust suppression during the cutting operations. Arrangements would, therefore, be needed for laying pipe ranges of clean water for providing water to the equipment as also for drinking water supply to the engaged workforce at the mine.

  
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Suggested Pattern is given below:

Blast Hole Spacing : 8 to 10 m  
Blast Hole Burden : 7 to 8 m

Blast holes will be suitably drilled to provide sufficient OB to each shovel unit for 1 week work load.

### 8.1.2 Coal

Surface miner as well as shovel dumper combination will be deployed for coal extraction. There will not be any drilling and blasting where surface miner will be deployed.

160mm drills will be used for drilling blast holes in Coal benches. Blasting will be done around once in 3 days in Coal benches. Field trials will be required by expert agency for designing best suited pattern in coal as well.

Annual Coal Production : 18Mt  
Production/day considering 330 days a year : 54500t  
Type of Explosives : Bulk Slurry/Emulsion.  
Powder Factor (assumed) : 5 Cum/Kg  
Weekly Explosive Required for Coal : 44 t

Suggested pattern for blasting in coal is given below:

Blast hole spacing : 6 m  
Blast hole Burden : 5 m

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Drilling should be suitably distributed in all coal benches to provide requisite work load for each shovel.

RQP No. 34011/(39)/2005-CPAM dated 26.6.06.

Prepared by me

Advance Coal Management & Marketing Pvt. Ltd.

(B. S. Nayak)

B-2

Received by \_\_\_\_\_ as approved vide 22/07/06  
Manager, Advance Coal Management & Marketing Pvt. Ltd.  
Plot No. 34011/(39)/2005-CPAM, Tataipalli, Jhansi  
Dist. Jhansi, M.P. 471001

### 8.1.3 Ground Vibrations

The ground vibrations due to blasting can be controlled by:-

- (i). Reducing the amount of explosives charged per delay.
- (ii). Reducing spacing and burden of blast holes per blast.
- (iii). Reducing the amount of explosives charged per blast.
- (iv). Proper controlled rock movement during blast by using suitable initiating sequence and delay.
- (v). Proper strata movement during blasting by using suitable firing sequence.

Since above parameters are site specific, the exact blasting pattern will be designed after conducting field trials.

### 8.1.4 Storage of Explosives

It is envisaged that the blasting operation will be carried out by SMS (Site Mixed Slurry) and will be transported to the mine site by the explosives agency. Magazine will be required only for storage of detonators, detonating fuse, cast boosters, , cord-relays, etc.

A cluster of 4 magazines each of 4T capacity (total capacity 16T) is provided for storing detonating fuses, detonators and other explosives etc. for secondary blasting.

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RQP No. 34011/(33)/2006-CPAM dated 28.8.05, Advance Coal Management & Marketing Pvt. Ltd.

8-3  
Recommended person as approved site 2/2/07 of  
Mineral Conservation Rules, 1925 as per  
of Coal & Mineral Management Dept. No  
34011/(33)/2006-CPAM dated 28.8.05

## 8.2 UNDERGROUND OPERATION

### 8.2.1 Drilling & Blasting


Drilling & Blasting may be needed during shaft sinking operations depending upon the technology of sinking accepted by the client at that period of time.

Drilling & Blasting will be needed for drivage of drifts from seam II to seam IIL2 & seam IIL3 and while crossing fault planes in the southwest and northwest parts of the coal block. Accordingly, there would be necessity of engaging work persons for various activities including handling & blasting of explosives of a type approved by DGMS for belowground workings.

For underground mining, continuous Miners have been envisaged. No Drilling & Blasting operations are needed for production of coal. However, drilling will be done for roof bolting of the strata.

### 8.2.2 Explosive Requirement

A small sized magazine for storage of approved explosives & detonators would also need to be provided at the project. Else the management could consider outsourcing the activity of making the needed stone drifts by a contractual agency, subject to adherence of any statutory requirements.

  
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RQP No. 34011/(39)/2005-CFAM dated 28.6.08, Advance Coal Management & Marketing Pvt. Ltd.

Recognized Person as approved w/s 72(C) & Mineral Conservation Rules 1987, by Director of Coal & Mines Administration of Govt. of India No. 34011/(39)/2005-CFAM dated 28.6.08

## CHAPTER-IX

## OPENCAST MINE DRAINAGE

## 9.1 MINE DRAINAGE HAS BEEN PLANNED FOR DEALING

- (a) Surface water/ rain water from out side the quarry area and
- (b) Water from inside the quarry, consisting of ground seepage water and rain fall within catchment of quarry excavated area.

## 9.2 SURFACE DRAINAGE

## 9.2.1 Physiography and Drainage

The topography of Talaipalli block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolge Pahar in the north and Sitol Pahar (580m) in the south. The general ground level elevation of the area varies between 280 m and 340m above MSL. The minimum ground level is 277.48m (borehole MNRT-73) near Kelo river and maximum ground elevation is 335.34m around borehole MNRT-61.

Kelo River is flowing through the south-eastern part of the block, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south.

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Prepared by me



- (S. Rana)

## 9.2.2 Rain fall

The monsoon period extends from mid June to September with an average annual mean rainfall of 1620 mm.

- i) The main rainy months are from June to September when about 92% of the annual rainfall occurs. During the post-monsoon period from October to November, about 4.4% of the annual rainfall occurs due to depression over the Bay of Bengal.
- ii) The average annual rainfall (1955 to 1980) is 972.0mm. and average number of rainy days in a year is 44.1
- iii) The variation of rainfall from year to year basis is very large. The highest rainfall amounting to about 158 percent (1533.0 mm) of the normal was recorded in 1973. The lowest annual rainfall of 419.8 mm (43% of normal) was recorded in the year 1965.
- iv) The heaviest rainfall in 24 hours amounting to 300.2 mm occurred on 8<sup>th</sup> August 1960.
- v) The highest monthly rainfall (wettest month) amounting to 831.5 mm was recorded in the month of August 1969.

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RQP No. 34011/(39)2005-CPAM dated 26.6.06

Advance Coal Management & Marketing Pvt. Ltd.  
 RECEIVED PERSON AS ALLOWED via 23(C) of  
 Mineral Cons. & Mngt. Rules 1950 by Ministry  
 of Coal & Mines Department of Coal & Mines  
 34011/(39)2005-CPAM dated 26.6.06

9-2



To deal with surface water following measures have been proposed :-

- Tallaipali coal block is bounded by hilly area in the north, particularly Tolge Pahar in the north. As the streams are flowing from North-West to South-East towards the Kelo river so before the mining operation starts a drain 5-6m deep has to be constructed all along the northern boundary.
- This will arrest the water of the catchment area in which the block is going to be mined. The catchment area's drainage is through the block so this drain has to be constructed as an advance action to the project.
- The drain will be pitched and will have embankments on either side.
- The width will be about 1-1/2 m and the height will be about 3m above the ground level.
- The construction of the embankment will be from the hard material dug out of the quarry.

### 9.2.3 Pumping of Mine Water

The pumping station has been planned for the mining block considering simultaneous working of coal from different seams in the block.

Mine working shall be planned in such a way that working faces and haul road shall remain dry as far as possible. Suitable gradient along quarry floor and benches shall be provided to facilitate self-drainage of water to lowest level. Water accumulated in the sump shall be pumped out of the mine into the settling pond. Any suspended particulate matter would settle and if needed, water will be treated in the settling pond. Clear water would pass over a spillway to be discharged into Kelo river. Proper garland drains shall be made

at the periphery of active edge of the quarry to prevent surface rain water from entering into quarry.

Water in w/g mine when it will be worked, shall be collected in the floor of bottom seam through bore holes in dip side. Face water shall be pumped out in district sump & from district sump to main sump.

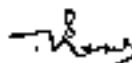
The pumping requirement has been assessed on the basis of following data:-

Excavated area (ultimate)	-	20.79 sq km in 52 years
Area beyond excavation	-	0.5sq km
Run off coefficient		
Mined out area	-	0.7
Dump area	-	0.15
Beyond excavt. area	-	0.1
Seepage	-	10%
Maximum rain fall in day	-	300 mm
Life of opencast mine	-	52 yrs

Upto 10<sup>th</sup> year, excavated area - 4.0 sq km (approx).

On the basis of above data the probable water accumulation in the mine on the day of maximum rain fall =  $1.35 \times 10^6 \text{ m}^3$ .

Taking 10 % Seepage, total make of water = 1485000 m<sup>3</sup>.

  
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#### 9.2.4 Provision of pumps

Assuming 20 hrs of pumping and 8 days to pump out total water, the required pumping rate shall be 9281 cum per hr. at initial stage of mine.

Prepared by me



ROP No. 34011/(39)/2008-CPAM dated 26.6.06, Advance Coal Management & Marketing Pvt. Ltd.

Prepared by person as approved vide 22194/4  
 Mineral & Coal Mines Rules, 1957, by authority  
 of Director General, Coal Production, vide letter no. 34011/(39)/2008-CPAM dt.

*Final Mining Plan--Talaipali Opencast and Underground Coal Project, NTPC Limited*

During the initial stage of mine operation, when the depth of the mine shall be low and gradually increases, low head pumps suitable for 65 m to 100m depth shall be provided in O/C.

- |                                       |   |       |
|---------------------------------------|---|-------|
| a. 540 cum per hr capacity, 80 m head | - | 4 nos |
| b. 300 cum per hr capacity 65 m head  | - | 3 nos |
- 5<sup>th</sup> to 10<sup>th</sup> year of mine

To meet the pumping requirement the following pumps complete with 6.6 KV electrical and accessories has been selected.

- |   |   |        |
|---|---|--------|
| a. 1000 cum per hr capacity, 185 m head | - | 5 nos. |
| b. 540 cum per hr capacity, 185 m head  | - | 4 nos. |

- **Face Pumps**

Eight (8) nos of face pumps have been provided to pump out water accumulated at quarry benches to discharge in main sump. The capacity shall be 50 cum per hr 45 m head with electricals 15 KV motor.

- **Slurry Pumps**

Six (6) nos. of slurry pumps have also been provided to pump out slurry accumulated at working faces of capacity 250 cum per hr, 45 m head with 75 KV motor.

- **Diesel Pumps**

Five nos. of 80 m head, 300 cum per hr capacity with all accessories have been provided for operation during power breakdown and emergency.

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RQP No. 34011/(39)/2006-CPAM dated 26.6.06.


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Received for use as approved by 27/03/06  
Mineral Conservation Rules 1988 by Ministry  
of Coal & Mines  
34011/(39)/2006-CPAM dated 26.6.06

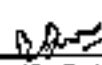
- **Self Priming Pumps**

Two self priming pumps of 50 cum/hr capacity and 18 m head have been provided for priming.

The delivery and suction pipes will be of 250 and 300 mm nominal diameter. The delivery pipe lines from pumping station are proposed to be taken out through the side batters of respective quarry.. These pipes are eventually brought to the surface, from where, the water will be discharged to the natural drainage system.

  
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RQP No. 34011/39/2008-CPAM dated 26.6.06, Advance Coal Management & Marketing Pvt. Ltd.  
 Recd. no. of Person as approved vide 22471 of  
 Mineral & Production Index. Issued by M&B/34  
 of Coal & Production Department, 17, 18th Flr, 25  
 24011/39/2008-CPAM dated 26.6.06

## CHAPTER-X

## DISPOSAL OF WASTE

## 10.1 GUIDING PRINCIPLES

The first guiding principle of designing dump planning has been followed as minimum degradation of existing land asset due to mining operation and accordingly no OB waste is going to be placed in external dump outside the coal block area of 2113 Ha, allocated to NTPC. In the initial years, when sufficient void to the floor of the basal seam III is not created, the OB spoil generated will be temporarily accommodated within the block area to the dipside of the working area and then re-handled back in the void to the floor of the basal seam as internal dump with additional cost to be incurred by NTPC.

The second guiding principle is slope stability of the Dump. Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 80m is above quarry surface. Each tier of OB dump is of 30m height and berm width has been increased to 40m, with the result that the ultimate dump slope is 22 degrees only along the slope line connecting mine floor to the crest of the dump, as opposed to the maximum permissible angle of 27 degrees. This feature has increased overall stability of the dump at its final stage.

Thirdly, in pre-mining stage itself, deep garland drain and North will be created with continuous slope to Kelo river to arrest any water from those sides. A wharfwall of 2m height and 1 m wide will be erected along the periphery of the bottom tier at surface level and the slopes and the berms

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Final Mining Plan--Tataipalli Opencast and Underground Coal Project, NTPC Limited

As there is no land available for external dump, it has been envisaged to re-handle external dump back to decoaled area of the mine. Re-handling of overburden will start from 9<sup>th</sup> of mine operation till 20<sup>th</sup> year of mine operation. About 264.52 Mcum of external dump will be required which has been planned to re-handle back to the decoaled area of the mine

Final stage dump plan, as well as stage plans also show the location of external/internal dumps in respective stage plan showing height as well as volume of dump.

The phased programme of OBR is given in table B.1.

Table 08.01- Dumping Schedule

(Figure in Mcum)

Dumping Schedule								
Year	External dump (Mcum)		Internal dump (Mcum)		Rehandling		Total OB (Mcum)	
	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
1	7.65	7.65	0.00	0.00		0.00	7.65	7.65
2	19.04	26.69	0.00	0.00		0.00	19.04	26.69
3	34.00	60.69	0.00	0.00		0.00	34.00	60.69
4	55.25	115.94	0.00	0.00		0.00	55.25	115.94
5	64.21	180.15	12.29	12.29		0.00	76.50	192.44
6	45.38	225.53	31.12	43.41		0.00	76.50	268.94
7	21.17	246.70	55.33	98.74		0.00	76.50	345.44
8	17.82	264.52	58.68	157.42		0.00	76.50	421.94
9	0.00	264.52	76.50	233.92	8.12	8.12	76.50	488.44
10	0.00	264.52	76.50	310.42	18.13	26.25	76.50	574.94
11	0.00	264.52	76.50	386.92	18.13	44.38	76.50	651.44
12	0.00	264.52	76.50	463.42	18.13	62.51	76.50	727.94
13	0.00	264.52	76.50	539.92	25.42	87.93	76.50	804.44
14	0.00	264.52	76.50	616.42	25.42	113.35	76.50	880.94
15	0.00	264.52	76.50	692.92	25.42	138.77	76.50	957.44
16	0.00	264.52	76.50	769.42	25.42	164.19	76.50	1033.94
17	0.00	264.52	78.30	847.72	25.42	189.61	78.30	1112.24

RCP No. 34011/39/2006-CPAM dated 26.6.06, Advance Coal Management & Marketing Pvt. Ltd.

Recognised Person as approved v/s 22(C) of Mines Act, 1952, by Government of India, Department of Coal, New Delhi. CPAM No. 34011/39/2006-CPAM dated 26.6.06

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18	0.00	264.52	78.30	926.02	25.42	215.03	78.30	1190.54
19	0.00	264.52	78.30	1004.32	25.42	240.45	78.30	1268.84
20	0.00	264.52	78.30	1082.62	24.07	264.52	78.30	1347.14
21	0.00	264.52	78.30	1160.92		264.52	78.30	1425.44
22	0.00	264.52	78.30	1239.22		264.52	78.30	1503.74
23	0.00	264.52	78.30	1317.52		264.52	78.30	1582.04
24	0.00	264.52	78.30	1395.82		264.52	78.30	1660.34
25	0.00	264.52	78.30	1474.12		264.52	78.30	1738.64
26	0.00	264.52	78.30	1552.42		264.52	78.30	1816.94
27	0.00	264.52	80.10	1632.52		264.52	80.10	1897.04
28	0.00	264.52	80.10	1712.62		264.52	80.10	1977.14
29	0.00	264.52	80.10	1792.72		264.52	80.10	2057.24
30	0.00	264.52	80.10	1872.82		264.52	80.10	2137.34
31	0.00	264.52	80.10	1952.82		264.52	80.10	2217.44
32	0.00	264.52	80.10	2033.02		264.52	80.10	2297.54
33	0.00	264.52	80.10	2113.12		264.52	80.10	2377.64
34	0.00	264.52	80.10	2193.22		264.52	80.10	2457.74
35	0.00	264.52	80.10	2273.32		264.52	80.10	2537.84
36	0.00	264.52	80.10	2353.42		264.52	80.10	2617.94
37	0.00	264.52	80.10	2433.52		264.52	80.10	2698.04
38	0.00	264.52	87.84	2521.36		264.52	87.84	2785.88
39	0.00	264.52	87.84	2609.20		264.52	87.84	2873.72
40	0.00	264.52	87.84	2697.04		264.52	87.84	2961.56
41	0.00	264.52	87.84	2784.88		264.52	87.84	3049.40
42	0.00	264.52	87.84	2872.72		264.52	87.84	3137.24
43	0.00	264.52	87.84	2960.56		264.52	87.84	3225.08
44	0.00	264.52	87.84	3048.40		264.52	87.84	3312.92
45	0.00	264.52	87.84	3136.24		264.52	87.84	3400.76
46	0.00	264.52	87.84	3224.08		264.52	87.84	3488.60
47	0.00	264.52	87.84	3311.92		264.52	87.84	3576.44
48	0.00	264.52	73.20	3395.12		264.52	73.20	3649.84
49		264.52	48.00	3433.12		264.52	48.00	3687.84
50		264.52	32.41	3465.63		264.52	32.41	3730.05
51		264.52	25.98	3491.51		264.52	25.98	3758.03
52		264.52	21.04	3512.55		264.52	21.04	3777.07
Total	264.52		3512.55		264.52			

Note: There will not be any external dump. All overburden has been planned to be placed in decaoled area of the mine.

Prepared by one

*B. S. Rana*

RQP No. 34011/(39)/2008-CPAM dated 26.6.06, Adv. S. Rana

Coal Management & Marketing Pvt. Ltd.

Received by Person as approved vide 226/CPAM dated 26.6.06, Adv. S. Rana, Secretary, Ministry of Coal, Govt. of India, New Delhi.



## 10.2 TOP SOIL MANAGEMENT

Top soil is proposed to be removed separately and dumped outside the quarry in a manner so as not to lose its fertility. The top soil would be spread over the reclaimed land, afterward.

Top soil will be stored for initial nine years and during subsequent years it will be directly spread over the reclaimed area. It has been envisaged on coal bearing area due to non availability of land.

Top soil details:

1. Quantity : 25.32 Mcum
2. Height of Top soil : 10 meters.
3. Year of Reclamation: After 10th year of mine operation.

Top soil quantities generated for 1<sup>st</sup> 5 years of mine operation are as follows:-

Sl.No.	Year of mine operation	Top soil (Mcum)
1	1 <sup>st</sup>	0.50
2	2 <sup>nd</sup>	0.97
3	3 <sup>rd</sup>	1.43
4	4 <sup>th</sup>	2.01
5	5 <sup>th</sup>	2.54

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NEW DELHI

## 10.3 WASTE MANAGEMENT - Belowground Mine

Waste would be generated initially during sinking of shafts. This would be disposed off suitably in the backfilled area around the shaft pillar.

Prepared by me

*[Signature]*

(D. S. Nayak)

RCP No. 34011/(39)/2006-CPAM dated 26.6.06, Advance Coal Management & Marketing Pvt. Ltd.

Ministry of Coal, Government of India, New Delhi  
Ministry of Coal, Government of India, New Delhi  
34011/(39)/2006-CPAM dated 26.6.06

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Subsequently, waste rock produced at the time of underground drifts would be packed in barrier gallery or by making niches in the barrier by working out coal and packing stone. These pack walls shall be suitably plastered to avoid any spontaneous heating etc.

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*B. S. Naq*  
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RDP No 34011/39/2006-CPAM dated 28.6.06, Advance Coal Management & Marketing Coy. Ltd.

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## CHAPTER-XI

## USE OF MINERAL

## 11.1 GENERAL

The project has been planned for producing 18 Million Tonnes of coal per annum. The weighted average ROM coal quality is likely to be of grade F i.e. power grade coal. Talaipalli Mine will be captive mine for Lara Thermal Power Station (4000 MW) of NTPC which is 60 km away from the mine.

Run of mine coal as produced at the mines would be crushed to (-) 50mm size and sent for consumption in boilers installed at Lara Thermal Power Station for generation of steam.

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RQP No. 34011/(39)/2008-CPAM dated 26.6.08, Advance Coal Management & Marketing Pvt. Ltd.

Prepared by: NTPC

(S. S. Rana)

11-1

Received at NTPC as per approval of 27/11/08  
 Ministry of Coal, Government of India, New Delhi  
 Office of the Under Secretary to the Ministry of Coal  
 34011/(39)/2008-CPAM dated 26.6.08

## CHAPTER-XII

## MINERAL PROCESSING

## 12.1 MINERAL PROCESSING

The entire coal of the mine is linked to Lara Thermal Power Station (4000 MW) of NTPC which is designed to accept F grade coal. It is envisaged to use surface miner for coal extraction and belt conveyor to transport coal from pit to surface, wherever applicable, which is explained in mining chapter. As such no processing is required and the sized coal will be directly dispatched to power plant.

However, if necessary, suitable deshaling arrangement will be provided.

वी. सुख. राधाव. S. RATHA  
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Prepared by me

*[Signature]*

19 S Naga

Prepared as per the approval of the (NTPC) of  
 Coal Management & Marketing Pvt. Ltd. by  
 12-1

## CHAPTER-XIII

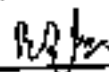
## SURFACE TRANSPORT &amp; COAL OFFTAKE

## 13.1 SURFACE TRANSPORT

Surface transport consists of transport of over burden and coal. Overburden will be transported by dumpers to allocated OB dumps. Haul road has been provided for movement of dumpers. Entire overburden during first four years would be dumped within the coal block. From 5<sup>th</sup> year of operation onwards, part of the overburden at the two quarries would be backfilled and from 9<sup>th</sup> year onward, entire quantity of overburden is planned to be placed in the de-coaled area. Re-handling of overburden placed within the block would also be carried out into the de-coaled area. It would be ensured that dumped overburden is completely removed by the time the mine front advances within 50 m of such dumping.

Coal from the quarry will be transported over the haul road provided in the quarry batters duly connected to various coal benches through temporary ramps. Coal dumpers would move up the access trench and on the surface to the discharge hoppers of primary crushers. Coal will be sized to (-) 200 mm in primary crushers and subsequently to (-) 50 mm size in secondary crushers. Two independent belt conveying circuits have been envisaged for transporting the crushed coal to the ground bunker at coal dispatch centre, planned to be constructed at the south western extremity of the coal block.

Prepared by me




ROP No. 34011/(33)/2005-CPAM dated 26.6.06

Advanced Coal Management &amp; Marketing Pvt. Ltd.

Prepared Person as approved vide 7201/13-1  
 Mining Concession Rules 1974 by 2005 by  
 M.C. & M. Deptt. Govt. of India  
 34011/(33)/2005-CPAM dated 26.6.06

*Final Mining Plan—Talsipatti Opencast and Underground Coal Project, NTPC Limited*

Suitable arrangement will be provided to draw coal from the ground bunker in to two silos from where coal will be dispatched to the power house over dedicated "Merry Go Round" system of rail network.

  
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ROP No. 34011/(39)/2006-CPAM dated 25.6.06, Advance Coal Management & Marketing Pvt. Ltd.

Prepared by me

(B. S. Nag)

13-2

Registered Person as approved vide 22(C) of  
 Coal Mines (Conservation) Rules, 1956 by the  
 Director of Coal Mines (Conservation), New Delhi.  
 34011/(39)/2006-CPAM dated 25.6.06

## CHAPTER-XIV

## OTHER FACILITIES

## 14.1 SITE SERVICES

The site infrastructure to be provided by NTPC will include roads, workshops, stores, power supply, pumping, surface water management, potable and industrial water supplies, offices, communication and other amenities required for the work force. The project site does not belong to a developed area and the local community will be included in the development process as per NTPC policy. A modern large mine will be constructed and operated at a remote location and this is expected to bring in improvement in quality of life of the community.

## 14.2 POWER SUPPLY

## 14.2.1 Source

A 40 MVA 132/33 kV Sub Station (S/S) has been commissioned at Bhendre one year back and presently having a peak load of approx. 15 MVA only.

This S/S is fed from Raigarh 220/132 kV grid s/s and is 30 km away from Raigarh. The distance of coal mine from this S/S is 15 km. This S/S is having 5 nos. of 33 kV feeders. It is understood from CSEB that S/S has been planned to have one more 40 MVA transformer based on load growth in the area.

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Prepared by: *[Signature]*

ROP No. 34011/39/2006-CFAM dated 26.6.06, Advance Coal, Management &amp; Marketing Pvt. Ltd.

अधिसूचना सं. 34011/39/2006-सीएमएम्, दि. 26.6.06  
आज के दिनांक से प्रवृत्त है।  
आवकियों को प्रेषित करने के लिए  
आवकियों को प्रेषित करने के लिए  
आवकियों को प्रेषित करने के लिए

This substation feeds Gharghoda 33/11 kV S/S which in turn feeds the villages around coal block at 11 kV. The substation is having a 33 kV feeder to Lailunga (as an alternate source to Lailunga) in floating condition. This 33 kV line is passing some 5-7 Kms away from coal mine area near Kotrimal and as per CSEB can be tapped, if required, to feed coal mine area.


#### 14.2.2 Requirement

The proposed mining block is virgin. No basic infrastructure like power, water supply etc are now available. Based on rated capacity of 18.0 MTY ROM Coal for Talaipalli Block and considering electric power consumption in HEMM, coal crushing, conveying, loading, pumping, workshop etc. aggregate requirement of power shall be in the range of about 15 MVA at high voltage, preferably 33KV. Diesel HEMM has been mostly proposed.

#### 14.2.3 Distribution

The 33/6.6 KV Sub-Station for the project will feed 6.6 KV switching station to feed power to respective sub-station for HEMM, Underground Mine (when it starts after 25 years of commencement of O/C mining ) CHP, Pumps, Workshop, Colony.

In quarry area mobile substation may be provided. The rest will be fed from fixed substation. Power for CHP, Conveyors, Pumps, Workshop and Colony will be fed by overhead line.

  
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Restricted earthing has been envisaged for electrical system, which will also be protected from lightning and high voltage Surge.

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ROP No. 34011/(33)/2006-CPAM dated 26.6.05.

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 Person as approved by 22.01.07  
 Person Roles 1996 by 14-2  
 Discontinued 14-2  
 CPAM dated 26.6.05



Substations and switching stations will be equipped with safety features and fire fighting arrangements. Capacitor banks will be provided to improve the system power factor to 0.95 or better.

### 14.3 WORKSHOP

#### 14.3.1 Excavation Workshop

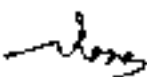
The excavation workshop will have repair bay for dumpers, dozers, pay loaders, washing bay, filling station, stores, parking space, engine repair room, auto electrician room, maintenance bays, office etc.

Inspection, washing, daily maintenance, lubrication, weekly/periodic maintenance, modular replacement, minor repair of assemblies/sub-assemblies will be done under preventive maintenance and scheduled maintenance respectively. Annual plan of major overhaul will be drawn up. Mobile repair/maintenance van will also be provided.

#### 14.3.2 E & M WORKSHOP

E & M workshop will undertake the following activities:

- > Minor repair, medium repair and replacement of components assemblies and sub-assemblies of CHP equipment, continuous miners, conveyors, and other electrical and mechanical equipment.
- > Daily washing of LMVs and washing of equipment assemblies and sub-assemblies as and when required.

  
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- Periodical lubrication.
- Repairs and replacement of components / assemblies for LMV.
- Minor and medium repair of switchgears, motors, self-starters and other electrical equipment.
- Battery charging facilities and re-conditioning of batteries.

A combined complex has been envisaged for HEMM, E&M workshop and stores.

#### 14.4 ROAD

The state highway is located close to the block. Surface roads essential for mining activity and for residential colony would be suitably connected to the state highway. Feeder roads to the Mine entries and a road to cluster of explosives magazines will be provided.

#### 14.5 WATER SUPPLY

There will be enough water being pumped from the mine, which will cater to the requirement of industrial water for dust suppression, washing and maintaining green zone. Drinking water will be supplied from bore wells and stored in overhead tanks and distributed through pipelines to different facilities to the area for drinking and domestic purpose. Tube wells will be dug for the surrounding villages for water supply, as water table is expected to go down with mining. Some of the delivery pipes of mine water could be used to feed ponds at the neighbouring villages to recharge the water table.

Prepared by me

*[Signature]*

(S. P. Singh)

ROP No. 34011/(39)/2005-CPAM dated 25.6.05.

Advance Coal Management & Marketing Pvt. Ltd. of  
 (Amended) Commission Rules 1944 by Ministry  
 of Coal, Govt. of India, New Delhi. 34011/39/2005-CPAM  
 34011/39/2005-CPAM dated 25.6.05.

#### 14.6 OTHER INDUSTRIAL BUILDINGS

All essential statutory buildings need to be constructed near the mine site. Statutory buildings would include manager's office, sub-station, explosive magazine, canteen, first aid rooms, rest shelter, vocational training centre, scooter/cycle shed, lavatory/urinals, workshops for HEMM and P&M repairs/ maintenance of equipment, winding engine houses and time keeper's office etc. need to be provided near the mine entrances of both the quarries/main mine openings of the projected belowground mine.

Service buildings like dispensary, community centre, post office/banking counter etc. may need to be provided near the coal block and close to the residential colony as per the necessity considered by the project proponent.

#### 14.7 RESIDENTIAL COLONY

The working manpower at the opencast mine has been assessed at 3179 persons. It is considered that about 65% of the assessed manpower may be provided suitable accommodation to enable their availability for efficient discharge of their responsibility at the mine. Accordingly this would need development of a suitable residential colony with basic requirements of drinking water, sewage disposal, colony roads, drains, parks etc. Land requirement would depend upon the availability of land as also on type of construction i.e. single/multistoried.

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#### 14.7 MANPOWER

While planning the manpower, it is to be remembered that there is no existing Industrial scenario in this remote neighborhood and the Mine has to

Prepared by me  
 18/05/2008  
 Approved as approved via 27103 of  
 Advance Coal Management & Marketing Pvt. Ltd. No  
 34011/35/2008-CPAM dated 26.5.08



## CHAPTER- XV

## ENVIRONMENT MANAGEMENT PLAN

## 15.0 GENERAL

As per statutory stipulations of Ministry of Environment & Forests (MOEF), it is mandatory to Prepare Environmental Impact Assessment & Environmental Management Plan report and get clearance for Talaipalli coal block.

Before the commencement of mining operation, the following statutory obligations in the environmental front need to be complied with. The guidelines of September 2006 of MOEF require the following:-

- Preparation of Terms Of Reference, presentation and obtaining approved TOR from MOEF
- Preparation of EIA/EMP report as per approved TOR
- Submission to State Pollution control board for public hearing
- Obtaining public hearing report
- Incorporation of public hearing report and preparation of Final EIA/ EMP report for submission to MOEF
- Obtaining MOEF clearance
- Obtaining NOC, consents from State Pollution Control Board

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Approved by MOE

*V. S. Rana*  
 V. S. RANA

Date: \_\_\_\_\_ Person as approved vide 22/03/06

### 16.1 SALIENT FEATURES OF THE BLOCK

As per the statutory requirement, for preparation of EIA/EMP report for this block, baseline Environmental data for various environmental parameters like Ambient Air, Water (both surface & Ground water), Noise, Soil, Land use, Flora & Fauna, Hydrology, Socio economic environment etc are being collected for Post monsoon 2009 season. The results of the same will be incorporated in the EIA/EMP report.

For the purpose of this study the area is divided into 2 zones namely core zone and the buffer zone. Core is the project area of Talaipalli coal block while the buffer zone encompasses an area 10km from the periphery of the core zone.

Opencast mining of seams above Seam-III and belowground mining of Seam-II/splits of Seam-II is planned at the project.

The salient features within the buffer zone are as follows:

Sl.No	Particulars	Distance (m)	Direction
1.	ROAD		
	MDR- Gharghoda To Lelonga	2000	
2	RAILWAY LINE:	Nil	
3	WATER BODIES		
	A. KELO RIVER	60	E
	B. PAJHAR NALA	3500	SW
4	INDUSTRIES	NIL	
5	RESERVED FOREST – COMMON TREES FOUND IN THE AREA ARE SAL YENDU, SAJA, PALAS, MAUHA, IMLI, ETC.		
	SILOT	1.0 KM	S
	RAJ	3.2	NW
	TOLGE EAST	<1.0 KM	SE
	TOLGE WEST	<1.0 KM	N
	DEODONGR:	<1.0 KM	N

Underground mining operations will commence only after 20 years from start of opencast mining operations. The impact on various environmental parameters due to mining operations and necessary control measures to be adopted are briefly given in this chapter.

## 15.2 FLORA & FAUNA IN THE STUDY AREA

**15.2.1 Flora:** The flora of the study area is tropical dry deciduous type. The trees commonly found in and around the villages sites are Mango, Jamun, Imlı, Pipal, Tendu, Mahua, Sal, Eucalyptus and Neem. Some of the species found in the study area are :

LOCAL NAME	BOTANICAL NAME
ARJUN	TERMINALIA ARJUNA
SARAI	SHOREA ROBUSTA
BAHERA	TERMINALIA BELERICA
MAHUA	MAPNUCA INDICA
SAL	SHOREA ROBUSTA (GAERTN)
PALAS	BUTEA FRONDOSA
JAMUN	SYZYGIUM CUMINI (LINN.)
SAGON	TACTONA GRANDIS
SAJA	TERMINALIA TOMENTOSA
BEL	AEGLE MARMELLOS (CORR.)
IMLI	TEMERINDUS INDICA
BABUL	ACACIA CATACHUA ARABTA
BER	ZIZYPHUS JUJUBA
AMLA	EMBLICA OFFICINALIS
TENDU	DIOSPYROS MELANDEXYLON
KUSH	DESMOSTACHYE BIPINNATA
NEEM	MELIGTONIA HARTENSI
AAM (MANGO)	MANGIFERRA INDICA
TIWAS	OUGEINIA DALBERGIODES
KHAIR	ACACIA CATECGY

Prepared by me

*[Signature]*

(Sd/-) \_\_\_\_\_

15.2.2 Fauna: The thick forest in the area is an ideal abode for wild life. The common species found in the forest of the area are, Elephant, Bear, Fox, Jackal, Hyena, Monkeys, Wild Dog, Rabbits etc. are among the mammals and in reptiles Cobra, Krait, Viper, Garden lizards etc. Where as in Birds are Parrot, Woodpecker, Crow, Vulture, Sparrow, Wild hen etc. The list of wild life with their local name and scientific name are given below:

LOCAL NAME	SCIENTIFIC NAME
<b>WILD ANIMALS</b>	
ELEPHANT	MELURSUS URSINUS
BEAR	VULPES BENGALENSIS
FOX	CANIS AUREUS (LINNACUS)
JACKAL	HYENA HYENA
HYENA	PERSBYTIS ENTELLUS
MONKEYS	BOSELAPHUS
NILGAI	
<b>BIRDS</b>	PSITTACULA KRAMERL
PARROT	TACCOCLA LESCHENAUR
TOTA JUNGALI	DINOPIUM JAVANENSE
WOODPECKER	TORGOS CALVUS
VALTURE	CORVUS MACROTHYCHOS
CROW	PERDICULA ARIATICA
BATER	GALLUS GALLUS
WILDHEN	GRUS ANTIGONA
SARUS	PASSER DOMESTCUS
SPARROW	
<b>PEPTILES</b>	
KOBRA	NAJA NAJA
CHHIPKALI	VARANUS MONITOR
KEKAR	PARATELPHUSA (BARATELPHUSA)
KRAIT	BANGARUS CAERULAUS
<b>FISHES</b>	
KATLA	CATLE CATLE
ROHU	LABEOROHITA



### 15.3 AMBIENT AIR QUALITY

The principal sources of Air pollution due to the proposed coal mining activity would be:-

- i. Dust particulates.
- ii. Gaseous pollutants.

The sources of dust generation in the mine could be:-

- a. Removal of overburden and production of Coal by Shovels & surface miners.
- b. Movement of HEMM
- c. Loading and unloading operations
- d. Drilling & blasting operations
- e. Wind erosion of dumps

The sources of gas emission could be:-

- a. Spontaneous heating of Coal and Coal stockpiles.
- b. Emission of SO<sub>2</sub> from diesel driven mining equipments, compressors, generator sets, etc.

Suspended Particulate Matter (SPM) especially finer than 5-micron size is a serious air pollutant, which can lead to lung disorders. Air pollution from the mining operations shall be effectively controlled by adopting various measures as enumerated hereafter:-

- a. Construction of haul roads at 6% or flatter gradient, black topping of roads wherever possible to avoid & eliminate air-borne dust.
- b. Development of green barriers around mine, workshop, around the industrial activity area and along roads etc.
- c. Avoiding overloading of dumpers/transport vehicles.

- d. Frequent water spraying / sprinkling using fixed / mobile sprinklers on the roads, stock-piles, OB dumps and transfer points where dust is produced.
- e. Providing dry fogging system in the CHP
- f. Wet drilling and blasting using controlled blasting technique to reduce ground vibrations.
- g. Improved maintenance of machinery for reducing gaseous and noise pollution.
- h. Provision of dust filters / masks to workers working at dust prone areas.
- i. Using sharp teeth for shovels and other soil excavation equipment, Periodical monitoring of Ambient air quality shall be carried out in the project and the surrounding area.

#### 15.4 WATER QUALITY

Impact on water quality due to the project operations can occur due to :

- a) Generation of industrial effluent water from workshop, service buildings and pumped out mine water with suspended particles.
- b) Washouts from overburden, Coal stockpile etc.

The following preventive measures are suggested to control the above:-

1. Maintaining a gradient of 1 or 2° for drainage of water on the bench floors and construction of water drains using local material to prevent soil erosion and uncontrolled flow of water.
2. Construction of Garland drains around the quarry area and the temporary external dump with proper gradients to prevent the rainwater descent into the active mine area. The clear water after passing through settling tanks to remove the suspended solids will be

- let out in to the surface settling tank. A settling tank of adequate capacity for pumping of mine sump water will be provided.
3. Provision of ETP comprising Oil & Grease trap for treatment of Workshop effluent and STP for domestic effluent from Colony. Treated water conforming the prescribed standards will be let out for gardening.
  4. Detailed hydrological investigation shall be carried out before undertaking mining operations to assess the aquifer status, based on which proper Ground water control operations should be adopted to prevent flooding etc.
  5. A detailed area drainage study shall be carried out to know the details of the existing surface water course in the mine area and the impact due to mining & dumping operations on these streams and the mitigative measures to be adopted.

## 15.6 NOISE LEVELS

Mining operations such as excavation, loading & dumping, drilling, workshop activities etc., will generate significant noise especially in the work environments unless proper remedial measures are adopted.

Prolonged exposure to a high noise level is harmful to the human auditory system and can create, mental fatigue, rebellious attitude, annoyance, and carelessness, which may lead to neglect of work and also result in accidents.

The Directorate General of Mines Safety in Circular No. DG (Tech)/18 of 1975, has prescribed the noise level for mining occupations (TLV) for workers, in an 8 hour shift period with unprotected ear as 90 dBA or less.

*[Signature]*  
 DIRECTOR GENERAL SECRETARY  
 DIRECTORATE GENERAL OF COAL  
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Noise will be produced due to operation and movement of Heavy Earth Moving Machinery, various other allied equipment and transport vehicles. The impact on the surrounding population in the buffer zone will be minimal from propagated noise levels from the mining area, due to adoption of following control measures:


1. The operator's cabin of equipments like dumpers, shovel, etc. would be made sound proof.
2. Proper and regular maintenance of equipments may lead to less noise generation.
3. Manufacturers of equipment will be advised to provide in-built mechanism for reducing sound emissions.
4. Where noise level exposure is more, workers will be provided with earmuffs.
5. Adopting controlled blasting technique and using delay detonators.
6. Regular health check-up of workers will be undertaken.
7. Accordingly, noise level status of operational machinery may be displayed on the machines to enable control measures to be taken in this respect.

This will enable to know the extent of noise level and to control the time to which the worker is exposed to higher noise levels.

#### 15.6 DETAILS OF LAND USE PATTERN

Total Block area = 2113 Ha (including Revenue, forest, Govt. and private)  
Revenue land = 1887.46 Ha

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ज्वर निदेशिका सचिव  
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Prepared by  
  
(R. S. Naq)

SI NO:	VILLAGE NAME	TOTAL AREA (Ha)	LAND UNDER DIFFERENT USES (Ha)		
			REVENUE FOREST (JJ)	GOVT. LAND (*)	PRIVATE LAND (**)
1	SALEHPALI	36.93	3.315	2.579	31.036
2	AJINGARH	20.87	..	3.083	17.787
3	BICHINARA	360.22	133.00	20.55	206.67
4	CHOTIGUDA	319.88	10.92	17.441	291.519
5	NAYARAMPUR	131.95	22.501	48.789	60.66
6	KUDURMOHA	121.65	8.64	44.056	68.944
7	TILAIPALI	295.13	59.611	33.548	201.971
8	RAIKERA	600.63	245.890	32.733	322.207
	TOTAL	1887.46	483.877	202.769	1200.814

\*Govt land includes grass land, roads, hill area, ponds, graveyard area, market area .

\*\*Private land includes agricultural land, barren area and residential area

Forest area-225.54 Ha

### 15.7 LAND DEGRADATION & RECLAMATION

The opening of a mine, irrespective of the method of mining, definitely has some impact on the land use pattern. In the proposed project, the impact on the land is due to:-

1. Overburden removal.
2. Dumping of overburden as well as Coal.
3. Construction of infrastructural facilities such as, workshop, office, road etc. within the project area.

Prepared by me

*(Signature)*


(R. S. Nigam)



Village wise details are as follows:-


Name of the Villages	Total PAF's
Talaipali	120
Bichhara	224
Nayarampur	182
Kudurmoha	45
Raikera	606
Chotiguda	499
Ajigarh	21
Salehpali	143
<b>Total</b>	<b>1840</b>

## 15.9 RESETTLEMENT & REHABILITATION

  
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 नई दिल्ली  
 NEW DELHI

Detailed R&R plan in accordance with state and central government R&R policy comprising details and classification of land oustees, home oustees and the details of Project Affected Persons (PAP), RAP (Rehabilitation Action Plan) for the Project Affected People etc. is being prepared by NTPC.

However, opening of this mine will have a positive impact on the socio-economic factors due to the creation of additional jobs, consequent migration of population etc. and improvement of the economic living standards. The mining operations will result in direct employment for about 3179 people and indirect employment of a large number of people in

  
 Resubmitted as approved vide 27/03/06  
 Member Secretary  
 Advance Coal Management & Marketing Pvt. Ltd.  
 34031

associated trading, transportation from mines, afforestation and other contract works. Although employment will be given preferably to local people, it is expected that there will be migration of people from nearby Districts and other States into the project area and peripheral regions.

Besides, there will be additional facilities available to the local population by way of better communication, postal services, higher educational facilities, advanced medical facilities etc. The State and the central Government will benefit through financial revenues worth crores of rupees by way of taxes, royalty etc. from the direct and indirect operations in the project area.

In addition to payment of compensation of acquired assets as per provisions of extant land acquisition acts, R&R issues will be dealt proactively and with right earnest at Talaipalli coal mining project through a participative and consultative process involving all the stakeholders viz. the representatives of State Administration, affected families and NTPC. The objective of the R&R program would be to improve upon or at least regain the lost standard of livelihood of the affected families.

For this purpose a Village Development Advisory Committee (VDAC) has already been constituted by the State Government under the chairmanship of SDM vide order dated 9.8.08.

Prior to this a comprehensive Socio Economic Survey (SES) has already been conducted by an independent agency viz. Xaviers Institute of Development Action and Studies (XIDAS), Jabalpur, an academic institute of repute. The demographic data for the affected area has already been captured in detail by the agency, which will provide valuable inputs for the preparation of Rehabilitation Action Plan (RAP) to adequately address the R&R issues of the project.

While addressing the R&R issues at Talaipalli project, individuals requirements for livelihood restoration and proper relocation of those requiring physical shifting of homesteads would be adequately taken care of as per extant R&R policies and provisions of R&R grants thereof. While broadly considering the provisions of the State R&R policy, it would also be ensured that the finalized R&R package meets





## Final Mining Plan—Tataiçali Opencast and Underground Coal Project, NTPC Limited

Lead (Pb)	Annual Average*	1.0 $\mu\text{g}/\text{m}^3$	0.75 $\mu\text{g}/\text{m}^3$	0.50 $\mu\text{g}/\text{m}^3$	ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	1.5 $\mu\text{g}/\text{m}^3$	1.00 $\mu\text{g}/\text{m}^3$	0.75 $\mu\text{g}/\text{m}^3$	
Ammonia	Annual Average*	0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	
	24 hours**	0.4 mg/m <sup>3</sup>	0.4 mg/m <sup>3</sup>	0.4 mg/m <sup>3</sup>	
Carbon Monoxide (CO)	8 hours**	5.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>	1.0 mg/m <sup>3</sup>	Non Dispersive Infra Red (NDIR)
	1 hour	10.0 mg/m <sup>3</sup>	4.0 mg/m <sup>3</sup>	2.0 mg/m <sup>3</sup>	Spectroscopy
Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.					
** 24 hourly/8 hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days.					

## NOTE:

1. National Ambient Air Quality Standard; The levels of air quality with an adequate margin of safety, to protect the public health, vegetation and property.
2. Whenever and wherever two consecutive values exceed the limit specified above for the respective category, it would be considered adequate reason to institute regular/continuous monitoring and further investigations.

## Effluent Standards

The standards for effluent discharge into sewer / stream / land are given below:

pH	:	5.5 to 9.0
Total Suspended Solids	:	100 mg/l (On land for irrigation)
Oil & Grease	:	10 mg/l
Nitrate Nitrogen	:	10 mg/l

## Noise Level Standards

Ambient Air quality standards in respect of noise as per MOEF notification S.O 123(E) is given below:

Noise level	8.00 AM – 10.00 PM	10.00 PM – 6.00 AM
a) Industrial area	Leq 75 dB (A)	Leq 70 dB (A)
b) Residential area	Leq 55 dB (A)	Leq 45 dB (A)

Prepared by Mr.


*[Signature]*  
(R. S. Nig)

RQP No. 34011/(39)/2006-CPAM dated 25.05.06. Advance Cost Management & Marketing Pvt. Ltd.




- b) The infrastructural facilities in the area like road, lighting, communication, Medicare, education etc.
- c) The financial accruals to the state and central exchequer through increased cash gains from cess, royalty, taxes etc from the project operation and allied activities.
- d) Availability of additional electricity, likely to be generated from the fuel supplies of the project, for the local industries, agriculturists, local community etc

With various environmental control measures, narrated earlier as above, the project operations will not adversely affect the pre project environmental status. The project will give many positive impacts as stated earlier, to the local community and to the nation.

  
 श्री. एस. रामो V. S. RANA  
 ज्येष्ठ अभियन्ता SENIOR SECRETARY  
 कोयला प्रशासन DEPARTMENT OF COAL  
 भारत सरकार GOVERNMENT OF INDIA  
 पई दिल्ली NEW DELHI

Prepared by me

  
 V. S. Rana

## CHAPTER XVI

## MANPOWER &amp; PRODUCTIVITY

## 16.1 MANPOWER

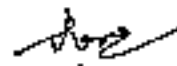
Tentatively 3139 persons will get direct employment and more than 8000 persons will get indirect engagement in various services, which will develop due to the project and the persons employed in the project.

The total tentative manpower required for Talaipalli OCP for 18 MTY coal production along with its corresponding OBR, is assessed at 3139. Total tentative manpower upto 5<sup>th</sup> year is only 2945. The requirement of manpower is on the basis of prevailing norms of operation in Coal India Ltd. i.e. 3 shift operation for 330 days in a year.

Similar requirement of manpower for the belowground mine unit has been assessed at about 434 for annual rated capacity of 0.72 MT.

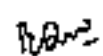
The Manpower list includes:-

- 1) Operational manpower for coal winning & OBR
- 2) Maintenance manpower of HEMM & other equipment
- 3) Project office, supervision & common manpower
- 4) Environment & Reclamation manpower.

  
 श्री. वी. एस. रामा  
 JUNIOR SECRETARY  
 MINISTRY OF COAL  
 GOVT. OF INDIA  
 NEW DELHI

The designations and relevant categories of the manpower have been adopted as per prevailing norms of Coal India Ltd.

Prepared by me

  
 (V. S. Rama)

Prepared as per norms as approved via 22(1) of  
 Ministry of Coal, Govt. of India, New Delhi

Prepared by me  
 V. S. Rama  
 JUNIOR SECRETARY  
 MINISTRY OF COAL  
 GOVT. OF INDIA  
 NEW DELHI

## Final Mining Plan—Talaipalli Opencast and Underground Coal Project, NTPC Limited

While estimating the manpower, following activities are proposed to be outsourced.

- 1) Security: - Entire security manpower is required to be arranged by outsourcing except skeleton manpower for supervision.
- 2) Welfare Facilities like Canteen, Transport requirement, civil repair & maintenance are proposed to be outsourced. Hence only skeleton supervision manpower is provided for this purpose.
- 3) Light Vehicles :- Drivers are provided for Senior Executives.

Detailed Manpower for opencast is Summarized below: -

Sl No	Designation	Upto 5th year	During life of mine
I	OPERATION		
	COAL	354	354
	OVERBURDEN REMOVAL	962	1166
	COMMON	182	182
	Sub-total (I)	1518	1732
II	MAINTENANCE	707	707
III	COAL HANDLING PLANT	84	84
IV	COMMON SERVICES		
	EXCV. SUPERVISION	85	85
	E&M SUPERVISOR	26	26
	E&M MAINT., QUARRY, W/SHOP, COLONY	138	128
	PUMPING OPERATIONS	16	16
	PLANNING OFFICE	8	8
	TRANSPORT	78	78
	MINING, SAFETY, DESPATCHES & QUALITY CONTROL	77	77
	TRAINING CENTRE	10	10
	GM OFFICE	26	26
	FINANCE & ACCOUNTS	18	18
	WATCH & WARD	4	4
	PERSONNEL & WELFARE	16	16
	STORES	30	30
	CIVIL & TOWN ADMN.	25	25
	MEDICAL & SANITATION	26	26
	WATER SUPPLY	16	16
	SURVEY	19	19
	COMMUNICATION	18	18
	TOTAL (COMMON)	646	646
V	MANPOWER FOR ENVIRONMENT	10	10
	Grand Total	2985	3139

Total manpower for opencast has been estimated as 3139. Total tentative manpower up to 5<sup>th</sup> year is only 2945.

Underground mine operation will start after 20 years of commencement of opencast mine.

For underground mine, manpower deployed for district is presented in table below:-

Category-wise District Manpower

Sl.No.	Designation	No./shift
A.	<b>Non-Executives</b>	
1	Continuous miner operator	1
2	Shuttle car operator	3
3	CM cable handler	1
4	LHD operator	1
5	Shuttle car cable handler/general helper	2
6	Feeder breaker attendant	1
7	Roof bolter operator	1
8	Roof bolter helper	1
9	Scoop operator	1
10	Conveyor cleaning mazdoor	1
11	MBLS operator	1
12	Timber mistry	2
13	Timber helper	4
14	Dresser	1
15	Mechanical fitter	2
16	Mechanical helper	2
17	Electrical fitter	2
18	Electrical helper	2
19	Foreman	1
20	Electrical supervisor	1
21	Overman	Prepared by site 1
22	Mining sirdar	1
23	Pump Khalasi	1

(B 15/2006)

## Final Mining Plan—Talaipalli Opencast and Underground Coal Project, NTPC Limited

24	Auxiliary fan attendant	1
25	Spraying/dusting mazdoor	2
	<b>Sub-total :</b>	<b>38</b>
<b>B</b>	<b>Executives</b>	
1	Assistant Manager (1 <sup>st</sup> class)	1
2	Under Manager	1
3	Executive Engineer	1
4	Engineer E&M	1
	<b>Sub-total (B) :</b>	<b>4</b>
	<b>Total district manpower</b>	<b>42</b>

Total Manpower for underground mine operation has been assessed at 434 as detailed hereafter:-

## (A) Underground

(i)	Mine Operations	90
(ii)	Gate Transport	20
(iii)	Trunk Transport	15
(iv)	Production Services	64
(v)	Ventilation & Safety	25
(vi)	Surveying	10
(vii)	Drifting, Supervisor & Executives	50
<b>Sub Total – Underground</b>		<b>274</b>

## (B) Surface

(i)	Production Services	40
(ii)	Coal Handling	35
(iii)	Workshop	15
(iv)	Stores	08
(v)	Security	17
(vi)	Office/Medical/Welfare	28
(vii)	Environment & Ecology	07
<b>Sub Total – Surface</b>		<b>160</b>
<b>Total</b>		<b>434</b>

Prepared by: S. RANJAN  
 Joint Secretary  
 Ministry of Coal  
 Government of India  
 New Delhi

Participating Person as approved vide 22(1) of  
 Ministry of Coal, Government of India

ROP No. 34011/(39)/2006-CPAM dated 26.6.06, Advance Cost Management & Marketing Pvt. Ltd.



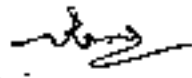
## 16.2 PRODUCTIVITY - OPENCAST

At the prevailing norms of Leave & Sick in CIL, the man shift have been calculated and at rated output of 18MTY the Output per Man Shift (O.M.S) for opencast mine has also been worked out and is given below -

a) Man-Power	=	3139
b) Annual man shifts	=	Manpower x No. of working days per year.
	=	3139 x 264
	=	828696
c) Annual Production		18 Million Tonnes
d) Output/Man shift (OMS) =		$\frac{\text{Annual Production in Million Tonnes}}{\text{Annual Man shifts}}$
	=	$\frac{18 \times 10^6}{828696}$
	=	21.72

## 16.3 PRODUCTIVITY - UNDERGROUND

At the prevailing norms of Leave & Sick in CIL, the man shift have been calculated and productivity at 100% rated capacity is assessed at about 6.99 tonnes per man shift.

  
 श्री. एन. संपन्न S. RAJAN  
 ज्येष्ठ सचिव/UNDER SECRETARY  
 कोयला विभाग/MINISTRY OF COAL  
 भारत सरकार/GOVT. OF INDIA  
 नई दिल्ली/NEW DELHI

Prepared by Mr.

(B. S. Rao)

Checked &amp; Issued as approved by 22/01/06

RQP No. 34011/(33)/2006-CPAM dated 26.6.06 Advance Coal Management &amp; Marketing Pvt. Ltd.

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## CHAPTER-XVII


## PROGRESSIVE MINE CLOSURE PLAN

## 17.1 INTRODUCTION

The progressive mine closure plan has been prepared for NTPC Ltd., who may be contacted for any information etc. at the address given below:

Name of Lease: Talaipalli Coal Block of Mand Raigarh Coalfield in Raigarh District (Chhattisgarh).

Regd office : NTPC Ltd.  
 (Erstwhile National Thermal Power Corporation Ltd)  
 (Govt of India Enterprises)  
 NTPC Bhawan  
 Scope Complex, 7, Institutional Area  
 Lodhi Road,  
 New Delhi-110003  
 Tel No- 0120-2410333-42/2410116-20  
 (Engineering Office Complex, Plot No-A-8A, Sector24, NOIDA (UP.))  
 Fax No- 0120-2410136/37

  
 श्री. ए.स. राणा/V. S. RANA  
 अवर सचिव/DEPUTY SECRETARY  
 राष्ट्रीय कोयला बोर्ड/NATIONAL BOARD OF COAL  
 भारत सरकार/GOVT. OF INDIA  
 नई दिल्ली/NEW DELHI

Extent of Lease Area : 2113 Ha

Land Use - Pre-mining

Break up of leasehold area in Ha is as follows :

Private Land	-	1200.813
Govt. Land	-	202.770
Forest and Notified	-	225.54
Forest Land J/J	-	483.77

Total - 2113.00

Prepared by me

PQP No. 34011/(39)/2006-CPAM dated 2E.8.06, Advance Management & Marketing Pvt. Ltd.  
 (B. Naga)  
 Person as approved vide 22(C) of  
 Mines Act, 1952. P. 105, 4000, 1112-1113  
 2006-07. 1112-1113  
 1112-1113

**Type of Lease Area**

- The topography of Talaipalli block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolge Pahar in the north, Siltot Pahar (580m) in the south, Palma Block in east and Chimpatapani Block in the west.
- The general ground level elevation of the area varies between 280 m and 340m above MSL. The minimum ground level is 277.48m near Kelo river and maximum ground elevation is 335.34m.
- Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system.
- The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area.

**Post Opencast Mining Land Status**

After opencast mining is completed, area of internal dump will be 1767 Ha, void 230.96Ha, area left in barrier will be 95.04 Ha.

**Reasons for Closure**

The plan is progressive mine closure plan, the reason for progressive closure of opencast mining operations is exhaustion of mineable opencast reserves.

After opencast and underground mining is completed, final mine closure plan will be submitted in future, after approval of the Board to relate to final stoppage of all mining operations in the block.

**Statutory Obligation:** There has been no mining in the lease area so far. Therefore, no statutory obligation is applicable as yet.

श्री. एस. राम S. RANA  
 UNDER SECRETARY  
 DEPARTMENT OF COAL

**Name & Address of the RQP who has prepared this plan**

Shri B.S.Nag, RQP No. 34011/(39)2006-CPAM  
 ACMM,511/1/2 Rajokri, New Delhi-110 038

RQP No. 34011/(39)2006-CPAM dated 25.6.06, Advance Coal Management & Marketing Pvt. Ltd.

Approved by the Board of Directors  
 on 14.07.06

## 17.2 MINE DESCRIPTION

The details of Geology are given in Chapter 4 of this document. However, a brief of the same is also given below.

### GEOLOGICAL STRUCTURE OF THE BLOCK

The Talaipalli block is mostly covered with soil, hence the structural interpretation is mainly based on the sub-surface data obtained during the course of exploratory drilling.

The general strike of the beds is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4° to 8° towards south-west.

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which two faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. Barren Measure Formation is preserved in a limited area in the north-western part of the block. Remaining area is structurally free except two relatively minor faults. All the faults a Talaipalli block have interpreted mostly on intersection in boreholes except F11-F11 and F12-F12 faults, and interpreted on level difference in floor contour plans. Minor slippages at many places cannot be ruled which is reflected in the floor plans.

SECRETARY  
GOVERNMENT OF COAL  
GOVT. OF INDIA  
DELHI

Prepared by M/S

12.5.2011

RQP No. 34011/(39)2006-CPAM dated 26.6.05, Advance Coal Management & Marketing Plan (2010) of

12.5.2011

## Sequence of Coal Seams and Partings in Talaipalli Block

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.00	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.95			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.85	23.45	15.0-21.0
13	V Top	0.50	3.08			0.50-1.50
	Parting			9.09	18.94	11.5-18.5

## Final Mining Plan--Talsipalli Opencast and Underground Coal Project, NTPC Limited

		Minimum	Maximum	Minimum	Maximum	
14	V Middle	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bottom	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.45	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Middle	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bottom	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.12	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.56	5.97			2.0-5.5
	Parting			31.1	55.93	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.66			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.58	3.0-14.0
25	II	0.13	5.92			0.50-2.50
	Parting			0.37	3.98	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting					Around 35.0 m
27	I	0.22	0.55			

Prepared by me



RGP No. 34011/(39)/2006-CPAM dated 26.6.06, Advance Coal Management &amp; Marketing Pvt. Ltd.

Prepared by me as approved by the  
 Director, Coal Management & Marketing Pvt. Ltd.  
 Ministry of Coal, Government of India  
 New Delhi

### 17.3 METHOD OF MINING

Mechanized opencast of the top seams XLA seam to III seam and mechanized underground for ILL3 to IIL seams. Opencast coal mining has been proposed up to the basal seam III for a total reserve of 1323.45 MT and the remaining 77.13 MT has been proposed as reserve of the Underground mine. Since opencast mining ensures much higher percentage of extraction of coal reserves, the proposed strategy is better from the point of view of coal conservation. The Opencast Mine will have maximum depth of 404m.

Talaipalli coal mine-cum Lara Power Station 4000 MW is a composite project of NTPC. The Mine has to meet total coal requirement of this power station working on very high PLF. Accordingly annual target production for the designed Mine comes to 18MTPA, which will be achieved in the Opencast Mine in the 5<sup>th</sup> year of coal production. Including build up period and tapering of production in the penultimate years, the Opencast Mine has a life of 52 years of coal production. Thus this proposed Mine will be able to meet total coal requirement of Lara Power Station of NTPC for nearly 50 years, including the build-up period of the Coal and Power Project.

The total O.C mineable coal reserves have been estimated as 843.68 Mt at the corresponding OBR of 3777.07 Mm<sup>3</sup> at an average SR of 4.48 m<sup>3</sup>/b, RANK

UNDER SECRETARY  
MINISTRY OF COAL  
GOVT. OF INDIA  
DELHI

After 20 years, shaft sinking for underground mine will commence. It will be serviced by two vertical shafts. The coal production target is planned at

0.72 MTPA at 100% capacity and 0.60 MT at 85% capacity from the Underground Mine. Expected life of the mine will be 30 years including construction period of 4 years. II Seam, which will be the main seam for





## 17.5 CLOSURE PLAN

**Mined out land**

The lease is being freshly allotted. The area has never been mined.

**Air Quality Management**

Dust suppression measures will be effective. Plantation over the dump, along diverted highway and on slopes of the embankment, around the area for surface infrastructure and the Incline top area will mitigate air pollution.

**Water Quality Management**

1. **Surface Water Resources:** The source of the surface water is mainly River, Nalas and ponds. The drainage of the study area is of sub-dendritic type and well developed. The predominant part of the study area is occupied by the structural hills & pediment, and hence first and second order drainage is predominant and mostly concentrated in the northern & southern part of the study area. The majority of streams are flowing in eastern and south easterly direction.

The major source of surface water in the study area is Kelo River, Pajhar Nadi and its tributaries. Beside river and nala, the other major source of surface water are ponds.

*[Handwritten Signature]*  
 Mr. C. S. RANA  
 Joint Secretary  
 Ministry of Coal

2. **Ground Water Sources:** The ground water in sedimentary formation occurs under confined conditions and is limited to the thickness of the formation. The Bāren Measure and Barakar formation act as a good aquifer due to high porosity and permeability in the formation. The northern and south central part of the study area is comprises of hills, pediment and undulating topography, the water level is at great depth

as compared to the pediplain areas. The exploration block that lies in the low-lying area.

Most of the northern part and south, south eastern part of the study area forms a run off area for rain water.

The water tables in the plain areas i.e. the south & eastern part of the study area varies from 8m. to 10 m. and in valley-fills areas the water table is at shallow depth and it varies from 5m - 8m. The ground water recharge in these areas is very high. The major source of drinking water is dug well and hand pump which is available in almost all the villages in the study area.

### 3. Ground Water Quality

The ground water becomes the main source of drinking water in the rural areas. The government agencies like PHE (Public Health Engineer) department engaged in installation of Hand pump for drinking water in rural areas. Almost all the villages in the study area is having hand pump as a source of drinking water facility.

The water table in the central part of the study area i.e. the NA exploration block varies from 2.0 m to 35.0 m. Where as in the entire study area in general the water level in pediplain area varies from 5 to 15m. In the northwestern part of the exploration block, in some of the borehole artesian condition has also observed. The ground water recharge in the area is very high.

Prepared by me  
R.G.

The major source of drinking water are dug well and hand pump, which is available in almost all the villages of the study area.

The ground water quality in the study area is of acceptable quality for drinking purpose. The fluoride content in water is almost absent in irrespective of their sources i.e. surface as well as in ground water. Beside this the other minerals like iron, calcium & magnesium are also within the permissible limit & safe for drinking purpose.

As per the data collected from water testing laboratory (PHED) Raigarh, the quality parameter of the ground water (tube well & hand pump), shows variation in parameters like pH ranges from 4.0 to 7.50, chloride ranges from 150 - 1400 mg/l, total hardness (as CaCO<sub>3</sub>) ranges from 50 to 160 mg/l, calcium as Ca 24 to 120 mg/l, magnesium (as mg) 12 to 146 mg/l, and Iron (as Fe) 0.1 to 1.0 mg/l.

#### 4. Actions Proposed

Garland drains around the quarry with settling tanks will arrest suspended solid matter. Effluents from the workshop, CHP will be collected and treated before discharge.

#### Waste Management

The first guiding principle of designing dump planning has been followed as minimum degradation of existing land asset due to mining operation and accordingly no OB waste is going to be placed in external dump outside the coal block area of 2113 Ha, allocated to NTPC. In the initial years, when sufficient void to the floor of the basal seam III is not created, the OB spoil generated will be temporarily accommodated within the block area to the dip side of the working

*Wans*  
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 भारत सरकार/GOVT. OF INDIA

Prepared by the  
 (P. B. Singh)  
 Record of the  
 Coal Management & Marketing Pvt. Ltd.  
 47-10

area and then re-handled back in the void to the floor of the basal seam as internal dump with additional cost to be incurred by NTPC.

The second guiding principle is slope stability of the Dump. Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 60m is above quarry surface. Each tier of OB dump is of 30m height and berm width has been increased to 40m, with the result that the ultimate dump slope is 21.5 degrees only along the slope line connecting mine floor to the crest of the dump, as opposed to the maximum permissible angle of 27 degrees. This feature has increased overall stability of the dump at its final stage.

Thirdly, in pre-mining stage itself, deep garland drain around Northwest and North will be created with continuous slope to Kelo river to arrest any water from those sides. A wharf wall of 2m height and 1 m wide will be erected along the periphery of the bottom tier at surface level and the slopes and the berms will be vegetated, Gullies will be provided to guide water from higher tier to lower and so on.

Total spoil of 3777.07 million cum, which will be generated due to opencast mining, will be placed within the mine boundary during the life of the Opencast Mine. This includes 264.52 million cum of OB, which has been planned to be kept within the mine as temporary external dump, which will be re-handled as internal dump in the mine. Rehandling will commence in the 9<sup>th</sup> year and will end in the 20<sup>th</sup> year, beyond which dumping will be only one-stage internal dumping.

The area of the final void of excavation at the floor level is 0.17 sq km and at surface level 7.45 sq km.

### Topsoil Management

Topsoil is about 6m deep, which will be separately stacked and judiciously reclaimed as the final layer over the embankment and the backfill after it has attained final contour. This will be an ongoing process, repetitive in character.

Top soil is proposed to be removed separately and dumped outside the quarry in a manner so as not to lose its fertility. The top soil would be spread over the reclaimed land, afterward.


Top soil will be stored for initial nine years and during subsequent years it will be directly spread over the reclaimed area. It has been envisaged on coal bearing area due to non availability of land.

Top soil details:

1. Quantity : 25.32 Mcum
2. Height of Top soil : 10 meters.
3. Year of reclamation : after 10th year of mine operation.

Top soil quantities generated for first 5 years of mine operation are as follows:-

Sl.No.	Year of mine operation	Top soil (Mcum)
1	1 <sup>st</sup>	0.50
2	2 <sup>nd</sup>	0.97
3	3 <sup>rd</sup>	1.43
4	4 <sup>th</sup>	2.01
5	5 <sup>th</sup>	2.54

  
 वी. एस. राणा / V. S. RANA  
 अवर सचिव / UNDER SECRETARY  
 कोयला विभाग / MINISTRY OF COAL  
 भारत सरकार / GOVT. OF INDIA  
 नई दिल्ली / NEW DELHI

During reclamation, following machinery will be utilized exclusively for reclamation, in addition to part of the fleet of HEMM, which may be used for re-profiling the lower benches of spoil by pushing such benches in the ultimate void to reduce its capacity and depth. NTPC

agrees to abide by any subsequent change in statute regarding reclamation of overburden dumps, during the intervening period between approval of this document and before final closure of opencast mine.

Reclamation Machinery	No.
Grader (280 hp)	2
Dozer (410 hp)	2
Water sprinkler (28kl)	2
Farm Truck	2

#### Tailing Dam Management

There will be no washery and hence no plan is envisaged for reject disposal or ash filling from FBC plant.

#### Infrastructure

All structural and P&M will be removed for gainful use. Civil structures like office etc may be handed over to the State Government on closure of the mine.

#### Disposal of Mining Machinery

Nearly all mining machinery will be moved to other units of NTPC Ltd.. Only the scrap and non-usable machines will be auctioned.

#### Safety and Security

Security personnel will protect plantation and mine fittings. Annual contracts will be given for cleaning the garland drains prior to and during rainy season for first ten years after stoppage of opencast operation, when underground mining will be continued, so as to give

वी. एल. सहाय, S. RAJGA  
 ज्येष्ठ सचिव UNDER SECRETARY  
 कोयला विभाग MINISTRY OF COAL  
 भारत सरकार GOVT. OF INDIA  
 नई दिल्ली NEW DELHI



### 17.7 TIME SCHEDULE OF ABANDONMENT

A tentative time schedule for abandonment is depicted in the barchart.

Abandonment Time Frame (Quarters)							
	1	2	3	4	5	6	7
Disposal of P&M							
Rehabilitation of worker							
Reclamation of quarry area							
Reclamation of dump area							
Top Soil Management							
Tailing Dump Management	Not required						
Disposal of office	Not required						

### 17.8 ABANDONMENT COST

As this is a PMCP, only tentative cost estimate has been done for the mine closure on approximate basis. The exact amount will depend on the price index during the actual time of mine closure.

Detailed Mine Closure Plan will be prepared 5 years prior to the actual closure of the quarries/underground mine.

Abandonment Cost of Opencast Mine	
Heads	Rs. Lacs
Disposal of P&M including mobile machinery	510
Rehabilitation of workers (to be transferred and absorbed in other projects)	Nil
Reclamation of Quarry	5050
Afforestation of dump area	1350
Tailing Dam Management	Nil
Top Soil Management	930
Disposal of Office & other buildings	Nil
<b>Total</b>	<b>Rs. 7940 Lacs</b>



In the Escrow Account to be opened by NTPC Ltd against Mine Closure, in the first 25 years an amount of Rs 12678 Lacs computed for 2113 Ha of land for opencast mining at the rate of Rs. 6 Lacs per ha will be deposited by NTPC Ltd in a designated Bank.

During last five years of mine operations, NTPC will withdraw through Coal Controller an amount equal to 7940 Lacs in five equal installments towards the abandonment cost of the Opencast Mine.

Remaining amount in the Escrow account with interest will be utilized as Final abandonment cost on closure of the Underground Mine after approval of the Final Plan by the Board of the Company.

#### 17.9 CERTIFICATE

The said closure plan complies with all statutory rules, regulations, orders made by central and state Government, statutory organization etc. All measures proposed in this Mine will be implemented in a time bound measure as proposed.

#### 17.10 RELEVANT PLANS & SECTIONS

The following plans have relevance for the progressive closure plan of the mine and also form part of the drawings for the mining plan (Vol. II).

Geological Plan  
Ultimate Pit Opencast Plan  
Underground Plan  
Final stage Dump Plan  
Mine Closure Plan  
Mine Closure Section

Proposed by

(M. S. Rana)

श्री. एच. राणा / M. S. RANA  
अवर सचिव / UNDER SECRETARY  
कोयला विभाग / MINISTRY OF COAL  
भारत सरकार / GOVT. OF INDIA  
नई दिल्ली / NEW DELHI

# ANNEXURES

No. 13056/25/2003-CA-I  
Government of India  
Ministry of Coal

New Delhi, dated the 25<sup>th</sup> January, 2008.

To

The Chairman/Managing Director,  
National Thermal Power Corporation Limited,  
NTPC Bhawan,  
SCOPE Complex, Lodhi Road,  
New Delhi - 110 003.

Subject: Allocation of Talaspalli coal block to M/s. National Thermal Power Corporation Ltd. (NTPC) for meeting coal requirement for the 4000 MW of Power Generation capacity as part of Large Integrated coal mine-cum-power project.

Sr.

I am directed to refer to your letter No. 01/FWC/Coal Mining/006-623 dated 01.05.2005 on the subject mentioned above and to convey the 'in principle' consent of the Government of India for allocation of Talaspalli coal block in the State of Chhattisgarh under the revised coal mining policy as decided by the Central Government vide letter No. 36023/2/97-CA dated 12.12.2001 subject to the following conditions:-

- i) Coal mining shall be carried out by NTPC, or a separate company to be created with NTPC participation provided such separate company is a Government company with coal mining as object in its Memorandum of Association, as provided under Section 3(S)(a)(i) of the Coal Mines (Nationalisation) Act, 1973 which allows mining by a Government Company.
- ii) Coal linkages from CIL/SOCL would not be disturbed in any way with coal mined from Talaspalli coal block. In case there already exist linkages from the above sources, NTPC shall continue to honour its commitment towards long-term linkage from these nationalized coal companies.
- iii) All coal mined from the block, including any middlings or washings if washing is resorted to, shall be used in NTPC power plants. No coal will be disposed off in any other manner, without the prior permission, in writing, of the Ministry of Coal.

V. S. RANA  
SECRETARY  
MINISTRY OF COAL  
GOVT. OF INDIA  
NEW DELHI

Proposed by

(V S RANA)

For the Secretary to Government of India

1/

- iv) The Company will do coal-mining in accordance with the provisions of the Coal Mines (Nationalisation) Act, 1973, the Mines and Minerals (Development & Regulation) Act, 1957, the Contract Labour (Regulation & Abolition) Act, 1970, and all the mineral, environmental and labour laws and other regulations governing coal industry.
- v) NTPC would plan for mining in Talaipalli coal block as per the approved mining plan so as to extract the reserves to the maximum extent possible.
- vi) The mining lease will be executed in the name of NTPC or such separate Government company which may be formed with equity participation of NTPC.
- vii) The power projects (3000 MW) based on coal from this block shall commence generation latest by the end of the 11<sup>th</sup> Five Year Plan. The end use project schedule and the coal mine development schedule should be submitted to this Ministry within 3 months from the date of this letter. Time frame for achieving major milestones related to coal mining is enclosed for guidance and adherence.
- viii) Violation of any of the conditions imposed above on the part of NTPC or such separate Government Company in mining and disposing of coal from the Talaipalli coal block will render the mining lease liable for cancellation.


2. The company may approach CIL, CMPDIL for geological report of the block on payment of necessary exploration cost to work the block as per the provisions of MM (D&R) Act, 1957 and contact the State Government authorities concerned for completing the necessary formalities for attaining mining lease rights and related matters. The arrangement of transport of coal, if any, etc. will have to be worked out by the company in consultation with the Ministry of Railways/ Ministry of Surface Transport depending on the mode of transport.

Yours faithfully,

  
(V.S. Rana)

Under Secretary to the Govt. of India.

Encls. As above.

  
वी. एस. राजा / V. S. RANA  
अवर सचिव / UNDER SECRETARY  
कोयला विभाग / MINISTRY OF COAL  
भारत सरकार / GOVT. OF INDIA  
नई दिल्ली / NEW DELHI

Prepared by -




(S. S. Rana)

Received by -  
Date -  
Signature -  
Designation -

2

EVENT	TIME LIMIT in months from 'V' date
1 Allocation	0
2 Purchase of GR	1.5
3 Bank Guarantee	3
4 Mining Lease Application	3
5 Mining Plan submission	5
6 Mining Plan approval	8
7 Previous approval application	11
8 Previous approval	11
9 Forest Clearance application	12
10 Forest Clearance	18
11 Environment Clearance Application	12
12 Environment Clearance	18
13 Mining Lease grant	24
14 Land acquisition begin	9, 19
15 Land Acquisition	30, 36
16 Opening permission application	34, 40 for OC 46, 52 for UG
17 Opening permission grant	35, 41 for OC 47, 53 for UG
18 Production	36, 42 for OC 48, 54 for UG

  
 वी. एस. राना V. S. RANA  
 जूनियर सचिव JUNIOR SECRETARY  
 कोयला विभाग MINISTRY OF COAL  
 भारत सरकार GOVT. OF INDIA  
 नई दिल्ली NEW DELHI

Prepared by Mr

3

  
 (13/5/2016)

Prepared by Mr. S. S. Rana at New Delhi on 13/5/2016.

Mr. S. S. Rana, Junior Secretary, Ministry of Coal, New Delhi.

Mr. S. S. Rana, Junior Secretary, Ministry of Coal, New Delhi.

Mr. S. S. Rana, Junior Secretary, Ministry of Coal, New Delhi.

Keelung Rated Capacity

श्री. एच. राणा/V. S. RANA  
जूनियर सचिव/HIGHER SECRETARY  
कोयला मंत्रालय/INDUSTRY OF COAL  
भारत शासन(GOVT. OF INDIA)  
नई दिल्ली/NEW DELHI

<http://coal.nic.in/emissions.htm>

1/4/2006

Prepared by: 4 3

*V.S. Rana*  
(V. S. Rana)

Received at Petrols and Lubricants Division  
Ministry of Coal, Government of India  
New Delhi

CERTIFICATE TOWARDS COST OF GEOLOGICAL REPORT

I have verified that :-

- (1) Client has submitted, copy of letter NO. 11-C/CW/TCS/COMACT(P)/2006 dated 24-02-2008 from DDE (Coal wing), GSI, Kolkata to Sr. Manager (CM), NTPC regarding receipt of Rs. 3,95,776/- (Rupees Three Lakh Ninety Six Thousand Seven Hundred Seventy Six only) as cost for regional drilling.
- (2) NTPC Limited have got detailed exploration carried out by MECL at their cost. MECL has submitted to NTPC in September 2006, the document titled 'Geological Report on Detailed Exploration for coal - Talaspali Coal Block (On Behalf Of NTPC Limited), Mandiraigarh Coalfield'.




B.S. Negi

Recognized Qualified Person

RQP No. 34011/(39)/2006/CPAM dated : 26/8/06

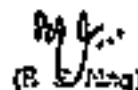
Place : NOIDA

Date : 5-11-2008



श्री. सुख-सुभाष. S. IRANA  
 ज्येष्ठ सचिव/SECTY  
 कोयला विभाग/INDUSTY OF COAL  
 भारत सरकार/GOVT. OF INDIA  
 नई दिल्ली/NEW DELHI

Prepared by :-



(B. S. Negi)

Prepared by :-  
 Approved by :-  
 Approved by :-  
 Approved by :-

## GOVERNMENT OF INDIA



Telegram : GEOSURVEY  
 Telephone : 23310641  
 23345921/23218794 /  
 23246476 - Extn-229  
 Fax : 031-2331 8447 /  
 2334 2362

No. 11-CC/WTC/CONTRACT/7/2006

Date: 24.02.2006

FROM  
 THE DY. DIRECTOR GENERAL  
 COAL WING  
 GEOLOGICAL SURVEY OF INDIA  
 BHUBANESWAR, BLOCK-DK-4  
 SECTOR-2, SALT LAKE CITY  
 KOLKATA - 700 081

TO  
 SENIOR MANAGER (DM)  
 NTPC LTD.  
 A-11, 1<sup>ST</sup> FLOOR, F WING,  
 MET. FREEMAN, SECTOR-24  
 NOIDA-201325  
 Fax: (056) 2412772

Sub: Purchase of Geological Report of the blocks allotted to NTPC.  
 Ref: Your letter No. NPL, dated 15.02.06

Sir,

This is to acknowledge you with thanks the receipt of the Demand Draft issued in favour of Dy. Director General, Coal Wing (Draft No. 029751 dt. 14.02.06 for Rs. 8,94,106.00/-) of the following four reports on coal exploration.

Sr.No.	Name of Block	Cost of Work Report (Rs.)	Total (Rs.)
01	Talipalli	1,95,776.00	
02	Chikra Paternal	59,770.00	
03	Brahmani	3,88,460.00	8,94,106.00
04	Brahmani south ext	49,100.00	

The above mentioned reports are handed over to you with this acknowledgment and will be received.

Yours faithfully,

(L. Mitra)

Director, TCS Division  
 Dy. Director General,  
 Coal Wing, G.S.I.

File No. \_\_\_\_\_

By \_\_\_\_\_

Date: \_\_\_\_\_

6



AREA OF TALAPALLI COAL BLOCK

The allocation letter from M.D.C. does not specify the area of Talapalli Coal Block. However, MECL have submitted to NTPC letter No. MECL/EXPL/FIL/8-07/TALAPALLI/NTPC/09/2078 dated 03.09.2009 (copy of letter forms Annexure A3.1) indicated area of Talapalli Coal Block as 21.13 Sq. Km.

Client (NTPC) has advised us that the same should be considered as area of the coal block for Mining Plan formulation. Accordingly, the mining plan has recorded the area as 2113 Hectares.


  
B.S. Nag

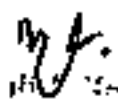
Recognized Qualified Person

RQP No. 34011/(39)2006/CPAM dated : 28/6/06

Place : NOIDA

Date : 5-11-2009

  
श्री. एच. राम V. S. RANA  
अवर सचिव/DEPUTY SECRETARY  
मंत्रालय/MINISTRY OF COAL  
सरकार, भारत/GOVT. OF INDIA  
नई दिल्ली/NEW DELHI

<p>Page No. 7</p> <p></p> <p>11-11-2009</p> <p>11-11-2009</p>
--

खनन विभाग  
Exploration Division



खनन खोजन निगम लिमिटेड  
(एक सार्वजनिक निगम)  
Mineral Exploration Corporation Limited  
(A Government of India Enterprise)

संयुक्त कक्षाओं में

ISO 9001:2008 COMPANY

Regd. Office: Dr. Bhaia Babu Anandkar Bhavan, Sector 7/10, Nagpur-440 006  
Telephone: 0713-2511824, 2512214, 2512200 FAX: 0713-2510948, 2510130  
E-mail: mecl, mep@mecl.com.nic.in Web Site: www.mecl.gov.in

No. MECL/EXPL/FILEG-01/Talsipalli/NTPC/2009/2074 - DATE: 03.09.2009

To  
Shri A.B. Bhatnagar,  
AGM (C.M.) NTPC Ltd.,  
Coal Mining Division, West Wing,  
1<sup>st</sup> Floor, PDU Bhawan, A-14, Sector-1,  
Noida-201301 (U.P.)  
FAX NO. 0120-2474091 / 2474096

Sub. Area of Talsipalli Coal Block.

Date: 03/09/09

With reference to NTPC letter No. NTPC / CM&CW / CC / Expt / 2009  
dttd. 02.09.2009 from Shri D.K. Mishra, Sr. Manager (Ecology), NTPC,  
it is confirmed that the area of Talsipalli Coal Block is 21.15 sq.km.

Thanking you,

Yours faithfully,

(Y.K.S. VISEN)  
HOD (EXPLORATION)

श्री. एच. विसन, डी. आर. ऑ.  
खनन खोजन निगम लिमिटेड  
खनन विभाग (पश्चिम) के डी. आर. ऑ.  
एन. टी. पी. सी. भवन, ए-14, सेक्टर-1,  
नोएडा, उत्तर प्रदेश

Personnel Person is advised on 03/09/09  
Mineral Exploration Division

By Registered Post

No. 34011/(30)/2006-CPAM  
 Government of India  
 Ministry of Coal  
 Shastri Bhawan

New Delhi, the 26<sup>th</sup> June, 2006

To	Bakhtawar Singh Nag, EC-106, Maya Enclave, New Delhi - 110 084
----	--

Subject	Grant of recognition to Bakhtawar Singh Nag, as competent person to prepare Mining Plan for Coal/Lignite block.
---------	---

Sir,

I am directed to refer to your letter dated 30.5.2006 on the above mentioned subject and to convey approval of the Central Government to the grant of recognition under Rule 22 (c) of Mineral Concession Rule, 1980 in your favour as competent person to prepare Mining Plan for Coal/Lignite block up to 10 years from the date of issue of this letter.

Your attention is also invited to this Ministry's letter No. 34011/(4)/2004-CPAM dated 26.10.2005 (copy below) for information and compliance.

Yours faithfully

sd/-  
 (Geeta Mishra)  
 Section Officer,  
 Phone No. 23389132

Contents of letter no. 34011(4)/2004-CPAM, dated 26-10-2005. "It has been decided that the additional area beyond the block boundary may be considered in a mining plan subject to condition that proper justification is given in the mining plan and that the additional area is non-coal bearing and does not infringe upon any already allotted or planned coal/lignite block(s)"

Prepared by: ...

sd/-  
 (Sandeep Gupta)  
 Under Secy to the Govt. of India  
 Recognised Person as notified vide 22(C) of M.C.R. 1980  
 Ministry of Coal  
 Shastri Bhawan  
 New Delhi

34

**CERTIFIED REGARDING BLOCK BOUNDARY**

It is to certify that the block boundary as shown in the Mining Plan of "Talpaal Opencast & Underground Coal Project" conforms to the boundary shown on various plates by MECL in the Geological report document of September, 2008




B.S. Negi

Recognized Qualified Person

RQP No. 34011/(39)/2005/CPAM dated : 25/6/05


Place : Noida

Date : 5-11-2008.



श्री. सुरेश चन्द्र  
 जूनियर इंजीनियरिंग  
 कोयला मंत्रालय  
 भारत सरकार GOVT. OF INDIA  
 नई दिल्ली NEW DELHI

Prepared by

  
 (B.S. Negi)

Prepared by B.S. Negi as recognized RQP  
 Admin

10

**CERTIFICATE**

1. Certified that the Provisions of Mineral Conservation and Development Rules, 1996 and Mineral Concession Rules, 1960 have been observed in the preparation of Mining Plan for Talabali Coal Block, which has been allocated to NTPC Limited, NOIDA, and whenever any specific permissions are required, the applicant will approach the concerned authorities.
2. Certified that the provision of the Mines Act, 1952 and Rules & Regulations made there under have been observed in the preparation of this Mining Plan and that wherever specific permission is required, the applicant will approach the Director General of Mines Safety in the matter.
3. Certified that the information furnished in this Mining Plan are true and correct to the best of my knowledge.



E.S. Nag

Recognized Qualified Person

RQP No. 34011/39/2006/CPAM dated: 25/8/08

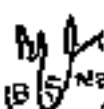
Place : NOIDA

Date : 5-11-2008



श्री. एम. एस. कुमार  
 जूनियर सिक्रेटरी  
 मंत्रालय, भारत सरकार  
 भारत सरकार, नई दिल्ली

From ...

  
 (E.S. Nag)  
 Recognized Person as approved via 29C  
 Mines Act, 1952. 5/11/08

11

**CERTIFICATE REGARDING COAL CONSERVATION**

It is to certify that all coal seams/splits upto Seam-III have been planned for mechanized opencast exploitation within the allocated block after leaving statutory barriers against boundaries and Kela river flowing on the Eastern edge.

High wall mining has been suggested to win part of coal locked in the high walls near the block boundary.

Below ground mining has been suggested in areas and seams/splits where such mining within mechanized mode is possible.



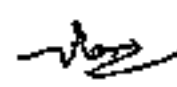
B.S. Nag

Recognized Qualified Person

RQP No. 3401U(39)/2006/CPAM dated: 28/8/06

Place : NOIDA

Date : 5-11-2009



श्री. एस. राजा/V. S. RAO-  
 उपायुक्त सचिव/UNDER SECRETARY  
 कोयला विभाग/INDUSTY OF COAL  
 भारत सरकार/GOVT. OF INDIA  
 नई दिल्ली/NEW DELHI

Page

12

(B.S. Nag)

Received by Person as approved via RQP  
 Name : . . . . .



**CERTIFICATE BY THE APPLICANT**

Certified that the Mining Plan of: Talalpalli Coal Block has been prepared by Shri B.S.Nag, RQP No. 34011/(B9)/2006/CPAM dated 26/06/06 of Advance Coal Management & Marketing Pvt. Ltd. at 511/2/1, Rajokri, New Delhi-110038, in consultation with, knowledge and consent of the Undersigned.

Signature of the Applicant in full



Name in full:  
Designation  
Address:

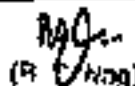
Sunil Junde (Authorized Signatory)  
Additional General Manager (PE-Mech)  
Engineering Office Complex (EOC)NTPC  
2<sup>nd</sup> Floor, A-8A, Sector-24, NOIDA-201301  
(U.P)  
Fax-0120-2410136

Date: 29/01/2010  
Place: NOIDA

सुनील जुन्डे / SUNIL JUNDE  
अधी. जनरल मॅनेजर (पी-मेक)  
अधी. जनरल मॅनेजर (PE-Mech)  
एम्प्लॉयी लीमिटेड / NTPC LIMITED  
A-8A, Sector-24, NOIDA-201301 (U.P)

श्री. एन. राजा/श्री. S. ...  
अधी. सचिव UNDER SECRETARY  
खण्ड मंत्रालय MINISTRY OF COAL  
भारत सरकार GOVT. OF INDIA  
नई दिल्ली NEW DELHI

Prepared

  
(B.S. Nag)

Prepared in presence of witnesses who have  
seen



NoJ-11015/279/2009 - IA.II(M)  
Government of India  
Ministry of Environment & Forests

Paryavaran Bhawan,  
C.G.O. Complex, Lodi Road New  
New Delhi - 110003,  
Dated: 02 January, 2013

To

The General Manager,  
M/s NTPC,  
Engineering complex,  
A-8A, Sector-24,  
NODA - 201301.

Sub: Talaiipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity of a total project area of 2349.35 ha) of M/s NTPC located in villages Talaiipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajiigarh, & Salehpali, Tehsil Gharghoda, district Raigarh, Chhattisgarh - Environmental Clearance - reg.

Sir,

This is with reference to letter No. CC:ESE:7011:2009:GEN: dated 25.09.2009 along with application for Terms of Reference (TOR) for a new Talaiipalli Opencast-cum-Underground Coalmine and this Ministry's letter dated 23.11.2009 granting the TOR and your letter No. CC:ESE:7011:2009:GEN: dated 30.03.2011 for environmental clearance and subsequent letters dated 20.09.2011, 21.10.2011, and 22.02.2012 on the aforesaid subject. The Ministry of Environment & Forests has considered the application. It is noted that the proposal is for opening a new Talaiipalli Opencast-cum-Underground Coalmine project of 18.72 MTPA production capacity in a total project area of 2349.35 ha located in Tehsil Gharghoda in district Raigarh, Chhattisgarh. The mine is captive to the company's Lara Super Thermal Power Project (4000MW) located at a distance of 60km. There are no National Parks, WL Sanctuaries, Biosphere Reserves within the 10 km study area. There are 5 blocks of Reserve Forest (RFs) Silot, Rai, Tolgi East, Tolgi West, Deodongri found within 10 Km radius of study area. A number of endangered species such as elephant, bear and leopard are reported in the study area. The total project area of 2349.35 ha includes ML of an area of 2113 ha and an area of 236.35 ha of land outside the ML which is required for colony, R&R colony and MGR. The MGR route passes through an elephant migratory corridor. Of the total project area, 1320.99 ha is private land, 261.97 ha is Govt. land, 766.393 ha is forestland. Forestry clearance has been obtained vide letter of the FC Division no. 8-18/2012-FC dated 5<sup>th</sup> November, 2012. The break-up of land use for the project is given below:

S.No.	Particular	Private	Govt.	Forest	Total
1	Mine lease area	1200.90	202.00	710.10	2113
2	Colony	6.317	30.25	-	36.567
3	R&R Colony	-	19.22	-	19.22
4	MGR corridor	113.77	10.50	56.293	180.563
	<b>Total</b>	<b>1320.987</b>	<b>261.97</b>	<b>766.393</b>	<b>2349.35</b>

1.2 River Kelo flows 50m along the eastern boundary of the ML and Pajhar nala at 3.5 km. A number of first order/second order streams originate from the ML. Kurra nala is a seasonal nala originating from the northern side of the block and passes through the block and joins River Kelo. It is proposed to divert Kurra nala flowing through the ML into a Channel (diversion canal) which would be constructed along the northern side of the block and ultimately join River Kelo. A detailed Area Drainage Study comprising run off characterization, flood frequency analysis, etc has been carried out. Based on

EC-Talaiipalli

- vi. The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in the public domain. The monitoring data of environmental quality parameters (Air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO2 and NOx, (ambient and stack if any) and critical national parameters shall also be displayed at the entrance of the project premises and main office and in corporate office and on the company's website.
- vii. The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions (both as hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB.
- viii. The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall ensure full cooperation to the officer(s) of the Regional Office by furnishing the requisite data/information/monitoring reports.
- ix. The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MOEF by e-mail.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of the clearance and attract the provisions of the Environment (Protection) Act, 1986.

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

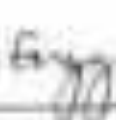
  
(Dr. Manoj Kumar Heker)  
Director

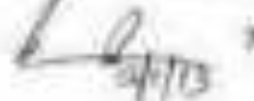
Copy to:

1. Secretary, Ministry of Coal, New Delhi.
2. DG (I) and Special Secretary, Ministry of Environment and Forests, New Delhi.
3. Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur.
4. Principal Chief Conservator of Forests and CWLW, Govt. of Chhattisgarh, Raipur.
5. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Ansa Colony, Bhopal - 462016.
6. Chairman, Chhattisgarh State Environment Conservation Board, 1-Tilak Nagar, Shiv Mandir Chowk, Main Road, Avant Vihar, RAIPUR-Chhattisgarh - 492001.
7. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi-110022.
8. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Connaught Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
9. District Collector, Raipur, Government of Chhattisgarh.
10. Monitoring File 11. Guard File 12. Record File.

  
(Dr. Manoj Kumar Heker)  
Director

11/1/2013

HOD, Env. Engrg :  please

  
3/1/13

F. No. 8-18/2012 - FC  
Government of India  
Ministry of Environment & Forests  
(FC Division)

Paryavaran Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi - 110510  
Date: 05<sup>th</sup> November, 2012

To

The Principal Secretary (Forests),  
Government of Chhattisgarh,  
Raipur.

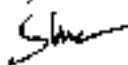
**Sub: Diversion of 766.393 ha of forest land for Talapalli Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raigad and Dharamjaigarh Forest Divisions, Chhattisgarh regarding.**

Sir,

I am directed to refer to the Govt. of Chhattisgarh letter no. F. 5-30/2011/10-2 dated 15<sup>th</sup> March, 2012 on above mentioned subject seeking prior approval of the Central Government under Section-2 of the Forest (Conservation) Act, 1980 and to say that the proposal has been examined by the Forest Advisory Committee constituted by the Central Government under section-3 of the said Act.

After careful examination of the proposal of the State Government and on the basis of the recommendation of the Forest Advisory Committee, the Central Government hereby conveys the 'in-principle' approval for diversion of 766.393 ha of forest land for Talapalli Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raigad and Dharamjaigarh Forest Divisions, Chhattisgarh subject to fulfillment of the following conditions:

- (i) Legal status of the diverted forest land shall remain unchanged;
- (ii) Compensatory afforestation over the degraded forest land double in extent to the forest land being diverted shall be raised and maintained by the State Forest Department at the cost of the User Agency;
- (iii) The land identified for the purpose of CA shall be clearly depicted on a Survey of India topsheet of 1:50,000 scale;
- (iv) The User Agency shall transfer the cost of raising and maintaining the compensatory afforestation, at the current wage rate, to the State Forest Department. The scheme may include appropriate provision for anticipated cost increase for works scheduled for subsequent years;
- (v) The State Government shall charge the Net Present Value (NPV) of the forest land being diverted under this proposal from the User Agency as per the orders of the Hon'ble Supreme Court of India dated 28.03.2008, 24.04.2008 and 09.05.2008 in Writ Petition (Civil) No. 202/1995 and the guidelines issued by this Ministry vide its letter No. 5-3/2007-FC dated 05.02.2009 in this regard;



- (vi) At the time of payment of the Net Present Value (NPV) at the then prevailing rate, the User Agency shall furnish an undertaking to pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;
- (vii) All the funds received from the user agency under the project, except the funds realized for regeneration/ demarcation of safety zone, shall be transferred to Ad-hoc CAMPA in the Saving Bank Account pertaining to the State concerned;
- (viii) The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, or Rules framed there under, subject to a maximum period of 30 years;
- (ix) User agency either himself or through the State Forest Department shall undertake gap planting and soil and moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease;
- (x) The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed.
- (xi) The User Agency either himself or through the State Forest Department shall undertake fencing, protection and afforestation of the safety zone area (7.5 meter strip all along the outer boundary of the mining lease or mining cluster, as applicable, and such other areas as specified in the approved mining plan) at the project cost;
- (xii) The User Agency either himself or through the State Forest Department shall undertake afforestation on degraded forest land, one and half time in extent to the area used for safety zone;
- (xiii) The boundary of safety zone shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;
- (xiv) In case of under-ground mines, areas on surface shall be fenced and afforested from the funds to be provided by the user agency.
- (xv) The user agency shall ensure that at least part of fly ash not used otherwise shall be used for back filling.
- (xvi) The user agency shall have a social welfare department to keep track of socio-economic conditions of all the project affected people.

*Shr*

- (xvii) The user agency shall undertake comprehensive greening in the surrounding villages.
- (xviii) The user Agency shall implement the R & R Plan as per the R & R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work and implementation. The said R & R Plan will be monitored by the State Government/Regional Office of MoEF along with indicators for monitoring and expected observable milestones.
- ✓ (xix) The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
- (xx) Following activities shall be undertaken by the User Agency at the project cost:
- (a) Preparation and implementation of a plan containing appropriate mitigative measures to minimize soil erosion and choking of streams;
  - (b) Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion;
  - (c) Construction of check dams, retention / toe walls along the contour to arrest sliding down of the excavated material;
  - (d) Stabilize the overburden dumps by appropriate grading/beaching so as to ensure that that angles of repose at any given place is less than  $28^{\circ}$ ; and
  - (e) Strict adherence to the prescribed top soil management.
- (xxi) The User Agency shall obtain the Environment Clearance as per the provisions of the Environmental (Protection) Act, 1986, if required;
- (xxii) No labour camp shall be established on the forest land;
- ✓(xxiii) The User Agency shall provide fuels preferably alternate fuels to the labourers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;
- (xxiv) The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;
- (xxv) The layout plan of the proposal shall not be changed without the prior approval of the Central Government;
- (xxvi) The forest land shall not be used for any purpose other than that specified in the proposal;
- (xxvii) The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;
- (xxviii) No damage to the flora and fauna of the adjoining area shall be caused;
- ✓(xxix) Any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;

- ✓ (xxx) The State Government shall complete settlement of rights, in terms of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, if any, on the forest land to be diverted and submit the documentary evidence as prescribed by this Ministry in its letter No. 11-9/1998-FC (pt.) dated 03.08.2009, in support thereof;
- (xxxi) The user agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry regularly;
- (xxxii) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife; and
- (xxxiii) The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

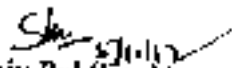
After receipt of the compliance report on fulfillment of the conditions mentioned above, the proposal shall be considered for final approval under Section-2 of the Forest (Conservation) Act, 1980.

Yours faithfully

(Shiv Pal Singh)  
Sr. Assistant Inspector General of forests

Copy for favour of information to:

1. The Principal Chief Conservator of Forest, Govt. of Chhattisgarh, Raipur.
2. The Addl. PCCF (Central), Regional Office Bhopal, MoEF
3. The Nodal Officer (PCA), O/o the PCCF, Govt. of Chhattisgarh, Raipur.
4. The User Agency.
5. Monitoring Cell.
6. Guard File.

  
(Shiv Pal Singh)  
Sr. Assistant Inspector General of forests

F. No. 8 18/2012 - FC  
Government of India  
Ministry of Environment & Forests  
(FC Division)

Paryavaram Bhawan,  
CGO Complex, Lodhi Road,  
New Delhi - 110510  
Date: 28<sup>th</sup> January, 2014  
*[Signature]*

To

The Principal Secretary (Forests),  
Government of Chhattisgarh,  
Raipur.

**Sub: Diversion of 766.393 ha of forest land for Talaijalli Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raigad and Dharamjaigarh Forest Divisions, Chhattisgarh regarding.**

Sir,

I am directed to refer to the Govt. of Chhattisgarh letter no. F. 5-30/2011/10-2 dated 15<sup>th</sup> March, 2012 on above mentioned subject seeking prior approval of the Central Government under Section-2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under section-3 of the said Act, 'in-principle' approval was granted vide this Ministry's letter of even number dated 5.09.2012 subject to fulfillment of certain conditions prescribed therein. The State Government has furnished compliance report in respect of the conditions stipulated in the 'in-principle' approval and has requested the Central Government to grant final approval.

In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government, vide letter no. Bhu-Prabandh/Khanij/331-27/1769 dated 8.10.2013 and 24.12.2013 final approval of the Central Government is hereby granted under section-2 of the Forest (Conservation) Act, 1980 for diversion of 766.393 ha of forest land for Talaijalli Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raigad and Dharamjaigarh Forest Divisions, Chhattisgarh subject to fulfillment of the following conditions:

- (i) Legal status of the diverted forest land shall remain unchanged;
- (ii) Compensatory afforestation over the degraded forest land, twice in extent to the forest land being diverted shall be raised and maintained by the State Forest Department from the funds already realized from the User Agency;
- (iii) The User Agency shall pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India;
- (iv) The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulating) Act, 1957, or Rules framed there under, subject to a maximum period of 30 years.

*[Signature]*

- (v) User agency either himself or through the State Forest Department shall undertake gap planting and soil and moisture conservation activities to restock and rejuvenate the degraded open forests (having crown density less than 0.40), if any, located in the area within 100 m. from outer perimeter of the mining lease;
- (vi) The user agency shall undertake mining in a phased manner after taking due care for reclamation of the mined over area. The concurrent reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year, and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the concurrent reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such reclamation activities are satisfactorily executed.
- (vii) The User Agency either himself or through the State Forest Department shall undertake fencing, protection and afforestation of the safety zone area (7.5 meter strip all along the outer boundary of the mining lease or mining cluster, as applicable, and such other areas as specified in the approved mining plan) in accordance with undertaking given by the user agency;
- (viii) The State Forest Department shall undertake afforestation on degraded forest land, one and half time in extent to the area used for safety zone from the funds already realized from the user agency;
- (ix) The boundary of safety zone shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;
- (x) In case of under-ground mines, areas on surface shall be fenced and afforested from the funds to be provided by the user agency.
- (xi) The user agency shall ensure that at least part of fly ash not used otherwise shall be used for back filling.
- (xii) The user agency shall have a social welfare department to keep track of socio-economic conditions of all the project affected people.
- (xiii) The user agency shall undertake comprehensive greening in the surrounding villages.
- (xiv) The user Agency shall implement the R & R Plan as per the R & R Policy of State Government in consonance with National R&R Policy, Government of India before the commencement of the project work and implementation. The said R & R Plan will be monitored by the State Government/Regional Office of MoF along with indicators for monitoring and expected observable milestones.



- (xv) The user agency shall undertake de-sifting of the village tanks and other water bodies located within five km from the mine lease boundary so as to mitigate the impact of siltation of such tanks/water bodies, whenever required;
- (xvi) Following activities shall be undertaken by the User Agency as per the Plan of Rs. 236.22 lakhs and undertaking submitted by them to implement this Plan:
- (a) Appropriate mitigative measures to minimize soil erosion and choking of streams;
  - (b) Planting of adequate drought hardy plant species and sowing of seeds in the appropriate area within the mining lease to arrest soil erosion;
  - (c) Construction of check dams, retention / toe walls along the contour to arrest sliding down of the excavated material;
  - (d) Stabilize the overburden dumps by appropriate grading/benching so as to ensure that the angles of repose at any given place is less than 28° and
  - (e) Strict adherence to the prescribed top soil management.
- (xvii) No labour camp shall be established on the forest land.
- (xviii) The User Agency shall provide fuels preferably alternate fuels to the laborers and the staff working at the site so as to avoid any damage and pressure on the nearby forest areas;
- (xix) The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project cost, by erecting four feet high reinforced cement concrete pillars, each inscribed with its serial number, forward and back bearing and distance from pillar to pillar;
- (xx) The layout plan of the proposal shall not be changed without the prior approval of the Central Government;
- (xxi) The forest land shall not be used for any purpose other than that specified in the proposal;
- (xxii) The forest land proposed to be diverted shall under no circumstances be transferred to any other agency, department or person without prior approval of the Central Government;
- (xxiii) No damage to the flora and fauna of the adjoining area shall be caused.
- (xxiv) Any tree felling shall be done only when it is unavoidable and that too under strict supervision of the State Forest Department;
- (xxv) The user agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry regularly;

- (xxvi) Any other condition that the concerned Regional Office of this Ministry may stipulate, from time to time, in the interest of conservation, protection and development of forests & wildlife; and
- (xxvii) All other conditions stipulated in the Stage-I approval for which the user agency has submitted undertakings shall be complied with.
- (xxviii) The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Guidelines, for the time being in force, as applicable to the project.

Yours faithfully

(Priya Ranjan)  
Sr. Assistant Inspector General of Forests

Copy for favour of information to:

1. The Principal Chief Conservator of Forest, Govt. of Chhattisgarh, Raipur.
2. The Addl. PCCF (Central), Regional Office Bhopal, MoEF
3. The Nodal Officer (FCA), O/o the PCCF, Govt. of Chhattisgarh, Raipur.
4. The User Agency (NTPC Limited, Talipadi Coal Mining Project, Lailunga Road, Ghughjoda, District Raigarh-496 111, Chhattisgarh).
5. Monitoring Cell.
6. Guard File.

(Priya Ranjan)  
Sr. Assistant Inspector General of Forests



सत्यमेव जयते

## INDIA NON JUDICIAL

Government of National Capital Territory of Delhi

## e-Stamp

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Unique Doc. Reference	:	SUBIN-DL01.83890367558504252492N
Purchased by	:	NTPC LTD
Description of Document	:	Article 5 General Agreement
Property Description	:	Not Applicable
Consideration Price (Rs.)	:	0 (Zero)
First Party	:	NTPC LTD
Second Party	:	Not Applicable
Stamp Duty Paid By	:	NTPC LTD
Stamp Duty Amount(Rs.)	:	500 (Five Hundred only)



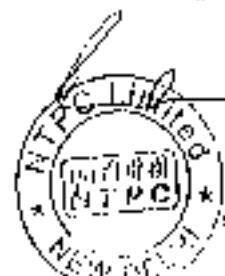
Please write or type below this line.....

**THE ALLOTMENT AGREEMENT BY AND BETWEEN THE PRESIDENT OF INDIA  
AND NTPC LIMITED IN RESPECT OF TALAI PALLI COAL MINE**

This Stamp-paper forms an integral part of this deed of Allotment Agreement.

Page 1 of 56

Vivek Bhargava



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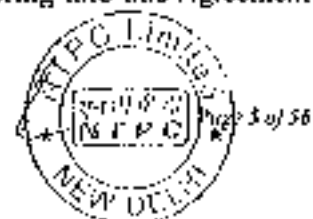
This Allotment Agreement is made by and between following:

**PARTIES:**

- 1 **The President of India**, acting through the Central Government represented by the Nominated Authority appointed under Section 6 of the Coal Mines (Special Provisions) Ordinance, 2014 read with Coal Mines (Special Provisions) Second Ordinance, 2014 (the "Nominated Authority").
- 2 **NTPC Limited** incorporated in India under the Companies Act, 1956 with corporate identity number L40101DL1975GOI007966, whose registered office is at NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi – 110003, India (the "Allottee").

**BACKGROUND:**

- A. The Supreme Court of India through its judgment dated August 25, 2014 read with its order dated September 24, 2014 (collectively the "Supreme Court Judgment") had cancelled allotment of 204 coal blocks.
- B. Subsequent to the Supreme Court Judgment, the Coal Mines (Special Provisions) Ordinance, 2014 read with Coal Mines (Special Provisions) Second Ordinance, 2014 (collectively the "Ordinance") were promulgated and the Coal Mines (Special Provisions) Rules, 2014 (the "Rules") were framed for auction and allotment of all blocks which were subject to cancellation pursuant to the Supreme Court Judgment.
- C. The Coal Mine (as defined in Clause 1.1.18) was included in the list of such 204 coal blocks and accordingly, its allotment to the Prior Allottee (as defined in Clause 1.1.40) was cancelled pursuant to the Supreme Court Judgment, with effect from the 'appointed date' (as defined in the Ordinance).
- D. Thereafter, the Central Government issued an order under Rule 8(2) of the Rules, dated December 18, 2014, as amended, to the Nominated Authority for allotment of the Coal Mine pursuant to Section 5 of the Ordinance. In such order, generation of power was the "Specified End Use" with respect to the Coal Mine.
- E. Pursuant to an allotment process conducted in accordance with the Ordinance, the Rules, the Allotment Document, dated February 18, 2015 and receipt of a direction from the Central Government under Rule 11(9) of the Rules, the Allottee has become entitled to enter into an agreement with the Nominated Authority pursuant to Rule 13(5) of the Rules with respect to allocation of the Coal Mine to the Allottee for use in the Specified End Use Plant (as defined in Clause 1.1.45).
- F. Accordingly, the Nominated Authority and the Allottee are entering into this Agreement



Allotment Agreement for Talaiipalli Coal Mine

with respect to matters related to allocation of the Coal Mine, including without limitation development of the Coal Mine and production and utilisation of coal from the Coal Mine.

NOW THEREFORE, in consideration of the mutual covenants, terms and conditions and understandings set forth in this Agreement, and other good and valuable consideration (the adequacy of which are hereby mutually acknowledged), the Parties with the intent to be legally bound hereby agree as follows:

## 1. DEFINITIONS AND INTERPRETATION

The definitions and rules of interpretation in this clause apply in this Agreement.

### 1.1. Definitions

- 1.1.1. "Acceptable Bank" shall mean a Scheduled Bank as listed in the Second Schedule of the Reserve Bank of India Act, 1934 excluding those listed under the headings of Grassin Banks, Urban Co-operative Banks and State Co-operative Banks.
- 1.1.2. "Agreement" means this Allotment Agreement and all attached annexure, schedules, exhibits and instruments supplemental to or amending, modifying or confirming this Agreement in accordance with the provisions of this Agreement.
- 1.1.3. "Agreement Date" shall mean the date on which execution of this Agreement by both the Allottee and the Nominated Authority is completed.
- 1.1.4. "Allotment Conditions" shall have the meaning given to such expression in Clause 3.1.
- 1.1.5. "Allotment Date" shall have the meaning given to such expression in Clause 4.3.
- 1.1.6. "Allotment Document" shall have the meaning given to it under the Rules and shall include the Allotment Document dated February 18, 2015 for allotment of the Coal Mine.
- 1.1.7. "Allotment Order" shall have the meaning given to such expression in the Ordinance and the Rules.
- 1.1.8. "Applicable Law" shall mean all applicable statutes, laws, by-laws, rules, regulations, orders, ordinances, protocols, codes, guidelines, policies, notices, directions, judgments, decrees or other requirements or official directive of any Governmental Authority or court or other law, rule or regulation approval from the relevant Governmental Authority, government resolution, directive, or other government restriction or any similar form of decision of, or determination by, or any interpretation or adjudication having the force of law in India.
- 1.1.9. "Appropriation Event" shall have the meaning given to such expression in Clause 6.2.1.





- 1.1.10. "Arrangement" shall have the meaning given to such expression in Clause 8.3.1.
- 1.1.11. "Arrangement Application" shall have the meaning given to such expression in Clause 8.3.1.
- 1.1.12. "Authorised Representative" shall have the meaning given to such expression in Clause 4.4.
- 1.1.13. "Business Day" shall mean a day which is not a Saturday, Sunday or any other day declared as a public holiday by the Central Government.
- 1.1.14. "Central Government" shall mean the Government of India, acting through the Ministry of Coal.
- 1.1.15. "CIL" shall mean Coal India Limited (a Government of India undertaking).
- 1.1.16. "CIL Notified Price" shall mean the prevailing notified price of relevant grade(s) of coal by CIL or any of its subsidiaries, as may be territorially relevant to the Coal Mine, as on the date of sale of coal.
- 1.1.17. "Claim" shall have the meaning given to such expression in Clause 18.3.
- 1.1.18. "Coal Mine" shall mean the coal mine as more particularly described in SCHEDULE A.
- 1.1.19. "Companies Act" means the Companies Act, 1956 or the Companies Act, 2013, as applicable, as now enacted or as the same may from time to time be amended, re-enacted or replaced.
- 1.1.20. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions exercisable by a person or persons acting individually or in concert, directly or indirectly, including by virtue of their shareholding or management rights or shareholders agreements or voting agreements or in any other manner.
- 1.1.21. "Commencement Plan" shall have the meaning given to such expression in Clause 5.1.
- 1.1.22. "Designated Bank Account" shall mean the following bank account of the Nominated Authority.
- Name of the bank: State Bank of India  
 Account number: 34823879210  
 Name of the account holder: Nominated Authority, Account -II (Allotment), Ministry of Coal, Government of India  
 IFSC Code: SBIN0003771
- 1.1.23. "Diversion Notice" shall have the meaning given to such expression in Clause 8.4.1.



- 1.1.24. "Efficiency Parameters" shall have the meaning given to such expression in Clause 10.1.
- 1.1.25. "Eligibility Conditions" shall mean the eligibility conditions specified in the Ordinance and the Rules including all the eligibility conditions listed in Clause 3.2 of the Allotment Document.
- 1.1.26. "Encumbrances" means any mortgage, pledge, equitable interest, assignment by way of security, conditional sales contract, hypothecation, right of other Persons, claim, security interest, encumbrance, title defect, title retention agreement, voting trust agreement, interest, option, lien, charge, commitment, restriction or limitation of any nature whatsoever, including restriction on use, voting rights, transfer, receipt of income or exercise of any other attribute of ownership, right of set-off, any arrangement (for the purpose of, or which has the effect of, granting security), or any other security interest of any kind whatsoever, or any agreement, whether conditional or otherwise, to create any of the same.
- 1.1.27. "Governmental Approval" means any authorization, approval, consent, licence or permit required from any Governmental Authority.
- 1.1.28. "Governmental Authority" means any government authority, statutory authority, government department, agency, commission, board, tribunal or court or other law, rule or regulation making entity having or purporting to have jurisdiction on behalf of the Republic of India or any state or other subdivision thereof or any municipality, district or other subdivision thereof.
- 1.1.29. "Event of Force Majeure" shall have the meaning given to such expression in Clause 23.1.
- 1.1.30. "Good Industry Practice" means, in relation to any undertaking and any circumstances, the exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced Person engaged in the same type of undertaking under the same or similar circumstances.
- 1.1.31. "Indemnified Party" shall have the meaning given to such expression in Clause 18.1.
- 1.1.32. "Mine Plan" shall mean a plan which has been approved in accordance with the Applicable Laws in relation to the Coal Mine.
- 1.1.33. "Mining Lease" shall have the meaning given to such expression in Clause 5.3.1.
- 1.1.34. "Monthly Payment" shall have the meaning given to such expression in Clause 9.1.1.
- 1.1.35. "Ordinance" shall have the meaning given to such expression in Clause II of the Background.



- 1.1.36. "Other Plants" shall have the meaning given to such expression in Clause 8.4.1.
- 1.1.37. "Parties" means and refers to the Nominated Authority and the Allottee collectively and "Party" refers to any one of them.
- 1.1.38. "Performance Security" shall have the meaning given to such expression in Clause 6.1.1.
- 1.1.39. "Person" means any individual, sole proprietorship, unincorporated association, body corporate, corporation, company, partnership, limited liability company, joint venture, Governmental Authority or trust or any other entity or organization.
- 1.1.40. "Prior Allottee" shall have the meaning given to it in the Ordinance and for the purposes of the Coal Mine, the Prior Allottee shall be NTPC Limited incorporated in India under the Companies Act with corporate identity number 140101DL1975GOI007966, whose registered office is at NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi – 110003, India.
- 1.1.41. "Reference Index" shall have the meaning given to such expression in Clause 9.2.1.
- 1.1.42. "Reserve Price" shall mean INR 100/Tonne (Indian Rupees One hundred/Tonne).
- 1.1.43. "Rules" shall have the meaning given to such expression in Clause B of the Background.
- 1.1.44. "Selectee" shall have the meaning given to such expression in Clause 19.3.3(b).
- 1.1.45. "Specified End Use Plant" shall mean the plant engaged in generation of power situated at Dist. Raigarh, Chhattisgarh, India, as prescribed for the Coal Mine under Rule 8(2) of the Rules, as more particularly described in SCHEDULE B.
- 1.1.46. "State Government" shall mean the Government of the state where the Coal Mine is located.
- 1.1.47. "Substitution Notice" shall have the meaning given to such expression in Clause 19.3.3(b).
- 1.1.48. "Supreme Court Judgment" shall have the meaning given to such expression in Clause A of the Background.
- 1.1.49. "Taxation" (including with correlative meaning, the terms "Tax" and "Taxes") means (a) any and all taxes, assessments and other charges, duties, impositions and similar liabilities imposed by any Governmental Authority, including without limitation taxes based upon or measured by gross receipts, income, profits, sales and value added, withholding, payroll, excise and property taxes, together with all interest, penalties and additions imposed with respect to such amounts; (b) any liability for the payment of any



taxes, assessments and other charges, duties, impositions and similar liabilities by the Allottee as a result of being a member of an affiliated, consolidated, combined or unitary group for any period; and (c) any taxes, assessments and other charges, duties, impositions and similar liabilities for the payment of any amounts by the Allottee as a result of any express obligation to indemnify any other Person or as a result of any obligation under any agreement or arrangement with any other Person with respect to such amounts and including any liability for Taxes of a predecessor entity.

1.1.50. "Third Party" means any Person that is not a signatory to this Agreement.

1.1.51. "Term" shall have the meaning given to such expression in Clause 24.2.

1.1.52. "Termination Event" shall have the meaning given to such expression in Clause 24.3.1.

1.1.53. "Upfront Amount" shall mean an amount equal to INR 1,39,94,96,780 (Indian Rupees One Hundred Thirty Nine Crore Ninety Four Lakh Ninety Six Thousand Seven Hundred and Eighty) payable by the Allottee in terms of Clause 5.2.

1.1.54. "Warranties" shall have the meaning given to such expression in Clause 17.1.

## 1.2 Interpretation

1.2.1. Any reference to any statute or statutory provision shall include:

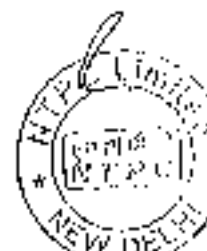
- (i) all subordinate legislation made from time to time under that provision (whether or not amended, modified, re-enacted or consolidated);
- (ii) such provision as from time to time amended, modified, re-enacted or consolidated (whether before or after the date of this Agreement) to the extent such amendment, modification, re-enactment or consolidation applies or is capable of applying to any transactions entered into under this Agreement prior to the Agreement Date and (to the extent liability there under may exist or can arise) shall include any past statutory provision (as from time to time amended, modified, re-enacted or consolidated) which the provision referred to has directly or indirectly replaced;

1.2.2. Unless the context otherwise requires, words in the singular shall include the plural and the plural shall include the singular.

1.2.3. References to the masculine, the feminine and the neuter shall include each other.

1.2.4. References to a "company" shall include a company, corporation or other body corporate, wherever and however incorporated or established.

1.2.5. The recitals and schedules form part of this Agreement and shall have the same force and



effect as if expressly set out in the body of this Agreement, and any reference to this Agreement shall include any recitals and schedules to it. Any references to clauses and schedules are to clauses and schedules to this Agreement. Any references to parts or paragraphs are, unless otherwise stated, references to parts or paragraphs of the schedule in which the reference appears.

- 1.2.6. A reference to **this Agreement** or **any other document** shall be construed as references to this Agreement or that other document as amended, varied, novated, supplemented or replaced from time to time.
- 1.2.7. A reference to **this Clause** shall, unless followed by reference to a specific provision, be deemed to refer to the whole Clause (not merely the sub-Clause, paragraph or other provision) in which the expression occurs.
- 1.2.8. A reference to a party shall include that party's representatives, successors and permitted assigns.
- 1.2.9. Each of the representations and warranties provided in this Agreement is independent of other representations and warranties and unless the contrary is expressly stated, no Clause in this Agreement limits the extent or application of another Clause.
- 1.2.10. Headings to Clauses, parts and paragraphs of schedules and schedules are for convenience only and do not affect the interpretation of this Agreement.
- 1.2.11. A reference to "in writing" includes any communication made by letter or fax but not e-mail (unless otherwise expressly provided in this Agreement).
- 1.2.12. Unless otherwise specified, any reference to a time of day is to Indian Standard Time.
- 1.2.13. Any words following the terms **including, include, in particular, for example or any similar expression** shall be construed as illustrative and shall not limit the sense of the words, description, definition, phrase or term preceding those terms.
- 1.2.14. Where the context permits, **other** and **otherwise** are illustrative and shall not limit the sense of the words preceding them.
- 1.2.15. References to a document in agreed form are to that document in the form agreed by the parties and initialled by them or on their behalf for identification.
- 1.2.16. Any obligation on a party not to do something includes an obligation not to allow that thing to be done.

## 2. ALLOCATION OF THE COAL MINE

The Allottee hereby represents and warrants to the Nominated Authority that it has



complied with all the terms and conditions of the Ordinance, the Rules, the Allotment Document and other Applicable Laws, as were required to be complied with by the Allottee, with respect to allotment process for the Coal Mine and the Allottee is eligible in all respects to receive allocation of the Coal Mine. The Allottee also represents and warrants to the Nominated Authority that it is in compliance with all the Eligibility Conditions and would continue to be in compliance with all the Eligibility Conditions during the Term.

- 2.2. Relying on the representations and warranties of the Allottee and the information, documents and other undertaking provided by the Allottee, including the Warranties provided under Clause 17, the Nominated Authority is pleased to enter into this Agreement with the Allottee for allocation of the Coal Mine to the Allottee subject to terms and conditions specified in this Agreement.

### 3. CONDITIONS FOR ALLOTMENT

#### 3.1. Allotment Conditions

The issuance of the Allotment Order in favour of the Allottee shall be subject to satisfaction of the following conditions (collectively the "Allotment Conditions"):

- (a) the Allottee continuing to be in compliance with all the Eligibility Conditions;
- (b) the Allottee having paid the first instalment of the Upfront Amount, in accordance with Clause 5.2.1;
- (c) the Allottee having furnished the Performance Security;
- (d) the Allottee having deposited an amount equal to INR 0 (Indian Rupees Zero), being the Fixed Amount, in the Designated Bank Account;
- (e) only in the event that the Allottee is a Prior Allottee for the Coal Mine or any other Schedule I coal mine (as defined in the Ordinance), the Allottee having paid the Additional Levy within the due date for payment of such Additional Levy as specified in Rule 18 of the Rules; and
- (f) The Allottee having provided a written intimation to the Nominated Authority in substantially the same form as provided in SCHEDULE C regarding: (i) the movable property which the Allottee has not negotiated to own or utilise and which it intends to move and store under Section 10(4) of the Ordinance; (ii) the contracts which the Allottee is desirous of adopting under Section 11(1) of the Ordinance, including contracts with secured creditors; and matters incidental thereto.



**3.2. Completion of Allotment Conditions and Notice**

- 3.2.1. Upon satisfaction of each of the Allotment Conditions specified in Clause 3.1, the Allottee shall provide a written notice to the Nominated Authority in substantially the same format as provided in SCHEDULE D (the "Completion Notice")
- 3.2.2. In the event the Allottee does not provide a Completion Notice with respect to each of the Allotment Conditions listed in Clauses 3.1(a); 3.1(b); 3.1(c); 3.1(d); 3.1(e) (in cases where the Allottee is a Prior Allottee for the Coal Mine or any other Schedule I coal mine (as defined in the Ordinance)) and Clause 3.1(f), within 30 Days of the Agreement Date, then the Nominated Authority may terminate this Agreement without incurring any liability whatsoever by providing a written notice to the Allottee. It is clarified that in such event the Allottee shall not be entitled to receive the Allotment Order and the Nominated Authority shall be entitled to dispose the Coal Mine in the manner provided in the Ordinance and the Rules, including through re-auction/re-allotment or through appointment of a designated custodian.
- 3.2.3. If the Allottee does not provide a Completion Notice with respect to 3.1(f) and fails to provide a written intimation in substantially the same form as provided in SCHEDULE C within 30 Days of the Agreement Date, then it shall be deemed that the Allottee is not desirous of owning or utilising any movable property or continuing any contract. In such cases, without prejudice to Clause 3.2.2, the Nominated Authority may elect to issue the Allotment Order without including aforementioned particulars in the Allotment Order; if all other Allotment Conditions have been satisfied by the Allottee and corresponding Completion Notice have been provided to the Nominated Authority.

**4. THE ALLOTMENT ORDER**

- 4.1. Upon receipt of the Completion Notice evidencing compliance with each of the applicable Allotment Conditions, the Nominated Authority may issue the Allotment Order, subject to the Ordinance, the Rules, the Allotment Document and other Applicable Laws, in the manner provided in this Clause 4.
- 4.2. The Allotment Order shall be issued by the Nominated Authority in substantially the same format as specified by the Central Government.
- 4.3. Prior to issuance of the Allotment Order, the Nominated Authority shall provide a written notice to the Allottee specifying the date of the Allotment Order (the "Allotment Date") and the date and time on which and place from where the Allotment Order may be collected by the Allottee.
- 4.4. The Allottee shall depute an authorised representative of the Allottee ("Authorised Representative") to receive the Allotment Order on behalf of the Allottee on the date,



time and place specified by the Nominated Authority under Clause 4.3.

- 4.5 The Authorised Representative shall be provided the Allotment Order in duplicate and shall be required to acknowledge the receipt of the Allotment Order. In the event, the Authorised Representative is not present on the date and time specified by the Nominated Authority under Clause 4.3, then the Nominated Authority shall dispatch the Allotment Order by registered post with acknowledgment due, to the registered office of the Allottee.
- 4.6 The Allottee shall, within seven Business Days of the receipt of the Allotment Order through the Authorised Representative or through registered post, as the case may be, sign and return the duplicate copy of the Allotment Order in acknowledgement thereof. In the event the duplicate copy of the Allotment Order duly signed by the Allottee is not received by the aforementioned date, the Nominated Authority may, unless it consents to extension of time for submission thereof, appropriate the Performance Security and other payments made by such Allottee as damages and also terminate this Agreement and cancel and withdraw the Allotment Order.

## 5. POST ALLOTMENT OBLIGATIONS

### 5.1. Commencement Plan

5.1.1. Within 30 Business Days of the date of the Allotment Order, the Allottee shall be required to submit a detailed plan (the "Commencement Plan") towards commencement of mining operations at the Coal Mine. The Commencement Plan shall include all actions that the Allottee may be required to perform to commence mining operations at the Coal Mine and shall include such information as may be required by the Nominated Authority, including without limitation, information regarding the following:

- (a) the Governmental Approvals, including the Mining Lease which shall be required for commencement of mining operations at the Coal Mine and the time within which the Allottee would make applications for such Governmental Approvals; and
- (b) revisions to the Mine Plan if any, as may be proposed by the Allottee.

5.1.2. The Commencement Plan shall be prepared by the Allottee to ensure strict compliance with the Efficiency Parameters.

### 5.2. Payment of the Upfront Amount

#### 5.2.1. First Instalment of fifty per cent

The first instalment of fifty per cent of the Upfront Amount being an amount equal to INR 69,97,48,390 (Indian Rupees Sixty Nine Crore Ninety Seven Lakh





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Forty Eight Thousand Three Hundred and Ninety), shall be deposited by the Allottee in the Designated Bank Account in the manner provided in Clause 3.1(b) as an Allotment Condition.

5.2.2. *Second instalment of twenty five per cent*

The second instalment of twenty five per cent of the Upfront Amount being an amount equal to INR 34,98,74,195 (Indian Rupees Thirty Four Crore Ninety Eight Lakh Seventy Four Thousand One Hundred and Ninety Five), shall be deposited by the Allottee in the Designated Bank Account, on or prior to expiry of 15 Business Days from the date of execution of the Mining Lease by the relevant State Government.

5.2.3. *Third instalment of twenty five per cent*

The third instalment of twenty five per cent of the Upfront Amount being an amount equal to INR 34,98,74,195 (Indian Rupees Thirty Four Crore Ninety Eight Lakh Seventy Four Thousand One Hundred and Ninety Five), shall be deposited by the Allottee in the Designated Bank Account, on or prior to expiry of 15 Business Days from the date of grant of mine opening permission from the state pollution control board of the relevant State where the Coal Mine is located..

5.2.4. *Failure to pay the Upfront Amount*

In the event the Allottee fails to pay the second instalment or the third instalment of the Upfront Amount within the time specified in Clause 5.2.2 or Clause 5.2.3, respectively, then the Nominated Authority shall be entitled to appropriate the Performance Security in the manner stipulated in Clause 6 (PERFORMANCE SECURITY) and such failure may also result in termination of this Agreement as provided in Clause 24 (EFFECTIVE DATE, TERM AND TERMINATION).

5.3. **The Mining Lease**

5.3.1. Pursuant to Section 8(4)(b) and Section 8(8), read with Section 8(12) of the Ordinance, the Allottee shall become entitled to the mining lease with respect to the Coal Mine (the "Mining Lease") to be granted by the State Government upon issuance of the Allotment Order.

5.3.2. The Allottee shall promptly upon issuance of the Allotment Order make an application to the State Government for grant of a Mining Lease in the name of the Allottee.



**6. PERFORMANCE SECURITY AND APPROPRIATION****6.1. Performance Security**

6.1.1. The Allottee shall provide an irrevocable and unconditional guarantee from an Acceptable Bank payable at Delhi for an amount equal to INR 4,12,58,88,000 (Indian Rupees Four Hundred Twelve Crore Fifty Eight Lakh and Eighty Eight Thousand) (the "Performance Security") in substantially the same form as provided in SCHEDULE F for the performance of its obligations within such time as specified in Clause 3.2.2

6.1.2. The Performance Security shall be an amount which is equal to aggregate of: (a) one year royalty calculated on the basis of peak rated capacity of the Coal Mine as per the approved Mine Plan, payable to respective State Government with respect to the Coal Mine; and (b) the annual peak rated capacity of the Coal Mine as per the approved Mine Plan multiplied by the Reserve Price.

6.1.3. In case of any revision in the Mine Plan in accordance with Clause 14, the amount of Performance Security shall be revised accordingly.

6.1.4. In such case, bank guarantee constituting the Performance Security shall be substituted with another bank guarantee of the enhanced value issued in accordance with this Clause 6, within a period of 15 Business Days of receipt of approval for revision to the Mine Plan.

6.1.5. The Performance Security should remain valid until such time when the Coal Mine achieves the annual peak rated capacity.

**6.2. Events for appropriation of the Performance Security**

6.2.1. The Performance Security may be appropriated by the Nominated Authority upon occurrence of any of the following events (the "Appropriation Event"), to be determined by the Nominated Authority in its sole discretion;

- (a) failure of the Allottee to provide the duly acknowledged duplicate copy of the Allotment Order as required under Clause 4.6;
- (b) failure of the Allottee to make payment of the first instalment, second instalment or the third instalment of the Upfront Amount within the time specified in Clause 3.1(b), Clause 5.2.2 or Clause 5.2.3, respectively;
- (c) failure of submission of Commencement Plan within the time specified in Clause 5.1.1;
- (d) failure of the Allottee to comply with the Efficiency Parameters as required under



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Clause 10;

- (e) any change in Control or transfer of right, title or interest in the Coal Mine which is not in conformity with Clause 13;
- (f) failure to make payment of the Monthly Payment in accordance with this Agreement;
- (g) any utilisation of coal which is not in conformity with Clause 8; or
- (h) any other breach or non-compliance of any of the provisions of this Agreement including in case of the Warranties being untrue or misleading or incorrect in any manner whatsoever.

6.2.2. Provided however that in the event an Appropriation Event has occurred solely on account of an Event of Force Majeure as provided in Clause 23, which could not have been mitigated by the Allottee through Good Industry Practice, then the Performance Security shall not be appropriated for such specific Appropriation Event.

### 6.3. Manner of appropriation of the Performance Security

6.3.1. Upon occurrence of an Appropriation Event, to be determined by the Nominated Authority, the Nominated Authority shall have the unconditional right to appropriate the Performance Security by providing a written notice to the Allottee, in the following proportion:

#	Appropriation Event	Amount of the Performance Security to be appropriated
1.	Failure of the Allottee to provide the duly acknowledged duplicate copy of the Allotment Order as required under Clause 4.6	Entire Performance Security.
2.	Failure of the Allottee to make payment of the first instalment, second instalment or the third instalment of the Upfront Amount within the time specified in Clause 3.1(b), Clause 5.2.2 or Clause 5.2.3, respectively	An amount equal to the first instalment, and/or second instalment and/or third instalment of the Upfront Amount together with 12% per annum simple interest on such amount starting from the date on which such amount was due and until the date of appropriation



*Allotment Agreement for Talaiwalli Coal Mine*

#	Appropriation Event	Amount of the Performance Security to be appropriated
		of the Performance Security.
3.	Failure of submission of Commencement Plan within the time specified in Clause 5.1.1	An amount equal to 10% of the Performance Security
4.	Failure of the Allottee to comply with the Efficiency Parameters as required under Clause 10	Such per cent of the Performance Security for each failure to comply with the Efficiency Parameters as specified in SCHEDULE E.
5.	Any change in Control or transfer of right, title or interest in the Coal Mine which is not in conformity with Clause 13	Entire Performance Security.
6.	Any utilisation of coal which is not in conformity with Clause 8	Entire Performance Security.
7.	Failure of the Allottee to make payment of the Monthly Payment	The amount of Monthly Payment due and payable, along with a simple interest of twelve per cent per annum, starting from the date on which such amount was due and until the date of appropriation of the Performance Security.
A.	Any other breach or non-compliance with any of the provisions of this Agreement, including in case of the Warranties being untrue or misleading or incorrect in any manner whatsoever.	Such proportion as may be determined by the Nominated Authority in its sole discretion.

6.3.2. Any Appropriation Event resulting in appropriation of the entire Performance Security shall be a Termination Event for the purposes of Clause 24 (EFFECTIVE DATE, TERM AND TERMINATION).

6.3.3. In the event of a part appropriation of the Performance Security, the Allottee shall be



required to: (i) rectify the Appropriation Event; and (ii) top-up the bank guarantee constituting the Performance Security within fifteen Business Days of receipt of a notice under Clause 6.3.1, failure to do so shall be a Termination Event for the purposes of Clause 24 (EFFECTIVE DATE, TERM AND TERMINATION). Appropriation Event, except as mentioned in clause 6.2.1(d), shall be rectified within seven Business Days of receipt of a notice under Clause 6.3.1. Appropriation Event mentioned in clause 6.2.1 (d) shall be rectified within the time specified in SCHEDULE E.

6.3.4. In the event that on account of one or more Appropriation Events, an amount equal to hundred per cent of the Performance Security is appropriated in aggregate in one or more instances, the same shall be a Termination Event for the purposes of Clause 24 (EFFECTIVE DATE, TERM AND TERMINATION).

## 7. INFORMATION

7.1. In addition to information that may be required to be provided in accordance with Applicable Laws, the Allottee shall provide periodic reports to the Nominated Authority (or such other Governmental Authority as may be specified by the Nominated Authority) regarding mining operations at the Coal Mine, including compliance with the Efficiency Parameters, in accordance with the following provisions:

### (a) *Pre-Commencement Report*

Prior to commencement of mining operations at the Coal Mine, the Allottee shall provide a written intimation ("Pre-commencement Report") to the Nominated Authority and the Central Government once every thirty calendar days regarding the following:

- (i) the actions taken by the Allottee towards commencement of the mining operations at the Coal Mine, including compliance with the Commencement Plan;
- (ii) any deviations from the Commencement Plan, the reasons for such deviations and the steps taken by the Allottee to rectify such deviation; and
- (iii) whether in the opinion of the Allottee, it shall be able to commence mining operations at the Coal Mine within the time mentioned in the Commencement Plan.

The Allottee shall also inform the Nominated Authority in writing within 3 Business Days of receipt of the mine opening permission from the state pollution control board of the relevant State where the Coal Mine is located.



**(b) Commencement Report**

Within three Business Days of the commencement of mining operations at the Coal Mine, the Allottee shall provide a written intimation to the Nominated Authority confirming commencement of mining operations at the Coal Mine (the "Commencement Report").

**(c) Monthly Report**

Subsequent to the Commencement Report, the Allottee shall provide a written intimation ("Monthly Report") to the Coal Controller's Organisation within seven Business Days of end of each calendar month comprising: (i) a declaration regarding compliance with the Efficiency Parameters in the immediately preceding calendar month. In the event of a non-compliance with the Efficiency Parameters, complete particulars of the same, including the reasons for such non-compliance, and the corrective steps proposed to be undertaken; and (ii) such other information as may be required to be provided by the Nominated Authority.

**(d) Yearly Report**

Within seven Business Days of conclusion of the annual general meeting of the Allottee, it shall provide the following information to the Coal Controller's Organisation:

- (i) two certified copies of its balance sheets, cash flow statement and profit and loss account, along with a report thereon by its statutory auditors; and
- (ii) such other information as may be required to be provided, by the Nominated Authority.

7.2. The Pre-Commencement Report, the Commencement Report, the Monthly Report and the Yearly Report shall be provided to the Nominated Authority or the Coal Controller's Organisation as attachments to an email addressed to the following e-mail address; (i) [nomauthority.mcc@nic.in](mailto:nomauthority.mcc@nic.in) in case of the Nominated Authority; or (ii) [coalcont-wh@nic.in](mailto:coalcont-wh@nic.in) in case of the Coal Controller's Organisation. Such attachments must be digitally signed by the Allottee using a Class III digital signature certificate issued by a verifying authority in India.

7.3. The Nominated Authority shall have the right to seek such further information regarding the Pre-Commencement Report, the Commencement Report, the Monthly Report or the Yearly Report and also seek independent verification of the same.



**8. UTILISATION OF COAL****8.1. Utilisation of Coal in the Specified End Use Plant**

Except as otherwise provided in this Clause 8, the coal extracted from the Coal Mine shall be utilised by the Allottee strictly in the Specified End Use Plant; and shall not be utilised for any other purpose whatsoever, either directly or indirectly.

**8.2. Middling or washery rejects**

8.2.1. The Allottee shall adhere to Good Industry Practice with respect to mining of coal and make best efforts to reduce generation of middling or washery rejects and utilise the same in any captive power plant of the Allottee. In any case the middling or washery rejects generated from the Coal Mine shall not exceed normative limits.

8.2.2. Any middling or washery rejects generated from the Coal Mine may be sold by the Allottee and the Allottee shall maintain separate records for the middling or washery rejects generated, utilised and sold. However, the middling or washery rejects generated from the Coal Mine should in no event, exceed the normative limits.

**8.3. Arrangements for optimal utilisation**

8.3.1. In terms of Section 20 of the Ordinance and Rule 19 of the Rules, the Allottee shall be permitted to enter into arrangements for optimum utilisation of the Coal Mine (the "Arrangement"). In the event the Allottee is desirous of entering into an Arrangement, it shall make an application (the "Arrangement Application") to the Central Government in accordance with Rule 19 of the Rules.

8.3.2. The Arrangement Application shall be filed by the Allottee prior to undertaking any Arrangement and no Arrangement shall be given effect to until the Arrangement Application has been approved by the Central Government.

8.3.3. The Arrangement Application shall be made in writing and shall include complete particulars of the proposed Arrangement, including the particulars required to be provided under Rule 19(2) of the Rules i.e. (a) parties to the proposed Arrangement; (b) the proposed Arrangement; (c) the manner in which such Arrangement would achieve optimal utilisation of the relevant coal mines and cost efficiencies.

8.3.4. In the event that the Central Government grants its approval to the Arrangement, then prior to implementation of the Arrangement, the Allottee shall provide to the Central Government duly certified copy of all agreements and other documents related to the Arrangement.



#### 8.4. Utilisation in any other plant of the Allottee

- 8.4.1. In the event that the Allottee is desirous of utilising the coal extracted from the Coal Mine in any other plants of the Allottee or its subsidiary company (in terms of the Companies Act, 2013) engaged in the same specified end use as the Specified End Use Plant ("Other Plant(s)") pursuant to Section 20(2) of the Ordinance, then the Allottee shall provide a written intimation ("Diversion Notice") to the Central Government.
- 8.4.2. In accordance with Rule 20(2) of the Rules, the Diversion Notice shall be provided at least thirty Business Days prior to the intended date of such utilisation.
- 8.4.3. In the event that, upon submission of the Diversion Notice the Central Government seeks further information regarding the aforementioned utilisation, then the Allottee shall provide the same within seven Business Days. The Allottee shall not utilise the coal extracted from the Coal Mine in any Other Plant(s) if: (i) the Central Government determines in its sole discretion that such utilisation is not in accordance with Section 20(2) of the Ordinance or Rule 20(2) of the Rules; or (ii) information regarding compliance with Section 20(2) of the Ordinance or Rule 20(2) of the Rules with respect to such utilisation is not provided to the Central Government in the manner stipulated under this Clause 8.4.
- 8.4.4. The Diversion Notice shall include complete particulars of the proposed utilisation of coal extracted from the Coal Mine in any Other Plant, including without limitation:
- (i) name and address of the Other Plant(s);
  - (ii) the ownership of the Other Plant(s). It is clarified that such Other Plant(s) should be owned solely by the Allottee or its subsidiary company (in terms of the Companies Act, 2013) to be eligible to get coal in terms of Section 20(2);
  - (iii) the mechanism for transportation of coal from the Coal Mine to the Other Plant(s);
  - (iv) the requirement of coal of the Other Plant(s); the sources from which such requirement is being met; and the per cent of such requirement being proposed to be met from the Coal Mine; and the manner in which such diversion would affect the Specified End Use Plant originally associated with the Coal Mine.
- 8.4.5. In the event that coal extracted from the Coal Mine is being diverted to any Other Plant(s) pursuant to this Clause 8.4, then the Allottee or any of its subsidiary company owning such Other Plant(s) shall also be required to adhere to the stipulations under this Agreement with respect to the utilisation of coal from the Coal Mine and the Specified End Use and any Applicable Law.





**8.5. Sale to CIL:**

8.5.1. Any coal extracted from the Coal Mine which is in excess of the requirements of coal for the Specified End Use Plant and the Other Plant(s) shall be required to be supplied to CIL at the CIL Notified Price.

8.5.2. It is clarified that for the purposes of sale of coal to CIL, the determination of grade of coal shall be based on joint analysis of coal carried out by the Allottee and CIL. It is further clarified that, the Allottee shall continue to make Monthly Payments with respect to the coal extracted from the Coal Mine as per Clause 9 including on the coal sold to CIL.

8.5.3. All Taxes applicable on such sale of coal shall be payable additionally.

**9. MONTHLY PAYMENTS AND ESCALATION****9.1. Monthly Payment**

9.1.1. The Allottee shall be required to make monthly payments (the "Monthly Payment") with respect to the coal extracted from the Coal Mine on the basis of the Reserve Price (as escalated in accordance with Clause 9.2).

9.1.2. The Monthly Payment is required to be made in the Designated Bank Account within 20 calendar days of expiry of each month with respect to coal extracted from the Coal Mine in such calendar month.

9.1.3. All payments required to be made by the Allottee shall be made net of all applicable Taxes. In the event, Taxes are payable, the Allottee shall gross-up the amount payable and make payment of the aggregate amount.

**9.2. Escalation**

9.2.1. For the purposes of computation of the Monthly Payment, the Reserve Price shall be subject to an escalation on a year-on-year basis every financial year on the basis of the pre-specified escalation formula that is prescribed in the relevant Standard Bidding Document for Design, Build, Finance, Own and Operate (DBFOO) bidding as formulated by Ministry of Power for escalation of fuel cost from captive mines (the "Reference Index"), and the Reserve Price shall stand increased by the per cent increase of the Reference Index on a year-on-year basis. It is clarified that for the purposes of escalation in a subsequent financial year, the escalated Reserve Price of the immediately preceding year shall be considered. The last published Reference Index shall be used for computing the escalation. The subject escalation would be applicable after the issuance of the Allotment Order.

9.2.2. In the event that the failure of the Allottee to make payment of the Monthly Payment



exceeds for more than three instances, such non-compliance may also result in termination of this Agreement as provided in Clause 24 (EFFECTIVE DATE, TERM AND TERMINATION).

- 9.3. It is clarified that in addition to the aforementioned payments any royalty payable under Applicable Laws shall be payable additionally.

## 10. EFFICIENCY PARAMETERS

- 10.1. The conduct of mining operations at the Coal Mine shall be subject to the milestones listed in SCHEDULE B (the "Efficiency Parameters").
- 10.2. The Allottee would provide periodic information to the Nominated Authority and the Central Government regarding compliance with the Efficiency Parameters in the manner stipulated in Clause 7 (INFORMATION).
- 10.3. Any non compliance with the Efficiency Parameters would result in appropriation of the Performance Security in the manner stipulated in Clause 6 (PERFORMANCE SECURITY) and in case where such non-compliance exceeds for more than five instances, such non-compliance may also result in termination of this Agreement as provided in Clause 24 (EFFECTIVE DATE, TERM AND TERMINATION).

## 11. GENERAL RIGHTS AND OBLIGATIONS

### 11.1. Limited Mining Rights

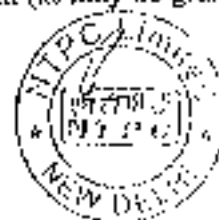
The Allottee shall be entitled to receive a Mining Lease for conduct of mining operations only in the Coal Mine and shall not be entitled to conduct the mining operations in any other area pursuant to this Agreement. The rights granted to the Allottee herein to conduct mining operations are exclusive within the Coal Mine. The Government undertakes not to grant any rights to mine coal in the Coal Mine to any Third Party during the Term.

### 11.2. Authorisations

The Allottee shall obtain and maintain all Governmental Approvals required for conducting the mining operations at the Coal Mine and performing its obligations under this Agreement. The Government undertakes, on a no-obligation basis, to expeditiously provide all necessary approvals and assistance for conducting mining operations and as otherwise may be reasonably required by the Allottee in relation to the rights granted to it under this Agreement.

### 11.3. Geological and Archaeological Finds

It is expressly agreed that other than rights to mine for coal (as may be granted under any



Mining Lease pursuant hereto), geological or archaeological rights do not form part of the rights granted to the Allottee under this Agreement and the Allottee hereby acknowledges that except in relation to coal (as may be granted under any Mining Lease pursuant hereto), it shall not have any mining rights or interest in the underlying minerals, metals (including gold, silver etc.), gas, oil, fossils, antiquities, structures or other remnants or things either of particular geological or archaeological interest and that such rights, interest and property on or under the Coal Mine shall vest in and belong to the relevant Central/ State Government or the concerned Governmental Authority. The Allottee shall take all reasonable precautions to prevent its workmen or any other person from removing or damaging such interest or property and shall inform the relevant Central/ State Government forthwith of the discovery thereof and comply with such instructions as the concerned Governmental Authority may reasonably give for the removal of such property.

#### 11.4. Health, Safety, Welfare, Social Security and Minimum Wages

- 11.4.1. The Allottee shall comply with all Applicable Laws and observe Good Industry Practice for the protection of the general health, safety, welfare, social security and minimum wages of employees engaged at the Coal Mine, including employees of any contractor or sub-contractor and of all other persons having legal access to the area covered by this Agreement.
- 11.4.2. Without prejudice to the generality of the foregoing, the Allottee shall ensure payment of minimum wages to the employees engaged at the Coal Mine and in related activity including employees of any contractor or sub-contractor.
- 11.4.3. The Allottee shall install and utilize such recognized modern safety devices and observe such recognized modern safety precautions as are provided and observed under Good Industry Practice. The Allottee shall maintain in a safe and sound condition for the duration of this Agreement all infrastructure and equipment constructed or acquired in connection with mining operations and required for ongoing operations.
- 11.4.4. The Allottee shall train employees engaged at the Coal Mine, including employees of any contractor or sub-contractor and of all other persons having legal access to the area covered by this Agreement, in accordance with the Good Industry Practice.
- 11.4.5. The Allottee shall construct, maintain, and operate health programs and facilities to serve the employees engaged at the Coal Mine, including employees of any contractor or sub-contractor and of all other persons having legal access to the area covered by this Agreement, which programs and facilities shall install, maintain and use modern health devices and equipment and shall practice modern health procedures and precautions in accordance with Good Industry Practice.



11.4.6. Without prejudice to the generality of the foregoing, in the event the Allottee provides housing, the same shall be built to a standard that provides suitable living environments adequate for health and well-being, and which meet applicable sanitation standards in terms of Good Industry Practice.

## 12. CONTRACTORS AND SUB-CONTRACTORS

12.1. In the event the Allottee enters into any agreement with any contractor in relation to the mining operations at the Coal Mine, then a duly certified copy of such agreement shall also be submitted to the Nominated Authority within fifteen Business Days of its execution.

12.2. Any Agreement between the Allottee and its contractors shall contain appropriate terms by which the contractor shall acknowledge and comply with the terms of this Agreement and the contractor shall also cause its sub-contractors to acknowledge and comply with the same.

12.3. Nothing in this Agreement shall exempt the Allottee from any and all obligations under this Agreement despite the delegation of such obligations to a contractor or its subcontractors.

12.4. Terms and Conditions for appointment of contractor(s) in relation to coal mining operations may be formulated in line with the terms and conditions specified in the Auction by Competitive Bidding of Coal Mines Rules, 2012 (as amended by notification dated 27.12.2012) framed under Sec. 11A of the MMDR Act. The terms and conditions may be as follows:

12.4.1. In case the Coal Mine is developed through contractor(s), the selection of the contractor(s) in relation to coal mining operation shall be through a competitive bidding process and the Allottee company shall inform the State Government concerned, the Central Government and the Nominated Authority about the engagement of such contractor(s) and the terms and conditions of such engagement, as soon as it is finalised.

12.4.2. The Allottee shall ensure that the criteria of bidding for engagement of the contractor(s) are not linked to CIL Notified Price.

12.4.3. The contractor(s) shall maintain all records as required to be maintained and shall provide such records for the inspection by the Allottee, the State Government concerned, the Central Government and the Nominated Authority.



**13. CHANGE IN CONTROL AND TRANSFER****13.1. Change in Control of the Allottee**

13.1.1. Change in Control of the Allottee or any transfer of the Specified End Use Plant along with the rights in relation to the Coal Mine, shall be permissible with prior intimation to the Nominated Authority and the Central Government if:

- (a) such change in Control does not result in the Allottee becoming non compliant with any of the Eligibility Conditions or the transferee is also compliant with the applicable Eligibility Conditions, as the case may be. It is clarified that no company other than a Government company or corporation shall be permitted to hold more than twenty-six per cent of the paid up share capital in the Allottee, either directly or through any of its subsidiary company or associate company; and
- (b) such change in Control or transfer does not require any prior consent, approval, no-objection certificate or the like under any Applicable Law.

13.1.2. In the event that any change in Control of the Allottee or any proposed transfer of the Specified End Use Plant along with the rights in relation to the Coal Mine requires prior Governmental Approval under any Applicable Laws, then such Governmental Approval shall be granted (in addition to any other requirement under Applicable Law) only if:

- (a) the transferee of such right, title or interest of the Allottee subsequent to change of Control, as the case may be, also meets all the applicable Eligibility Conditions; or
- (b) the Allottee continues to meet all the applicable Eligibility Conditions, as the case may be

**13.2. Change in Control in case of a joint venture**

13.2.1. In the cases where allotment has been made to a joint venture of any two or more Government companies or corporations, such companies shall be prohibited from alienating or transferring any interest, except for taking of loans or advances from a bank or financial institution, in the joint venture of whatsoever nature including ownership in favour of a Third Party.

**13.3. Consequences of default**

13.3.1. In the event of any change in Control or any transfer of right, title or interest in the Coal Mine which is not in conformity with this Agreement or any Applicable Law, then in addition to any rights, remedy or consequences as may be applicable under Applicable Laws, the Nominated Authority or the Central Government may, in its sole discretion,



Allotment Agreement for Yaluriipalli Coal Mine

appropriate the Performance Security, disqualify the Allottee from participating in any further auction or allotment process conducted by the Nominated Authority; terminate this Agreement; and/or terminate and withdraw the Allotment Order as the case may be.

13.3.2. Any transfer of right, title or interest which is not in conformity with this Agreement or Applicable Laws shall be deemed to be void *ab-initio*.

**14. MINE PLAN**

14.1. The Mine Plan approved in relation to the Prior Allottee, if any shall also be applicable to the Allottee.

14.2. Upon allocation of Coal Mine, the Allottee may revise the Mine Plan for extraction of more coal as compared to the Mine Plan being subject to revision in accordance with the provisions of Applicable Law and the Agreement.

14.3. The Allottee may increase mine production to the maximum possible extent and utilise the coal in accordance with Clause 8. Subject to Applicable Laws, the Allottee may apply for coal linkages or participate in auction/allotment for the Specified End Use Plant three years prior to the exhaustion of extractable reserves in the Coal Mine.

**15. MINE CLOSURE**

15.1. Upon exhaustion of the extractable coal reserves at the Coal Mine the Coal Mine shall be closed, in the manner provided in the mine closure plan and Applicable Laws.

**16. COMPLIANCE AND RECORD KEEPING**

16.1. The Allottee shall keep at its normal place of business detailed, accurate and up to date records and books of account showing all payments made by the Allottee in connection with this Agreement, the development of the Coal Mine, mining operations and matters incidental thereto and the steps taken by the Allottee to comply with Applicable Laws. Such records and books of accounts shall be required to be maintained for a period of six years. The Allottee shall ensure that such records and books of accounts are sufficient to enable verification of the Allottee's compliance with its obligations under this Agreement.

16.2. The Allottee shall permit the Nominated Authority and its representatives, to access and take copies of the Allottee's records and any other information held at the Allottee's premises and to meet with the Allottee's personnel to audit the Allottee's compliance with its obligations under this Agreement. Such audit rights shall continue for three years after termination of this Agreement. The Allottee shall give all necessary assistance to the conduct of such audits during the Term of this Agreement and for a period of three year after termination of this Agreement.



**17. REPRESENTATIONS AND WARRANTIES**

- 17.1. The Allottee represents and warrants to the Nominated Authority (save as otherwise disclosed to the Nominated Authority in writing), as of the Agreement Date, in the manner as detailed in SCHEDULE G ("Warranties").
- 17.2. None of the representations, warranties and/ or statements contained in this Agreement shall be treated as qualified by any actual or constructive knowledge on the part of the Nominated Authority or the Central Government or any of its respective agents, representatives, officers, employees or advisers.
- 17.3. In the event that any of the representations or warranties made or given by the Allottee ceases to be true or stands changed, the Allottee shall promptly notify the Nominated Authority of the same. The Allottee hereby waives all its rights to invoke and shall not invoke the Nominated Authority's knowledge (actual, constructive or imputed) of a fact or circumstance that might make a statement untrue, inaccurate, incomplete or misleading as a defence to a claim for breach of Warranties or covenant or obligation of the Allottee.

**18. INDEMNITIES**

- 18.1. In this clause, a reference to the Nominated Authority shall include the Nominated Authority; the Government of India; any of the departments or ministries of Government of India; and of the officers, employees, staff, advisors, representatives or agents of the Government of India (collectively the "Indemnified Party") and the provisions of this Clause shall be for the benefit of the Indemnified Party, and shall be enforceable by each such Indemnified Party.
- 18.2. The Allottee shall indemnify the Indemnified Party against all liabilities, costs, expenses, damages and losses (including but not limited to any interest, penalties and legal costs (calculated on a full indemnity basis) and all other professional costs and expenses) suffered or incurred by the Indemnified Party arising out of or in connection with:
- (a) any breach of the Warranties
  - (b) Allottee's breach or negligent performance or non-performance of this Agreement;
  - (c) the enforcement of this Agreement;
  - (d) any claim made against the Indemnified Party for actual or alleged infringement of a Third Party's rights arising out of or in connection with mining operations at the Coal Mine or performance or non performance of any of the obligations under this Agreement to the extent that such claim arises out of the breach, negligent performance or failure or delay in performance of this Agreement by the Allottee,



its employees, agents or contractors;

- (e) any claim made against the Indemnified Party by a Third Party for death, personal injury or damage to property arising out of or in connection with mining operations at the Coal Mine or performance or non performance of any of the obligations under this Agreement;
  - (f) any loss or damages caused on account of breach of any Applicable Law by the Allottee, including without limitation any costs incurred by the Nominated Authority in cleaning or rectifying of any environmental damages caused by the Allottee on account of, lack of Good Industry Practice; breach, negligent performance or failure or delay in performance of this Agreement; or non-compliance with Applicable Law.
- 18.3. If any Third Party makes a claim, or notifies an intention to make a claim, against the Indemnified Party which may reasonably be considered likely to give rise to a liability under this indemnity (a "Claim"), the Indemnified Party shall as soon as reasonably practicable, give written notice of the Claim to the Allottee, specifying the nature of the Claim in reasonable detail.
- 18.4. Subject to the Allottee providing security to the Indemnified Party, to the Indemnified Party's sole and absolute satisfaction against any claim, liability, costs, expenses, damages or losses which may be incurred, the Allottee may take such action as it may reasonably deem fit to avoid, dispute, compromise or defend the Claim.
- 18.5. Payments of the amount of Claim shall become due and payable within thirty Business Days of receipt of notice of Claim. If a payment due from the Allottee under this clause is subject to Tax (whether by way of direct assessment or withholding at its source), the Indemnified Party shall be entitled to receive from the Allottee such amounts as shall ensure that the net receipt, after Tax, to the Indemnified Party in respect of the payment is the same as it would have been were the payment not subject to Tax.

## **19. ASSIGNMENT, SECURITY FOR FINANCING**

### **19.1. Prohibition on Assignment**

19.1.1. Except as provided in this Clause 19, the Allottee shall not assign this Agreement, either directly or indirectly, save and except with the prior consent in writing of the Nominated Authority, which consent the Nominated Authority shall be entitled to decline without assigning any reason.

19.1.2. Subject to compliance with provisions of Clause 19.2, this Agreement may be assigned by the Allottee in the following events:





*Allotment Agreement for Talatpalli Coal Mine*

- (a) upon occurrence of a change in Control or transfer which is permissible in terms of Clause 13, to the transferee; or
- (b) upon occurrence of an enforcement event, to a transferee as may be determined by a bank or financial institution in terms of Clause 19.3.

**19.2. Assignment Conditions**

Assignment of this Agreement shall also be subject to the following conditions precedent:

- (a) the proposed assignee must meet the applicable Eligibility Conditions;
- (b) the proposed assignee must agree to unconditionally and irrevocably adhere to the provisions of this Agreement and must enter into a deed of adherence in the manner as prescribed by the Nominated Authority;
- (c) the proposed assignee must have furnished the Performance Security, to substitute any subsisting Performance Security provided by the Allottee;
- (d) the proposed assignee must have paid any other amount due from the Allottee and agree to indemnify and hold the Nominated Authority harmless in all respects against any claims from any Third Party or the Allottee with respect to such assignment.

**19.3. Security for financing, enforcement Event**

19.3.1. Subject to Applicable Laws, the Allottee shall be entitled to create security over the Coal Mine through mortgage for the purposes of availing financing from a bank or financial institutions for the purposes of financing of the Specified End Use Plant or mining operations at the Coal Mine and such security creation shall not require prior approval by the Nominated Authority or the Central Government. It is clarified that the Allottee shall be permitted to enter into any agreement with bank or financial institutions with respect to assignment of this Agreement in terms of this Clause 19 and in such case the assignment conditions mentioned in Clause 19.2 shall not be applicable and the conditions specified in Clause 19.3 shall be applicable.

19.3.2. The Allottee shall keep the Nominated Authority promptly informed about: (i) any default in its obligation under any arrangement with any bank or financial institution; (ii) any security interest created over the Coal Mine; and (iii) any action initiated by the bank or financial institution regarding enforcement of security.

19.3.3. In the event of a default, the banks or financial institutions, as the case may be shall be entitled to enforce their security interest, provided that the conditions listed in Clause 19.2 are met, in the manner provided below:



- (a) the security interest shall be exercised in accordance with the provisions of Applicable Laws and any inter-se agreement between the secured creditors, if any;
- (b) the lead secured creditor (in case of consortium lending) or the secured creditor with the highest exposure (in case of multiple banking), shall be entitled to seek a substitution of the Allottee by providing a written notice (the "Substitution Notice") to the Nominated Authority;
- (c) the Substitution Notice shall contain complete particulars of the proposed transferee (the "Selectee"), particulars of compliance of the Selectee with all the Eligibility Conditions; particulars of the debt due and such data and information as would be necessary and relevant for the Nominated Authority to decide as to the acceptability of the Selectee;
- (d) the Nominated Authority may require such other information as it may deem fit regarding the suitability of the Selectee to receive rights and obligations with respect to the Coal Mine;
- (e) the Substitution Notice must be accompanied by an unconditional undertaking of the Selectee to the effect that it shall upon acceptance by the Nominated Authority observe, comply with, perform and fulfil the residual terms, conditions and covenants of this Agreement as if the Selectee had been the Allottee under this Agreement and to assume, discharge and pay the debt due on the terms and conditions agreed to by the Selectee with the secured creditors. The Selectee shall also undertake to enter into such documents and agreements with Nominated Authority as may be necessary or required to give effect to the substitution of the Allottee by the Selectee;
- (f) the Nominated Authority shall convey its acceptance or otherwise of the Selectee within sixty Business Days of (a) the date of receipt of the Substitution Notice; or (b) the date of receipt of the additional information and clarifications requested in respect of any data, particulars or information comprised in the Substitution Notice, whichever is later.
- (g) In the event that the Nominated Authority fails to communicate its acceptance or otherwise or the objections if any it has to the acceptance of the Substitution Notice, within the time specified in sub-clause (f) above, the Nominated Authority shall be deemed to have accepted the Substitution Notice and the Selectee.

19.3.4. Upon acceptance of the Selectee by the Nominated Authority or the Nominated Authority having been deemed to have accepted the Substitution Notice, this Agreement shall be



deemed to be assigned in favour of the Selectee without any further act or deed of the Allottee.

## **20. INSURANCE**

20.1. At all times during the Term hereof, the Allottee will maintain, and cause its contractors and sub-contractors to maintain, with financially sound and reputable insurers, insurance against such casualties and contingencies, of such types, on such terms and in such amounts (including deductibles, co-insurance and self-insurance, if adequate reserves are maintained with respect thereto) as is consistent with Good Industry Practice.

## **21. ACCOUNTS AND AUDIT**

### **21.1. Audited Accounts**

The Allottee shall maintain books of accounts recording all its receipts, income, expenditure, payment, assets and liabilities in accordance with Good Industry Practice and Applicable Laws.

### **21.2. Appointment of Auditors**

The Nominated Authority shall have the right, but not the obligation, to appoint at its cost, from time to time and at any time, an auditing firm or an auditor to audit and verify all those matters, expenses, costs, realizations and things with respect to the Coal Mine or which the statutory auditors are required to do, undertake or certify pursuant to this Agreement.

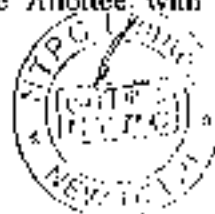
### **21.3. Certification of claims by Statutory Auditors**

Any claim or document provided by the Allottee to the Nominated Authority in connection with or relating to receipts, income, payments, costs, expenses, accounts or audit, and any matter incidental thereto shall be valid and effective only if certified by its statutory auditors.

## **22. GOVERNMENT INSPECTION**

22.1. The Nominated Authority, through its authorized representatives shall have the right to free ingress and egress within any part of the Coal Mine at any time to inspect works or activities being undertaken or implemented by the Allottee in order to monitor and verify compliance with the terms of this Agreement and all Applicable Laws.

22.2. The Nominated Authority, through its authorized representatives, shall have access to the Allottee's financial and other records and transactions (relatable to any period) at any time upon reasonable advance notice, the right to copy therefrom, for the purpose of assessing the performance and compliance of the Allottee with the terms of this



Agreement and all Applicable Laws, rules and regulations or to aid in the enforcement of the same.

22.3. The Nominated Authority shall have the right to conduct, either directly or indirectly through any Third Party, a performance audit to verify compliance by the Allottee, of its obligations hereunder.

## 23. EVENT OF FORCE MAJEURE

23.1. Event of Force Majeure means any of the following events or circumstances or combination of the following events or circumstances which are beyond the reasonable control of the Allottee, which could not have been prevented by Good Industry Practice or by the exercise of reasonable skill and care and which or any consequences of which, have a material and adverse effect upon the performance by the Allottee of its obligations or enjoyment of its rights:

- (i) acts of God, flood, drought, earthquake or other natural disaster;
- (ii) epidemic or pandemic;
- (iii) terrorist attack, civil war, civil commotion or riots, war, threat of or preparation for war, armed conflict, imposition of sanctions, embargo, or breaking off of diplomatic relations;
- (iv) nuclear, chemical or biological contamination or sonic boom;
- (v) collapse of buildings, fire, explosion or accident;
- (vi) any labour or trade dispute, strikes, industrial action or lockouts (other than those solely affecting Allottee claiming the same as an Event of Force Majeure and attributable to such Allottee's policies regarding labour, compensation or employment or labour-related conditions).

23.2. Provided it has complied with Clause 23.3, if the Allottee is prevented, hindered or delayed in or from performing any of its obligations under this Agreement by an Event of Force Majeure, the Allottee shall not be in breach of this Agreement or otherwise liable for any such failure or delay in the performance of such obligations.

23.3. Upon occurrence of an Event of Force Majeure, the Allottee shall:

- (i) as soon as reasonably practicable after the start of the Event of Force Majeure but no later than thirty Business Days from its start, notify the Nominated Authority and the Central Government in writing of the Event of Force Majeure, the date on which it started, its likely or potential duration, and the effect of the Event of Force Majeure on its ability to perform any of its obligations under this



Agreement; and

- (ii) use all reasonable endeavours to mitigate the effect of the Event of Force Majeure on the performance of its obligations including following of Good Industry Practice.

23.4. If an obligation is suspended by reason of an Event of Force Majeure for more than one month continuously, the Parties shall enter into good faith negotiations to revise the terms of this Agreement to reflect the changed circumstances, provided that this Agreement shall remain in effect during the period during which the Parties are negotiating the terms of any such revision.

23.5. Notwithstanding Clause 23.4, in the event that performance of obligations under this Agreement remain suspended for a period of: (a) six months continuously; (b) or nine months over a period of one year, then the Nominated Authority may in its sole discretion terminate this Agreement in the manner provided in Clause 24 (EFFECTIVE DATE, TERM AND TERMINATION).

## 24. EFFECTIVE DATE, TERM AND TERMINATION

### 24.1. Effective Date

This Agreement shall come into effect on the Agreement Date. It is clarified that the provisions of this Agreement shall also be included in the Mining Lease.

### 24.2. Term

This Agreement shall commence on the dates mentioned in Clause 24.1 and shall continue for the period of validity of the Mining Lease granted to the Allottee ("Term"), unless agreed otherwise by the Parties and unless this Agreement is terminated earlier in accordance with its terms prior to the expiry of the Term.

### 24.3. Termination

24.3.1. This Agreement may be terminated upon occurrence of any of the following events (each a "Termination Event"):

- (a) failure of the Allottee to make payment of the Upfront Amount in the manner provided in Clause 5.2;
- (b) failure of the Allottee to complete the Allotment Conditions within the time specified in Clause 3.2;
- (c) failure of the Allottee to make payment of additional levy within the time specified under Rule 18 of the Rules, if required to be paid;



- (d) occurrence of any Appropriation Event resulting in appropriation of the entire Performance Security or on account of one or more Appropriation Events, an amount equal to hundred per cent of the Performance Security being appropriated in aggregate (in one or more instances) as provided in Clause 6.3;
- (e) failure of the Allottee to replenish the Performance Security within a period of 15 Business Days, in the event that a part of the Performance Security has been appropriated;
- (f) non compliance of the Allottee with the Efficiency Parameters for more than five instances (in aggregate and not over a specified period) as provided in Clause 10.3;
- (g) suspension of obligations on account of an Event of Force Majeure for a period longer than as specified in Clause 23.5;
- (h) failure to make payment of the Monthly Payment for more than three instances (in aggregate and not over a specified period) in terms of Clause 9.2.2;
- (i) failure to provide any information requested by the Nominated Authority in terms of this Agreement;
- (j) failure of the Allottee to ensure continued compliance with the Eligibility Conditions;
- (k) in case the Allottee is a joint venture company, alienation or transfer of any interest, except the taking of loans or advances from a bank or financial institution, in the joint venture of whatsoever nature including ownership in favour of a Third Party;
- (l) a company other than a Government company or corporation holding more than twenty-six per cent of the paid up share capital of the Allottee, either directly or through any of its subsidiary company or associate company (such expressions having meaning ascribed under the Companies Act, 2013);
- (m) the Allottee dissolves, liquidates, becomes insolvent, commits an act of bankruptcy, makes an assignment for the benefit of creditors, petitions or applies to any tribunal for the appointment of a trustee or receiver for itself, or commences any proceedings concerning itself under a law concerning bankruptcy, or insolvency other than for the purposes of corporate reorganization;
- (n) any other breach of any of the provisions of this Agreement (including in case of the Warranties being untrue or misleading or incorrect in any manner whatsoever), which is not cured by the Allottee within thirty Business Days of



becoming aware of the same, on its own accord or upon receipt of a notice from the Nominated Authority;

- (o) surrender of the Coal Mine by the Allottee;
- (p) cessation of coal mining operation exceeding a period of one year continuously, or 18 months over a period of two years without occurrence of any Event of Force Majeure;
- (q) termination of the Mining Lease granted to the Allottee; or
- (r) in the opinion of the Central Government, it is expedient in public interest to terminate this Agreement.

24.3.2. Upon occurrence of a Termination Event, the Nominated Authority may elect to terminate this Agreement by providing a 15 Business Days written notice to the Allottee. The determination of the Nominated Authority regarding occurrence of a Termination Event shall be final and binding on the Allottee.

24.3.3. In case the Nominated Authority elects to terminate this Agreement, then the Performance Security and all other payments made by the Allottee shall be forfeited and the Allottee shall not be entitled to any benefits under this Agreement but would continue to be liable towards any antecedent liability, all obligations accrued before the effective date of the surrender/ termination and also for the obligations that must be fulfilled after termination.

#### 24.4. Retention of Books and Records

Upon termination of this Agreement, the Allottee shall retain all documents, books and records related to the Coal Mine for a period of three years or such longer period as may be specified under Applicable Law. It is clarified that the Allottee may also retain such books and records in electronic form if permitted under Applicable Laws.

### 25. GOVERNING LAW AND DISPUTE RESOLUTION

25.1. This Agreement and all questions of its interpretation shall be construed in accordance with the laws of India, without regard to its principles of conflicts of laws.

25.2. Any dispute, controversy or claim arising out of or relating to or in connection with the Agreement including a dispute as to the validity or existence of this Agreement, or any breach or alleged breach thereof, shall be settled through mutual discussions between the Parties. In this regard, the Allottee shall nominate an officer not below the rank of a director to participate in the discussions on its behalf.

25.3. In the event that the Allottee fails to nominate an officer in the manner required under Clause 25.2; or the Parties are unable to resolve any dispute in accordance with Clause



Allotment Agreement for Talalpalli Coal Mine

25.2 within a period of 30 Business Days starting from the date on which the first notice of dispute was provided by either Party, such dispute shall be resolved in accordance with Section 27 of the Ordinance.

25.4. It is expressly agreed between the Parties, that any existence of a dispute shall not affect in any manner any of the rights of the Nominated Authority under this Agreement, including without limitation the right to appropriate Performance Security or terminate this Agreement, until a final determination in this regard is made.

25.5. The provisions contained in this Clause 25 shall survive the termination of this Agreement.

## 26. MISCELLANEOUS

### 26.1. Time of Essence

Each of the Parties hereby agrees that, with regard to all dates and time periods set forth or referred to in this Agreement, time is of the essence.

### 26.2. Publicity

The Allottee shall not issue any information, document or article for publication in any news or communications media or make any public statement in relation to this Agreement without the prior written consent of the Nominated Authority unless required to do so by Applicable Law, provided that prior to any disclosure of any such information required by Applicable Law, the Allottee must first notify the Nominated Authority, who shall then have the opportunity to respond to and/or dispute such intended disclosure.

### 26.3. Severability

26.3.1. If any term, provision, covenant or restriction of this Agreement or the application thereof to any Person or circumstance shall be held invalid, void or unenforceable by a court of competent jurisdiction or other Governmental Authority to any extent, the remainder of the terms, provisions, covenants and restrictions of this Agreement and the application thereof to Persons or circumstances (other than those as to which any portion of this Agreement is held invalid, void or unenforceable) shall not be affected thereby and shall remain in full force and effect to the fullest extent permitted by law, so long as the economic or legal substance of the transactions contemplated hereby is not affected in any manner materially adverse to any Party.

26.3.2. Upon such a determination, the Parties shall negotiate in good faith to modify this Agreement so as to effect the original intent of the Parties as closely as possible in an acceptable manner in order that the transactions contemplated hereby be consummated as originally contemplated to the fullest extent possible.





**26.4. Costs and Expenses**

26.4.1. The Allottee shall bear its own costs in connection with the negotiation, preparation and execution of this Agreement.

26.4.2. The stamp duty payable for this Agreement shall be borne by the Allottee.

**26.5. Further Assurance**

The Allottee shall cooperate with the Nominated Authority and execute and deliver to the Nominated Authority such instruments and documents and take such other actions as may be requested from time to time in order to carry out, evidence and confirm their rights and the intended purpose of this Agreement.

**26.6. Legal And Prior Rights**

All rights and remedies of the Nominated Authority hereto shall be in addition to all other legal rights and remedies belonging to the Nominated Authority and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid and it is hereby expressly agreed and declared by and between the Parties hereto, that the determination of this Agreement for any cause whatsoever shall be without prejudice to any and all rights and claims of the Nominated Authority, which shall or may have accrued prior thereto.

**26.7. Waiver**

26.7.1. The waiver of any default or breach under this Agreement by the Nominated Authority shall not constitute a waiver of the right to terminate this Agreement for any substantial default of a similar nature or under any other terms and conditions of this Agreement.

26.7.2. No failure or delay by the Nominated Authority in exercising any right or remedy provided by Applicable Law under or pursuant to this Agreement shall impair such right or remedy or operate or be construed as a waiver or variation of it or preclude its exercise at any subsequent time and no single or partial exercise of any such right or remedy shall preclude any other or further exercise of it or the exercise of any other right or remedy. The rights and remedies of the Nominated Authority under or pursuant to this Agreement are cumulative, may be exercised as often as it considers appropriate and are in addition to its rights and remedies under Applicable Law.

26.7.3. Submission of any document, information, report or notice, which contains any information or reference to any default or breach under this Agreement or any Applicable Law, to the Nominated Authority shall not be construed to be a deemed approval of such breach or default and the Nominated Authority may exercise any rights or remedies with respect to such default at any time.



**26.8. Amendments**

No amendment of this Agreement (or of any of the documents referred to in this Agreement) shall be valid unless it is in writing and signed by or on behalf of each of the Parties to it. The expression "amendment" shall include any amendment, variation, supplement, deletion or replacement however effected. Unless expressly agreed, no amendment shall constitute a general waiver of any provisions of this Agreement, nor shall it affect any rights, obligations or liabilities under or pursuant to this Agreement which have already accrued up to the date of amendment, and the rights and obligations of the Parties under or pursuant to this Agreement shall remain in full force and effect, except and only to the extent that they are so amended.

**26.9. Counterparts**

This Agreement may be executed in two counterparts, each of which will be deemed an original, with the same effect as if the signatures thereto and hereto were upon the same instrument, but all of which together will constitute one and the same instrument.

**26.10. No Agency or partnership**

The Parties agree that nothing in this Agreement shall be in any manner interpreted to constitute an agency for and on behalf of any other Party. None of the provisions of this Agreement shall be deemed to constitute a partnership between the Parties hereto and no Party shall have any authority to bind the other Party or shall be deemed to be the agent of the other Party in any way.

**26.11. Notices**

All notices, requests, demands or other communication ("Notice") required or permitted to be given under this Agreement and the provisions contained herein shall be written in English and shall be deemed to be duly sent by registered post with acknowledgment due, or transmitted by facsimile transmission to the other Parties at the address indicated in SCHEDULE H hereof or at such other address as the Party to whom such notices, requests, demands or other communication is to be given shall have last notified to the Party giving the same in the manner provided in this Clause, but no such change of address shall be deemed to have been given until it is actually received by the Party sought to be charged with the knowledge of its contents. Any notice, request, demand or other communication delivered to the Party to whom it is addressed as provided in this Clause 26.11 shall be deemed to have been given and received on the day of its receipt at such address.

A copy of the Notice sent by registered post with acknowledgment due, or transmitted by facsimile transmission may also be sent through email to the email addresses specified in



SCHEDULE H solely for the information of the recipient and shall take effect only when the registered post is actually delivered or the fax is received by the recipient, as the case may be.

#### 26.12. Entire Agreement

This Agreement (including all such deeds and documents issued or executed pursuant hereto or referred to herein) and the Allotment Document constitutes and represents the entire agreement between the Parties with regard to the rights and obligations of each of the Parties and cancels and supersedes all prior arrangements, agreements or understandings, if any, whether oral or in writing, between the Parties on the subject matter hereof or in respect of matters dealt with herein. In the event of a conflict between this Agreement and the Allotment Document, the provisions of this Agreement shall prevail to the extent of the conflict.

#### 26.13. Specific Performance of Obligations

The Nominated Authority shall be entitled to an injunction or injunctions to prevent breaches of this Agreement or to seek or enforce specific performance of this Agreement, in addition to any other legal rights and remedies, without the necessity of demonstrating the inadequacy of monetary damages.

#### 26.14. Power of the Central Government

The Allottee acknowledges that for the purposes of this Agreement, the Central Government is acting through the Nominated Authority pursuant to the Ordinance and the Rules. However, for the purposes of exercise of rights and obligations hereunder and any Applicable Law, the Central Government shall be entitled to act through any of its relevant departments, ministries or any Governmental Agencies and all such relevant departments, ministries or any Governmental Agencies shall be entitled to exercise rights and obligations under this Agreement as if such relevant departments, ministries or any Governmental Agencies were a Party hereto.

[Remaining part of this page intentionally left blank, schedules follow.]



**SCHEDULE A - PARTICULARS OF THE COAL MINE**

<b>Name of Coal Mine</b>	Talaiipalli
<b>Latitude</b>	22°13'35" N to 22°16'08" N
<b>Longitude</b>	83°25'49" E to 83°30'22" E
<b>Coalfield</b>	Mand Raiguda
<b>Villages</b>	Talaiipalli, Bhichinara, Nayarampur, Kudumoha, Raikera, Chotiguda, Ajiigarh & Salehpali
<b>Tehsil/Taluka</b>	Ghargoda
<b>District</b>	Raigarh
<b>State</b>	Chhattisgarh



**SCHEDULE B - PARTICULARS OF THE SPECIFIED END USE PLANT**

Name of Specified End Use Plant	Address	Configuration	Capacity
Lara STPP	Dist. Raigarh, Chhattisgarh	5 x 800 MW	4000 MW

\*MW stands for Mega Watt



**SCHEDULE C - FORMAT OF INTIMATION TO THE NOMINATED AUTHORITY**

To  
The Nominated Authority  
[address]

[date]

Sub: Intimation under Clause 3.1(f) of the Allotment Agreement (the "Agreement").

Dear Sir,

We write with reference to Clause 3.1(f) of the Agreement read with the Ordinance and the Rules, including Section 10 and Section 11 of the Ordinance in terms of which we intend to own and utilise certain movable property of the Prior Allottee and also adopt certain contracts as detailed below:

- (a) particulars of movable property along with the details of the current owner, the terms of negotiations, related documentation and other details, which we intend to own and use in terms of Section 10(1) of the Ordinance is enclosed as Annexure A;
- (b) particulars of movable property along with the details of the current owner, the terms of negotiations, related documentation and other details, which we do not intend to own and use and which we intend to move in terms of Section 10(4) of the Ordinance is enclosed as Annexure B;
- (c) the list of contracts (including contracts with secured creditors<sup>1</sup>) which we intend to adopt and continue, along with complete particulars of such contracts is enclosed as Annexure C;
- (d) the list of contracts (including contracts with secured creditors) which we do not intend to adopt and continue, along with complete particulars of such contracts is enclosed as Annexure D.

Apart from the particulars of the movable property and the contracts listed in this letter, we do not intend to own, use, continue or adopt any other movable property or contracts, as the case may be and do hereby relinquish our rights with respect to the same. We acknowledge that any information not provided in this letter may not be included by the Nominated Authority in the Allotment Order.

<sup>1</sup> Not applicable if the Allottee is the Prior Allottee in which case the secured creditors shall have an option to continue in terms of Section 12(1) of the Ordinance.



Yours Sincerely,

.....

(Authorised Signatory)

Name:

Designation:

**Enclosed: As Above**

Annexure A

Annexure B

Annexure C

Annexure D



**SCHEDULE D - FORMAT OF THE COMPLETION NOTICE**

To  
The Nominated Authority  
[address]

[date]

**Sub: Completion Notice under Clause 3.2.1 of the Allotment Agreement (the "Agreement").**

Dear Sir,

We write with reference to Clause 3.2.1 of the Agreement. We have completed each of the Allotment Conditions specified in Clause 3.1 of the Agreement and the particulars of the same are provided below:

- (a) We continue to be in compliance with all the Eligibility Conditions;
- (b) we have paid the first instalment of the Uplift Amount, in accordance with Clause 5.2.1 through [particulars of payment to be mentioned];
- (c) we have furnished the Performance Security through [particulars of performance security and its manner of delivery to be mentioned];
- (d) we have paid the Fixed Amount through [particulars of payment to be mentioned];
- (e) Additional Levy as was required to be paid has been paid through [particulars of payment to be mentioned]<sup>2</sup>; and
- (f) we have provided a written intimation as was required under Clause 3.1(f) of the Agreement through a letter dated [particulars to be mentioned].

Documentary evidence with respect to completion of each of the Allotment Conditions is enclosed.

Yours Sincerely,

.....  
(Authorised Signatory)

Name:

Designation:

Enclosed: As Above





## SCHEDULE E - EFFICIENCY PARAMETERS

S. N.	Milestone	Time Limit in Months (From the date of the Allotment Order)
		Explored Blocks
1	Prospecting License	0
2	Completion of Exploration and Preparation of Geological Report (GR)	0
	Events after preparation of GR	
3	Mining Lease Application	3
4	Submission of Mining Plan	6
5	Mining Plan Approval	11
6	Previous Approval Application	12
7	Previous Approval	13
8	Forest Clearance Application	14
9	Forest Clearance	21
10	Environment Clearance Application	14
11	Environment Clearance	21
12	Grant of Mining Lease	24
13	Land Acquisition (To reach rated capacity)	36/42(in case of forest land)
14	Opening of Escrow Account	37/43(in case of forest land)
15	Application for Opening Permission	37/43(in case of forest land)
16	Grant of Opening Permission	38/44(in case of forest land)
17	Schedule of Production/ Reaching Rated Capacity	As per approved Mining Plan
18	RUP Synchronisation	As per approved Mining Plan

(a) The percentage for appropriation of Performance Security shall be calculated in proportion to the failure/delay in compliance with the timeliness mentioned for achievement of Efficiency Parameters which shall be broadly based on the weightages prescribed in the recommendations of Inter-Ministerial Group.

(b) In case of non-compliance with the Efficiency Parameters mentioned above, the Successful Bidder shall be required to rectify the same within such time as may be prescribed.



**SCHEDULE F - FORMAT OF PERFORMANCE SECURITY**

[Reference number of the bank]

[date]

To

The Nominated Authority

[address]

**WHEREAS**

- A. [Name of the Allottee] incorporated in India under the Companies Act, [1956/2013] with corporate identity number [CIN of the Allottee], whose registered office is at [address of registered office], India and principal place of business is at [address of principal place of business, if different from registered office] (the "Allottee") is required to provide an unconditional and irrevocable bank guarantee for an amount equal to INR [figures] (Indian Rupees [words]) as a performance security for a period of [period of performance bank guarantee].
- B. The Performance Security is required to be provided to **The President of India**, acting through the Central Government represented by the Nominated Authority appointed under Section 6 of the Coal Mines (Special Provisions) Ordinance, 2014 read with Coal Mines (Special Provisions) Second Ordinance, 2014 (the "Nominated Authority") for discharge of certain obligations under the Allotment Agreement dated [date] (the "Agreement").
- C. We, [name of the bank] (the "Bank") at the request of the Allottee do hereby undertake to pay to the Central Government an amount not exceeding INR [figures] (Indian Rupees [words]) to secure the obligations of the Allottee under the Agreement on demand from the Nominated Authority on the terms and conditions herein contained herein.

**NOW THEREFORE**, the Bank hereby issues in favour of the Nominated Authority this irrevocable and unconditional payment bank guarantee (the "Guarantee") on behalf of the Allottee in the amount INR [figures] (Indian Rupees [words]).

1. The Bank for the purpose hereof unconditionally and irrevocably undertakes to pay to the Nominated Authority without any demur, reservation, caveat, protest or recourse, immediately on receipt of first written demand from the Nominated Authority, a sum or sums (by way of one or more claims) not exceeding in the aggregate the amount of INR



[figures] (Indian Rupees [words]) without the Nominated Authority needing to prove or to show to the Bank grounds or reasons for such demand for the sum specified therein and notwithstanding any dispute or difference between the Nominated Authority and Allottee on any matter whatsoever. The Bank undertakes to pay to the Nominated Authority any money so demanded notwithstanding any dispute or disputes raised by the Allottee in any suit or proceeding pending before any court or tribunal relating thereto the Bank's liability under this present being absolute and unequivocal.

2. The Bank acknowledges that any such demand by the Nominated Authority of the amounts payable by the Bank to the Nominated Authority shall be final, binding and conclusive evidence in respect of the amounts payable by Allottee to the Nominated Authority under the Agreement.
3. The Bank hereby waives the necessity for the Nominated Authority from demanding the aforesaid amount or any part thereof from the Allottee and also waives any right that the Bank may have of first requiring the Nominated Authority to pursue its legal remedies against the Allottee, before presenting any written demand to the Bank for payment under this Guarantee.
4. The Bank further unconditionally agrees with the Nominated Authority that the Nominated Authority shall be at liberty, without the Bank's consent and without affecting in any manner the Bank's obligation under this Guarantee, from time to time to:
  - (i) vary and/or modify any of the terms and conditions of the Agreement;
  - (ii) extend and / or postpone the time for performance of the obligations of the Allottee under the Agreement, or
  - (iii) forbear or enforce any of the rights exercisable by the Nominated Authority against the Allottee under the terms and conditions of the Agreement.

and the Bank shall not be relieved from its liability by reason of any such act or omission on the part of the Nominated Authority or any indulgence by the Nominated Authority to the Allottee or other thing whatsoever which under the law relating to sureties would, but for this provision, have the effect of relieving the Bank of its obligations under this Guarantee.

5. Any payment made hereunder shall be made free and clear of and without deduction for, or on account of, any present or future taxes, levies, imposts, duties, charges, fees, commissions, deductions or withholdings of any nature whatsoever and by whom ever imposed; and where any withholding on a payment is required by law, the Bank shall comply with such withholding obligations and shall pay such additional amount in respect of such payment such that the Nominated Authority receives the full amount due hereunder as if no such withholding had occurred. It is clarified that even in such case the



Allocation Agreement for Tataipalli Coal Mine

obligation of the Bank shall not in any manner exceed in the aggregate the amount of INR [figures] (Indian Rupees [words]).

6. The Bank agrees that Nominated Authority at its option shall be entitled to enforce this Guarantee against the Bank, as a principal debtor in the first instance without proceeding at the first instance against the Alotee.
7. The Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that specified in the Agreement and that it shall continue to be enforceable till all the obligations of the Alotee under or by virtue of the said Agreement with respect to the Performance Security have been fully paid and its claims satisfied or discharged or till the Nominated Authority certifies that the terms and conditions of the Agreement with respect to the Performance Security have been fully and properly carried out by the Alotee and accordingly discharges this guarantee. Notwithstanding anything contained herein, unless a demand or claim under this guarantee is made on the Bank in writing on or before the [date of expiry of bank guarantee] the Bank shall be discharged from all liability under this guarantee thereafter.
8. The payment so made by the Bank under this Guarantee shall be a valid discharge of Bank's liability for payment thereunder and the Nominated Authority shall have no claim against the Bank for making such payment.
9. This Guarantee is subject to the laws of India. Any suit, action, or other proceedings arising out of this Guarantee or the subject matter hereof shall be subject to the exclusive jurisdiction of courts at Delhi.
10. The Bank has the power to issue this Guarantee in favour of the Nominated Authority. This guarantee will not be discharged due to the change in the constitution of the Bank.
11. The Bank undertakes not to revoke this Guarantee during its currency except with the previous consent of the Nominated Authority in writing.
12. The Nominated Authority may, with prior intimation to the Bank, assign the right under this Guarantee to any other departments, ministries or any governmental agencies, which may act in the name of the President of India. The Nominated Authority may also assign this Guarantee in favour of the Governor of a State, with prior intimation to the Bank. Save as provided in this Clause 12, this Guarantee shall not be assignable or transferable.

Dated the [day] day of [month] [year] for the Bank.



Allotment Agreement for Talotipalli Coal Mine

In witness whereof the Bank, through its authorized officer, has set its hand and stamp.

.....  
(Signature)

.....  
(Name and Designation)

.....  
(Bank Stamp)



**SCHEDULE G – WARRANTIES****1. INFORMATION**

- 1.1. The information, provided to the Nominated Authority during the allotment process and any time thereafter, including but not limited to the information contained in this Agreement, by the Allottee is true, accurate and not misleading in any manner whatsoever.
- 1.2. Neither this Agreement nor any of the information and documents provided during the allotment process exercise contains any untrue statement of fact, or omits to state a material fact necessary to make the statements herein or therein not misleading. The documents provided to the Nominated Authority and/or its advisors during the conduct of the allotment process, are true and complete copies of such documents and none of the information provided to the Nominated Authority and/or its advisors during the allotment process was incorrect, inaccurate or misleading in any manner whatsoever.

**2. AUTHORITY**

- 2.1. The Allottee has full legal capacity to enter into this Agreement and to perform its obligations under it and has taken all action necessary to authorise such execution and delivery and the performance of such obligations.
- 2.2. This Agreement has been duly executed and delivered by the Allottee, and (assuming due authorisation, execution and delivery and performance by the Parties), constitutes a legal, valid and binding obligation of the Allottee, enforceable against the Allottee in accordance with the terms of the Agreement.
- 2.3. The Allottee has obtained requisite corporate authorisation, including passing of all necessary resolutions to execute this Agreement and carry out all transactions and actions contemplated under this Agreement and do all necessary acts incidental to this Agreement.
- 2.4. The execution and delivery of this Agreement by the Allottee and the performance of the obligations under it do not and shall not:
- (a) conflict with or violate any provision of the memorandum of association or articles of association of the Allottee;
  - (b) require on the part of the Allottee, any filing with, or permission, authorisation, consent or approval of, any Governmental Authority;
  - (c) conflict with, result in breach of, constitute (with or without due notice or lapse of time or both) a default under, result in the acceleration of obligations under, create in favour of any party any right to terminate, modify or cancel, or require any



notice, consent or waiver under, any contract or instrument to which the Allottee is party or by which it is bound or to which its assets are subject;

- (d) violate, conflict with or constitute a default under any Applicable Law, lien, lease, judgement, award, ordinance, order, writ, injunction, decree, statute, rule or regulation or any other restriction of any kind or character applicable to the Allottee or its properties or assets;

2.5. No person is entitled to any brokerage, finder's, or other similar fee or commission in connection with the transactions contemplated by this Agreement.

### 3. GENERAL

The Allottee

- (a) is a Government company duly organised, validly existing and in good standing under the laws of India;
- (b) meets all the Eligibility Conditions prescribed under the Ordinance read with the Rules and the Allotment Document;
- (c) has the financial standing and capacity to undertake mining operations at the Coal Mine in accordance with the Efficiency Parameters;
- (d) is subject to civil and commercial laws of India with respect to this Agreement and it hereby expressly and irrevocably waives any immunity in any jurisdiction in respect thereof;
- (e) there are no actions, suits, proceedings or investigations pending or to the Allottee's knowledge threatened against it at law or in equity before any court or before any other judicial, quasi judicial or other authority, the outcome of which may constitute an event of default hereunder;
- (f) has neither violated or defaulted nor has knowledge of any violation or default with respect to any order, writ, injunction or any decree of any court or any legally binding order of any Governmental Authority;
- (g) has complied with all Applicable Laws and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities;
- (h) except as set forth in any Mining Lease, all rights and interests of the Allottee in and to the Coal Mine shall pass to and vest in the relevant Governmental Authority on the date of termination or expiry hereof, free and clear of all Encumbrances without any further act or deed on the part of the Allottee or the Central Government;



- (i) no bribe or illegal gratification or any other illegal amount has been paid or will be paid in cash or kind by or on behalf of the Allottee to any Person to procure the rights granted hereunder; and
- (ii) Without prejudice to any express provision contained in this Agreement, the Allottee acknowledges that prior to the execution of this Agreement, the Allottee has after a complete and careful examination made an independent evaluation of the Coal Mine and the information provided by the Nominated Authority, and has determined to its satisfaction the nature and extent of risks and hazards as are likely to arise or may be faced by the Allottee in the course of performance of its obligations hereunder. The Allottee also acknowledges and hereby accepts the risk of inadequacy, mistake or error in or relating to any of the matters set forth above and hereby confirms that the Nominated Authority and any Governmental Authority shall not be liable for the same in any manner whatsoever to the Allottee.





**SCHEDULE II - ADDRESS FOR PROVIDING NOTICES**

**A. Notice to the Nominated Authority**

<b>Address</b>	Nominated Authority, Ministry of Coal, World Trade Tower, Ground Floor, Barakamba Lane, New Delhi - 110001
<b>Telephone</b>	011-23414136
<b>Fax</b>	011-23414136
<b>E-mail (only for information)</b>	nomauthority,moc@nic.in

**With CC to the Central Government**

<b>Address</b>	Ministry of Coal, Shastri Bhawan, New Delhi - 110001
<b>Telephone</b>	011-23073933
<b>Fax</b>	011-23381678
<b>E-mail (only for information)</b>	soea3,moc@nic.in

**B. Notice to the Allottee**

<b>Address</b>	NTPC Limited, NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi - 110003, India
<b>Telephone</b>	011-24362344
<b>Fax</b>	011-24362344
<b>E-mail (only for information)</b>	partham@ntpc.co.in



Allotment Agreement for Talaspalli Coal Mine

IN WITNESS WHEREOF, the Parties have caused this Agreement to be duly executed by their duly authorised representatives on the date and year written below, at New Delhi:

**Signatories**

The Nominated Authority

NTPC Limited

*Vivek Bharadwaj*  
 Name: Vivek Bharadwaj  
 Date: March 30, 2015



*Partha Mukherjee*  
 Name: Partha Mukherjee  
 Designation: General Manager (Coal Mining)  
 Date: March 30, 2015  
 Duly authorized to execute this Agreement pursuant to resolution passed by the board of directors of the NTPC Limited.





INDIA NON JUDICIAL

Government of National Capital Territory of Delhi

e-Stamp

Certificate No.	1 IN-DL63749002731100H
Certificate issued Date	1 07-Sep-2013 05:58 PM
Account Reference	1 IMPACC (PP) 6783913/ DELHI/DL/DLH
Unique Doc. Reference	1 SUBIN-DL/DL/7639130014214410023M
Purchased by	1 NTPC LTD
Description of Document	1 Article 3 General Agreement
Property Description	1 Not Applicable
Consideration Paid (Rs.)	1 0 (Zero)
First Party	1 NTPC LTD
Second Party	1 MINISTRY OF COAL
Stamp Duty Paid By	1 NTPC LTD
Stamp Duty Amount (Rs.)	1 500 (Five hundred only)



Stamp serial printed below QR Code

**THE DEED OF FIRST AMENDMENT TO THE ALLOTMENT AGREEMENT BY AND BETWEEN THE PRESIDENT OF INDIA AND NTPC LIMITED IN RESPECT OF TALAIWALLI COAL MINE.**

This Stamp paper forms an integral part of this deed of first amendment to Allotment Agreement.

 *NTPC Ltd*

Page 1 of 1



Stamping Station  
1. This stamp is valid only for the purpose of stamping documents and is not valid for any other purpose.  
2. The stamp is valid only for the purpose of stamping documents and is not valid for any other purpose.  
3. The stamp is valid only for the purpose of stamping documents and is not valid for any other purpose.

This First Amendment to the Allotment Agreement ("Amendment Agreement") is made by and between following:

#### **PARTIES**

1. **The President of India, acting through the Central Government represented by the Nominated Authority appointed under Section 6 of the Coal Mines (Special Provisions) Act, 2011 (the "Nominated Authority").**
2. **NTPC Limited incorporated in India under the Companies Act, 1956 with corporate identity number 140101DL1575GCH07986, whose registered office is at NTPC Bhawan, Scarpe Complex, 7, Institutional Area, Lodhi Road, New Delhi - 110003, India (the "Allottee").**

#### **BACKGROUND**

- A. The Allotment Agreement dated March 30, 2011 (the "Original Agreement") was entered into between the Nominated Authority and the Allottee.
- B. Subsequent to the execution of the Original Agreement, the Nominated Authority has noted that for even for minor changes in the Original Agreement, such as particulars of bank accounts and e-mail addresses, etc., an amendment agreement is required to be executed. Thus, for operational convenience Nominated Authority considered to provide a mechanism for amendment of certain provisions of the Original Agreement through a written notice, without requiring execution of an amendment agreement to the Original Agreement.
- C. The Nominated Authority is pleased to permit certain amendments of the Original Agreement.
- D. Accordingly, in terms of Clause 26.8 of the Original Agreement, the Nominated Authority and the Allottee are entering into this Amendment Agreement to record certain amendments to the Original Agreement.

**NOW THEREFORE**, in consideration of the mutual covenants, terms and conditions and understandings set forth in this Amendment Agreement and the Original Agreement, and other good and valuable consideration (the adequacy of which are hereby mutually acknowledged), the Parties with the intent to be legally bound hereby agree as follows:

#### **1. DEFINITIONS AND INTERPRETATION**

The definitions and rules of interpretation as specified in the Original Agreement shall apply to this Amendment Agreement.



**2. AMENDMENTS**

- 2.1. The following definition be and is hereby added prior to Clause 1.1.1 of the Original Agreement:

*"1.1.1 "Act" shall mean the Coal Mines (Special Provisions) Act, 2015"*

- 2.2. All references to the expression "the Ordinance" in the Original Agreement be and are hereby substituted by the expression "The Act".

- 2.3. Schedule I of the Original Agreement is hereby substituted with the revised Schedule I as provided in the Schedule to this Amendment Agreement.

- 2.4. Clause 1.1.2 of the Original Agreement is hereby substituted with the revised Clause 1.1.2 as provided below:

*"Designated Bank Account" shall mean the following bank account of the Nominating Authority:*

*Name of the bank: United Bank of India*

*Account number: 0270010414300*

*Name of the account holder: PAO, Mo Coal*

*BIC Code: UTBIIN33*

- 2.5. Clause 3.1 (d) of the Original Agreement is hereby substituted with the revised Clause 3.1 (d) as provided below:

*"The Allottee having deposited an amount equal to INR 1,07,33,71,118.82 (Indian Rupees One Hundred Seven Crores Fifty Five Lakh Seventy One Thousand One Hundred Thirty Nine and Eighty Two Paise), being the Final Amount, in the Designated Bank Account, it is clarified that any upward revision in the Final Amount on a subsequent date by the Government or the Nominating Authority consequent to any process or on the orders of any competent court of law, shall also be payable by the Allottee on receipt of any notice in that effect from the Nominating Authority."*

- 2.6. Clause 3.2.2 of the Original Agreement is hereby substituted with the revised Clause 3.2.2 as provided below:

*"In the event the Allottee does not provide a Completion Notice with respect to each of the Allotment Conditions listed in Clauses 1.1(a), 3.1(b), 3.1(c), 3.1(d), 3.1(e) (in the cases where the Allottee is a Free Allottee for the Coal Mine or any other Schedule I coal mine (as defined in the Act) and Clause 3.1(f), within 184 Days of the Agreement Date, then the Nominating Authority may terminate this Agreement without incurring any liability whatsoever by providing a written notice to the Allottee. It is clarified that in such event the Allottee shall not be entitled to receive the Allotment Order and the*



*Nominating Authority shall be entitled to dispose the Coal Mine in the manner provided in the Act and the Rules, including through re-uction by allotment or through appointment of a designated executor."*

27. Clause 3.2.3 of the Original Agreement is hereby substituted with the revised Clause 3.2.3 as provided below:

*"If the Allottee does not provide a Completion Notice with respect to 3.1(f) and fails to provide a written intention in substantially the same form as provided in SCHEDULE C within 184 Days of the Agreement Date, then it shall be deemed that the Allottee is not desirous of owning or utilizing any movable property or continuing any contract. In such cases, without prejudice to Clause 3.2.2, the Nominating Authority may elect to issue the Allotment Order without including aforementioned particulars in the Allotment Order (if all other Allotment Conditions have been satisfied by the Allottee and corresponding Completion Notice have been provided to the Nominating Authority)."*

28. Clause 8.2.2 of the Original Agreement is hereby substituted with the revised Clause 8.2.2 as provided below:

*"Any middling or washery rejects generated from the Coal Mine may be sold by the Allottee only with the prior approval of the Coal Controller's Organisation and the Allottee shall maintain separate records for the middling or washery rejects generated, utilized and sold. However, the middling or washery rejects generated from the Coal Mine should in no event, exceed the normative limits."*

29. In Clause 18.2, Sub-clause (g) is hereby added after Sub-clause (f) as provided below:

*"(g) Any claim made to or against the Indemnified Party hereinafter for any amount ascertainable as Flood Amount in terms of the Allotment Document and the Act."*

30. After Clause 26.14 of the Original Agreement a new Clause 26.15, as provided below, shall be inserted:

***"26.15. Change Notice***

*Notwithstanding anything contained herein, the Nominating Authority may issue a change notice ("Change Notice") for change in particulars of*

- (a) the Designated Bank Account;*
- (b) the number of days within which the Completion Notice is required to be provided in terms of Clauses 3.2.2 and 3.2.3 of the Original Agreement, by extending the time period provided in Clauses 3.2.2 and 3.2.3 of the Original Agreement, prior to the expiry of such periods; or*
- (c) the e-mail address for submission of the Pre-Commencement Report, the*



*First Amendment to Alliance Agreement for Tebiotuli Coal Mine*

*Companyscope Report, the Monthly Report and the Yearly Report, as specified in Clause 7.2 of the Original Agreement*

*The change notice shall be issued in writing by the Nominated Authority and shall be sent by registered post with acknowledgment due, or transmitted by facsimile transmission at the address of the Alliance as specified in Clause 26.11 for providing Notices. A copy of the Change Notice sent by registered post with acknowledgment due, or transmitted by facsimile transmission may also be sent through email to the email addresses specified pursuant to Clause 28.11 solely for the information of the Alliance and shall be deemed to be delivered when the registered post is actually delivered or the fax is received by the Alliance, or in the case may be*

*Within 7 Business Days of receipt of the Change Notice, the Alliance shall provide a written acknowledgment of its receipt to the Nominated Authority through email. The Change Notice shall take effect from: (a) the date specified in the Change Notice - if such date has been specified in the Change Notice; or (b) the date of its receipt - if no effective date has been specified in the Change Notice."*

### 3. CONTINUING OBLIGATIONS

The Original Agreement and all terms and conditions of the Original Agreement shall continue to remain valid, operative, binding, subsisting, enforceable and in full force and effect save and except to the extent amended by this Amendment Agreement, and the Original Agreement shall always be read in conjunction with this Amendment Agreement.

### 4. MISCELLANEOUS

- 4.1. The provisions of Clause 25 of the Original Agreement (Governing Law and Dispute Resolution), and Clause 26 of the Original Agreement (Miscellaneous), shall mutatis mutandis apply in this Amendment Agreement and shall be deemed to be incorporated by reference.
- 4.2. This Amendment Agreement shall become effective on the date on which execution of this Amendment Agreement by both the Alliance and the Nominated Authority is completed.



## SCHEDULE E – EFFICIENCY PARAMETERS

E. No.	Milestone	Time Limit in Months (From the date of the Allocation Order/ zero date)	Weightage for calculating deduction of Performance Security (in case of failure/ delay in achieving milestone)
1	Prospecting License	0	5
2	Completion of Exploration and Preparation of Geological Report (GR)	0	
Events after preparation of GR			
3	Mining Lease Application	3	7
4	Submission of Mining Plan	6	8
5	Mining Plan Approval	11	8
6	Previous Approval Application	12	6
7	Previous Approval	18	3
8	Forest Clearance Application	11	8
9	Forest Clearance	21	5
10	Environment Clearance Application	11	8
11	Environment Clearance	21	5
12	Grant of Mining Lease	24	3
13	Land Acquisition (To match mine capacity)	36/42 (in case of forest land)	5
14	Opening of Escrow Account	37/43 (in case of forest land)	8
15	Application for Opening Permission	37/43 (in case of forest land)	3
16	Grant of Opening Permission	38/44 (in case of forest land)	2
17	Schedule of Production/ Reaching Rated Capacity	As per approved Mining Plan	8
18	ELP Synchronization	As per approved Mining Plan	3

(a) The percentage for appropriation of Performance Security shall be calculated in proportion to the failure/ delay in compliance with the timelines mentioned for achievement of Efficiency Parameters which shall be broadly based on the above-mentioned weightage.

(b) In case of non-compliance with the Efficiency Parameters mentioned above, the Allocatee shall be required to rectify the same within such time as may be prescribed by the competent authority after consultation on a case to case basis.





First Amendment to Alliance Agreement for Talasmati Coal Mine

IN WITNESS WHEREOF, the Parties have caused this Agreement to be duly executed by their duly authorized representatives on the date and year written below, at New Delhi:

The Nominated Authority

NTPC Limited

  
 Name: Vivek Bhandari  
 Date: September 08, 2015



  
 Name: Partha Mazumder  
 Designation: General Manager (Coal Mining)  
 Date: September 08, 2015  
 Duly authorized to execute this Agreement pursuant to resolution passed by the Board of Directors of NTPC Limited.



**Government of India**  
**Ministry of Coal**  
 On the Nominated Authority

World Trade Tower, New Delhi

Office of the nominated authority constituted under section 5 of the Coal Mines (Special Provisions) Act, 2015

**Allotment order under clause (x) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13**

**In re:** Talaspalli Coal Mine (the "mine") particulars of which is specified in Annexure 1

**Order no.:** 103/31/2015/NA

**Date:** September 08, 2015

**In favour of:** NTPC Limited incorporated in India under the Companies Act, 1956 with corporate identity number L40101DL1973GOI007966, whose registered office is at NTPC House, Scope Complex, 7, Institutional Area, Lodi Road, New Delhi - 110003, India (the "Allottee").

**For utilization in:** End Use Plant situated at Dist. Raigarh, Chhattisgarh, as more particularly described below (the "End Use Plant")

S. No.	Name of Specified End Use Plant	Address	Configuration	Capacity
1	Lam SIPP*	Dist. Raigarh, Chhattisgarh	3 x 800 MW	4000 MW

\*SIPP stands for Super Phosphate

WHEREAS, the nominated authority has, in accordance with the provisions of the Coal Mines (Special Provisions) Act, 2015 (the "Act") and the Coal Mines (Special Provisions) Rules, 2014 (the "rules") conducted the allotment of the mine;

AND WHEREAS the allottee is eligible to receive this allotment order with respect to the mine as described in this allotment order, including, inter-alia -

(a) the coal bearing land acquired by the prior allottee and the lands, in or adjacent to the coal mines used for coal mining operations acquired by the prior allottee; and

(b) any existing mine infrastructure as defined in clause (j) of sub-section (1) of section 3 of the Act.



AND WHEREAS the allottee was also the prior allottee of such Schedule I coal mine;

AND WHEREAS, the allottee has deposited the additional levy payable under sub-section (7) of section 7 of the Act in or prior to the due date specified under rule 18 of the rules;

AND WHEREAS the allottee has furnished a performance bank guarantee dated April 28, 2015 for an amount equal to INR 4,12,58,88,000 (Indian Rupees Four Hundred Twelve Crore Fifty Eight Lakh and Eighty Eight Thousand) issued by State Bank of India in accordance with the allotment document read with sub-section (6) and sub-section (12) of sections 8 of the Act and sub-rule (4) rule 13 of the rules;

AND WHEREAS the allottee has entered into an Allotment Agreement dated March 30, 2015 (as amended) with the nominated authority in accordance with the provisions of sub-rule (5) of rule 13;

NOW, THE NOMINATED AUTHORITY DOES ORDER:

1. On and from September 08, 2015 ("allotment date") and in accordance with sub-section (4) of section 8 read with sub-section (12) section 8 of the Act, with respect to the mine, the following shall stand fully and absolutely transferred and vested in the allottee, to-wit:-

- (a) all the rights, title, interest and liabilities as were available to the prior allottee;
- (b) entitlement to a mining lease to be granted by the State Government with the terms and conditions of the Allotment Agreement forming a part of it on making an application;
- (c) all statutory licences, permits, permissions, approvals or consents as per rules, required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on the same terms and conditions as were applicable to the prior allottee, as listed in the Annexure 2;
- (d) entitlement to any statutory licence, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the Annexure 3;
- (e) entitlement to any statutory licence, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the State Government, to the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the Annexure 4;
- (f) rights appertaining to the approved mining plan of the prior allottee;
- (g) in the event the assigned vendor elects to continue the facility arrangements and security interest, the Allottee shall continue the credit or banking facilities or other lending arrangements in which the prior allottee was a party in terms of clause (a) of sub-section (1) of section 12 of the Act.



2. The Allottee may seek any change in the terms and conditions attached to such license, permit, permissions, approval or consent by making an application in accordance with applicable laws.
3. This Allotment order is liable to be cancelled in accordance with the provisions of sub-rule (4) of rule 13.

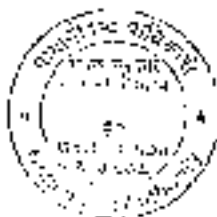
  
(By the nominated authority)

## Annexures

## Annexure 1: Particulars of the mine

## Part A – Description of the mine

<b>Name of Coal Mine</b>	<b>Talaiipali</b>
<b>Latitude</b>	22°13'35" N to 22°16'08" N
<b>Longitude</b>	83°25'49" E to 83°30'22" E
<b>Coalfield</b>	Mand Raigarh
<b>Villages</b>	Talaiipali, Bhichinara, Nayarampur, Kudumoha, Raikera, Chotiguda, Ajiigarh & Salehpali
<b>Tehsil/Taluka</b>	Ghargoda
<b>District</b>	Raigarh
<b>State</b>	Chhattisgarh



## Part B – Description of Land in relation to the mine

Type of Land: Eritorial Land for Mining as per Mining Lease

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
1	Raikara	18/1	02-Feb-15	1.762
2	Raikara	18/2	02-Feb-15	0.202
3	Raikara	20/1	02-Feb-15	0.580
4	Raikara	20/3	02-Feb-15	0.202
5	Raikara	20/5	02-Feb-15	0.405
6	Raikara	22/1	02-Feb-15	0.409
7	Raikara	22/2	02-Feb-15	0.089
8	Raikara	28/1	02-Feb-15	0.440
9	Raikara	29/1	02-Feb-15	0.107
10	Raikara	31	02-Feb-15	0.324
11	Raikara	32/1	02-Feb-15	1.982
12	Raikara	33/1	02-Feb-15	0.613
13	Raikara	36/1	02-Feb-15	0.447
14	Raikara	36/2	02-Feb-15	0.447
15	Raikara	36/3	02-Feb-15	0.447
16	Raikara	36/4	02-Feb-15	0.448
17	Raikara	38	02-Feb-15	0.253
18	Raikara	39/1	02-Feb-15	0.077
19	Raikara	39/2	02-Feb-15	0.557
20	Raikara	40/1	02-Feb-15	0.255
21	Raikara	40/2	02-Feb-15	0.162
22	Raikara	40/4	02-Feb-15	0.524
23	Raikara	40/5	02-Feb-15	0.284
24	Raikara	40/6	02-Feb-15	0.238
25	Raikara	40/7	02-Feb-15	0.237
26	Raikara	40/8	02-Feb-15	0.237
27	Raikara	41/1	02-Feb-15	0.343
28	Raikara	41/2	02-Feb-15	0.343
29	Raikara	41/3	02-Feb-15	0.312
30	Raikara	41/4	02-Feb-15	0.134
31	Raikara	42	02-Feb-15	0.348
32	Raikara	43	02-Feb-15	0.154
33	Raikara	45/1	02-Feb-15	0.182
34	Raikara	45/1	02-Feb-15	0.364
35	Raikara	45/4	02-Feb-15	0.364
36	Raikara	45/1	02-Feb-15	0.405
37	Raikara	45/7	02-Feb-15	0.028
38	Raikara	45/8	02-Feb-15	0.030
39	Raikara	45/9	02-Feb-15	0.040
40	Raikara	45/10	02-Feb-15	0.996
41	Raikara	45/11	02-Feb-15	0.303
42	Raikara	40	02-Feb-15	0.781
43	Raikara	47	02-Feb-15	0.987



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
44	Raikarn	49/2	02-Feb-15	0.412
45	Raikarn	50	02-Feb-15	0.445
46	Raikarn	52	02-Feb-15	0.218
47	Raikarn	51/2	02-Feb-15	0.204
48	Raikarn	54/2	02-Feb-15	0.611
49	Raikarn	55/1	02-Feb-15	0.971
50	Raikarn	55/2	02-Feb-15	0.198
51	Raikarn	57	02-Feb-15	0.387
52	Raikarn	58	02-Feb-15	0.123
53	Raikarn	60	02-Feb-15	0.700
54	Raikarn	61	02-Feb-15	1.603
55	Raikarn	64/1	02-Feb-15	0.486
56	Raikarn	64/2	02-Feb-15	0.121
57	Raikarn	65/1	02-Feb-15	0.302
58	Raikarn	67/1	02-Feb-15	2.614
59	Raikarn	67/2	02-Feb-15	0.575
60	Raikarn	68	02-Feb-15	0.279
61	Raikarn	69/1	02-Feb-15	0.202
62	Raikarn	69/2	02-Feb-15	0.202
63	Raikarn	70/4	02-Feb-15	0.382
64	Raikarn	73/4	02-Feb-15	0.870
65	Raikarn	74/2	02-Feb-15	0.072
66	Raikarn	74/3	02-Feb-15	0.072
67	Raikarn	74/4	02-Feb-15	0.072
68	Raikarn	75/1	02-Feb-15	0.165
69	Raikarn	79	02-Feb-15	0.206
70	Raikarn	80/1	02-Feb-15	0.166
71	Raikarn	80/2	02-Feb-15	0.178
72	Raikarn	80/4	02-Feb-15	0.648
73	Raikarn	80/5	02-Feb-15	0.689
74	Raikarn	81/1	02-Feb-15	0.222
75	Raikarn	81/6	02-Feb-15	0.665
76	Raikarn	81/7	02-Feb-15	0.154
77	Raikarn	82/1	02-Feb-15	0.348
78	Raikarn	83/2	02-Feb-15	0.179
79	Raikarn	83/6	02-Feb-15	0.065
80	Raikarn	83/9	02-Feb-15	0.186
81	Raikarn	85	02-Feb-15	0.530
82	Raikarn	86/1	02-Feb-15	0.691
83	Raikarn	86/2	02-Feb-15	0.490
84	Raikarn	87	02-Feb-15	0.291
85	Raikarn	91/4	02-Feb-15	0.486
86	Raikarn	92	02-Feb-15	0.262
87	Raikarn	93	02-Feb-15	0.282
88	Raikarn	94/2	02-Feb-15	0.377
89	Raikarn	94/3	02-Feb-15	0.417



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
80	Raikarn	94/4	02-Feb-15	0.504
81	Raikarn	94/5	02-Feb-15	0.526
82	Raikarn	95/1	02-Feb-15	0.330
83	Raikarn	95/2	02-Feb-15	0.330
84	Raikarn	96	02-Feb-15	0.486
85	Raikarn	97	02-Feb-15	0.299
86	Raikarn	98	02-Feb-15	0.219
87	Raikarn	102	02-Feb-15	0.644
88	Raikarn	103/1	02-Feb-15	0.708
89	Raikarn	103/2	02-Feb-15	0.242
100	Raikarn	107/2	02-Feb-15	0.378
101	Raikarn	107/4	02-Feb-15	0.202
102	Raikarn	108/1	02-Feb-15	0.235
103	Raikarn	108/2	02-Feb-15	0.263
104	Raikarn	108/3	02-Feb-15	0.134
105	Raikarn	108/4	02-Feb-15	0.119
106	Raikarn	108/5	02-Feb-15	0.548
107	Raikarn	108/6	02-Feb-15	0.238
108	Raikarn	110	02-Feb-15	0.376
109	Raikarn	111	02-Feb-15	0.368
110	Raikarn	113/2	02-Feb-15	0.227
111	Raikarn	114	02-Feb-15	0.737
112	Raikarn	117	02-Feb-15	0.174
113	Raikarn	118/1	02-Feb-15	0.558
114	Raikarn	118/2	02-Feb-15	0.117
115	Raikarn	119	02-Feb-15	1.145
116	Raikarn	121/2	02-Feb-15	0.076
117	Raikarn	122/1	02-Feb-15	0.119
118	Raikarn	122/2	02-Feb-15	0.089
119	Raikarn	122/4	02-Feb-15	0.138
120	Raikarn	122/5	02-Feb-15	0.053
121	Raikarn	122/6	02-Feb-15	0.069
122	Raikarn	123/1	02-Feb-15	9.211
123	Raikarn	125	02-Feb-15	0.178
124	Raikarn	129/1	02-Feb-15	0.728
125	Raikarn	130/1	02-Feb-15	0.101
126	Raikarn	130/2	02-Feb-15	0.271
127	Raikarn	130/3	02-Feb-15	0.417
128	Raikarn	133	02-Feb-15	0.406
129	Raikarn	137/2	02-Feb-15	0.089
130	Raikarn	140	02-Feb-15	0.196
131	Raikarn	142	02-Feb-15	0.405
132	Raikarn	143	02-Feb-15	0.405
133	Raikarn	145	02-Feb-15	0.779
134	Raikarn	148/1	02-Feb-15	1.028
135	Raikarn	148/2	02-Feb-15	0.645





S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
136	Raikara	148/3	02-Feb-15	0.093
137	Raikara	150/1	02-Feb-15	0.635
138	Raikara	150/3	02-Feb-15	0.162
139	Raikara	152	02-Feb-15	0.352
140	Raikara	154	02-Feb-15	0.304
141	Raikara	156/1	02-Feb-15	0.205
142	Raikara	156/2	02-Feb-15	0.206
143	Raikara	156/3	02-Feb-15	0.206
144	Raikara	156/4	02-Feb-15	0.110
145	Raikara	156/6	02-Feb-15	0.121
146	Raikara	157/1	02-Feb-15	0.068
147	Raikara	157/2	02-Feb-15	1.019
148	Raikara	161	02-Feb-15	0.084
149	Raikara	163/2	02-Feb-15	0.013
150	Raikara	166	02-Feb-15	0.259
151	Raikara	168/1	02-Feb-15	1.783
152	Raikara	169	02-Feb-15	1.226
153	Raikara	170/3	02-Feb-15	0.862
154	Raikara	171/1	02-Feb-15	0.527
155	Raikara	171/2	02-Feb-15	2.324
156	Raikara	171/3	02-Feb-15	0.717
157	Raikara	171/4	02-Feb-15	0.384
158	Raikara	171/5	02-Feb-15	0.793
159	Raikara	171/6	02-Feb-15	0.174
160	Raikara	171/7	02-Feb-15	0.635
161	Raikara	171/9	02-Feb-15	0.518
162	Raikara	171/10	02-Feb-15	0.364
163	Raikara	171/11	02-Feb-15	0.364
164	Raikara	171/12	02-Feb-15	0.688
165	Raikara	171/13	02-Feb-15	0.405
166	Raikara	171/14	02-Feb-15	0.101
167	Raikara	172/1	02-Feb-15	0.069
168	Raikara	172/2	02-Feb-15	0.202
169	Raikara	172/3	02-Feb-15	0.069
170	Raikara	172/4	02-Feb-15	0.069
171	Raikara	173	02-Feb-15	2.784
172	Raikara	175/1	02-Feb-15	0.330
173	Raikara	177/1	02-Feb-15	0.417
174	Raikara	177/2	02-Feb-15	0.420
175	Raikara	178/1	02-Feb-15	1.214
176	Raikara	178/2	02-Feb-15	0.809
177	Raikara	178/3	02-Feb-15	1.064
178	Raikara	178/5	02-Feb-15	1.214
179	Raikara	179/1	02-Feb-15	0.202
180	Raikara	179/2	02-Feb-15	1.793
181	Raikara	179/3	02-Feb-15	1.794



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
182	Raikarn	179/4	02-Feb-15	1.794
183	Raikarn	179/5	02-Feb-15	1.794
184	Raikarn	179/7	02-Feb-15	0.309
185	Raikarn	181/1	02-Feb-15	0.368
186	Raikarn	181/2	02-Feb-15	0.243
187	Raikarn	183	02-Feb-15	1.214
188	Raikarn	184/3	02-Feb-15	0.385
189	Raikarn	184/4	02-Feb-15	0.405
190	Raikarn	190	02-Feb-15	0.985
191	Raikarn	193/2	02-Feb-15	0.278
192	Raikarn	193/3	02-Feb-15	0.130
193	Raikarn	195	02-Feb-15	1.053
194	Raikarn	196	02-Feb-15	1.048
195	Raikarn	197/2	02-Feb-15	0.526
196	Raikarn	198/1	02-Feb-15	0.629
197	Raikarn	198/2	02-Feb-15	0.629
198	Raikarn	198/3	02-Feb-15	0.629
199	Raikarn	198/4	02-Feb-15	0.630
200	Raikarn	199	02-Feb-15	0.597
201	Raikarn	201	02-Feb-15	0.293
202	Raikarn	204/2	02-Feb-15	0.110
203	Raikarn	205	02-Feb-15	0.134
204	Raikarn	206/1	02-Feb-15	0.323
205	Raikarn	206/3	02-Feb-15	0.294
206	Raikarn	207	02-Feb-15	0.806
207	Raikarn	208/1	02-Feb-15	0.295
208	Raikarn	208/2	02-Feb-15	0.310
209	Raikarn	208/3	02-Feb-15	0.372
210	Raikarn	208/5	02-Feb-15	0.267
211	Raikarn	209/2	02-Feb-15	0.607
212	Raikarn	211	02-Feb-15	0.704
213	Raikarn	212/4	02-Feb-15	1.300
214	Raikarn	213	02-Feb-15	0.729
215	Raikarn	214/2	02-Feb-15	0.999
216	Raikarn	215/1	02-Feb-15	0.134
217	Raikarn	215/2	02-Feb-15	0.134
218	Raikarn	215/3	02-Feb-15	0.134
219	Raikarn	215/7	02-Feb-15	0.271
220	Raikarn	217/2	02-Feb-15	0.657
221	Raikarn	217/3	02-Feb-15	0.334
222	Raikarn	218	02-Feb-15	0.943
223	Raikarn	220/2	02-Feb-15	1.418
224	Raikarn	224	02-Feb-15	1.543
225	Raikarn	225/1	02-Feb-15	1.599
226	Raikarn	225/2	02-Feb-15	1.598
227	Raikarn	228/1	02-Feb-15	0.270



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
228	Raikarn	233/1	02-Feb-15	1.048
229	Raikarn	233/2	02-Feb-15	0.162
230	Raikarn	236	02-Feb-15	0.484
231	Raikarn	237	02-Feb-15	0.405
232	Raikarn	239/1	02-Feb-15	0.182
233	Raikarn	239/2	02-Feb-15	0.210
234	Raikarn	239/3	02-Feb-15	0.449
235	Raikarn	240/1	02-Feb-15	0.387
236	Raikarn	240/4	02-Feb-15	0.364
237	Raikarn	241/1	02-Feb-15	0.317
238	Raikarn	241/3	02-Feb-15	0.178
239	Raikarn	241/6	02-Feb-15	0.061
240	Raikarn	242/2	02-Feb-15	1.418
241	Raikarn	244	02-Feb-15	0.113
242	Raikarn	245	02-Feb-15	0.808
243	Raikarn	247/1	02-Feb-15	0.098
244	Raikarn	248/1	02-Feb-15	0.403
245	Raikarn	248/3	02-Feb-15	0.135
246	Raikarn	248/4	02-Feb-15	0.135
247	Raikarn	251	02-Feb-15	0.199
248	Raikarn	252/2	02-Feb-15	0.402
249	Raikarn	253	02-Feb-15	0.478
250	Raikarn	254/2	02-Feb-15	1.456
251	Raikarn	254/4	02-Feb-15	0.377
252	Raikarn	254/5	02-Feb-15	0.377
253	Raikarn	255	02-Feb-15	0.269
254	Raikarn	256	02-Feb-15	1.392
255	Raikarn	259	02-Feb-15	0.947
256	Raikarn	261	02-Feb-15	0.154
257	Raikarn	264	02-Feb-15	1.265
258	Raikarn	265	02-Feb-15	1.275
259	Raikarn	266	02-Feb-15	0.551
260	Raikarn	267/1	02-Feb-15	1.998
261	Raikarn	267/2	02-Feb-15	2.347
262	Raikarn	268	02-Feb-15	0.802
263	Raikarn	270/3	02-Feb-15	0.141
264	Raikarn	270/5	02-Feb-15	0.403
265	Raikarn	272	02-Feb-15	0.360
266	Raikarn	273/1	02-Feb-15	0.154
267	Raikarn	273/3	02-Feb-15	0.194
268	Raikarn	274/4	02-Feb-15	0.061
269	Raikarn	277	02-Feb-15	0.202
270	Raikarn	280	02-Feb-15	0.869
271	Raikarn	281/1	02-Feb-15	0.204
272	Raikarn	281/2	02-Feb-15	0.286
273	Raikarn	282/2	02-Feb-15	0.206



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
274	Raikara	2824	02-Feb-15	0.182
275	Raikara	2826	02-Feb-15	0.065
276	Raikara	2821	02-Feb-15	0.268
277	Raikara	2842	02-Feb-15	0.299
278	Raikara	2843	02-Feb-15	0.283
279	Raikara	2844	02-Feb-15	0.283
280	Raikara	2845	02-Feb-15	0.283
281	Raikara	285	02-Feb-15	0.302
282	Raikara	286	02-Feb-15	1.210
283	Raikara	2871	02-Feb-15	0.476
284	Raikara	2881	02-Feb-15	0.083
285	Raikara	2882	02-Feb-15	0.300
286	Raikara	2892	02-Feb-15	0.277
287	Raikara	2911	02-Feb-15	0.077
288	Raikara	294	02-Feb-15	0.555
289	Raikara	2952	02-Feb-15	0.459
290	Raikara	2971	02-Feb-15	0.081
291	Raikara	2981	02-Feb-15	0.218
292	Raikara	3001	02-Feb-15	0.191
293	Raikara	3012	02-Feb-15	0.247
294	Raikara	3035	02-Feb-15	0.083
295	Raikara	3036	02-Feb-15	0.053
296	Raikara	3037	02-Feb-15	0.053
297	Raikara	3043	02-Feb-15	0.338
298	Raikara	308	02-Feb-15	0.591
299	Raikara	3101	02-Feb-15	0.164
300	Raikara	3102	02-Feb-15	0.176
301	Raikara	3141	02-Feb-15	0.101
302	Raikara	3142	02-Feb-15	0.064
303	Raikara	315	02-Feb-15	0.202
304	Raikara	316	02-Feb-15	0.166
305	Raikara	318	02-Feb-15	0.534
306	Raikara	3193	02-Feb-15	0.095
307	Raikara	3195	02-Feb-15	0.329
308	Raikara	3196	02-Feb-15	0.164
309	Raikara	3195	02-Feb-15	0.141
310	Raikara	3196	02-Feb-15	0.182
311	Raikara	3147	02-Feb-15	0.030
312	Raikara	3148	02-Feb-15	0.101
313	Raikara	320	02-Feb-15	0.162
314	Raikara	321	02-Feb-15	0.142
315	Raikara	324	02-Feb-15	0.081
316	Raikara	325	02-Feb-15	0.162
317	Raikara	326	02-Feb-15	0.067
318	Raikara	3272	02-Feb-15	0.435
319	Raikara	3273	02-Feb-15	1.671



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
320	Raikarn	3275	02-Feb-15	0.946
321	Raikarn	328/1	02-Feb-15	0.825
322	Raikarn	328/3	02-Feb-15	0.477
323	Raikarn	328/4	02-Feb-15	0.609
324	Raikarn	329	02-Feb-15	0.190
325	Raikarn	331	02-Feb-15	0.563
326	Raikarn	333/2	02-Feb-15	0.809
327	Raikarn	333/3	02-Feb-15	0.203
328	Raikarn	334	02-Feb-15	0.252
329	Raikarn	333/1	02-Feb-15	0.734
330	Raikarn	333/2	02-Feb-15	0.283
331	Raikarn	337/1	02-Feb-15	0.729
332	Raikarn	338/1	02-Feb-15	0.373
333	Raikarn	339/10	02-Feb-15	0.210
334	Raikarn	340	02-Feb-15	0.567
335	Raikarn	341	02-Feb-15	1.218
336	Raikarn	342/2	02-Feb-15	1.214
337	Raikarn	342/3	02-Feb-15	1.416
338	Raikarn	342/5	02-Feb-15	1.406
339	Raikarn	342/6	02-Feb-15	1.410
340	Raikarn	342/10	02-Feb-15	1.333
341	Raikarn	342/11	02-Feb-15	1.072
342	Raikarn	346/2	02-Feb-15	1.672
343	Raikarn	346/3	02-Feb-15	0.202
344	Raikarn	346/6	02-Feb-15	0.443
345	Raikarn	346/8	02-Feb-15	0.749
346	Raikarn	346/7	02-Feb-15	0.182
347	Raikarn	346/3	02-Feb-15	0.890
348	Raikarn	346/3	02-Feb-15	0.607
349	Raikarn	375/3	02-Feb-15	0.809
350	Raikarn	384/1	02-Feb-15	0.134
351	Raikarn	385/2	02-Feb-15	0.850
352	Raikarn	396	02-Feb-15	0.202
353	Raikarn	398/1	02-Feb-15	0.170
354	Raikarn	398/2	02-Feb-15	0.212
355	Raikarn	398/1	02-Feb-15	0.764
356	Raikarn	398/3	02-Feb-15	0.445
357	Raikarn	398/6	02-Feb-15	0.260
358	Raikarn	400/1	02-Feb-15	0.465
359	Raikarn	400/4	02-Feb-15	0.243
360	Raikarn	494	02-Feb-15	0.073
361	Raikarn	495	02-Feb-15	0.385
362	Raikarn	496/1	02-Feb-15	0.181
363	Raikarn	496/2	02-Feb-15	0.227
364	Raikarn	497/4	02-Feb-15	0.178
365	Raikarn	499	02-Feb-15	0.403



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
366	Kaikara	501	02-Feb-15	0.821
367	Kaikara	503/1	02-Feb-15	0.116
368	Kaikara	505/2	02-Feb-15	0.364
369	Kaikara	503/3	02-Feb-15	0.405
370	Kaikara	505/9	02-Feb-15	0.248
371	Kaikara	503/11	02-Feb-15	0.245
372	Kaikara	505/12	02-Feb-15	0.405
373	Kaikara	505/13	02-Feb-15	0.202
374	Kaikara	505/14	02-Feb-15	1.057
375	Kaikara	506/1	02-Feb-15	0.061
376	Kaikara	506/4	02-Feb-15	0.152
377	Kaikara	115/08	02-Feb-15	0.036
378	Kaikara	115/09	02-Feb-15	0.089
379	Kaikara	115/20	02-Feb-15	0.016
380	Kaikara	118/2	02-Feb-15	0.041
381	Kaikara	118/3	02-Feb-15	0.032
382	Kaikara	118/2	02-Feb-15	0.098
383	Kaikara	540	02-Feb-15	0.251
384	Kaikara	542/1	02-Feb-15	0.061
385	Kaikara	450/2	02-Feb-15	0.130
386	Kaikara	450/3	02-Feb-15	0.131
387	Talasipalli	2/12	02-Feb-15	0.080
388	Talasipalli	2/13	02-Feb-15	0.080
389	Talasipalli	0	02-Feb-15	1.000
390	Talasipalli	8/1	02-Feb-15	0.285
391	Talasipalli	8/4	02-Feb-15	0.160
392	Talasipalli	11/2	02-Feb-15	0.260
393	Talasipalli	11/3	02-Feb-15	0.485
394	Talasipalli	22/1	02-Feb-15	0.400
395	Talasipalli	22/2	02-Feb-15	0.425
396	Talasipalli	24/7	02-Feb-15	0.222
397	Talasipalli	26/2	02-Feb-15	0.226
398	Talasipalli	26/3	02-Feb-15	0.226
399	Talasipalli	26/4	02-Feb-15	0.089
400	Talasipalli	26/5	02-Feb-15	0.089
401	Talasipalli	26/8	02-Feb-15	0.960
402	Talasipalli	26/10	02-Feb-15	0.154
403	Talasipalli	26/11	02-Feb-15	0.202
404	Talasipalli	26/12	02-Feb-15	0.202
405	Talasipalli	26/13	02-Feb-15	0.069
406	Talasipalli	26/14	02-Feb-15	0.251
407	Talasipalli	26/15	02-Feb-15	0.166
408	Talasipalli	26/16	02-Feb-15	0.170
409	Talasipalli	26/17	02-Feb-15	0.251
410	Talasipalli	26/20	02-Feb-15	0.089
411	Talasipalli	26/21	02-Feb-15	0.089



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
412	Talaiipalli	26/22	02-Feb-15	0.194
413	Talaiipalli	26/23	02-Feb-15	0.081
414	Talaiipalli	26/25	02-Feb-15	0.105
415	Talaiipalli	26/26	02-Feb-15	0.085
416	Talaiipalli	26/28	02-Feb-15	0.162
417	Talaiipalli	26/31	02-Feb-15	0.174
418	Talaiipalli	26/33	02-Feb-15	0.097
419	Talaiipalli	26/35	02-Feb-15	0.426
420	Talaiipalli	26/37	02-Feb-15	0.089
421	Talaiipalli	26/38	02-Feb-15	0.069
422	Talaiipalli	26/40	02-Feb-15	0.182
423	Talaiipalli	26/41	02-Feb-15	0.182
424	Talaiipalli	26/42	02-Feb-15	0.150
425	Talaiipalli	26/43	02-Feb-15	0.150
426	Talaiipalli	26/44	02-Feb-15	0.065
427	Talaiipalli	26/45	02-Feb-15	0.081
428	Talaiipalli	26/47	02-Feb-15	0.372
429	Talaiipalli	26/48	02-Feb-15	0.677
430	Talaiipalli	26/49	02-Feb-15	0.129
431	Talaiipalli	26/50	02-Feb-15	0.053
432	Talaiipalli	26/51	02-Feb-15	1.174
433	Talaiipalli	26/52	02-Feb-15	0.142
434	Talaiipalli	26/54	02-Feb-15	0.182
435	Talaiipalli	26/55	02-Feb-15	0.182
436	Talaiipalli	26/56	02-Feb-15	0.210
437	Talaiipalli	26/57	02-Feb-15	0.182
438	Talaiipalli	26/59	02-Feb-15	0.406
439	Talaiipalli	26/60	02-Feb-15	0.784
440	Talaiipalli	26/61	02-Feb-15	0.486
441	Talaiipalli	26/63	02-Feb-15	0.150
442	Talaiipalli	26/64	02-Feb-15	0.210
443	Talaiipalli	29/7	02-Feb-15	0.636
444	Talaiipalli	29/13	02-Feb-15	0.405
445	Talaiipalli	30/1	02-Feb-15	0.357
446	Talaiipalli	30/2	02-Feb-15	0.357
447	Talaiipalli	30/3	02-Feb-15	0.358
448	Talaiipalli	31/5	02-Feb-15	0.182
449	Talaiipalli	32/1	02-Feb-15	0.068
450	Talaiipalli	32/4	02-Feb-15	0.068
451	Talaiipalli	32/5	02-Feb-15	0.060
452	Talaiipalli	33/7	02-Feb-15	0.202
453	Talaiipalli	39	02-Feb-15	0.360
454	Talaiipalli	40/1	02-Feb-15	1.663
455	Talaiipalli	40/4	02-Feb-15	1.019
456	Talaiipalli	40/5	02-Feb-15	1.244
457	Talaiipalli	40/6	02-Feb-15	0.243









S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
550	Talaipalli	1310	02-Feb-13	0.447
551	Talaipalli	1311	02-Feb-13	0.263
552	Talaipalli	1312	02-Feb-13	0.263
553	Talaipalli	1313	02-Feb-13	0.030
554	Talaipalli	1318	02-Feb-13	0.061
	<b>Total</b>			<b>241.465</b>

Note: Land Rights vested on NTPC Limited by virtue of Section 11 notification under C.B.I Act

Type of Land: Leasehold Land for Mining as per Mining Lease

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	766.29



**Part C – Description of Mine Infrastructure in relation to the mine****C1- Mine Infrastructure: Immovable Assets**

S. No.	Head of Assets	Description (Nature of Assets)
1	CWIP - Railway Siding	Railway Siding (Being Amount paid as Credit Charge)
2	Other Holdings	Other: At Thirupulladi

**C2- Mine Infrastructure: Land for Compensatory Afforestation**

Type of Land: Freehold Land for Compensatory Afforestation

Nil

Type of Land: Leasehold Land for Compensatory Afforestation

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-

**C3- Mine Infrastructure: Resettlement and Rehabilitation Land**

Type of Land: Resettlement and Rehabilitation Freehold Land

Nil

Type of Land: Resettlement and Rehabilitation Leasehold Land

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-



**Annexure 2: Particulars of statutory licences, permits, permissions, approvals or consents issued by the Central Government which are being transferred along with this Allotment Order.**

S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Approval of Mining Plan and Mine Closure Plan Mining Plan (February, 2010)	Ministry of Coal	No.13016/29/2003- CA-I (Vol.III)	31.03.2010



**Annexure 3: Particulars of statutory licenses, permits, permissions, approvals or consents issued by the Central Government to be obtained on application by the Aletta.**

S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Opening of Treasury Account	Ministry of Coal - CCO		05.04.2014
2.	Environment Clearance	Ministry of Environment and Forests	No. 11015/279/2009-1A/JFM	02.01.2013
3.	Forest Clearance - a) Stage 1	Ministry of Environment and Forests	F. No.8-18/2012-FC	05.11.2012
	b) Stage 2		F. No.8-18/2012-FC	28.09.01.2014



Annexure 4: Particulars of statutory clearances, permits, permissions, approvals or consents issued by the State Government to be obtained on application by the allottee.

S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Consent to establish	Chhattisgarh Environment Conservation Board	No. 6466/INCD/201 5	06.01.2015



Government of India  
Ministry of Environment, Forest & Climate Change

Indira Paryavaran Bhawan  
Aliganj Road,  
Jor Bagh, New Delhi

No. J-11015/279/2009-IA-II(M) Pt. file

Dated 28<sup>th</sup> October, 2015

To,

The Managing Director,  
M/s NTPC Limited.  
NTPC Bhawan, Scope Complex,  
7, Institutional Area, Lodhi Road,  
New Delhi -110003  
Email: [partham@ntpc.co.in](mailto:partham@ntpc.co.in)

*R. E. D. (C.M.)*  
*G.M. (M-TS)*  
*DA*  
*13/11*

**Sub: Revalidation/Transfer of Environmental Clearance of Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudumoha, Ralkera, Chotiguda, Ajjigarh, & Salohpali, Tehsil Gharghoda, District Raigarh (Chhattisgarh) – reg.**

The Ministry of Environment, Forest and Climate Change (MoEFCC), in accordance with the Environmental Impact Assessment (EIA) Notification, 2006 and subsequent amendment thereto had accorded Environmental Clearance (EC) for Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudumoha, Ralkera, Chotiguda, Ajjigarh, & Salohpali, Tehsil Gharghoda, District Raigarh (Chhattisgarh) to M/s National Thermal Power Corporation Limited subject to compliance of terms and conditions stipulated therein vide letter No. J-11015/279/2009-IA-II (M) dated 2<sup>nd</sup> January, 2013.

WHEREAS the Hon'ble Supreme Court of India vide judgment dated 25<sup>th</sup> August, 2014 read with the order dated 24<sup>th</sup> September, 2014 has cancelled the allocation of 204 coal blocks and issued directions with regard to such coal blocks wherein the Central Government in pursuance of the said directions has to take immediate action to implement the said order.

निर्वाह/DIR (C)  
निर्वाह/DIR (O)  
निर्वाह/DIR (T)  
निर्वाह/DIR (HR)  
निर्वाह/DIR (PRO)  
निर्वाह/DIR (F)  
निर्वाह/RED ( )  
निर्वाह/ED ( )

Page 1 of 3

Revalidation/Transfer, Talaipalli NTPC to NTPC



WHEREAS in pursuance of the judgment and order of the Hon'ble Supreme Court, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Second Ordinance, 2014 and the Coal Mines (Special Provisions) Rules, 2014 conducted the auction of the mines

WHEREAS Ministry of Coal (MOC) vide letter No. **13016/38/2015-CA-III** dated 18<sup>th</sup> September, 2015 has informed that, their Ministry has allotted 8 Coal Mines through allotment routes to 3 different allottees. MOC has requested this Ministry to facilitate transfer of the Environment Clearance and Forest Clearance of these blocks to the successful allottees.

WHEREAS Ministry of Coal vide Allotment Order under clause (c) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 and Order No. **103/31/2015/NA** dated 8<sup>th</sup> September, 2015 has allotted the Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajilgarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgrah) to M/s National Thermal Power Corporation Limited as the successful allottee.

WHEREAS vide Gazette Notification S.O. 811 (E) Notification dated 23.03.2015, MOEFCC has made amendments to paragraph 11 in the Gazette Notification S.O.1533 (E) dated 14<sup>th</sup> September, 2006. Vide the said amendment; where an allocation of coal block is cancelled in any legal proceeding; or by the Government in accordance with law, the environmental clearance granted in respect of such coal block may be transferred, subject to the same validity period as was initially granted, to any legal person to whom such block is subsequently allocated, and in such case, obtaining of 'no objection' from either the holder of environment clearance or from the regulatory authority concerned shall not be necessary and no reference shall be made to the Expert Appraisal Committee or the State Level Expert Appraisal Committee concerned.

WHEREAS in light of the MOC Allotment Order No. **103/31/2015/NA** dated 8<sup>th</sup> September, 2015, transfer of EC may not be warranted as the Successful Allottee M/s National Thermal Power Corporation Limited is already in possession of EC letter No. **J-11015/279/2009-JA.II (M)** dated 2<sup>nd</sup> January, 2013.

However, the said EC may be considered for revalidation in favour of M/s National Thermal Power Corporation Limited for Talaipalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2349.35 ha) in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajilgarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgrah) subject to the following conditions.



- (i) Any change in scope of work will attract the provisions of the Environment (Protection) Act, 1986 and Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments / circulars.
- (ii) All conditions stipulated in the FC letter No.J-11015/279/2009-1A.II (M) dated 2<sup>nd</sup> January, 2013 shall remain unchanged.
- (iii) The allottee shall be liable, if any, for any act of violation of the EP Act, 1986 / EIA Notification 2006/subsequent amendments and circulars which it has inherited during the revalidation/transfer.
- (iv) Allottee shall be liable for compliance of all court directions, if any.

  
(P. R. Sakhare)  
Scientist C

Copy to .

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. The Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arera Colony, Bhopal – 462016.
3. The Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur
4. The Member Secretary, Chhattisgarh State Environment Conservation Board, 1- Tilak Nagar, Shiv Mandir Chowk, Main Road, Avanti Vihar, Raipur – Chhattisgarh – 492001..
5. The Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi -110 032
6. The Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi
7. The Advisor, Coal India Limited, SCOPE Minar, Core-I, 4<sup>th</sup> Floor, Vikas Marg, Laxmi nagar New Delhi.
8. The District Collector, Raigarh, Government of Chhattisgarh
9. Monitoring File    10.    Guard File    11.    Record File    12. Notice Board

  
(P. R. Sakhare)  
Scientist C



**COMMENCEMENT PLAN (Schedule-III Mines)**

**Name of Coal Block : TALAIPELLI**

Sl.	Milestone	Time Limit in Months (From the Date of Vesting /Allotment Order/Zero Date) for explored coal block	Schedule - latest by (Considering 08 <sup>th</sup> Sept.'15 as "ZERO DATE")
1	Appointment of MDO	No Schedule	Dec.'16
2	Land Acquisition (To reach rated capacity)	42 (in case of Forest Land)	08.03.19
3	<b>Application for Opening Permission to</b>		
	DGMS	No Schedule	08.12.18
	Coal Controller	No Schedule	08.01.19
	SPCB	43 (in case of Forest Land)	08.04.19
4	<b>Grant of Opening Permission from</b>		
	DGMS	No Schedule	08.05.19
	Coal Controller	No Schedule	08.05.19
	SPCB	44 (in case of Forest Land)	08.05.19
5	Commencement of Mining Operations	No Schedule	May.'19
6	Schedule of Production / Reaching Rated Capacity	As per approved Mining Plan	Nov.'19 / 2024-25
7	EUP Synchronisation		Lara STPS
			U1 - 2016-17 U2- 2017-18

**Note:**

Mining Lease is not applicable since mining area land being acquired under CBA Act.

Balance efficiency parameters already achieved.

Copy to  
 GM (E)  
 GM (D-2)  
 GM (E3)  
 GM (D- Budget)  
 Chiefy  
 EOP (M)  
 Agm. Secy  
 A. Singh

INTER OFFICE MEMO

FROM : Company Secretary

TO: Shri Sharad Anand  
RED (Coal Mining)

REF. NO.: 01-SEC. BM. 08

DATED : 30.03.2017

SUBJECT: Proposal for Investment Approval for Tataipalli Coal Mining Project,  
 rated Production Capacity of 18 MTPA

Please find enclosed extracts from the Minutes of 444<sup>th</sup> Meeting of the Board of Directors held on Wednesday, 22<sup>nd</sup> March 2017 on the above subject for your information and necessary action.

  
 (K.P. Gupta)

Encl.: As above

**EXTRACTS FROM THE MINUTES OF 444<sup>TH</sup> MEETING OF THE BOARD OF DIRECTORS HELD ON WEDNESDAY, 22<sup>ND</sup> MARCH 2017**

**Item No.444.2.7 Proposal for Investment Approval for Talaipalli Coal Mining Project, rated Production Capacity of 18 MTPA**

XX XX XX XX XX XX

XX XX XX XX XX XX

The Board, after discussions, passed the following resolution:

Resolved that the Investment Proposal for Talaipalli Coal Mining Project (18 Million Tonnes per annum) at ICRA Management Consulting Services Limited (IMac) appraised Current Estimated Cost of Rs. 3004.00 Crore including Interest During Construction (IDC) & Financing Charges (FC) of Rs. 134.20 Crore (in addition to Working Capital Margin money (WCM) of Rs. 61.28 Crore) as of III<sup>rd</sup> Qtr. '2016 price level and corresponding Indicative Estimated Completed Cost of Rs. 3318.39 Crore including IDC & FC of Rs. 139.28 Crore (in addition to WCM of Rs. 62.50 Crore) for NTPC investment under outsourcing mode of operation, as per the memorandum submitted before the Board be and is hereby approved.

Further resolved that the Chairman & Managing Director, be and is hereby authorised to approve any subsequent updation in the cost estimates as well as the changes that may be required to be carried out based on comments of the agencies according statutory clearances.

\*\*\*\*

4







submitted by the State Government/Regional Office of NREGS along with members of monitoring and implementation committees.

20. The work schedule shall involve the working of the village works and other works under the fund which shall not exceed the work hours normally so as to maintain the regularity of work of Government workers, wherever applicable.
21. No extra work shall be undertaken on the fund itself.
22. The User Agency shall provide fully qualified persons to the labourers and the staff working at the site so as to avoid any damage and process on the nearby lands etc.
23. The layout plan of the project shall not be changed without the prior approval of the Central Government.
24. The fund shall not be used for any purpose other than that specified in the proposal.
25. The fund shall not be diverted to any other work or expenditure not authorized in any other agency's department or project without prior approval of the Central Government.
26. No change in the time and place of the activities shall be allowed.
27. Any work before shall be done only when it is unavoidable and then only with prior approval of the State Government.
28. Any other condition that the concerned Regional Office of the Ministry may specify, from time to time, in the interest of conservation, protection and development of forests & wildlife.
29. All other conditions stipulated in the signed approval for which the user agency has undertaken responsibility shall be complied with.
30. The User Agency shall submit the annual self compliance report in respect of the above stated conditions to the State Government/Regional Office and to the Ministry by the end of March every year.
31. Any other condition that the concerned Regional Office of the Ministry may specify, from time to time, in the interest of conservation, protection and development of forests & wildlife.
32. The user agency shall comply all the provisions of the JEE Act, Forest Regulation, Conditions & Bye-laws (Forest Rules) pertaining to the project, if any, and the working of forest as applicable to the project.

Yours faithfully,

*[Signature]*

(Name of the official)

Assistant Inspector General of Forests (H)

Copy to:

1. The Principal Chief Conservator of Forests, Govt. of Madhya Pradesh,
2. The Joint P.W.D. in charge, Regional Office, Nagpur.
3. The National Bureau of Aquaculture, P.W.D. Govt. of Madhya Pradesh, Bhopal.
4. The User Agency.
5. Monitoring Cell.
6. Guard File.

*[Signature]*

(Name of the official)

Assistant Inspector General of Forests (H)





एनटीपीसी लिमिटेड  
**NTPC Limited**  
 नारायणगुडी / Talaipatti

Ref. No: CS-7014-602-9-FOA

Date: 04.07.2018

WITHOUT PREJUDICE

To,

"M/s. NCC-BGR Consortium" comprising of

1. M/s. NCC Limited (as Consortium Leader)  
 NCC House, Madhapur,  
 Hyderabad- 500 081, Telangana.  
**AND**
2. M/s. BGR Mining & Infra Limited (as Consortium Member)  
 B-2- 596/R, Road No.10, Banjara Hills,  
 Hyderabad-500 034, Telangana

Fax No.: 040-2312 6007 / 6555

Kind Attn.: - Sh. R. Subba Raju, Executive Vice President (F & A)

Subj.: Termination of Contract for Development and Operation of Talaipatti Coal Mining Block; Bid Doc. No. CS-7014-602-9 under clause 24.4(d) of Project Agreement.

Dear Sir,

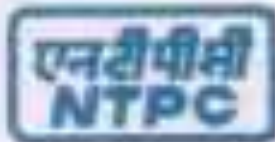
- 1.0 This has reference to the following:
- 1.1 Letter of Acceptance (LOA) bearing Ref. No. CS-7014-602-9-CS-LOA-0612 dated 13.11.2017 and Amendment No. 01 to LOA dated 27.11.2017 for the subject package;
- 1.2 NTPC Letter ref. no. CS-7011/7014-602-9-FOA dated 12.12.2017 to M/s. BGR Mining & Infra Private Limited;
- 1.3 Letter ref. BGR/HYD/NTPC/2017-18/2292 dated 14.12.2017 by M/s. BGR Mining & Infra Private Limited;
- 1.4 NTPC email dated 18.12.2017 informing NCC-BGR Consortium about the calling of BGR MINING& Infra Limited by IEMs vide IEM's Sectt. letter dated 18.12.2017;
- 1.5 NTPC Letter ref. no. CS-7014-602-9-FOA dated 20.12.2017 regarding suspension of Mining Services under the subject Contract;
- 1.6 Letter ref. BGR/HYD/NTPC/TLP/2017/2365 dated 22.12.2017 by M/s. BGR Mining & Infra Limited;



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NTPC Limited  
A MAHINDRA COMPANY

तालापाळी / Talajpalli

- 1.7 Letter ref. BGR/HYD/NTPC/2017-18/2365 dated 24.12.2017 by M/s. BGR Mining & Infra Limited.
- 1.8 Letter ref. nil dated 25.12.2017 by NCC-BGR Consortium.
- 1.9 NTPC Letter ref. no. CS-7014-802-G-FOA dated 29.12.2017 to NCC-BGR Consortium.
- 1.10 Letter ref. nil dated 08.01.2018 by NCC-BGR Consortium.
- 1.11 Letter ref. NCC-BGR/NTPC-Talajpalli/2017-18/01 dated 08.01.2018 by NCC-BGR Consortium.
- 1.12 NTPC Letter ref. no. CS-7014-802-G-FOA dated 10.01.2018 to NCC-BGR Consortium.
- 1.13 Letter ref. nil dated 12.01.2018 & email dated 12.01.2018 by NCC-BGR Consortium.
- 1.14 Dispute letter ref. NCC-BGR/NTPC-Talajpalli/2017-18/02 dated 17.01.2018 by NCC-BGR Consortium.
- 1.15 NTPC Letter ref. no. CS-7014-802-G-FOA dated 29.04.2018 inviting NCC-BGR Consortium for "Good Faith Discussions" in terms of Clause 23.1(i) of Project Agreement, which shall also be construed as discussions under Clause 24.4(c) of the Project Agreement as per Judgements dated 21.01.2019 & 15.02.2019 of Hon'ble Delhi High Court and Order dated 26.04.2019 of Hon'ble Supreme Court of India.
- 1.16 Minutes of Meetings dated 06.05.2019, 15.05.2019 & 27.05.2019 for good faith discussions held between NTPC and NCC-BGR Consortium.
- 1.17 Email dated 18.06.2019 by NCC-BGR Consortium.
- 1.18 NTPC's email dated 04.07.2019.
- 2.0 Subsequent to the award of subject Contract, an FIR (RC AC1 2017 A 0007 dated 07.12.2017) has been registered by CBI for Criminal Conspiracy, public servant obtaining valuable thing without consideration from person concerned in proceeding or business transacted by such public servant and abetting public servant for obtaining illegal gratification, against Sh. Kalamani Bawa, Director (Fin), NTPC, Mr. Rohit Reddy one of the Directors of M/s. BGR Mining & Infra Limited and his associate Mr. Prabhakar Kumar, who handles his tasks in Delhi. According to CBI, the informant disclosed, prima facie, commission of an offence under Sections 11 and 12 of the Prevention of Corruption Act, 1988 inw Section 120-B of the Indian Penal Code, 1860.
- 3.0 Clause 24.3 (b) (xi) of the Project Agreement stipulates that if the Mine Operator, in the reasonable judgement of the Owner has engaged in corrupt or fraudulent practices in competing for or in executing the Agreement pursuant to Clause 9.1, shall be considered as "Mine Operator's Events of Default. Since M/s. BGR Mining & Infra Limited is a member of NCC-BGR Consortium, therefore the above act of abetting a public servant for obtaining illegal gratification, by one of the Directors, Mr. Rohit Reddy and his associate Mr. Prabhakar Kumar of M/s BGR Mining & Infra Limited, is Mine Operator's Events of Default under clause 24.3 (b) (xi) of the Project Agreement.
- 4.0 In view of the aforesaid Mine Operator's Event of Default, the Notice for "Show Cause / Termination for an Event of Default" was issued to you vide our letter bearing ref no. CS-7014-802-G-FOA dated 28.12.2017 under Clause 24.4 (a) of the Project Agreement for the Mine Operator's Event of Default under Clause 24.3 (b)(xi) of Project Agreement, confirming NTPC's intent to terminate this agreement.



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**NTPC Limited**  
A MAJOR GOVT. ENTERPRISE

तालापल्ली / Talapalli

- 5.0 Subsequently, in view of Judgements dated 21.01.2019 & 15.02.2019 of Hon'ble Delhi High Court and Order dated 26.04.2019 of Hon'ble Supreme Court of India, NTPC vide letter dated 29.04.2019 invited NCC-BGR Consortium/Mine Operator for "Good Faith Discussions" on 06.05.2019, in terms of Clause 23.1(b) of Project Agreement, which shall also be construed as discussions under Clause 24.4(c) of the Project Agreement.
- 6.0 Good Faith Discussions commenced on 06.05.2019 between NTPC and NCC-BGR Consortium and same continued on 15.05.2019, 27.05.2019, 17.06.2019 & 18.06.2019.
- 7.0 Based on the Good Faith Discussions held under Clause 24.4(c) of Project Agreement as referred above, it is evident that circumstances constituting the termination event have neither been remedied to the satisfaction of NTPC nor have ceased to apply.
- 8.0 In view of above, NTPC hereby intimates you of its decision to terminate the Project Agreement under clause 24.4(d) of Project Agreement. Accordingly, the Project Agreement shall stand terminated on the expiry of the notice period of 45 days from the date of this letter, i.e. 04.07.2019. This letter is without prejudice to NTPC's other rights, which NTPC is entitled to under the Project Agreement and/or under any applicable law.
- 9.0 Further, we hereby call upon you to provide NTPC a notice of at least 72 hours prior to taking any action against NTPC before any judicial forum and/or other authority whatsoever, and to refrain from obtaining any orders against NTPC without disclosing this entire letter to such judicial forum and/or authority.

Thanking You.

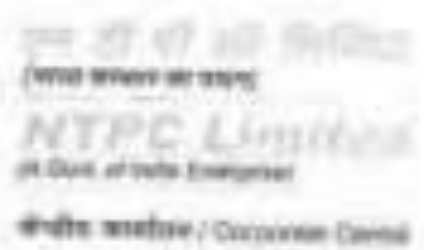
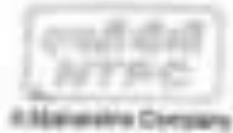
Yours faithfully,  
 For and on behalf of NTPC Limited (Owner)

(RAMESH KHER)  
 CHIEF GENERAL MANAGER  
 Talapalli Coal Mining Project

(Owner's representative)

→ AGM (Mining)





Date: 01.11.2018

Ref:CC:CM:EN03:7014/NA:76

To

Nominated Authority,  
Ministry of Coal,  
Shastri Bhawan,  
New Delhi-110001

Sub: Start of Mining Operations at Talaspali Coal Mining Project (From South Pit) of NTPC Ltd

Dear Sir,

We are pleased to inform you that subsequent to the "Seam Opening Permission" granted by Coal Controller on 30.03.2018, the mining operations have commenced from the South Pit of Talaspali mine from 15.10.2018.

Information regarding the start of mining operations has also been conveyed to DGMS, Coal Controller and Collector, Raigarh (Copy enclosed).

Thanking you.

Yours Sincerely,

  
(Partha Mazumdar)  
ED (Coal Mining)



एन.टी.पी.सी. लिमिटेड  
(एन.टी.पी.सी. लिमिटेड)  
**NTPC Limited**  
(A Bharat Company)  
ग्रहण संख्या / Corporate Centre

Ref:CC/CB/ENGG/7014/NA/77

Date :18.11.2013

To

Nominated Authority,  
Ministry of Coal,  
Shastri Bhawan,  
New Delhi-110001

Sub: Start of Coal Production from Talajgarh Coal Mining Project of NTPC Ltd.

Dear Sir,

We are pleased to inform you that subsequent to the start of mining operations in Talajgarh Coal Mining Project (TLCMP) located in Mand-Rajgarh Coalfield of district Rajgarh (Chhattisgarh) with effect from 15.10.2013, coal extraction has commenced in this block with effect from 18.11.2013.

This is for your kind information please.

Thanking you,

Yours Sincerely,

  
(Partha Basumaty)  
ED (Coal Mining)



# THRIVENI EARTHMOVERS PRIVATE LIMITED

*Engineers & Contractors*

HO: 22/110, Greenways Road, Farlands, Salem, Tamilnadu - 636 016, Email: [info@thriveni.com](mailto:info@thriveni.com) ☎/Fax: 0427 2447667 / 2445909  
 Delhi Office: F-277, New Rajendra Nagar, New Delhi-110060, Email: [kks@thriveni.com](mailto:kks@thriveni.com) Mob/☎: 99587 13999 / 011 48959991  
 CIN No. U60231721999PTC008876

Ref: TEMPL/DEL/KKS/NTPC/COAL/TP#6-2020

Date: 27/08/2020

To,  
 GM(CS)  
 NTPC Limited,  
 6th Floor, Engineering Office Complex,  
 Plot No. A-8A, Sector-24, NOIDA,  
 Distt. Gautam Budh Nagar, (UP),  
 INDIA, Pin-201301

**Sub: Acknowledgment and acceptance of LOA for our Project proposal and Price proposal for the Development and operation of Talaipalli Coal mining Project.**

Dear Sir,

we thankfully acknowledge the Letter of acceptance of our Project Proposal and Price proposal submitted by us for the Development and Operation of Talaipalli Coal mining Project issued by you on 26<sup>th</sup> August 2020. A copy of the LOA duly signed by us on each page as a token of our acceptance is enclosed herewith.

Yours faithfully

For Thriveni Earthmovers Pvt Ltd

( K K Shukla)

Authorised Signatory





एनटीपीसी लिमिटेड  
NTPC Limited

तालापुली / Talapulli

Ref: 1071/TLCMP/Min/2020/F-188/125/1/1

Dated: 23.11.2020

M/s Thriveni Earthmovers Private Ltd.  
Camp Raikera  
Tehsil Ghatghoda  
Balgarh.

Sub: 'Draft Operation Plan' of Talapulli Coal Mine.

Ref: TEMPL's Letter No. TEMPL/TL/Contracts/2020-21/030 dated 25.10.2020.

Dear Sir,

This is in reference to your above-mentioned letter. It is observed that the 'Draft Operational Plan' submitted by you is in variance with 'Approved Mining Plan'. You are therefore, requested to submit Draft Operation Plan in line with the 'Approved Mining Plan'. While doing so, you are requested to take care of the following:

1. To start mining operation simultaneously from East & West pit, since land is already available and not to make any changes in the location of O&B dump area.
2. Not to make any change in coal evacuation infrastructure viz. CHP, Conveyor layout etc. w.r.t to 'Surface Master Plan' wherein conveyor layout for coal evacuation separately, from both West & East pit are considered.
3. Considering the milestone targets of Mine and requirement of coal at our Lara Power Plant, you are also requested to submit an interim plan to commence coal production before end of Development Stage. The same may be done considering the following -
  - a) Working simultaneously from East & West pit right from the beginning.
  - b) Box cut may be planned by 1<sup>st</sup> week of January 2021 so as to start coal production by April 2021.
  - c) Coal production may be targeted on an average of approx 3000 Tons/day for the period from April 2021 to Dec 2021 considering the present coal evacuation arrangement by road.

From January 2022 to March 2022, coal production may be targeted @ approx 25,000 Tons/day which shall commensurate with anticipated operationalisation of MGR coal evacuation system in December 2021. When rail construction for coal transportation through MGR may be taken up till Silos are ready as an interim arrangement.

Contd..2

संलग्नक संख्या: 1071/TLCMP/Min/2020/F-188/125/1/1  
दिनांक: 23.11.2020  
प्राप्त: 25.10.2020

आपका ध्यान देने योग्य है कि यह पत्र केवल सूचना के लिए है।  
आपका ध्यान देने योग्य है कि यह पत्र केवल सूचना के लिए है।

आपका ध्यान देने योग्य है कि यह पत्र केवल सूचना के लिए है।  
आपका ध्यान देने योग्य है कि यह पत्र केवल सूचना के लिए है।





# THRIVENI EARTHMOVERS PRIVATE LIMITED

A World Class Mine Developer Operator

CIN: U60231TZ1998PTC000878



Ref: TEMPL/TL/Contracts/0000-21028

27th Nov 2020

To:

The Head of Project  
Talapali CMP  
NTPC Limited, Lalunga Road,  
Gherghoda Dist: Raigarh - 495111  
Chhattisgarh state

**Sub Agreement Ref No.-CS-1014-802(R)-3-CS-PA-6960 Dated 23.09.2020**  
Development and Operation of Talapali Coal Block - In situ OB Volume based on pit design - Reg

Dear Sir,

With reference to the above subject, we would like to draw your kind attention towards the following:

While preparing the detailed execution plan for Talapali coal block production, we found discrepancies in coal and OB quantities between our pit designs based on the 25th year boundary and the volumes indicated in the Approved Mining Plan (AMP). Coal reserves determined from our designs consider coal from seams greater than 1m thickness and the OB volumes account for coal from seams less than 1m, geological loss and mining loss. There is a considerable difference between the OB volume in the AMP and our design affecting the overall strip ratio and hence, requires declaration.

In this regard, we humbly request for an opportunity to present our designs along with the volumes and the consequent difference in the Strip Ratio (SR) to seek your guidance and concurrence.

This is for your information and necessary action, please.

Thanking You,

Yours Sincerely,

For Thriveni Earthmovers Private Limited

Authorized Signatory

CC: a) HDM Mining Branch



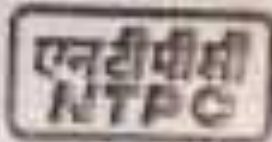
*Detail  
Letter forwarded to  
CS-1014  
22/11/20*

*AGM (Mining) Dept  
It looks up with  
Design - 2020*



- Head Office: 25/2/94, Talapali CMP, Raigarh, Chhattisgarh, India. Raigarh, Chhattisgarh - 495111
- Tel: +91-91-264241-20, Fax: +91-91-264241-21, Email: info@thriveni.com
- Web: 25/2/94, Talapali CMP, Raigarh, Chhattisgarh, India. Raigarh, Chhattisgarh - 495111
- Tel/Fax: 91/91-264241-20/21





एन टी पी सी लिमिटेड  
NTPC Limited

तालापली / Talaspali

However, at the time of mining operation, if there is any variation in the quantity of CB, the same shall be dealt as per the provisions of Project Agreement.

You are hereby advised to submit the revised draft operational plan and interim production plan in-line with the Approved Mining Plan, at the earliest.

This is for your kind information and necessary action please.

Thanking You.

Yours faithfully

  
(Ramesh Kher)  
Chief General Manager

*Received*  
*U. Kher*  
*11/01/2022*

Zimbra

kdesai@ntpc.co.in

Re: Draft Operational Plan dated 06.01.2021 – regarding

**From :** Ram Kumar K <krk@thriveni.com>  
**Subject :** Re: Draft Operational Plan dated 06.01.2021 – regarding

Thu, Feb 04, 2021 06:40 PM

3 attachments

**To :** sanjivkumarsingh01  
 <sanjivkumarsingh01@ntpc.co.in>, Biswajit Chakraborty  
 <bchakraborty01@ntpc.co.in>

**Cc :** Ramesh Kher <rameshkher@ntpc.co.in>, Kudappa  
 Desai <kdesai@ntpc.co.in>, Biswa Singh  
 <bmsingh01@ntpc.co.in>, Amudala Prathap  
 <amudalaprathap@ntpc.co.in>, Sidharth Jain  
 <sdj@thriveni.com>, Sachin Hanandham A  
 <Ash@thriveni.com>, Ravichandran Nannuri  
 <rcn@thriveni.com>, Pradeep Kumar Chintalapati  
 <cpk@thriveni.com>, Hanakrishna VS  
 <cvsh@thriveni.com>

\*\*\*\*Security Advisory: This Email has been sent by a Non-NTPC mail ID from Internet. The Actual sender determined by Security Gateway is [krk@thriveni.com]. Please do not click links contained in this mail or open attachments unless you recognise the source of this email and know the content is safe. \*\*\*\*

Dear Sir,

Thanks for giving us an opportunity to discuss and deliberate our views about the Revised Draft Operational Plan submitted on 06th Jan 2021. As we have received the Revised notes shared by your goodself on 1st & 2nd Feb 2021 at your corporate office, NCSDA. We have prepared and submitted our points for consideration and the same is received in pdf and word format. Kindly refer the file name of "MoM NTPC-TEPC at NCSDA 1st & 2nd Feb Revised DOP".

This is for your kind information please.

Thanks and Regards

Ram Kumar K

m. +91-9652935027, +91-9440516167

On Thu, Jan 28, 2021 at 7:07 PM Amudala Prathap <amudalaprathap@ntpc.co.in> wrote:  
 Dear Sir

The meeting has been scheduled on 01.02.2021 at 2.30 PM and shall continue on 02.02.2021.

— Original Message —

From: Ram Kumar K <krk@thriveni.com>

To: Amudala Prathap <amudalaprathap@ntpc.co.in>

Cc: Biswajit Chakraborty बिसवाजीत चक्रवर्ती <bchakraborty01@ntpc.co.in>, Hanakrishna VS <cvsh@thriveni.com>, Kudappa B Desai <kdesai@ntpc.co.in>, Pradeep Kumar



Lalunga Road,  
Ghargoda, Dist Raigarh, PIN 496111, Chhattisgarh  
Mobile: +919431142888 , +917004714595  
Alternate mail [anudalacruthap@gmail.com](mailto:anudalacruthap@gmail.com)

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- **MoM NTPC-TEMPL at NOIDA 1nd 2nd Feb Revised DOP.pdf**  
100 KB
  - **MoM NTPC-TEMPL at NOIDA 1nd 2nd Feb Revised DOP.docx**  
26 KB
  - **Notes of Meeting 1st and 2nd Feb. 2021.pdf**  
847 KB
-



## COAL MINING - CC

Record Notes of meeting between M/s NTPC and M/s Thriveni Earthmovers Private Limited held on 01.02.2021 and 02.02.2021 for Talajpalli Coal Mining Project at Coal Mining, CC, Noida

The following executives were present:

M/s NTPC Ltd.	M/s Thriveni Earthmovers Private Limited
1. Bheemcharan Singh, AGM(Dart), CM- HQ, Ranch	1. Sachinhanasadhram A, VP(EPC)
2. Ajay Kumar, AGM(CC-Mining)	2. Ramkumar K. Sr. GM (Operations)
3. Sanjay Kumar Singh, AGM(CC-Mining)	3. Souvik Roy, AGM(Geology)
4. Biswajit Chakraborty, AGM(TLMP)	4. Pradeep Kumar Chintalapati, (GM/Planning)
5. T Perumal, DGM(CC-Mining)	5. Ravichandran H, Sr. Manager (Mining)
6. B V Ramesh Kumar, DGM, CM- HQ, Ranch	
7. Raju N Sr. Manager, (CC-Mining)	
8. Kalfappa B Desai, Sr. Manager (Mining), TLMP	
9. Manish Kulkarni, Dy. Manager (Survey), TLMP	

The following points which were being raised by M/s TEMPL through various earlier correspondence were discussed at length:

1. Draft Operational Plan and a separate Interim Plan shall be submitted in-line with the approved Mining Plan. Interim Annual Approved Production Plan and Schedule to be submitted by Mar'21 with existing data with target of start of mining operation by April 2021.
2. Re-sequencing of mining operations of West and East pits shall be looked into if required after two years with sufficient gathering of additional Geo-mining data through info drilling and mining operations (exposure of the floor of the basal coal seam).
3. Land for accommodating additional O&B, if required, shall be arranged by NTPC.
4. Payment for excess O&B removal shall be done as per provisions of Project Agreement (Clause 15.7.5 and Clause 1.3 of Schedule 11 of Project Agreement).





## COAL MINING - CC

3. During interim plan, delivery Point and location of stockpile will be discussed and finalised at site (Clause 15 (b) of Schedule 2 of Project Agreement).
6. Revised PDM shall be prepared in line with the Project Agreement.

**Minutes of Meeting on Revised Draft Operational Plan  
Talaipalli Coal Block**

Between  
NTPC Ltd. (NTPC)  
And

**M/s Thriveni Earthmovers Pvt. Ltd (TEMPL)**  
Held On – Feb 01 and 02, 2021 at NTPC's Noida Office

M/s Thriveni Earthmovers Private Limited thanked NTPC for scheduling a meeting on Jan 18, 2021 and Feb 01 and 02, 2021 to discuss the Revised Draft Operational Plan submitted by TEMPL on Jan 06, 2021.

**Attendees**

NTPC	TEMPL
1. Ajay Kumar, AGM (CC-Mining)	1. Sachidhananadham A. VP (EPCC)
2. Sanjeev singh, AGM (CC-Mining)	2. K. Ram Kumar (Sr. GM Operations & MDO's Representative)
3. Biswajit Chakraborty, AGM (CC-Mining)	3. Pradeep Chintalapati (DGM Tech. Services)
4. T Perumal, DGM (CC-Mining)	4. Souvik Roy (AGM MinePlanning)
5. Raju N Sr. Manager, (CC-Mining)	5. Ravichandran (Sr Manager Mines)
6. Kudlappa B Desai, Sr Manager (Mining), TLCMP	
7. Manish Kolhe, Dy Manager (Survey)	

NTPC initiated the discussion on the key concerns raised by THRIEVNI in its Revised Draft Operational Plan.

S. No.	NTPC Points	Detail Explanation on the NTPC Points
1	Draft Operational Plan and a separate Interim Plan shall be submitted in-line with the approved Mining Plan Interim Annual Approved Production Plan and Schedule to be submitted by Mar 21 with existing data with target of start of mining operation by April 2021.	<ol style="list-style-type: none"> <li>1. TEMPL explained to NTPC that there are differences in the coal and waste volumes between the actual designs as developed by TEMPL after the Commencement Date, and the volumes indicated in the Approved Mining Plan (AMP). TEMPL responded to NTPC that the strip ratio is 5.25 as per the designs developed by it subsequent to the Commencement Date, given the same inputs and design criteria in the Approved Mining Plan.</li> <li>2. TEMPL explained that the waste volume generated from both the West and East pits is around 575 MBCM (Million Bank Cubic Meters) by the end of 10th year of mining operation according to the Approved Mining Plan. TEMPL also attempted to optimize the two-pit operation in its design and found that the external dump volume will be around 400 MBCM by the end of 10th year as opposed to 264.5 MBCM envisaged in AMP. <ol style="list-style-type: none"> <li>a. TEMPL demonstrated that the void created in both the pits by the end of 10th year can accommodate about 62 MBCM (assuming Swell factor of 15%) as opposed to 310.42 MBCM indicated in the Approved Mining Plan. Implying that the pit void assumed to be created in the AMP is ~5 times higher than TEMPL's design.</li> <li>b. TEMPL highlighted the fact that Seam III (Basal Seam) is at a depth of 290 meters from the surface in the west pit implying that de-coaling takes longer and thus delaying the creation of void for progressive backfilling.</li> <li>c. <b>If a two-pit operation is implemented as per AMP then, there will be a situation wherein the pits cannot progress because of the external dump, and external dump cannot be rehandled to the in-pit dump because void created is not adequate to accommodate. Entire mining operations will come to a standstill.</b></li> <li>d. With the intent to overcome such a situation, TEMPL has proposed the single pit operation as a potential solution. NTPC may review the designs submitted by TEMPL in CAD format.</li> </ol> </li> <li>3. TEMPL has explained about its proposal made in the Revised Draft Operational Plan to overcome practical constraints associated with the two-pit operations. Following are the key considerations. <ol style="list-style-type: none"> <li>a. TEMPL proposed to start mining operations from the East side and progress</li> </ol> </li> </ol>

		<p>towards the South and West direction in order to resolve the issue of inadequate dumping space associated with the two-pit operation.</p> <p>b. On the East side of the lease boundary, seam III (basal seam) is encountered at the depth of 90 to 100 meters enabling faster de-coaling and progressive backfilling thereof.</p> <p>c. It is estimated that about 250 MBCM of waste will be generated if mining operation is carried out with a single-pit that starts from the East of the lease as opposed to 264.5 MBCM with two-pit operations envisaged in the AMP.</p> <p>4. TEMPL requested NTPC to approve the single pit operation as it offers NTPC the following advantages</p> <ul style="list-style-type: none"> <li>a. NTPC will <u>not</u> have to acquire additional land out of the 25th year pit boundary.</li> <li>b. NTPC will <u>not</u> have to relocate and rehabilitate Nayarampur village.</li> <li>c. NTPC will <u>not</u> have to compensate for the additional cost towards increase in lead and volume of waste outside the area earmarked for dumping in the AMP</li> <li>d. The total external dump volume proposed by TEMPL with the single-pit option (~250 MBCM) is less than the volume indicated in the AMP (~264.52 MBCM) suggesting that all the waste can be temporarily accommodated within the 25th year boundary.</li> </ul> <p>5. NTPC urged TEMPL to start the interim production at the earliest and TEMPL has agreed to do so. TEMPL will submit the interim production plan considering single-pit operation (East pit) after completion of 6 Nos. infill drill holes. TEMPL informed NTPC that infill drilling was taken up to fulfil contractual obligation per clause 4.3 of Schedule 2. Further, NTPC asked TEMPL to submit the interim production plan based on the existing geological data without waiting for completion of infill drill holes.</p>
2	<p>Re-sequencing of mining operations of West and East pits shall be looked into if required after two years with sufficient gathering of additional</p>	<p>1. TEMPL requested NTPC to consider modification of the Approved Mining Plan in view of the impracticalities mentioned above or implementing the two-pit operation as envisaged in the Approved Mining Plan.</p> <p>2. NTPC has responded that "Re-Sequencing of mining operations of West and East pit shall be looked into after two years, if required, with sufficient gathering of additional Geo-Mining data through infill drilling and mining operation (exposure of the floor of the basal coal</p>

<p>Geo-mining data through infill drilling and mining operation (exposure of the floor of the basal coal seam).</p>	<p>seam)'.  3 TEMPL responded requesting NTPC to initiate modification of the Approved Mining Plan immediately and not after two years, as it is crucial to account for the changes in the increased waste volumes and dump space right from the initial years of operation. TEMPL also requested NTPC to consider the following reasons for immediate modification of the AMP, which are fundamental issues, and which are obvious from TEMPL's design and -</p> <ol style="list-style-type: none"> <li>a. As the AMP does not include a 25th year stage plan and that NTPC has awarded a contract to TEMPL for 25 years, it is essential to modify the AMP to show the exact pit and dump positions of the 25th year.</li> <li>b. Dump space to accommodate waste volumes externally within the 25th year boundary is inadequate if the two-pit operation is adopted and hence, requires change in the operation regime from two-pits to single-pit starting from East.</li> </ol> <p>4. Opencast mineable reserves are estimated considering upto floor of seam III, which is encountering at a depth of 290 meters during the initial years of operation in western side of the lease area.</p> <p>5 TEMPL explained in its design the exposure of the floor of the basal coal seam. Seam III On the North East (East pit) side of the lease boundary, seam III (basal seam) is encountered at the depth of 90 to 100 meters so the floor of the seam III will be exposed within a year. Whereas on the North west (west pit) side of the lease boundary, Seam III (basal seam) is encountered at the depth of 290 meters which is very deep seated and the exposure of floor of the basal seam in west pit is expected after 5 years of mining operation.</p> <p>6 When NTPC insisted that TEMPL should follow the Approved Mining Plan, TEMPL humbly submitted that according to the Approved Mining Plan, about 180 meters of excavation is planned in year 3 with a strike length of 1000m and width of 300 meters along the dip direction. TEMPL expressed its concern that it is very impractical to achieve such a high bench turnaround in one year.</p> <p>7 TEMPL also indicated to NTPC that there were no benches designed in the west pit but only a single slope was used at an angle of &gt;40 degrees. This does not help NTPC and TEMPL to visualize pit progress and bench turnaround</p> <p>8 There are about 240 Acres of land in Ajjigarh village that is unclassified area and this issue is pending from allotment of Coal block. The part of the proposed dump falls in this 240</p>
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		<p>acres area. While the classification is underway and until the land acquisition is complete, TEMPL is of the view that no dumping can be done in the proposed area. NTPC has acknowledged this issue as well.</p> <p>9. TEMPL indicated its observation in mismatch between both the lease boundaries on the NW side of the coal block and west side between boundary pillars bearing number BP 27 to 34, BP 47-54. Mismatch area on the western side is approximately 52 Ha. The same has been informed to NTPC vide TEMPL letter TEMPL/TL/Contracts/2020-21/033 dated 19<sup>th</sup> Dec 2020 and requested NTPC's guidance on this</p> <p>10. TEMPL explained to NTPC that for the purposes of seeking a loan from financier/lenders. TEMPL needs NTPC to approve the revised DOP and requested NTPC to give an assurance to modify the Approved Mining Plan immediately such that the strip ratio of 5:25 is reflected in the plan and the plan allows it to operate single-pit starting from East.</p> <p>TEMPL, therefore, is of the opinion that "Re-sequencing of mining operations" as described by NTPC is not a solution to the issues and concerns raised by TEMPL in its revised DOP submitted on Jan 06, 2021 and requests for an immediate "Modification of the Approved Mining Plan", and consequential adjustment of Mining Fees for the entire Term of the Project Agreement.</p>
3	Land for accommodating additional OB, if required shall be arranged by NTPC	<p>1. NTPC insisted TEMPL to operate two pits simultaneously i.e. in line with the Approved Mining Plan</p> <p>2. TEMPL has explained the factors that are affecting to initiate the mining operations as per the approved mining plan, which factors are identified and elaborated in TEMPL's designs as submitted with the DOP.</p> <ul style="list-style-type: none"> <li>i. Opencast mineable reserves are estimated considering upto floor of seam III, which is encountering at a depth of 290 meters during the initial years of operation in western side of the lease area.</li> <li>ii. TEMPL humbly submitted to NTPC that according to the Approved Mining Plan, about 180 meters of excavation is planned in year 3 with a strike length of 1000m and 300 meters along the dip direction. TEMPL expressed its concern that it is very impractical to achieve such a high bench turnaround in a single year. NTPC has acknowledged that indeed this is impractical.</li> <li>iii. TEMPL also indicated to NTPC that there were no benches designed in the west pit.</li> </ul>

		<p>but only a single slope was used at an angle of &gt;40 degrees. This does not help NTPC and TEMPL to visualize pit progress and bench turnaround.</p> <ul style="list-style-type: none"> <li>iv. There are about 240 Acres of land in Ajjigarh village that is unclassified. The part of the proposed dump falls in this 240 acres area. While the classification is underway and until the land acquisition is complete, TEMPL is of the view that no dumping can be done in the proposed area. NTPC has acknowledged this issue as well.</li> <li>v. TEMPL indicated its observation in mismatch between both the lease boundaries on the NW side of the coal block and west side between boundary pillars bearing number BP 27 to 34, BP 47-54. Mismatch area on the western side is approximately 52 Ha. The same has been informed to NTPC vide TEMPL letter TEMPL/TL/Contracts/2020-21/033 dated 19<sup>th</sup> Dec 2020 and requested NTPC's guidance on this.</li> </ul> <p>3. TEMPL explained the practical constraint associated with the two-pit operation is that the dumping space will not be adequate to accommodate ~400MBCM within the 25th year boundary. NTPC responded stating that they will provide additional land, if required. TEMPL then, requested NTPC for the following –</p> <ul style="list-style-type: none"> <li>a. NTPC needs to provide the required land outside of the 25th year boundary for the excess waste volume as neither the earmarked dumping area nor the area within the 25th year boundary are adequate to accommodate ~400 MBCM within 10 years of operation.</li> <li>b. NTPC needs to compensate TEMPL for the excess waste handled, excess hauling distance, and the re-handling thereof.</li> </ul>
4	<p>Payment of Excess OB removal shall be done as per provisions of Project Agreement (Clause 15.7.5 and Clause 1.0 of Schedule 11 of Project Agreement)</p>	<p>TEMPL requests NTPC for an immediate discussion on the life of mine strip ratio and its settlement through a joint review and consensus, thereafter 'Modification of the Approved Mining Plan', and consequential adjustment of Mining Fee, under the Project Agreement. TEMPL believes the Agreement is not amply clear on this matter of payment of excess OB over the Term of the Project Agreement.</p> <p>Nonetheless, in good faith over the next one year, during the Interim Arrangement, TEMPL on NTPC's assurance of payment for Excess OB (from our meeting), is willing to produce the</p>

		coal in good faith. However, the interim production plan would require commencement with a single pit and coal stockpile location to be discussed and finalized.
5	During Interim Plan, delivery Point and location of stockpile will be discussed and finalized at site (Clause 15 (b) of Schedule 2 of Project Agreement).	<ol style="list-style-type: none"> <li>1. TEMPL has informed that the delivery of coal can be made in the nearest possible location from east pit which falls along the approach road constructed from Raikera office to East pit location. The exact location will be discussed and finalized at site.</li> <li>2. It was informed by TEMPL as per the provision of project agreement clause 8.2 (e) (V) that an internal approach road from Raikera office to East pit has been made which is under usage currently further work is under progress.</li> <li>3. As per the provision of Project Agreement Clause 15 (e) of Schedule 2 under Interim Arrangement for coal production during Development Stage, Owner shall make Interim Arrangement for evacuation of coal from the surface stockyard.</li> </ol>
6	Revised PDM shall be prepared in line with the Project Agreement.	<ol style="list-style-type: none"> <li>1. CHP to be constructed is dependent on the mining operations methodology i.e. single-pit or double-pit. PDM will be finalized based on the modification of the Approved Mining Plan for the reasons stated above.</li> <li>2. As there are ambiguities with respect to the design of the CHP as per the Project Agreement, it needs to be discussed and finalized based on the guidelines of the contract.</li> </ol>

Signature of NTPC Representatives

Signature of TEMPL Representatives



**Minutes of Meeting on Revised Draft Operational Plan  
Tatalpalli Coal Block**

Between  
NTPC Ltd. (NTPC)  
And

**M/s Thriveni Earthmovers Pvt. Ltd (TEMPL)**  
Held On – Feb 01 and 02, 2021 at NTPC's Noida Office

M/s Thriveni Earthmovers Private Limited thanked NTPC for scheduling a meeting on Jan 18, 2021 and Feb 01 and 02 2021 to discuss the Revised Draft Operational Plan submitted by TEMPL on Jan 06, 2021.

**Attendees**

NTPC	TEMPL
1. Ajay Kumar, AGM (CC-Mining)	1 Sachidhananadham A VP (EPCC)
2. Sanjeev singh, AGM (CC-Mining)	2. K. Ram Kumar (Sr. GM Operations & MDO's Representative)
3. Biswajit Chakraborty AGM (CC-Mining)	3 Pradeep Chintalapati (DGM Tech Services)
4. T Perumal, DGM (CC-Mining)	4 Souvik Roy (AGM MinePlanning)
5. Raju N Sr. Manager, (CC-Mining)	5 Ravichandran (Sr Manager Mines)
6. Kudlappa B Desai, Sr Manager (Mining), TLCMP	
7. Manish Kolhe, Dy Manager (Survey)	

NTPC initiated the discussion on the key concerns raised by THRIEVNI in its Revised Draft Operational Plan

S. No.	NTPC Points	Detail Explanation on the NTPC Points
1	Draft Operational Plan and a separate Interim Plan shall be submitted in-line with the approved Mining Plan. Interim Annual Approved Production Plan and Schedule to be submitted by Mar'21 with existing data with target of start of mining operation by April 2021.	<ol style="list-style-type: none"> <li>1. TEMPL explained to NTPC that there are differences in the coal and waste volumes between the actual designs as developed by TEMPL after the Commencement Date, and the volumes indicated in the Approved Mining Plan (AMP). TEMPL responded to NTPC that the strip ratio is 5.25 as per the designs developed by it subsequent to the Commencement Date, given the same inputs and design criteria in the Approved Mining Plan</li> <li>2. TEMPL explained that the waste volume generated from both the West and East pits is around 575 MBCM (Million Bank Cubic Meters) by the end of 10th year of mining operation according to the Approved Mining Plan. TEMPL also attempted to optimize the two-pit operation in its design and found that the external dump volume will be around 400 MBCM by the end of 10th year as opposed to 264.5 MBCM envisaged in AMP               <ol style="list-style-type: none"> <li>a TEMPL demonstrated that the void created in both the pits by the end of 10th year can accommodate about 62 MBCM (assuming Swell factor of 15%) as opposed to 310.42 MBCM indicated in the Approved Mining Plan implying that the pit void assumed to be created in the AMP is ~5 times higher than TEMPL's design.</li> <li>b TEMPL highlighted the fact that Seam III (Basal Seam) is at a depth of 290 meters from the surface in the west pit implying that decoaling takes longer and thus delaying the creation of void for progressive backfilling.</li> <li>c <b>If a two-pit operation is implemented as per AMP then, there will be a situation wherein the pits cannot progress because of the external dump, and external dump cannot be rehandled to the in-pit dump because void created is not adequate to accommodate. Entire mining operations will come to a standstill.</b></li> <li>d With the intent to overcome such a situation, TEMPL has proposed the single pit operation as a potential solution. NTPC may review the designs submitted by TEMPL in CAD format</li> </ol> </li> <li>3. TEMPL has explained about its proposal made in the Revised Draft Operational Plan to overcome practical constraints associated with the two-pit operations. Following are the key considerations.</li> </ol>

		<ul style="list-style-type: none"> <li>a. TEMPL proposed to start mining operations from the East side and progress towards the South and West direction in order to resolve the issue of inadequate dumping space associated with the two-pit operation</li> <li>b. On the East side of the lease boundary, seam III (basal seam) is encountered at the depth of 90 to 100 meters enabling faster de-coaling and progressive backfilling thereof</li> <li>c. It is estimated that about 250 MBCM of waste will be generated if mining operation is carried out with a single-pit that starts from the East of the lease as opposed to 264.5 MBCM with two-pit operations envisaged in the AMP</li> </ul> <p>4. TEMPL requested NTPC to approve the single pit operation as it offers NTPC the following advantages.</p> <ul style="list-style-type: none"> <li>a. NTPC will <u>not</u> have to acquire additional land out of the 25th year pit boundary</li> <li>b. NTPC will <u>not</u> have to relocate and rehabilitate Nayarampur village.</li> <li>c. NTPC will <u>not</u> have to compensate for the additional cost towards increase in lead and volume of waste outside the area earmarked for dumping in the AMP.</li> <li>d. The total external dump volume proposed by TEMPL with the single-pit option (~250 MBCM) is less than the volume indicated in the AMP (~264.52 MBCM) suggesting that all the waste can be temporarily accommodated within the 25th year boundary.</li> </ul> <p>5. NTPC urged TEMPL to start the interim production at the earliest and TEMPL has agreed to do so. TEMPL will submit the interim production plan considering single-pit operation (East pit) after completion of 6 Nos. infill drill holes. TEMPL informed NTPC that infill drilling was taken up to fulfil contractual obligation per clause 4.3 of Schedule 2. Further, NTPC asked TEMPL to submit the interim production plan based on the existing geological data without waiting for completion of infill drill holes.</p>
2	Re-sequencing of mining operations of West and East pits shall be looked into if required after two years with sufficient	<p>1. TEMPL requested NTPC to consider modification of the Approved Mining Plan in view of the impracticalities mentioned above or implementing the two-pit operation as envisaged in the Approved Mining Plan.</p> <p>2. NTPC has responded that "Re-Sequencing of mining operations of West and East pit shall be looked into after two years, if required, with sufficient gathering of additional Geo Mining</p>

<p>gathering of additional Geo-mining data through infill drilling and mining operation (exposure of the floor of the basal coal seam).</p>	<p>data through infill drilling and mining operation (exposure of the floor of the basal coal seam).</p> <p>3. TEMPL responded requesting NTPC to initiate modification of the Approved Mining Plan immediately and not after two years, as it is crucial to account for the changes in the increased waste volumes and dump space right from the initial years of operation. TEMPL also requested NTPC to consider the following reasons for immediate modification of the AMP, which are fundamental issues, and which are obvious from TEMPL's design and -</p> <ol style="list-style-type: none"> <li>a. As the AMP does not include a 25th year stage plan and that NTPC has awarded a contract to TEMPL for 25 years, it is essential to modify the AMP to show the exact pit and dump positions of the 25th year.</li> <li>b. Dump space to accommodate waste volumes externally within the 25th year boundary is inadequate if the two-pit operation is adopted and hence, requires change in the operation regime from two-pits to single-pit starting from East.</li> </ol> <p>4. Opencast mineable reserves are estimated considering upto floor of seam III, which is encountering at a depth of 290 meters during the initial years of operation in western side of the lease area.</p> <p>5. TEMPL explained in its design the exposure of the floor of the basal coal seam, Seam III. On the North East (East pit) side of the lease boundary, seam III (basal seam) is encountered at the depth of 90 to 100 meters so the floor of the seam III will be exposed within a year. Whereas on the North west (west pit) side of the lease boundary, Seam III (basal seam) is encountered at the depth of 290 meters which is very deep seated and the exposure of floor of the basal seam in west pit is expected after 5 years of mining operation.</p> <p>6. When NTPC insisted that TEMPL should follow the Approved Mining Plan, TEMPL humbly submitted that according to the Approved Mining Plan, about 180 meters of excavation is planned in year 3 with a strike length of 1000m and width of 300 meters along the dip direction. TEMPL expressed its concern that it is very impractical to achieve such a high bench turnaround in one year.</p> <p>7. TEMPL also indicated to NTPC that there were no benches designed in the west pit but only a single slope was used at an angle of &gt;40 degrees. This does not help NTPC and TEMPL to visualize pit progress and bench turnaround</p>
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		<p>8. There are about 240 Acres of land in Ajijgarh village that is unclassified area and this issue is pending from allotment of Coal block. The part of the proposed dump falls in this 240 acres area. While the classification is underway and until the land acquisition is complete, TEMPL is of the view that no dumping can be done in the proposed area. NTPC has acknowledged this issue as well</p> <p>9. TEMPL indicated its observation in mismatch between both the lease boundaries on the NW side of the coal block and west side between boundary pillars bearing number BP 27 to 34, BP 47-54. Mismatch area on the western side is approximately 52 Ha. The same has been informed to NTPC vide TEMPL letter TEMPL/TL/Contracts/2020-21/033 dated 19<sup>th</sup> Dec 2020 and requested NTPC's guidance on this.</p> <p>10. TEMPL explained to NTPC that for the purposes of seeking a loan from financier/lenders, TEMPL needs NTPC to approve the revised DOP and requested NTPC to give an assurance to modify the Approved Mining Plan immediately such that the strip ratio of 5:25 is reflected in the plan and the plan allows it to operate single-pit starting from East</p> <p>TEMPL, therefore is of the opinion that "Re-sequencing of mining operations" as described by NTPC is not a solution to the issues and concerns raised by TEMPL in its revised DOP submitted on Jan 08, 2021 and requests for an immediate "Modification of the Approved Mining Plan", and consequential adjustment of Mining Fees for the entire Term of the Project Agreement</p>
3	Land for accommodating additional CB, if required shall be arranged by NTPC.	<p>1. NTPC insisted TEMPL to operate two pits simultaneously i.e. in line with the Approved Mining Plan</p> <p>2. TEMPL has explained the factors that are affecting to initiate the mining operations as per the approved mining plan, which factors are identified and elaborated in TEMPL's designs as submitted with the DOP:</p> <ul style="list-style-type: none"> <li>i. Opencast mineable reserves are estimated considering upto floor of seam III, which is encountering at a depth of 290 meters during the initial years of operation in western side of the lease area</li> <li>ii. TEMPL humbly submitted to NTPC that according to the Approved Mining Plan, about 180 meters of excavation is planned in year 3 with a strike length of 1000m and 300 meters along the dip direction. TEMPL expressed its concern that it is very</li> </ul>

		<p>impractical to achieve such a high bench turnaround in a single year. NTPC has acknowledged that indeed this is impractical.</p> <ul style="list-style-type: none"> <li>iii. TEMPL also indicated to NTPC that there were no benches designed in the west pit but only a single slope was used at an angle of &gt;40 degrees. This does not help NTPC and TEMPL to visualize pit progress and bench turnaround</li> <li>iv. There are about 240 Acres of land in Ajijgarh village that is unclassified. The part of the proposed dump falls in this 240 acres area. While the classification is underway and until the land acquisition is complete, TEMPL is of the view that no dumping can be done in the proposed area. NTPC has acknowledged this issue as well</li> <li>v. TEMPL indicated its observation in mismatch between both the lease boundaries on the NW side of the coal block and west side between boundary pillars bearing number BP 27 to 34 BP 47-54. Mismatch area on the western side is approximately 52 Ha. The same has been informed to NTPC vide TEMPL letter TEMPL/TL/Contracts/2020-21/033 dated 19<sup>th</sup> Dec 2020 and requested NTPC's guidance on this.</li> </ul> <p>3. TEMPL explained the practical constraint associated with the two-pit operation is that the dumping space will not be adequate to accommodate ~400MBCM within the 25th year boundary. NTPC responded stating that they will provide additional land, if required. TEMPL then, requested NTPC for the following –</p> <ul style="list-style-type: none"> <li>a. NTPC needs to provide the required land outside of the 25th year boundary for the excess waste volume as neither the earmarked dumping area nor the area within the 25th year boundary are adequate to accommodate ~400 MBCM within 10 years of operation</li> <li>b. NTPC needs to compensate TEMPL for the excess waste handled, excess hauling distance, and the re-handling thereof</li> </ul>
4	<p>Payment of Excess OB removal shall be done as per provisions of Project Agreement (Clause 15.7.5 and Clause 1.0 of</p>	<p>TEMPL requests NTPC for an immediate discussion on the life of mine strip ratio and its settlement through a joint review and consensus, thereafter "Modification of the Approved Mining Plan", and consequential adjustment of Mining Fee, under the Project Agreement. TEMPL believes the Agreement is not amply clear on this matter of payment of excess OB over the Term of the Project Agreement.</p>

	Schedule 11 of Project Agreement)	Nonetheless, in good faith over the next one year, during the Interim Arrangement, TEMPL or NTPC's assurance of payment for Excess CB (from our meeting), is willing to produce the coal in good faith. However, the interim production plan would require commencement with a single pit and coal stockpile location to be discussed and finalized.
5	During Interim Plan, delivery Point and location of stockpile will be discussed and finalized at site (Clause 15 (b) of Schedule 2 of Project Agreement).	<ol style="list-style-type: none"> <li>1. TEMPL has informed that the delivery of coal can be made in the nearest possible location from east pit which falls along the approach road constructed from Raikera office to East pit location. The exact location will be discussed and finalized at site.</li> <li>2. It was informed by TEMPL, as per the provision of project agreement clause 8.2 (v) (V) that an internal approach road from Raikera office to East pit has been made which is under usage currently further work is under progress.</li> <li>3. As per the provision of Project Agreement Clause 15 (a) of Schedule 2 under Interim Arrangement for coal production during Development Stage, Owner shall make Interim Arrangement for evacuation of coal from the surface stockyard.</li> </ol>
6	Revised PDM shall be prepared in line with the Project Agreement.	<ol style="list-style-type: none"> <li>1. CHP to be constructed is dependent on the mining operations methodology i.e. single-pit or double-pit. PDM will be finalized based on the modification of the Approved Mining Plan for the reasons stated above.</li> <li>2. As there are ambiguities with respect to the design of the CHP as per the Project Agreement, it needs to be discussed and finalized based on the guidelines of the contract.</li> </ol>

Signature of NTPC Representatives

Signature of TEMPL Representatives

**THRIVENI EARTHMOVERS PRIVATE LIMITED**

A World Class Mine Developer Operator

CIN : U60202TZ1999FTC0088376



TEMP/TL/Contracts/2021-20/002.  
4<sup>th</sup> May, 2021

To,  
The Head of Project,  
Jaganmohan CMP,  
NTPC Ltd., Lakshmi Road,  
Dhanbad, District Jaganmohan 826111,  
Dhanbad, Jharkhand

**Sub: PA No. CS-7014-002 (R)-2-CS-PA-0002: Project Agreement for Development and Operation of Telkavih Coal Block - Reg.**

**Ref:** (i) Letter of Acceptance (LOA) issued vide NTPC letter no. CS-7014-002 (R)-2-CS-PA-0002 dated 28.08.2020

- (ii) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/002 dated 08.09.2020  
 (iii) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/003 dated 29.09.2020  
 (iv) NTPC letter no. TL/CM/Minerals/001/18 dated 08.10.2020  
 (v) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/013 dated 16.10.2020  
 (vi) NTPC letter no. 1071/TL/CM/Minerals/001/18 dated 23.11.2020  
 (vii) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/029 dated 27.11.2020  
 (viii) NTPC letter no. 1071/TL/CM/Minerals/001/18 dated 02.12.2020  
 (ix) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/037 dated 05.01.2021  
 (x) Email from NTPC advising meeting on 18.01.2021 to discuss the SCOP  
 (xi) NTPC letter no. 1071/TL/CM/Minerals/001/18 dated 25.01.2021  
 (xii) E-mail dated 28.01.2021 by TEMP, sharing detailed MOM on meeting held on 18.01.2021  
 (xiii) Meeting held between NTPC and TEMP on 1-2 February 2021  
 (xiv) Email by Mr. Rameshwar (TEMP) sharing detailed MOM on meeting held on 1<sup>st</sup> and 2<sup>nd</sup> of February 2021  
 (xv) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/049 dated 19.02.2021  
 (xvi) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/052 dated 27.02.2021  
 (xvii) NTPC letter No. 1071/TL/CM/Minerals/001/18 dated 28.02.2021 (as received on 01.03.2021)  
 (xviii) Meeting held between NTPC and TEMP on 1-2 March 2021  
 (xix) TEMP/TL letter no. TEMP/TL/Contracts/2020-21/060 dated 04.03.2021  
 (xx) NTPC letter no. 0M-CO/TL/MO/02 dated 11.03.2021  
 (xxi) Meeting held between NTPC and TEMP on 26.04.2021  
 (xxii) Meeting held between NTPC and TEMP on 30.04.2021

Dear Sir,

We write pursuant to our meetings on 9 April 2021 and 30 April 2021.

At the meetings, we presented to NTPC the analysis and outcomes of the extensive mine planning work done by TEMP, and various external consultants including M/s. SRK Consulting (SRK) which was engaged by TEMP, at its cost pursuant to the meeting with NTPC on 21-02 March 2021. Comparison of the results from our mine planning work, with that of ThyssenKrupp SRK, MM&C on the one hand and the Approved Mining Plan (AMP) on the other hand was also presented to you.

The following is the summary of the mine planning work done so far and the outcomes thereof. In addition, we have also responded to the suggestions given by NTPC at the meeting on 4 April 2021. The findings are deaggregated in the table encapsulated over the next few pages.

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## 1. Strip Ratio differences

The fundamental crux of the challenge, that we are unable to resolve despite numerous iterations, is the significant differences in overburden volumes (and consequently the Strip Ratio) between the Approved Mining Plan ("AMP") and the actual designs of the Talepalli coal block (which had to be prepared by the AOC as per Clause 4.2 of Schedule 2 of the Project Agreement). As you are well aware this would, and does, have a substantial cascading effect leading to lack of space, hurdles in continuing coal production for the contract period, overstated lead and 09 operating distances, and complete overhauling of the mine infrastructure designs, all of which require complete re-do of the approved Mining Plan and the Project Agreement.

Whilst the stated Strip Ratio (SR) as per the AMP is 4.33, the findings of a number of domain experts demonstrate numbers much in excess and is beyond 5. Our assumption for the 25<sup>th</sup> year pit and is the current boundary of the current operating South Pt. mine, which incidentally, is the same boundary shown in the 2013 tender and fits with the practicalities of the ground situation.

The slides below show various designs, with varying permutations and combinations, none of which lower the Strip Ratio below 4.50:



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20th Year Pit

Number of new pits have been created with different experts including

- Track and Shovel method by Thipsoeknapp
- Track and Shovel method by TEMPL and
- Track and Shovel method by IRE Consulting Florence



Study	Cost	Value
Full Catchment Modelling	10	1000
Workshop	1000	200
Workshop	1000	100



Study	Cost	Value
Full Catchment Modelling	10	1000
Workshop	1000	200
Workshop	1000	100

21th Year Pit

Thermal Straps



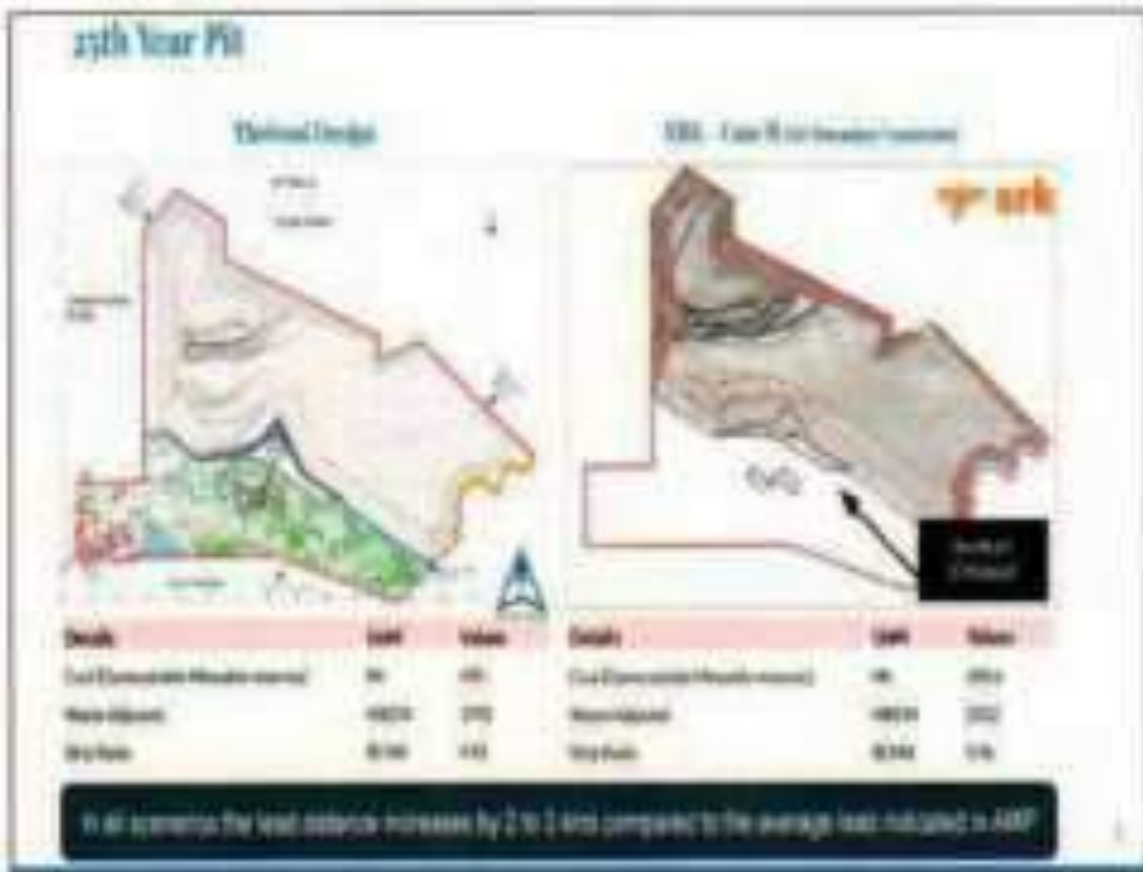
Study	Cost	Value
Full Catchment Modelling	10	1000
Workshop	1000	200
Workshop	1000	100

IRE - East 2 (Downing Road 10 Street)



Study	Cost	Value
Full Catchment Modelling	10	1000
Workshop	1000	200
Workshop	1000	100

Outcome of IRE's work has indicated similar outcomes



Over the last few months, with a view to have clarity on the matter and to assist NTPC in taking an appropriate decision, we have worked with a number of domain experts on the waste volume matter. The slide below is a summary of the outcomes.

### Summary

Item	Status	Key Metrics				2018	2020	2022
		Domestic	Domestic	Domestic	Domestic			
<b>Coal &amp; Waste Provision</b>								
Coal (Domestic) (Months covered) (M)	Green	46.0	46	46.0	46.0	46.0	46	46
Waste Volume (M2020)	Green	370	370	370	370	370	370	370
Waste Fee (M2020)	Green	44	44	44	44	44	44	44
<b>Summary</b>								
Waste Volume (2020) (M2020)	Green	370	370	370	370	370	370	370
Waste Fee (2020) (M2020)	Green	44	44	44	44	44	44	44
Waste Volume (2020) (M2020)	Green	370	370	370	370	370	370	370



## 2 Waste Dump and Dumping Land availability

A natural outcome of the higher SR is significantly larger than anticipated waste/overburden mined. That waste needs lands to enable placement and disposal as environment and safety norms. In our planning process we have considered all parameters as per the AMP and the Project Agreement.

- (i) the height of the external dump to be no more than 30m from the Original Ground Level (OGL)
- (ii) the height to the in-pit dump will be from the bottom of Seam II to 30m above OGL, and
- (iii) as per clause 2(i) of Schedule 2 of the Project Agreement, the waste/overburden mined is transported to dedicated and approved dumping locations indicated in the AMP.
- (iv)

For perspective of the dump's land footprint and height, we demonstrate below (from HTPC's Pakri Barwadih project a ~70 million cubic meter Waste dump with 30m height:

### Footprint of Dump C at Pakri Barwadih (PB) Mine



- Dump C is located within the Lease area.
- Dump height 30m
- Volume of Waste in Dump C 72.7 MCM

We compare below optimized DRK and TEMPL's mine planning outcomes on the waste volumes. In all cases we notice that:

- (i) A complete lack of space at the coal block to accommodate ~557 to ~725 million cum of overburden.
- (ii) Wahamas in continuing coal production beyond the 5<sup>th</sup> year, if the dumping location identified in the AMP is strictly adhered to.

While the capacity of the temporary external dump as per the AMP is 294.8 M Cu.M, the validation work suggests that the actual capacity is ~200 M Cu M for a height of 30m above the Original Ground Level (OGL) as indicated in the AMP. Given the dump capacity is ~200 MCM and the location is defined, coal can be produced until the end of Year 5 (4446) post which the entire operations will come to a halt (see 5<sup>th</sup> Year Stage Plan of Approach T). It is important to note that the swell factor is not indicated in the AMP and TEMPL, therefore, had to consider 15%

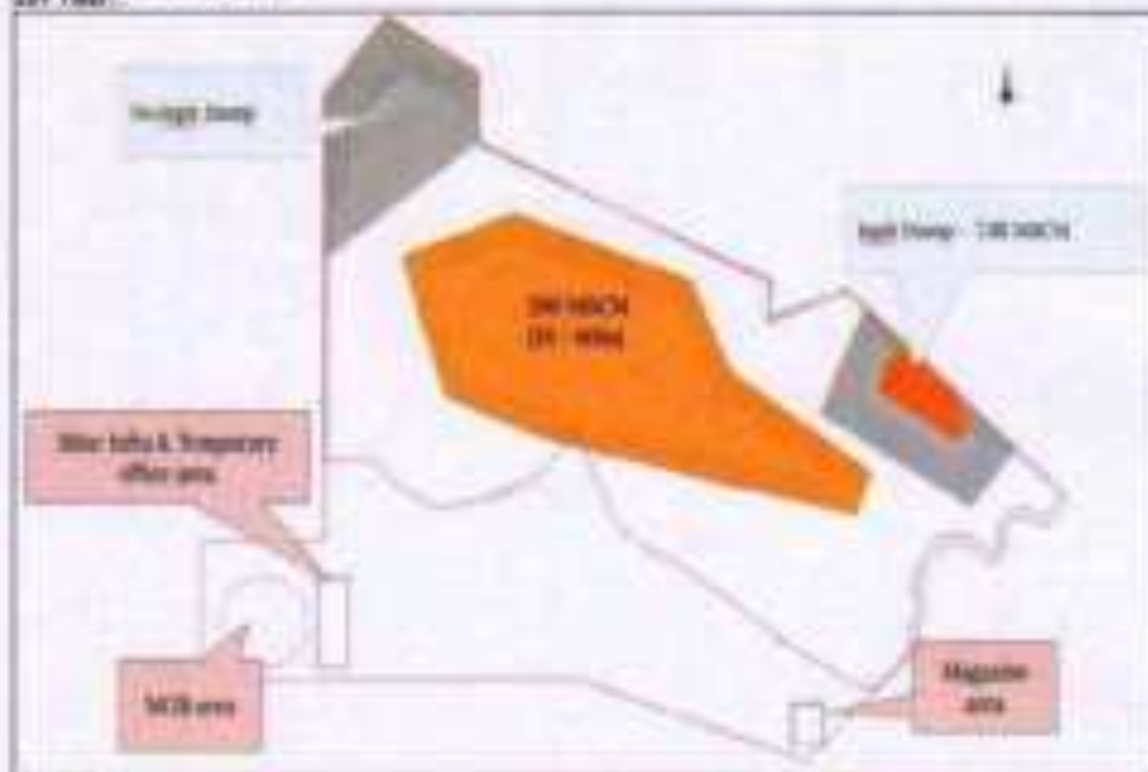


upon NTPC's advice. However, TEMPA is of the view that the swell factor will be even higher i.e. around 25%.

Even if the height of the dump is increased by another 30m i.e. to 60m from OGL it departs from AMP, the dump can accommodate ~255.5 MSCM suggesting that the operations will come to a standstill after Year 5 (5) 5M0 (see 8<sup>th</sup> Year Stage Plan of Approach 1). By increasing the height of the dump another 30m to accommodate the waste, the land and M also increases significantly adversely affecting the economics.

Eventually, if the double pit operation is scrupulously followed per the AMP and if the location of the temporary external dump is sanctioned per 2-d) of Schedule 2 then (hereinafter referred to as Approach 1), the coal production will halt in Year 6. Below are the stage plans for year period

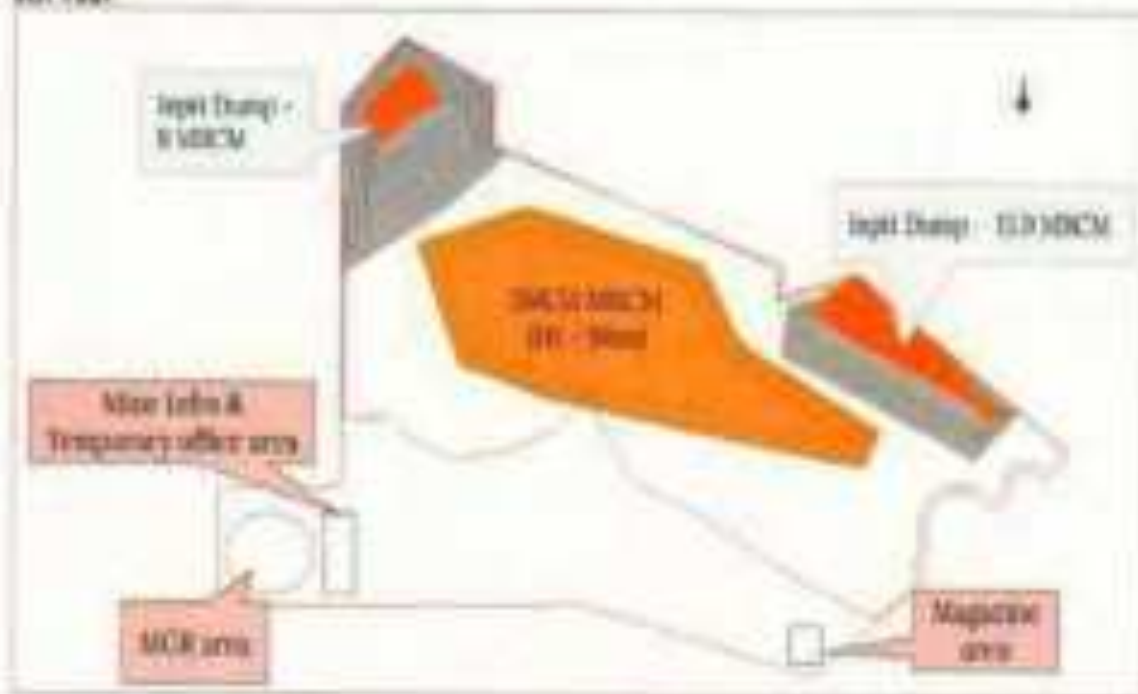
#### Approach 1 - Stage Plans 5th Year:



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8th Year



Even in an alternative circumstance, where the location of the temporary external dump location were to be changed in order to ensure continuity of coal production beyond Year 5, then ideally the waste dump should be constructed along the southern boundary of the 52 year lease boundary initially with due and prior approval of a revised mining plan.

As operations progress, the waste dump should advance to the North towards the mining pits with the intent to increase coal extraction and the longevity of the operations. From this exercise TEMPL understands that the quantity of waste required to be stored in the temporary dump is in the magnitude of ~500 MDCM, while SRK indicated a space deficiency for a waste quantity between ~450 MDCM to ~500 MDCM which essentially increases to a storage of mining operations before Year 12.

While the AMP envisages dumping of waste in the temporary external dump happens until the end of Year 5 and the rehandling begins in Year 5, our stage plans include that the timeline for dumping of waste externally goes well beyond Year 5 and in fact to Year 14. This scenario arises when the mining plan is changed in a manner to continue operations beyond 6<sup>th</sup> year where the stoppage will happen if AMP is followed as mandated. TEMPL did not prepare stage plans beyond Year 14 as there is no land available within the Takapaki lease area to accurately estimate the temporary external dump volume i.e. the volume to be rehandled back into the exhausted pit. During the operations between Year 1 and 14, the land distance to dump waste externally increases by at least 2 to 3 kms compared to the AMP. Similarly, the land distance to rehandle the waste, if practical, also increases significantly compared to the AMP.

Below is the evaluation and dumping schedule assuming that the waste can be dumped in areas other than the AMP approved areas. This scenario considers use of all the land available within the 52-year lease area for carrying out the mining operations (hereinafter referred to as Approach 2). Tentatively, at the end of the 14<sup>th</sup> year after producing about 204 MMt of coal at an average strip ratio of 4.87 i.e. 7,215 MDCM of waste, the operations come to a standstill as there is no real estate available for accommodating waste within the lease area. Nor is there enough pit coal needed to rehandle a portion or all of the waste in the external dump.

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Year	TEMPL			ADP		
	Coal Del. (Curtal)	Waste Adj. (Curtal)	Strip Rate	Coal Del. (Curtal)	Waste Adj. (Curtal)	Strip Rate
	Mt	MBCM	MCMt	Mt	MBCM	MCMt
9	44.1	206	4.72	44.8	192	4.32
10	121.3	562	5.25	124.3	515	4.27
12	172.7	834	4.92	170.5	725	4.27
14	204.2	1,215	4.97	206.5	821	4.27

It is evident from the stage plans that despite utilizing the entire land available within the 52 year lease area, there is a space deficit for accommodating waste generated from coal production. The stage plans in case of Approach 2 for years 9, 10, 12, and 14 suggest that TEMPL will not be able to fulfil its contractual obligation to deliver a coal quantity of 404.5Mt because lack of space to dump waste becomes an obstruction for the mining pits to progress further to produce requisite coal. TEMPL admits that although the ADP envisages the height of the temporary external dump to be 80m from OGL, TEMPL assumed the height to be 50m as an optimization alternative. Despite this, the coal production drops after Year 14 primarily due to insufficient pit land created in the working pits to accommodate all of the waste dumped externally (i.e. 592 MBCM) and no more land within the 52 year lease area is available for accommodating more waste. Below is the dumping schedule for your kind perusal.

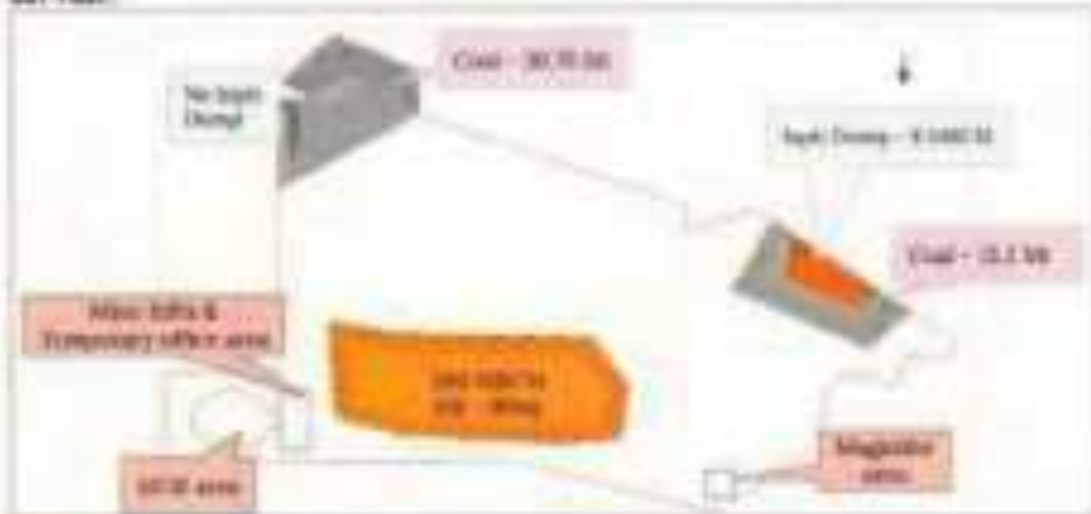
Year	TEMPL		ADP	
	External Dump	Internal Dump	External Dump	Internal Dump
	MBCM	MBCM	MBCM	MBCM
9	206	8	192	12
10	427	371	365	310
12	428	408	365	403
14	385	428	365	416

#### Approach 2 - Stage Plans

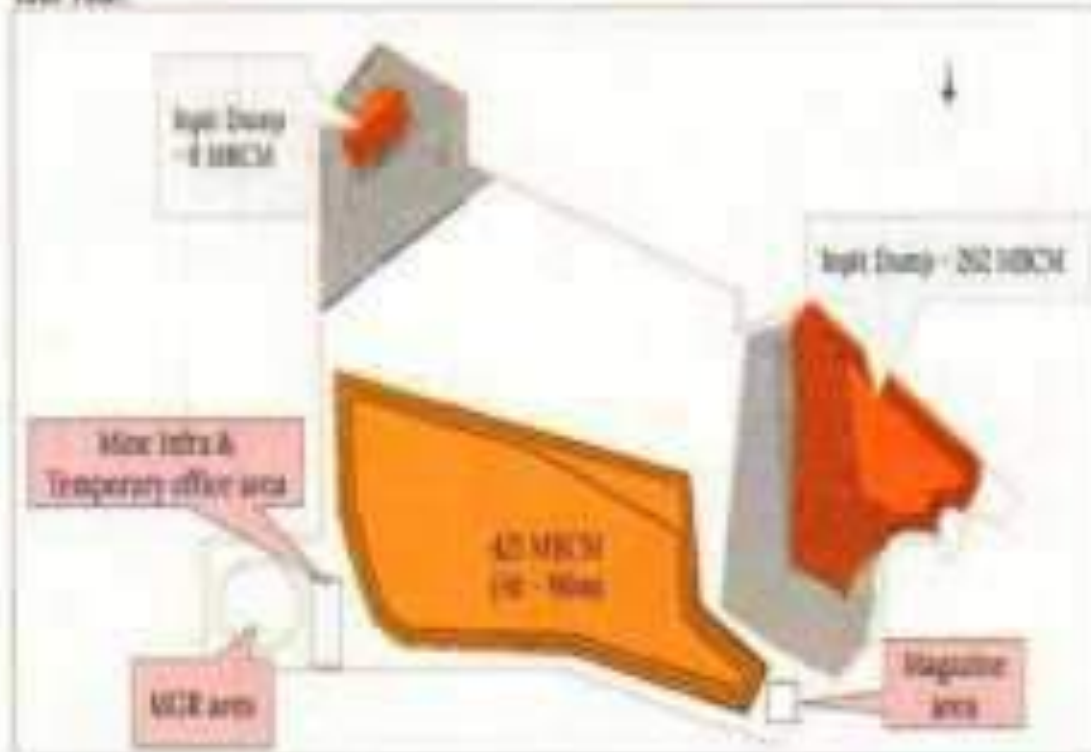
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201 Year:



1000 Year:

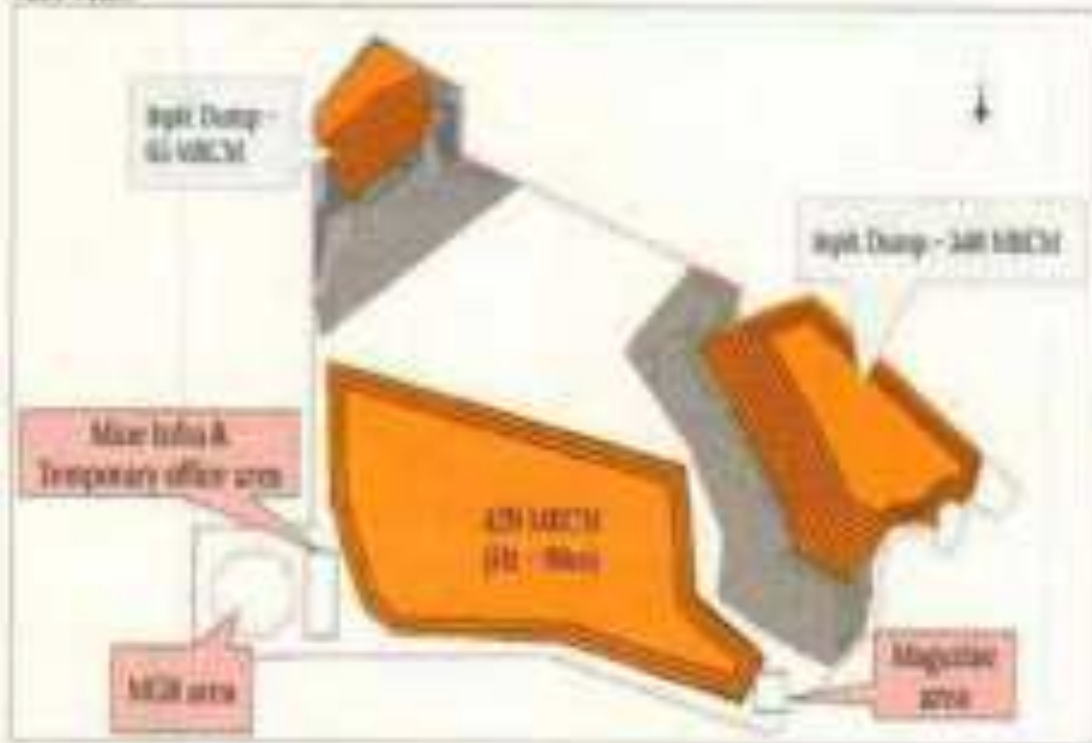


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12th Year



14th Year



### 3 Load distance and LHM changes

With changes in OPI and waste dump limits, the project would not only be required to excavate and haul excess waste compared to the AMP but also, to haul the entire waste a distance of 2 to 3 kms in addition to the distance indicated in the AMP. A detailed core planning work focusing on progress of the pit and dump at various stages indicates that the location of the temporary external dump as per the AMP becomes a nuisance to the continuity of coal supply beyond Year 8. When the location of the temporary external dump is proposed to be changed to overcome this



distance than the lead distance increases by at least 2 to 3 kms thereby significantly affecting the project capital cost and operating economics.

A suggested solution we considered was to increase dump height by 30 meters, subject to due modification of AMP, this has a serious impact as with the increase of the dump trucks wheel we require to traverse considerably longer distances, again impacting project operating costs.

With increased OR, lean and total waste volume to be handled results in significant increase in the equipment requirements. This results in additional upfront capital for the project, importantly, the operating cost also increases due to hauling excess waste to a longer distance as opposed to what is indicated in the AMP.

#### 4 Change in working slope angle

At our meeting on 08.04.2021, you asked us to consider a change in working slope angle laterally to verify its impact on the OR. We did those runs and below are the results with our narrative. In our designs we considered below:

- (i) Design C – working slope of 28 degrees
- (ii) Design D – working slope of 40 degrees (as advised)

Its impact on OR is near negligible, changing it from 4.02 to 4.30 and the outcome demonstrates Design D is not executable.

Coal Reserve Summary	Units	Design C (Working Slope 28 deg)	Design D (Final Slope 40 – As Advised)
Unreal Geological Reserves for operation	Mt	473.7	474.3
Geological Loss (10%)	Mt	47.4	47.5
Net Geological Reserves	Mt	426.3	427.2
Mining Loss (5%)	Mt	21.3	21.4
<b>Operational Mineable Reserves</b>	<b>Mt</b>	<b>405.0</b>	<b>405.8</b>
Waste	MBCM	1,992	1,989
<b>Strip Ratio</b>	<b>BCM/T</b>	<b>4.92</b>	<b>4.90</b>

Dump Parameters	Units	Design C (Approach 1)	Design C (Approach 2)
<b>External Dump</b>			
Exit Capacity	MBCM	208.8	200
<b>Internal Dump</b>			
In-pit Capacity	MBCM	23.84	429
Remarks		Pit Operation will come to a halt after delivering ~61.3 Mt of Coal (i.e. after the ~10th year of Operation).	Pit Operation will come to a standstill after delivering ~204.2 Mt of Coal (i.e. after the ~14th year of Operation).

#### Design C - narrative

The Operational Mineable Reserves are 405.0Mt at a strip ratio of 4.92 i.e. total waste expected of 1,992 MBCM. Although Design C seems to be assisting in fulfilling the contractual obligation of delivering a coal quantity of 404.5Mt over the Term, any minor change in geology, site conditions, slope stability, etc. will lead to reduction in total coal delivered or increase in waste volumes. It is also important to note that Design C considers an overall pit slope angle as steep as 40° - 44° along the northern boundary. Given the steep pit slope angle, we would draw your attention on DGM's presumed concerns on safety, stability, and the approval process for



implementing this Option. Moreover, it is understood from various iterations of the pit designs that thus far Design C is the most optimal as far as the Strip Ratio is concerned; however, with practical constraints highlighted subsequently.

Design C	UoM	Quantity
Coal (Crematistone Mineable Reserves)	Mt	408
Waste Adjusted	MBCM	1,992
Strip Ratio	BCM/Mt	4.92

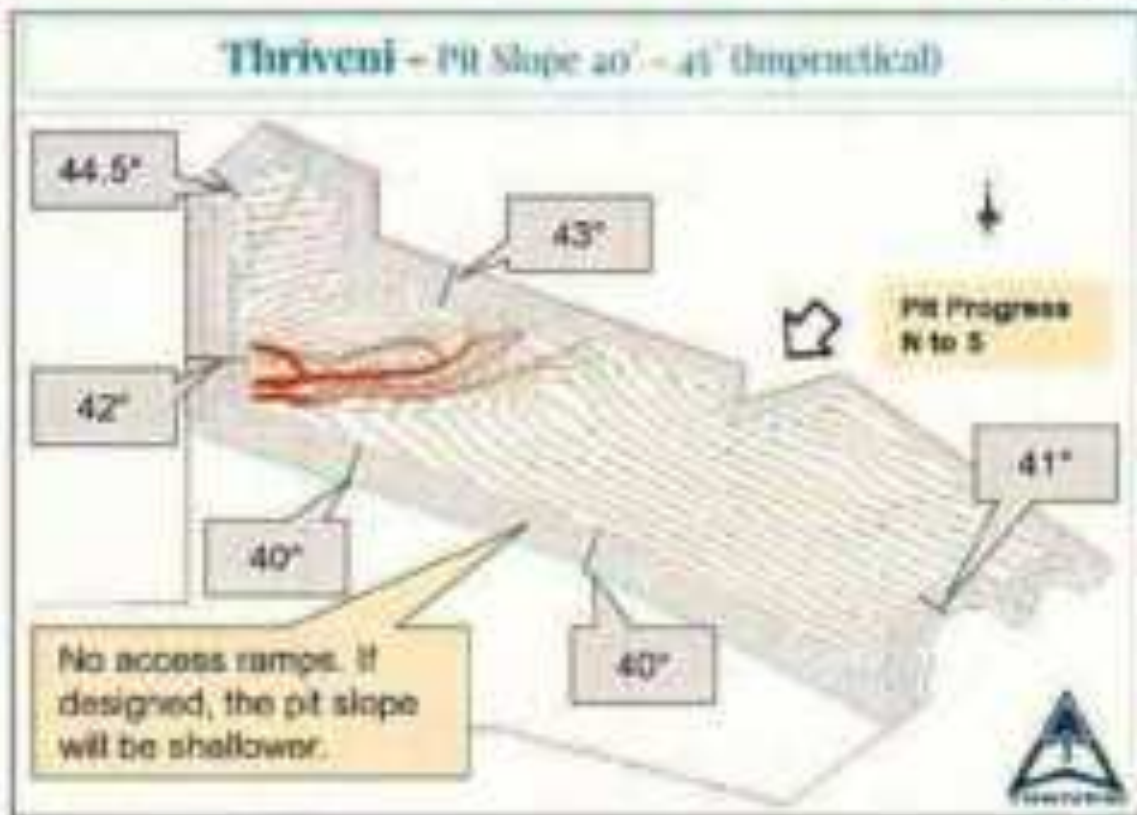


#### Design D - alternative

With your suggestion we also designed a pit (Design D) with an overall slope angle as high as possible in view of the statutory requirements i.e. 40 to 45 degrees all along the proposed 25<sup>th</sup> year boundary. A coal quantity of 435.8Mt can be delivered at an average strip ratio of 4.92. Compared to Design C, waste quantity has reduced by 15 MBCM i.e. a reduction in waste volume of 0.88%.

Design D does not include haul roads and ramps connecting the pit surface to the pit bottom. With inclusion of the ramps of 30m width, the overall slope along the southern boundary of the proposed 25<sup>th</sup> year will become shallower. Thus, Design D is not executable.

Details	UoM	Quantity
Coal (Crematistone Mineable Reserves)	Mt	435.8
Waste Adjusted	MBCM	1,988
Strip Ratio	BCM/Mt	4.53



#### Excavation Schedule of Design C

We then compared the AMP to our Design C Approach 2 (where the scenario considers use of all the land available within the 52-year mining lease area for carrying out the mining operations) and study how the lift reconciles with every stage plan.

Below is the excavation and dumping schedule assuming that the waste can be dumped in areas other than the dedicated and approved areas as provided in the AMP. Territorily, at the end of the 14th year after producing about 204 MM of coal at an average strip ratio of 4.37 i.e., 1,015 MSCM of waste, the operations come to a standstill as there is no real waste available for accommodating waste within the lease area. For there is enough pit void created to rehandle a portion of the waste in the external dump.

Years	Thriveni Design C					AMP Design				
	Coal Del (Cumul)	Cumul Waste Ad. (Cumul)	Strip Ratio	External Dump	Internal Dump	Coal Del (Cumul)	Waste Ad. (Cumul)	Strip Ratio	External Dump (Cumul)	Internal Dump (Cumul)
	MM	MSCM	MSCM	MSCM	MSCM	MM	MSCM	MSCM	MSCM	MSCM
5	44.1	208	4.72	208	5	44.5	102	4.32	190	12
10	131.5	602	5.25	421	271	134.5	575	4.27	265	315
12	173.7	834	4.80	428	405	170.5	738	4.27	265	483
14	204.2	1,015	4.97	390	425	205.5	881	4.27	265	818

In the 1<sup>st</sup> year, about 2158 of coal is produced from the west pit and about 1348 from the east pit. However, a pit void for an in-pit landfill dump is created in the west pit alone because re-coaling



is done in the east but not in the west pit. The capacity of this void is approx. 8 MDCM. Initially, there is enough real estate for both pit and dump construction. Progressing to the 10th year of coal production, the dump size increases in its extent and is more than twice the size of the dump at the end of year 5. At the end of the 10th year, the west pit can only accommodate 9 MDCM waste whereas the east pit can hold 252 MDCM. Between and 10 and 12th year, the majority of the waste generated from the pits may get accumulated in the in-pit located dump. A marginal increase (by ~8 MDCM) in the external dump is evident during this period. The direction of the pit progression is driven by the external dump extents. Both the west and east pits progress towards each other in order to effectively utilize the available land. By the end of year 14, a total of 204,254 of coal can be delivered with a waste generation of 1,215 MDCM. About 590 MDCM of waste is dumped externally and the rest is dumped in the in-pit located. All of the available land within the S2 is utilized and exhausted for any further progression of the pits. Hence, coal delivery of 42M & M in 25 years is not practical with any of the design options.

### 8 Strip Ratio and Stage Plans

The above year-wise Stage Plans for the term of the Proposed Agreement corroborate our initial apprehensions. The Stage Plans indicate that if all other parameters of the AMP are strictly adhered to and considering the location of the external dump as identified in the AMP, it would be impossible to continue coal production beyond the 6<sup>th</sup> year. The year-wise Stage Plans as prepared by us also confirm the significantly higher overburden volumes and the lack of space to accommodate such higher overburden volumes. We then attempted to reconcile where the potential problem lies. Our 21<sup>st</sup> year stage plan shows major discrepancies.

The Approved Mining Plan (AMP) is for a 32-year life of mine and it contains Stage plans for Years 1,2,3,4,5 and Year 32 and excavation schedule (Table 6.1 of AMP) for 32 years. However, the Proposed Agreement is for 25 years. The coal and waste volumes for the 6<sup>th</sup> and 32<sup>nd</sup> year plan, as provided in AMP, reconcile with TEMPL's work, but the year-wise Stage Plans between Year 6 and Year 25 as prepared by us paint a very different picture than what had been presented in the tender and bidding documents.

You may recall that we had requested for NTPC's year-wise Stage Plans even before the execution of the Agreement, since year-wise stage plans are important determinants that lead to coal and waste volumes and consequent Strip Ratios. The provision of said documents and year-wise Stage Plans by NTPC would have enabled us to identify these issues for NTPC's consideration much earlier, but unfortunately, for reasons unknown to us, the said documents were not shared, even though we have reliable basis to believe that the 25-year Stage Plan is very much consistent with NTPC, and that it corroborates our design and findings.

The tables below demonstrate the weakness and omissions in the tender data:







greater even with the surface mine. Given these parameters and equipment configuration, the strip ratio to deliver 404.5Mt of coal over the Term is 4.32 as mentioned above (Design C).

NTPC during our meeting on 06.04.2021 suggested that TEMPL considers a model run with a minimum thickness of 0.5m instead of 1m, although it is not in conformity with AMP provisions. In view of NTPC's suggestion, TEMPL identified the coal reserves with mining thickness of 0.5m and greater for seams X Bottom, VI Middle, IV Top, and II as per AMP and found that overall coal quantity increases by ~2Mt and waste quantity decreases by ~1.3 MBCM. The Strip Ratio changes marginally from 4.32 to 4.34.

TEMPL has done this exercise comparing the coal and waste volumes considering minimum mining thickness of 0.5m only because NTPC suggested so and for academic purposes only. As such TEMPL is of the view that mining of seams with thickness 1m or greater and deployment of the Surface Miner in the seams mentioned above is appropriate as per the AMP (refer pg. 6.12 of AMP).

Details	UoM	Seen thickness >0.5m	Thrive Seam Thickness +1m
Coal (Demonstrable Reserve reserved)	Mt	407	404
Waste Adjusted	MBCM	1,336.7	1,332
Strip Ratio	SCuM	4.34	4.32

To summarize, the above analysis and outcomes of the extensive mine planning work done by TEMPL, and various external consultants and related experts, considering various permutations and combinations, brings out the following:

- (i) There are significant differences in overburden volumes (and consequently the Strip Ratio) between the AMP and bidding documents on the one hand, and the agreement TEMPL has worked in consultation with global consultants of highest repute for the Talapelli coal block.
- (ii) Waste volumes (for the 25-year operating period of the Project Agreement) remain far in excess of the that provided in 50-year AMP, consequently the AMP Strip Ratio for the contract is misrepresented and is much in excess of 4.3.
- (iii) The findings of a number of domain experts demonstrate numbers much in excess and range between 5.22 to ~4.9.
- (iv) Designated levels as per the AMP, for dumping the waste, are grossly inadequate and fall far short to what are actually required.
- (v) By carrying out the mine development and operations strictly as per the AMP with a Double Pit operator and designated waste dumping levels, the mine will stop after Year 5 while the contract tenure is 25 years.

The Project Agreement as represented by NTPC during the bidding process is thus unworkable and impossible to perform. The substance of the contract is vitiated to an extent that it makes the contract impossible to perform. The above analysis and findings clearly indicate that due to the misrepresented overburden volumes and Strip Ratio, the mining operations come to a standstill after Year 5, in violation to the 25-year term of the Project Agreement. NTPC's assertion in the bidding documents, that the Mining Fee is payable to produce 404.5 million tons of coal with an average strip ratio of 4.30 for a period of 25 years of coal production, is true fundamentally incorrect.

This is essentially a non-executable project on the present terms. It cannot be performed in any form and manner.





TEMPL is thus constrained to exercise its legal rights and elect to avoid the Project Agreement on account of NTPC's misrepresentations qua IIRP funds. TEMPL has done everything under its control as evidenced by the various correspondences referred to herein to engage with NTPC in absolute good faith over the past 3-6 months to solicit NTPC's due consideration of the fundamental issues in the project and find a collaborative solution. For reasons best known to NTPC, it has time and again referred us back to the Project Agreement, thereby frustrating our sincere efforts to address the fundamental issues in the contract due to significantly higher generation of power burden, and the consequential technical and commercial impediments that it presents. Since we believe that we have exhausted our good faith efforts, we have no other option but to rescind the Project Agreement and treat it as void ab initio. Please treat the present letter as TEMPL's communication rescinding the Project Agreement and voiding it ab initio.

TEMPL also requests NTPC that NTPC forthwith return the Performance Bank Guarantee furnished by TEMPL of Rs. 81.31.18,000/- (Rupees eighty-one crore ninety-one lakh sixteen thousand eight hundred only), also compensate TEMPL for the losses suffered by it due to NTPC's misrepresentations. The quantum of losses to be compensated by NTPC shall be communicated separately by TEMPL.

Thanking you,

Yours sincerely,

for Thriveni Earthmovers Private Limited

Authorized Signatory

S-O-21

\* IN THE HIGH COURT OF DELHI AT NEW DELHI

- CS(COMM) 219/2021 &amp; I.A.Nos 6177/2021, 6180/2021&amp; 6181/2021

THRIVANI EARTHMOVERS PVT. LTD ..... Plaintiff

Through: Mr. Mukul Rohatgi and Mr.  
Rajshekhar Rao, Senior Advocates  
with Mr. Anand Varna, Ms.  
Devanshi Singh, Mr. Sameer Rohatgi,  
Ms. Aanchal Tikamani, Mr.  
Shreyash Lalit, and Ms. Astha  
Ahuja, Advocates.

versus

NTPC LTD ..... Defendant

Through: Mr. Tushar Mehta, Solicitor General  
along with Mr. Puneet Taneja, Mr.  
Laxmi Kumar and Mr. Manmohan  
Singh, Advocates.

CORAM:

HON'BLE MR. JUSTICE J.R. MIDHA

**ORDER**% **10.05.2021**

1. On 09<sup>th</sup> May, 2021, the defendant sent a reply to the plaintiff in which the defendant disputed the averments made by the plaintiff in its notice of recession. However at the end, the defendant suggested to the plaintiff to withdraw the letter dated 04<sup>th</sup> May, 2021 and come forward for amicable resolution of disputes. The relevant portion of the order dated 09<sup>th</sup> May, 2021 is reproduced hereunder:-

*"In view of the above, we hereby call upon you to immediately within 24 hours of receipt of this letter withdraw your letter dated 04.05.2021 in writing and further come forward for amicable resolution of the issue within the framework of the*

*contract, failing which, we shall be constrained to treat this as your failure to make progress with work and as a mine operator's event of default under the provisions of Project Agreement, entitling us to take all other actions as provided to us under the contract.*

*This letter is issued without prejudice to our rights under Contract, Project Agreement and law."*

2. Mr. Mukul Rohatgi, learned senior counsel for the plaintiff submits on instructions that the plaintiff is willing to avail the opportunity of making an endeavour to amicably resolve the disputes.

3. Mr. Tushar Mehta, learned Solicitor General submits that the plaintiff should withdraw their letter dated 04<sup>th</sup> May, 2021 to which Mr. Mukul Rohatgi, learned senior counsel for the plaintiff submits that the plaintiff would participate in the settlement talks without prejudice to the rights and contentions of the parties.

4. Mr. Mukul Rohatgi, learned senior counsel for the plaintiff further submits that the plaintiff be protected till the settlement takes place.

5. This Court is of the view that it would be appropriate to keep the letter dated 04<sup>th</sup> May, 2021 in abeyance/suspension till the settlement talks are continuing and both the parties shall hold settlement talks without prejudice to their respective rights and contentions. Since the plaintiff's apprehension for invocation of the bank guarantee arose out of the letter dated 04<sup>th</sup> May, 2021, with the interim suspension of letter dated 04<sup>th</sup> May, 2021, there should not be any apprehension in the mind of the plaintiff that the defendant would take any pre-emptive action during the settlement talks. Needless to say that the plaintiff is at liberty to approach this Court if the plaintiff has any apprehension during the settlement talks.

6. Mr. Mukul Rohatgi, learned senior counsel for the plaintiff submits that the plaintiff's complaint has been referred to Central Mine Planning and Design Institute Limited (CMPDIL) and the report of the said authority would be relevant for settlement talks. Mr. Tushar Mehta, learned Solicitor General submits that he shall verify the averments made by the plaintiff and communicate the same to the defendant.

7. With the consent of both the parties, the hearing of this case is deferred for eight weeks to enable the parties to make an endeavour to amicably resolve the matter. Both the parties shall hold the first meeting within one week from today. The plaintiff's letter dated 04<sup>th</sup> May, 2021 shall remain in abeyance/suspension till the settlement talks are continuing. Both the parties shall participate in the settlement talks without prejudice to their respective rights and contentions.

8. List for reporting outcome of the settlement talks on 27<sup>th</sup> July, 2021.

**J.R. MIDHA, J.**

**MAY 10, 2021**  
**ak**

[kbdesai@ntpc.co.in](mailto:kbdesai@ntpc.co.in)

---

**From:** Kudlappa B Desai <[kbdesai@ntpc.co.in](mailto:kbdesai@ntpc.co.in)>  
**Sent:** 14 May 2021 22:42  
**To:** Ram  
**Cc:** [s.c@hriveni.com](mailto:s.c@hriveni.com); Biswajit Chakraborty; Sanjiv Kumar Singh राजीव कुमार सिंह; गो. पैरुमाल - Perumal  
**Subject:** Draft MOM of mutual discussion held on 14.05.2021 for amicable resolution of the issues  
**Attachments:** Draft MOM of the meeting on Amicable resolution held on 14.05.2021.docx

Dear Sir,

Draft MOM of mutual discussion held on 14.05.2021 for amicable resolution of the issues, is attached herewith, for your kind consideration and signing please.

सादर / Regards

कुडलप्पा बी देसाई / Kudlappa B Desai

वरिष्ठ प्रबंधक (माइनिंग) / Sr. Manager (Mining) तलईपल्ली कोल माइनिंग प्रोजेक्ट / Talalpalli Coal Mining Project एनटीपीसी लिमिटेड / NTPC Ltd.

मोबाइल-०९६५०९९२६९० / Mobile-09650992690

**Minutes of meeting held on 14.05.2021 between M/s NTPC and M/s TEMPL for amicable resolution of issues as per the direction of Hon'ble High Court of Delhi**

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In accordance to the direction of Hon'ble High Court of Delhi vide its order dated 10.05.2021 in the case of CS(Comm) 219/2021, M/s NTPC on 12.05.2021, invited M/s TEMPL for discussion on amicable resolution of issues on 14.05.2021, to be construed as mutual discussions under clause 23.1 of Project Agreement. M/s TEMPL confirmed its participation on 13.05.2021.

Accordingly, discussion was held on 14.05.2021 at 11.00 AM through MS-Teams. Both the parties welcomed each other and expressed for positive outcome.

The points discussed/submitted are placed below:

- 1) At the outset M/s NTPC recalled the last meeting held on 30.04.2021, wherein M/s NTPC asked M/s TEMPL to come out with a feasible solution. M/s TEMPL had agreed to come back in 2 to 3 days, whereas, M/s TEMPL chose to communicate the notice of rescinding of Project Agreement and filed Commercial Civil Suit before Hon'ble Delhi High Court.
- 2) In order to move ahead, M/s NTPC requested M/s TEMPL to work further on the feasible solution (Option 2C) submitted by M/s TEMPL through letter dated 27.02.2021 and meeting held on 06.04.2021 (Ranchi). M/s NTPC further requested M/s TEMPL to submit workings/model/details of the feasible option to study in detail, jointly.
- 3) M/s TEMPL asked M/s NTPC to look into the issue of variance in stripping ratio. M/s NTPC clarified that strip ratio adjustment formula in the Project Agreement shall take care of commercial implication arising out due to variance in stripping ratio, if any. It was also clarified that aforesaid formula deals with all the elements of mining. In response, M/s TEMPL submitted that the strip ratio formula of Project Agreement doesn't address the commercial implications. However, TEMPL assured to revert back on the issue.
- 4) M/s TEMPL made a submission that both parties must consult M/s CMPDIL for resolution of technical issue.
- 5) M/s NTPC requested to M/s TEMPL to continue the works including most works under progress like a) Environment Monitoring b) Diversion of road crossing MGR. To this M/s TEMPL assured to come back on this issue in next meeting.
- 6) Lastly, it was agreed by both the parties to meet after one-week, i.e. on 21.05.2021.

The list of participants in mutual discussion is enclosed at Annexure A.

(M/s TEMPL)

(M/s NTPC)

**List of participants in the mutual discussion held on 14.05.2021****M/s TEMPL**

1. Mr Siddharth Jain
2. Mr K Ramkumar
3. Mr A Subramanian
4. Mr A Sachidhandam
5. Mr Pradeep Kumar
6. Mr Souvik Roy

**M/s NTPC**

- 1 Mr. Sanjiv Kumar Singh
2. Mr. Bikram Mandal
- 3 Mr Biswajit Chakraborty
- 4 Mr T Perumal
- 5 Mr. Dharmendra Singh
- 6 Mr. Gurmej Singh Randhawa
- 7 Mr Kudlappa B Desai
- 8 Mr. Raju N
9. Mr. Bhanu Prakash
- 10 Mr Sharad Vashisth
11. Mr Abhay Anand

**NTPC Limited**

(A Government of India Enterprise)  
**SSC - Coal Mining(Ranchi)**  
Salonga Road, Dhanpada  
Ranchi  
Chhattisgarh- 496111, India  
Telephone No. : Fax No. :

**Service Purchase Order**

PAN No. : AAACH0293D  
CIN No. : L40101DL19750C000968

Purchase Order No. : 5300028793-188-1071 Date : 23.07.2021 ( version | 0 )

To  
CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD.  
GONDWANA PLACE, KANKE ROAD  
RANCHI  
Jharkhand  
India - 834006  
Tel. 08617789100  
E-Mail : cdd@cmpdi.co.in

Vendor Code: 1018888

**Subject:** : Engaging M/s CMPDI, as an Independent Consultant for Preparation of Report on Technical Feasibility of Mining of Talaspali Coal Block.  
**RIT NO.** : Dated  
**Your Offer No.** : nr/CMPDI/SD/A/002E-496/2011-12418, Dtd:13.07.2021  
**Your Reference** :

Dear Sir

This has reference to our above mentioned RIT, Your offer and subsequent discussions. We are pleased to accept your offer opened on and confirm having awarded on you the work of Engaging M/s CMPDI, as an Independent Consultant for Preparation of Report on Technical Feasibility of Mining of Talaspali Coal Block of total value INR 5,097,000.00 (Rupee - FIFTY-SIX LAKH NINETY-SEVEN THOUSAND ONLY) mentioned in the scope of works, special terms & conditions, Bill of quantities etc.

The duration of the service period shall be from 26.07.2021 to 26.10.2021. Though the duration of contract shall remain same, the actual date of commencement of the contract shall be as per the direction of EIC. AGM (Coal Mining) shall be EIC for this work.

This service purchase order along with its annexure is being issued to you in duplicate. We request you to return the duplicate copy of this service purchase order, duly signed on each page by your authorized signatory in token of your unequivocal acknowledgment of the same within 15 days from the date of this service purchase order. If no communication is received within 15 days of receipt of Purchase Order, it will be treated that order has been accepted in entirety.

We thank you for the interest shown by you in our project and the cooperation extended to us. We expect to receive your continued cooperation in future also.

Thanking You,  
For & on behalf of NTPC Limited

VEERA SURESH,  
SR. MANAGER (CAM)

Enclosure :



SI No.	Code	Description	Unit	Quantity	Net Price	Amount	Long Text
<b>Name of Work:</b>		<b>(Bill of Quantity)</b> Engaging M/s CMPOIL as an Independent Consultant for Preparation of Report on Technical Feasibility of Mining of Talapalli Coal Block					
<b>Delivery/Invoicing Address:</b> 1071 Talapalli Coal Mining Project Islimga Road, Gharghoda, Raigarh Chhattisgarh 496111 India							
Invoicing to be done on GST No : 22AAACN0255D4Z5							
20		consultancy fee	AJ	1.000	5,697,000.00	5,697,000.00	
Tax: IN Integrated GST-ND @ 18.00 % Extra							
20.10		Engaging of independent consultant	NO	1	5,697,000.0000	5,697,000.00	YES
TOTAL OF BOQ PART :		00020				INR 5697000.00	
<b>Amount</b>						<b>5697000.00</b>	
Other Charges						0.00	
Net Amount on BOQ PART		00020				INR 5697000.00	
Net Total Amount						INR 5,697,000.00	
Less Rebate/Amount						INR 0.00	
Grand Total						INR 5,697,000.00	
INR FIFTY-SIX LAKH NINETY-SEVEN THOUSAND ONLY							

**Terms & Conditions****Payment Terms**

The payment terms for the assignment shall be as below:

- i) 80% of the total consultancy fee along with GST for the subject assignment shall be paid as advance as an initial payment along with the work order
- ii) 20% of the total consultancy fee along with GST for the subject assignment shall be paid on completion of assignment

**Payment Mode**

EFT

Invoice to be raised on delivery/invoice address against the given PO line items

**Special Instruction**

1 Total Contract Value Rs.56,97,000/- excluding GST.

2 Contract Period: 03 months from Zero date. The Zero date shall reckon from the date of receipt of work order along with the payment as per payment terms.

3 GST shall be 18% as per GST rule.

4 Payment Terms: The payment terms for the assignment shall be as below:

- i) 80% of the total consultancy fee along with GST for the subject assignment shall be paid as advance as an initial payment along with the work order
- ii) 20% of the total consultancy fee along with GST for the subject assignment shall be paid on completion of assignment

5 Defect Liability Period Nil

6 Security Deposit Not applicable

7 All other terms & conditions shall be as per budgetary offer of M/s. CMPDIL vide ref:CMPDI/BD/A(003)E-496281/I-12418. Dtd 13.07.2021

Break up of Price (For Service Related Lines Only)

SI No.	Service Code	Description	Qty.	UOM	Rate	Premium	Discount	Addl Discount	Net Rate	Value
20-10		Engaging of independent consultant	1	NO	5,607,000.00	0.00	0.00	0.00	5,607,000.00	5,607,000.00

### SCOPE OF WORK

**00020 : consultancy fee**

Terms of Reference for #Preparation of Report on Technical Feasibility of Mining of Talaipalli Coal Block'

All the Scope of services, Deliverables, Terms of Payment and Time Schedule of this assignment is as per the budgetary offer of CMPDI vide letter dated 13.07.2021.

Salient Features of the Offer is as follows:

**1.0 Scope of Services**

1.1 The scope of services of CMPDI for preparation of Technical Feasibility of Mining of Talaipalli Coal Block.

1.2 Scope of work shall be as follows

- a) Examination of two entry scenario as per Approved Mining Plan with respect to mineable reserves, waste quantities, average stripping ratio, waste disposal planning and average lead.
- b) Generate a best possible scenario to maximize mineable coal from the block providing mineable reserves, waste quantities, average stripping ratio, waste disposal planning and average lead & lift and identification of all major assumptions.
- c) Provide coal evacuation arrangement upto railway siding with respect to Sl.No.b) above.

d) The following Schematic drawing and plans will be included in the Report. Stage Plans (5th year, 10th year, 15th year, 20th year & 25th year)

1.3 The report shall be prepared in two volumes

A. Volume # I Text

B. Volume # II : Plates (including Stage Plans of 5th, 10th, 15th, 20th & 25th year)

**2.0 Time Schedule**

The time schedule for submission of Technical Feasibility Report is three (03) months from the date of receipt of LOA & payment as mentioned in payment terms

**3.0 Deliverables**

Final Technical Feasibility Report # 02 copies along with one set of A3 drawing and soft copy

**SERVICE SPECIFICATIONS**

---

**20.10 - Engaging of independent consultant**

Engaging M/s CMPDIL as an Independent Consultant for "Preparation of Report on Technical Feasibility of Mining of Talaipalli Coal Block

Prepared By:

VEERA SURESH RABBA

List of Documents

Please note that below documents are needed to be provided along with Invoice.

S.No.	Document Description
-------	----------------------

**NTPC VENDOR PAYMENT PORTAL & PAYMENT PROCEDURE**

1. For all the cases where payment documents are to be directly submitted to NTPC (excluding Payment through Bank cases), the Invoice and supporting document(s) as required in the Purchase Order have to be Digitally Signed with class II or III digital signature and uploaded in the NTPC Vendor Payment Portal <https://pradip.ntpc.co.in/VendorFinal/Login.jsp>

In such cases, there will be no requirement of physical copy of invoice & documents except for Lorry Receipts (LRs)/ Delivery Challan, which are normally sent along with the material/ transporter. Bank Guarantees to be sent in original wherever applicable.

2. From 15.5.2020, NTPC will accept only digitally signed Invoice & supporting documents from Vendors for direct payment cases. Submission of documents in physical form shall not be accepted by NTPC unless otherwise asked for in the PO.

For such cases of physical submission, Vendors are required to send complete set of documents including invoice etc. addressed to the "Invoice Receipt Center" of the Delivery/ Invoicing Address as mentioned in the Purchase Order Annexure 1/ BOQ Sheet.

While submitting the Invoice/ Bills & related documents in physical form, Vendors are required to mention the following details on the top of the envelope:

- a Invoice/Bill reference No.
- b NTPC PO No./ Package no.
- c NTPC Vendor Code as per PO.

In addition to above, vendors are requested to mention their correspondence E-mail & Mobile No. in the Covering Letter, through which invoice processing related information/clarification request may be sent.

3. Vendors can track / monitor the status of payments from the Vendor payment portal. Help documents are available in the portal, Vendors are requested to make full use of the Vendor Payment Portal.

4. For payment cases through bank, all original documents are to be submitted in bank as per terms of PO.



अंग्रेज भाषा में लिखे गए पत्रों का अनुवाद: भारतीय  
कोयला निगम लिमिटेड (एन.टी.पी.सी.) का कार्यालय, कोयला निगम  
निगम, कोयला निगम, कोयला निगम, कोयला निगम, कोयला निगम  
Central Mining Planning & Design Institute Limited  
a Subsidiary of Coal India Limited, Coal of India Public Sector (Mineral)  
Sardar Patel, Sarva Road, Ranchi - 834 001, Jharkhand (India)  
CORPORATE IDENTITY NUMBER - 2049070417500200021

No.: *DS/4-38/E-23785 (C)*

Date: 07.08.2021

To:

The Executive Director (Coal Mining)  
M/s NTPC Ltd.  
Coal Mining Headquarter, Green Plaza  
Opp. Chulia Police Station  
Ranchi (Jharkhand) - 834001  
e-Mail: parham@ntpc.co.in

& M/s Thriveni Earthmovers Pvt. Ltd.  
22/11B, Greenway Road, Fairlands  
Salem, Tamilnadu-630016  
e-Mail: nra@thriveni.com

Subject: Consultancy Services for Preparation of Note on Technical Feasibility of Mining of Talapalli Coal Block of M/s NTPC.

Ref. No.: 1) CMPDI/BD/A/2021E-496281/1-12438, Dtd: 13.07.2021  
2) Purchase order no-4105195066 dated 15.07.2021 of M/s Thriveni Earthmovers  
Private Limited  
3) Purchase order no-5500188793-108-1171 dated 23.07.2021 of NTPC Limited

Dear Sir

In reference to the above, please find enclosed, soft copy of the Note on Technical Feasibility of Mining of Talapalli Coal Block along with set of Plans for your perusal and consideration. The 35th year stage plan and coal handling arrangement layout plan will be submitted shortly.

Thanking You

Yours Sincerely,

*[Signature]*  
D. Shastri

General Manager (Operations)

Cc:

1. Dr. JTF&G, CMPDI
2. GM (BD), CMPDI







*cmpdi*  
A Mini Ratna Company



## TECHNICAL FEASIBILITY NOTE TALAIPALLI COAL BLOCK



SEPTEMBER 2021

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6	Final Year(26 <sup>th</sup> ) Stage Plan	1:10000	HQ/OCM/003315

## DISCLAIMER

For the preparation of this Report, the MINEX Model, Approved Mining Plan and Feasibility Report for Talaipalli Coal block as provided by NTPC Ltd has been relied upon by CMPDI. CMPDI has not verified data provided by NTPC Ltd for accuracy and does not warrant the accuracy of, or make any other warranties or representations regarding this Report if there is any discrepancy in the data provided by NTPC Ltd. Further, this Technical review is a broad assessment and is subject to refinement in the detailed planning.

## CHAPTER 1

### BACKGROUND

#### 1.1 INTRODUCTION

Talaipalli coal mining block in the state of Chhattisgarh was initially allotted to NTPC by Ministry of Coal (MoC), vide letter no.13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000MW Lara Integrated Power Project which is approximately 60 kms away from the coal block.

Talaipalli Block lies in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. At the time of allotment, the block was regionally explored by GSI by drilling 15 holes (6434.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

On receiving Letter of Award (LOA) from Ministry of Coal, NTPC Ltd issued Work order to MECL to carry out detailed exploration in the block. MECL drilled about 102 boreholes (39854.75 mtrs. of drilling) in approximately 20 sq. km. block area for which the Geological Report (GR) was submitted to NTPC on 29.09.08.

On receipt of GR, NTPC awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi. The Mining Plan was prepared by ACMM in 2009 for a rated capacity of 18.00 Mtpy based on the aforementioned GR which was later approved by the Ministry of Coal on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

However, as a consequence to the judgment of the Hon'ble Supreme Court in September 2014, the block allocation was cancelled which was later re-allotted to NTPC on 08.09.2015.



NTPC planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator(MDO) with scope of works viz. overburden removal, extraction of coal, construction of CHP & other fixed mine infrastructures, compliance of statutory obligations and other associated activities.

Meanwhile, all requisite statutory clearances and permissions were obtained from the respective statutory bodies. The major statutory clearances out of the above are furnished below:

*Table 1-1: Major Statutory Clearances with Obtaining Date*

<b>Activity</b>	<b>Date of Achievement</b>
Env. Clearance	02.01.13/13.11.15 (Rev.)
Forest Clearance	St-I : 05.11.12; St-II; 29.01.14; 23.05.17(Rev)
Consent to Establish	06.01.15
Consent to Operate	17.03.16
Tripartite Escrow Agreement (Banker, CCO & NTPC)	15.05.14 & 04.09.17
DGMS Permission	19.01.18
Coal Controllers permission	31.01.18

NTPC floated the 1st NIT for appointment of MDO (for 404.5 MMT of coal extraction with a stripping ratio of 4.3 Cum./t in a period of 25 years as per Approved Mine Plan) on 31.12.2015. M/s. NCC-BGR Consortium was declared successful in the bid and was awarded the contract on 13.11.2017, but due to one FIR filed by CBI on corruption charges involving one of the Directors of BGR & NTPC, this contract was terminated on 04.07.2019.

Thereafter, Second NIT for appointment of MDO (for 404.5 MMT of coal extraction with a stripping ratio of 4.3 Cum./t in a period of 25 years as per Approved Mine Plan) was issued on 19.08.2019. M/s. Thriveni Earthmovers Pvt. Ltd. (TEMPL) emerged as the successful bidder and was appointed as MDO on 26.08.2020.

## 1.2 REASON FOR THIS TECHNICAL FEASIBILITY STUDY

M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talaspalli Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL has claimed that as per their calculations 404.5 MT of coal can't be extracted at a stripping ratio of 4.33 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.82 to 5.25 Cum/t. Along with this, the issue of accommodation of excess OR in the designated dump area including temporary external dump and unfeasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan has also been raised by M/s TEMPL. There were a series of discussion/meetings held between NTPC and TEMPL to resolve the issue.

Subsequently, M/s TEMPL chose to rescind the contract through their Notice dated 04.05.2021 and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Subsequent to few hearings and submissions made by both the Parties, the Hon'ble Delhi High Court directed both the parties for mutual discussions for amicable resolution of the issue which was complied by both the Parties by holding meetings wherein M/s TEMPL requested for appointment of Independent Expert for review of the mining plan of Talaspalli coal mining project.

M/s TEMPL vide letter dated 31.05.2021 (Annexure-II), submitted its consent to NTPC for appointment of CMPDIL as an Independent Consultant for review of the technical parameters of the Talaspalli coal mining project along with the consent to share the cost of the assignment/fees of CMPDIL equally with NTPC. Thereafter, NTPC requested CMPDIL vide letter NTPC/CM-HQ/TLCMP/2021/02 dated 01.06.2021 (Annexure- I) to take up this work on urgent basis which has been accepted by CMPDIL.

### **1.3 OBJECTIVE OF THE STUDY**

The objective of the study is to ascertain the technical feasibility of the mining of the Talaipalli Coal Block and determine maximum coal that can be extracted from the block.

The report is aimed at holistically evaluating the feasibility of mining/dumping sequence as per the Approved Mining Plan and if found unworkable, provide an alternate technically feasible option to maximize the mineable coal.

### **1.4 SCOPE OF THE WORK**

The agreed broad scope of the work is as below:

- ✓ Examination of two Entry scenario as per Approved Mining Plan with respect to Mineable Reserves, OB quantities, Average stripping ratio, Waste Disposal Planning and Average Lead.
- ✓ Generate a best possible scenario to maximize mineable coal from the block providing Mineable Reserves, OB quantities, Average stripping ratio, Waste Disposal Planning and Average Lead & Lift and Identification of all major assumptions.
- ✓ Provide coal evacuation/handling arrangement up to railway siding with respect to proposed feasible option.

The Schematic drawing and plates with respect to Stage Plans (5<sup>th</sup> year, 10<sup>th</sup> year, 15<sup>th</sup> year, 20<sup>th</sup> year, and 25<sup>th</sup> year) are included in the Report.

## CHAPTER 2

### TALAI PALLI COAL BLOCK: AN OVERVIEW

#### 2.1 SITE INFORMATION

Talaipalli coal block is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajiigarh and Kudur-Mauha village forming the northern boundary. The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaipalli, Kudhur-Mauha, Ajiigarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajhepalli are numerous villages located within the block.

The block is about 55 km away from Raigarh Township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lelunga road. Gharghoda is about 35 km North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway.

#### 2.2 GEOLOGY, EXPLORATION AND RESOURCES

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. The area of the block is about 20 sq. km. Major part of the block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 2-1 below:

Table 2-1 Geological Succession in Talaipalli Block:

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakera	30 – 596	Fine, medium and coarse grained feldspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir	1.00 – 54.30	Khakae, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

### 2.2.1 STRUCTURE OF THE BLOCK

The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from  $4^{\circ}$  to  $8^{\circ}$  towards South-west.

The Geological Plan of the Talaipalli Coal Block is given in Fig. 2-1 below:



(Figure 2.1- Geological Map of Talaspell Coal Block)

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. The faults details are furnished in Table 2-2 below:

Table 2-2: Details of Faults

Fault No.	Location	Trend	Nature of fault	Throw
F1-F1	Northern part passing near BH No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20m – 85 m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m.
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.
F4-F4	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	30 – 150 m
F5-F5	Northern western part through BH. MNRT-62	East-West	Strike fault	35 m
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 – 25 m.
F7-F7	Northern part passing through MNRT-11	NW – SE	Oblique fault	20 m.
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m.
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike/Oblique Fault	25m
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0-10 m.
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m.
F12-F12	Southern part	NW-SE	Oblique	25 m.

### 2.2.2 COAL SEAMS

Detailed exploration in Talaipalli Block has revealed the presence of coal bearing horizons belonging to Barakar Formations. These carbonaceous horizons could be distinctly

demarcated as upper, middle and lower columns of Barakar formation. The coal is dull in appearance high in moisture and is of non-coking type.

There are 27 correlatable coal horizons, viz. seams XLA, XLB, X TOP, X BOT, IXL2, XL1, IX, VIII, VII, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, IIL3, II L2, II L1, II, II L & I.

The sequence of coal seams and parting is given Table 2-3 below:

Table 2-3: Sequence of Coal Seams & Parting

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.05			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-5.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	5.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0



S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	3.09			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around		
27	I	0.22	0.55		-	27

### 2.2.3 RESERVES

As per GR, a Net Geological Reserve of 1267.145 million tonnes of coal reserves including both opencast and underground reserves varying in grade from 'A' to 'G' have been established in the block.

### 2.3 BRIEF OVERVIEW OF APPROVED MINING PLAN (OPENCAST MINING)

M/s ACMM prepared the Mining Plan for Talaipalli Coal Block in 2010 for a rated capacity of 18.00 Mtpa. As per Mining Plan, this coal block has gross geological reserves of 1400.58 MT. Opencast coal mining has been proposed upto the basal seam III for a total gross geological reserves of 1323.58 MT and the balance 77.13 MT are considered for by below ground method of mining. Salient Features of the Approved Mining Plan is given below:

Table 2-4: Salient Features of Approved Mining Plan

Sl.No	Particulars	
1.	Project Details	Location: Eastern part of Mand-Raigarh Coalfield, Dist- Raigarh, Chhattisgarh Area - 21.13 sq km
2.	Reserves (MT)	a) Gross Geological Reserves -1400.58 b) Net Geological Reserves- 1260.52 c) Mineable Reserves*/Extractable- - Opencast- 843.68 - Under ground- 17.57 d) Reserves blocked in barrier & Batter 336.69 [* Mining Loss(@ 5% ) 44.40
3.	Quarry Parameters (m)	Max. depth-404 Max. strike length-6690 Min. strike length-1370 Max. dip rise length-4760 Min. dip rise length-3060

S.No	Particulars						
4.	Annual Target Output (MT)	Opencast-13.3 Underground-0.72 (at 100%) & -0.60 (at 85%)					
5.	Total Life (Years)	Opencast- Construction -3 Production -52 Underground- Construction - 4 Production - 20					
7.	Quality of Coal: Overall Grade - "F" Non-coking	U.H.V (K.Cal/kg)		Ash %		Moisture %	
		Min	Max	Min	Max	Min	Max
		1310	5892	17.6	45.1	1.2	11
8.	Average Stripping Ratio Min <sup>3</sup> /te	4.45					
9.	Specific gravity of coal(Average)	1.55 te/cum					
10.	Method of Mining	Opencast -(Shovel-Dumper combination)/ Surface miner Underground- Continuous Miner & Shuttle car combination					

### 2.1.1 MINING STRATEGY

In the Mining plan, it is proposed to mine maximum area leaving a statutory barrier of 7.3m on surface from block boundary. It is also proposed to leave barrier of 80m from Kelo river on the eastern side of the block.

It is proposed to develop infrastructure facility like MGR, Workshop, store, Sub-station, office etc. on the South-Western corner of the property. At the end of the mining operation, it is suggested to dismantle all infrastructure facility on the South-Western corner of the property to extract blocked coal below infrastructure facilities.

To ensure availability of adequate quantity of coal, it has been planned to commence mechanized mining operations by having two independent opencast mines at eastern & western extremities. Accordingly mining operation has been envisaged by driving two

access trenches, one on the east side of the North Eastern side and the other on the western side of the property as shown in Fig 2-2 & 2-3. Both the quarries would advance towards southwards as also towards each other to finally merge into one entity after about 20 years of mine operation.

Internal dump will start once sufficient void space gets available from 5th year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will be placed as temporary external dump within the mine property.

The lead of Coal and lead of OB/partings has been considered as 2.0-3.0 Km.



Figure 2-2: First year Stage Plan as per Mining Plan



Figure 2-4: 10th year Slope Plan as per Mining Plan

Some major system parameters for both coal winning & OB removal are given below:-

a) For 15 M<sup>3</sup> Electric rope shovel to be deployed for removal of overburden.

- 1) Height of the bench - 20 m.
- 2) Width of the working bench - 50m
- 3) Width of the non-working bench - 30m
- 4) High wall angle of the bench - 70° to the horizontal

b) For 20 M<sup>3</sup> Hydraulic shovel to be deployed for removal of overburden.

- 5) Height of the bench - 15m
- 6) Width of the working bench - 50m
- 7) Width of the non-working bench - 30m
- 8) High wall angle of the bench - 70° to the horizontal

c) For 12 M<sup>3</sup> hydraulic shovel working in the thick seam and thick parting:

- 1) Height of the bench - 15m
- 2) Width of the working bench - 40m
- 3) Width of the non-working bench - 25m
- 4) High wall angle of the bench - 70°

d) For 4.5 M<sup>3</sup> hydraulic shovel working in the thin seam and thin parting:

- 1) Height of the bench - equal to thickness of coal seam and thickness of parting
- 2) Width of the working bench - 30m
- 3) Width of the non-working bench - 25m
- 4) High wall angle of the bench - 70°

The above parameters may be modified according to the actual working condition. The high wall angle for the soft OS bench will not be steeper than 45°.

The Final Stage Quarry Plan and Final Stage Dump Plan is shown below in fig. 2-4 and 2-5.



Figure 2-4: Final Stage Quarry Plan (for open pit mining plan)



Figure 2-3: Final Stage Dump Plan as per Mining Plan.

### 2.3.2. CALENDAR PROGRAMME OF EXCAVATION

The summarized calendar programme of excavation is given in Table 2-5 which has been developed based on adopted sequence of open cast mine development at optimum condition of mining operation in the block.

Table 2-5: Calendar Programme of Excavation

Year	Coal	Current coal	Natural		Mining	Avg	Adjusted		Mining	Avg
			DB	Current DB			DB	Current DB		
	Mt	Mt	Mt/yr	Mt/yr	Cum/yr	Cum/yr	Mt/yr	Mt/yr	Cum/yr	Cum/yr
1	1.70	1.50	8.00	8.00	4.00	4.00	7.00	7.00	5.10	5.10
2	8.10	5.50	16.90	21.90	8.00	8.00	19.00	16.00	8.70	8.80
3	8.00	14.60	21.90	48.07	8.00	8.00	40.00	42.00	8.70	4.90
4	12.00	26.50	34.97	102.94	4.00	4.00	75.25	113.94	4.20	4.30
5	12.00	44.90	71.96	173.90	4.00	4.00	76.50	190.90	4.10	4.30
6	10.00	62.90	71.91	245.81	3.00	3.00	76.50	268.90	4.20	4.30
7	10.00	80.90	71.47	317.27	3.00	3.00	76.50	345.44	4.20	4.30
8	10.00	98.90	71.47	392.74	3.00	3.00	76.50	421.94	4.20	4.20
9	10.00	100.50	71.47	464.21	3.00	3.00	76.50	498.44	4.20	4.20

Technical Feasibility Note: Talaipalli Coal Block

Year	Coal BH	Cumm coal MT	Natural		Roaming	Avg	Adjusted		Roaming	Avg
			DB	Cumm DB	SR	SR	DB	Cumm DB	SR	SR
			Mcum	Mcum	Cum/t	Cum/t	Mcum	Mcum	Dist/t	Dist/t
10	18.00	134.50	71.47	535.67	3.97	3.98	76.50	574.94	4.25	4.27
11	18.00	152.50	70.05	606.72	3.89	3.97	76.50	651.44	4.25	4.27
12	18.00	170.50	69.96	675.58	3.88	3.96	76.50	727.94	4.25	4.27
13	18.00	188.50	69.86	745.44	3.88	3.95	76.50	804.44	4.25	4.27
14	18.00	206.50	69.86	815.30	3.88	3.95	76.50	880.94	4.25	4.27
15	18.00	224.50	69.86	885.16	3.88	3.94	76.50	957.44	4.25	4.26
16	18.00	242.50	69.86	955.02	3.88	3.94	76.50	1033.94	4.25	4.26
17	18.00	260.50	75.30	1020.32	4.18	3.96	78.30	1112.24	4.35	4.27
18	18.00	278.50	76.91	1107.24	4.27	3.98	78.30	1190.54	4.35	4.27
19	18.00	296.50	76.91	1184.15	4.27	3.99	78.30	1268.84	4.35	4.28
20	18.00	314.50	76.91	1261.06	4.27	4.01	78.30	1347.14	4.35	4.28
21	18.00	332.50	76.91	1337.98	4.27	4.02	78.30	1425.44	4.35	4.28
22	18.00	350.50	76.91	1414.89	4.27	4.04	78.30	1503.74	4.35	4.29
23	18.00	368.50	76.91	1491.80	4.27	4.05	78.30	1582.04	4.35	4.29
24	18.00	386.50	76.91	1568.72	4.27	4.06	78.30	1660.34	4.35	4.30
25	18.00	404.50	76.91	1645.63	4.27	4.07	78.30	1738.64	4.35	4.30
26	18.00	422.50	76.91	1722.54	4.27	4.08	78.30	1816.94	4.35	4.30
27	18.00	440.50	74.91	1797.45	4.16	4.08	80.10	1897.04	4.45	4.31
28	18.00	458.50	74.90	1872.36	4.16	4.08	80.10	1977.14	4.45	4.31
29	18.00	476.50	74.90	1947.26	4.16	4.09	80.10	2057.24	4.45	4.32
30	18.00	494.50	74.90	2022.16	4.16	4.09	80.10	2137.34	4.45	4.32
31	18.00	512.50	74.90	2097.06	4.18	4.09	80.10	2217.44	4.45	4.33
32	18.00	530.50	79.58	2176.65	4.42	4.10	80.10	2297.54	4.45	4.33
33	18.00	548.50	82.28	2258.92	4.57	4.12	80.10	2377.64	4.45	4.33
34	18.00	566.50	82.28	2341.20	4.57	4.13	80.10	2457.74	4.45	4.34
35	18.00	584.50	82.28	2423.48	4.57	4.15	80.10	2537.84	4.45	4.34
36	18.00	602.50	82.28	2505.75	4.57	4.16	80.10	2617.94	4.45	4.35
37	18.00	620.50	84.07	2589.83	4.67	4.17	80.10	2698.04	4.45	4.35
38	18.00	638.50	87.35	2677.18	4.85	4.19	87.84	2785.88	4.88	4.36
39	18.00	656.50	87.35	2764.52	4.85	4.21	87.84	2873.72	4.88	4.38
40	18.00	674.50	87.35	2851.87	4.85	4.23	87.84	2961.56	4.88	4.39
41	18.00	692.50	87.35	2939.22	4.85	4.24	87.84	3049.40	4.88	4.40
42	18.00	710.50	86.54	3025.76	4.81	4.26	87.84	3137.24	4.88	4.42
43	18.00	728.50	85.80	3111.37	4.78	4.27	87.84	3225.08	4.88	4.43
44	18.00	746.50	85.80	3196.97	4.76	4.28	87.84	3312.92	4.88	4.44
45	18.00	764.50	85.80	3282.57	4.76	4.29	87.84	3400.76	4.88	4.45
46	18.00	782.50	82.58	3365.13	4.59	4.30	87.84	3488.60	4.88	4.46
47	18.00	800.50	79.84	3438.97	4.10	4.30	87.84	3576.44	4.88	4.47
48	15.00	815.50	51.53	3500.50	4.10	4.29	73.20	3649.64	4.88	4.48
49	10.00	825.50	41.02	3541.52	4.10	4.29	48.00	3697.64	4.80	4.48
50	7.00	832.50	96.52	3638.04	13.79	4.37	32.41	3730.05	4.63	4.48
51	6.00	838.50	74.52	3712.56	12.47	4.43	25.98	3756.03	4.33	4.48
52	5.18	843.68	64.51	3777.07	11.42	4.48	21.04	3777.07	4.06	4.48
<b>Total</b>	<b>843.68</b>		<b>3777.07</b>				<b>3777.07</b>			



It is envisaged to make two quarry entry into the mine one on the east side of the North Eastern side and one on the western side of the property shown in the final stage quarry plan (fig. 2-4). Year wise coal extraction from east and west quarry for initial five year is summarized in table below:

Table 2-6. Coal extraction from east & west quarry for initial five years

YEAR	COAL(Mt)		OBR(Mcum)		Total Coal (Mt)	Total OBR (Mcum)
	East	West	East	West		
1	0.45	1.05	2.45	5.20	1.50	7.65
2	1.03	2.97	5.18	13.86	4.00	19.04
3	1.68	6.32	7.06	26.94	8.00	34.00
4	2.13	10.87	8.93	46.32	13.00	55.25
5	5.48	12.52	23.04	53.46	18.00	76.50

The total mineable coal reserves have been estimated as 843.69 Mt at the corresponding OBR of 3777.07 Mm<sup>3</sup> at an average SR of 4.48 m<sup>3</sup>/t.

The rated output of 18 Mty would be achieved in 5th year of quarry excavation (excluding construction period).

### 2.3.3 LIST OF MAJOR HEMM

The list of major mining machineries upto target year is given below in table 2-7.

Table 2-7 List of HEMM

Sl. No.	Equipment	Size	No	Year				
				1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>
<b>A</b>	<b>Overburden</b>							
1	Electric Shovel	35 Cum	4				2	4
2	Electric Hydraulic Shovel	20 Cum	8	1	2	3	7	8
3	Electric Hydraulic Shovel	4.5 Cum	11	3	8	8	8	11
4	Rear Dumper	240T	41				21	41
5	Rear Dumper	190T	76	8	18	43	67	76
6	Rear Dumper	50 T	92	21	61	61	67	92
7	Electric Drill	311 mm	3				1	3
8	Elec. Drill	250 mm	13	2	4	8	11	13
9	Diesel Drill	160 mm	9	2	3	5	7	9
10	Doser	450 hp	6	2	5	8	6	6
11	Doser with Ripper	850 hp	3	1	2	3	4	5
<b>B</b>	<b>Coal</b>							
1	Diesel Hydraulic Shovel	12 Cum	1			1	1	1
2	Diesel Hydraulic Shovel	4.5 Cum	3	1	2	2	3	3
3	Surface Miner	2200	4				1	4
4	Front end loader	4.5 cum	4				2	4
5	Rear Dumper	35 T	88				19	88
6	Rear Dumper	120T	10			10	10	10
7	Rear Dumper	50 T	26	8	16	18	26	26
8	Elec. Drill	250 mm	2			1	2	2
9	Diesel Drill	160 mm	3	1	2	3	3	3
10	Doser	450 hp	3	1	1	2	3	3
11	Doser with ripper	850 hp	3			1	3	3
<b>C</b>	<b>Common</b>							
1	Grader	290 hp	8	2	4	6	7	8
2	Hydraulic Shovel	8.5 Cum	2		1	2	2	2
3	Crane	100 T	4	1	2	3	3	4
4	Crane	30 T	4		1	2	2	4
5	Crane	8T	6	1	2	2	4	6
6	Crane	5T	4		1	2	3	4
7	Diesel Blower	1.0 Cum	6	2	3	4	5	6
8	FE Loader	5-6 Cum	3	1	2	2	3	3

9	FE Loader	1-2 Cum	4	2	2	3	4	4
10	Diesel Drill	100 mm	4	1	1	2	4	4
11	Dozer	450 hp	4	1	2	3	3	4
12	Diesel bowser		8	3	4	5	7	8
13	Fire tender		3	1	2	3	3	3
14	Boom truck		3	0	1	3	3	3
15	Heavy duty toe truck		3	1	3	3	3	3
16	Fork lift truck	8 T	3	1	3	3	3	3
17	Line Truck		2	1	2	2	2	2
18	Tipping truck	8 T	6	2	4	6	6	6
19	Vibratory compactor		4	1	2	4	4	4
20	Tyre handler		4	1	3	3	4	4
21	Mobile maintenance Van		5	1	3	5	5	5
22	Water sprinkler	28kl	10	2	4	6	8	10
0	Reclamation							
1	Grader	280 hp	2					2
2	Dozer	410 hp	2					2
3	Water sprinkler	28kl	2					2
4	Farm Truck		2					2

### 2.3.4 DISPOSAL OF WASTE

In the initial years, when sufficient void to the floor of the basal seam III is not created, the OB spoil generated will be temporarily accommodated within the block area to the dipside of the working area and then re-handled back in the void to the floor of the basal seam as internal dump.

Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 60m is above quarry surface. Each tier of OB dump is of 30m height and berm width has been increased to 30m, with the result that the ultimate dump slope is 22 degrees.

Internal dump will start once sufficient void space gets available from 5th year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will

be placed at two external dump as shown in fig. 2-2 and fig. 2-3 earlier. For first four years of mine operation, OS will be accommodated in external dump only. In 5th year, majority of the OS will be dumped in external dump and only 12.29 Mcum will be accommodated in internal dump. From 9th year onward, no external dumping will be required. Hence, OS will be accommodated in internal dump for rest of the mine life.

As there is no land available for external dump, it has been envisaged to re-handle external dump back to de-coaled area of the mine. Re-handling of overburden will start from 9th year of mine operation till 20th year of mine operation. About 264.52 Mcum of external dump will be required which has been planned to re-handle back to the de-coaled area of the mine.

Top soil is proposed to be removed separately and dumped outside the quarry in a manner so as not to lose its fertility. The top soil would be spread over the reclaimed land, afterward.

The dumping schedule is given in table 2-8 below:

Table 2-8 Dumping Schedule

Year	External Dump (Mcum)		Internal Dump (Mcum)		Rehandeling		Total OS (Mcum)	
	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
1	7.65	7.65	0.00	0.00		0.00	7.65	7.65
2	23.04	23.04	0.00	0.00		0.00	23.04	26.69
3	32.00	60.88	0.00	0.00		0.00	32.00	60.88
4	33.25	115.94	0.00	0.00		0.00	33.25	115.94
5	44.21	180.15	12.29	12.29		0.00	36.50	182.44
6	45.99	225.53	31.11	43.41		0.00	36.50	268.94
7	21.17	246.70	25.51	68.96		0.00	36.50	303.44
8	17.82	264.52	38.88	117.42		0.00	36.50	421.84
9	0.00	264.52	36.74	213.82	8.11	8.11	36.50	499.44
10	0.00	264.52	36.50	210.42	18.11	25.21	36.50	578.94
11	0.00	264.52	36.50	206.82	18.11	44.38	36.50	651.84
12	0.00	264.52	36.50	443.42	18.11	42.51	36.50	721.84
13	0.00	264.52	36.50	528.92	25.42	67.93	36.50	804.44
14	0.00	264.52	36.50	616.42	25.42	113.35	36.50	880.94
15	0.00	264.52	36.50	692.92	25.42	138.77	36.50	957.44
16	0.00	264.52	36.50	769.42	25.42	164.19	36.50	1033.94
17	0.00	264.52	36.50	847.72	25.42	189.61	36.50	1112.94

Year	External dump (Mcum)		Internal dump (Mcum)		Rehandling		Total OS (Mcum)	
	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
18	0.00	264.52	78.30	926.02	25.42	215.03	78.30	1190.54
19	0.00	264.52	78.30	1004.32	25.42	240.45	78.30	1268.84
20	0.00	264.52	78.30	1082.62	24.07	264.52	78.30	1347.14
21	0.00	264.52	78.30	1160.92		264.52	78.30	1425.44
22	0.00	264.52	78.30	1239.22		264.52	78.30	1503.74
23	0.00	264.52	78.30	1317.52		264.52	78.30	1582.04
24	0.00	264.52	78.30	1395.82		264.52	78.30	1660.34
25	0.00	264.52	78.30	1474.12		264.52	78.30	1738.64
26	0.00	264.52	78.30	1552.42		264.52	78.30	1816.94
27	0.00	264.52	80.10	1632.52		264.52	80.10	1897.04
28	0.00	264.52	80.10	1712.62		264.52	80.10	1977.14
29	0.00	264.52	80.10	1792.72		264.52	80.10	2057.24
30	0.00	264.52	80.10	1872.82		264.52	80.10	2137.34
31	0.00	264.52	80.10	1952.92		264.52	80.10	2217.44
32	0.00	264.52	80.10	2033.02		264.52	80.10	2297.54
33	0.00	264.52	80.10	2113.12		264.52	80.10	2377.64
34	0.00	264.52	80.10	2193.22		264.52	80.10	2457.74
35	0.00	264.52	80.10	2273.32		264.52	80.10	2537.84
36	0.00	264.52	80.10	2353.42		264.52	80.10	2617.94
37	0.00	264.52	80.10	2433.52		264.52	80.10	2698.04
38	0.00	264.52	87.84	2521.36		264.52	87.84	2785.88
39	0.00	264.52	87.84	2609.20		264.52	87.84	2873.72
40	0.00	264.52	87.84	2697.04		264.52	87.84	2961.56
41	0.00	264.52	87.84	2784.88		264.52	87.84	3049.40
42	0.00	264.52	87.84	2872.72		264.52	87.84	3137.24
43	0.00	264.52	87.84	2960.56		264.52	87.84	3225.08
44	0.00	264.52	87.84	3048.40		264.52	87.84	3312.92
45	0.00	264.52	87.84	3136.24		264.52	87.84	3400.76
46	0.00	264.52	87.84	3224.08		264.52	87.84	3488.60
47	0.00	264.52	87.84	3311.92		264.52	87.84	3576.44
48	0.00	264.52	73.20	3385.12		264.52	73.20	3649.64
49		264.52	48.00	3433.12		264.52	48.00	3697.64
50		264.52	32.41	3485.53		264.52	32.41	3730.05
51		264.52	25.98	3491.51		264.52	25.98	3756.03
52		264.52	21.04	3512.55		264.52	21.04	3777.07
<b>Total</b>	<b>264.52</b>		<b>3512.55</b>		<b>264.52</b>		<b>3777.07</b>	

### 2.3.5 COAL HANDLING AND OFFTAKE

Coal from the quarry will be transported over the haul road provided in the quarry batters duly connected to various coal benches through temporary ramps. Coal dumpers would move up the access trench and on the surface up to the discharge hoppers of primary crushers. Coal will be sized to <math>(-) 200\text{ mm}</math> in primary crushers and subsequently to <math>(-) 30\text{ mm}</math> size in secondary crushers. Two independent belt conveying circuits on eastern and western side of the block have been envisaged for transporting the crushed coal to the ground bunker at coal dispatch center, planned to be constructed at the south western extremity of the coal block as shown in fig. 2-6.

Suitable arrangement will be provided to draw coal from the ground bunker in to two silos from where coal will be dispatched to the power house over dedicated "Merry Go Round" system of rail network.



Figure 2-6: Surface Plan showing conveyor route and Coal Dispatch Centre.

## CHAPTER 3

### TECHNICAL FEASIBILITY STUDY

As mentioned earlier in the report, the need for this technical feasibility study for Talaipalli coal block arose due to the dispute between NTPC and its MDO M/s TEMPL regarding strip ratio in Approved Mining Plan, issue of accommodation of DB dump and unworkability of Talaipalli mine as per Approved Mining Plan.

As per the scope, the study has been done in two parts. Firstly, the opencast mining part of the approved mining plan has been reviewed with respect to Mineable Reserves, DB quantities, Average stripping ratio and Waste Disposal Planning. Secondly, an alternate feasible option for opencast mining of the Talaipalli Coal Block has been worked out to extract maximum open-castable reserves of coal from the block. Also, the coal evacuation strategy has been reviewed in light of the alternate feasible option.

#### 3.1 REVIEW OF MINING PLAN (OPENCAST MINING)

The Approved Mining Plan has been examined with respect to Stripping Ratio and waste disposal planning. The volumetric calculation is based on the MINEX model of Talaipalli Coal Block prepared by MECL. The MINEX model, Approved Mining Plan and Feasibility Report was provided by NTPC. The Review of Mining Plan has been done up to calendar year 25 since the MDO contract has been awarded for 25 years only. However, the strip ratio of the final Stage Quarry (52<sup>nd</sup> year) provided in the Mining Plan has been determined to find out the variance in stripping ratio, if any.

As discussed earlier, the Mining plan has envisaged two entries for mining the Talaipalli Block: one on the east side of the North Eastern side and the other on the western side

of the property. It is mentioned in the Mining Plan that both the eastern and western quarry will advance independently and they will merge after about 20 years of mine operation. However, the Mining Plan contains only Final Stage Plans alongwith 1<sup>st</sup> to 5<sup>th</sup> year stage plans. The 25<sup>th</sup> year stage pit has not been provided in the Mining Plan for analysing the volumetric.

Therefore, the 25<sup>th</sup> year Pit has been taken from the Feasibility Report for Talaspell Coal block provided by NTFC for like to like comparison of Reserves and Strip Ratio. The 25<sup>th</sup> year stage pit is shown below in fig. no. 3-1.



Figure 3-1: 25<sup>th</sup> Year Stage Pit in Feasibility Report of Talaspell Block



### 3.1.1 RESERVES, OB VOLUME AND STRIPPING RATIO

The Mineable Reserve, OB volume and Average Stripping Ratio for the Talaipalli Block has been determined for Year 5, Year 25 and Year 52 (life of the mine) based on the stage pit boundaries provided in the Mining Plan/Feasibility Report. The details are given in table 3-1 below:

Table 3-1: Comparison of Mineable Reserve, OB volume and Stripping Ratio

Year	As per Approved Mining Plan (AMP)			As per CMPDIL based on AMP design		
	Coal (Mte)	OB (Mcum)	Stripping Ratio (cum/te)	Coal (Mte)	OB (Mcum)	Stripping Ratio (cum/te)
5	44.50	192.44	4.32	36.08	165.07	4.58
25	404.5	1738.64	4.30	430.50	2169.66	5.04*
52 (Final)	843.69	3777.07	4.48	790.81	4008.5	5.07*

*\*Not Workable according to design of Approved Mining Plan/Feasibility Report as discussed later*

The average stripping ratio to produce ~404.5 Mte of coal in 25 years is ~4.30 cum/te as per Mining Plan whereas examination of the Pit boundaries and designs provided in Mining Plan/Feasibility Report to deliver ~404.5 Mte of coal indicates that the average strip ratio is ~5 cum/te (five). The variance in strip ratio is around 16-17%.

According to the Mining Plan, the total Mineable Coal is 843.69 Mte and the total OB volume is 3777.07 Mcum with average strip ratio of 4.48 cum/te. However, analysis of the design of the final stage pit in the Mining Plan and volumetric calculation using MINEX model provided by NTPC suggest that the total mineable coal estimated in the final stage pit is 790.81 Mte and OB volume is estimated to be 4008.50 Mcum. This gives an average strip ratio of 5.07 cum/te which is ~13% more than what is indicated in the Mining Plan.

### 3.1.2 WASTE DISPOSAL PLANNING AND AVAILABILITY OF LAND

As per the Mining Plan, about 264.52 Mcum of OB is likely to be accommodated in the temporary external dump and has been planned to be re-handled back to the de-coaled area of the mine. The temporary external dump is 60m above the ground level with maximum RL of +360m. A particular area in the dip side within the block has been designated for temporary external dump.

Upon examining the design in Mining Plan/Feasibility Report, it is understood that the maximum OB that can be accommodated in the proposed temporary external dump is ~178 Mcum assuming the swell factor to be 1.2. Therefore, 264.52 Mcum of OB cannot be accommodated in the temporary external dump as envisaged in the Mining Plan.

Further, it has been envisaged in the Mining Plan that the internal dump will start in the 5<sup>th</sup> year of mine operation and from 9<sup>th</sup> year of mine operation sufficient void space will be created such that re-handling of temporary external dump along with yearly OB removed will be accommodated in the generated internal void. The temporary dump has been envisaged to be re-handled till 20<sup>th</sup> year of mine operation.

Upon perusal of the stage pit and sequence of mining in the Mining Plan, it is estimated that to deliver 44.50 Mte of coal in 5 years, total OB removed will be around ~204 Mcum rather than 192.44 Mcum given in the Mining Plan. The strip ratio works out to be ~4.58 cum/te rather than 4.32 cum/te in the Mining Plan. Further, it has been estimated that at the end of 5<sup>th</sup> year of mine operation, the total internal dump capacity created in the void is ~11 Mcum.

Table 3.2: Estimated OB generated and OB accommodation in proposed dump at the end of 5 year

Year	Estimated OB (Mcum)	Total OB accommodated (Mcum)			Remarks
		External	Internal	Total	
5	204	178	11	189	Shortage of space for ~15 Mcum of OB

Thus, the total OB accommodation in external and internal dump is estimated to be ~189 Mcum (178 Mcum+ 11 Mcum) at the end of 5<sup>th</sup> year while the total OB estimated to be generated is ~204 Mcum.

This suggest that if the mining sequence and dumping location for temporary external dump identified in the Mining Plan is strictly adhered to, it will effectuate cessation of the opencast mining operation in 5<sup>th</sup> year due to inadequate dumping space and mine will not be able to progress thereafter.

Even when the temporary external dump height is increased to 90m above the ground level upto a RL of +330m, the maximum OB accommodation in external dump would be ~251 Mcum. In 6<sup>th</sup> year stage, total OB generated would be ~286 Mcum and total OB accommodation in internal dump would be ~25 Mcum. So, the mine operation will stop in 6<sup>th</sup> year, even if the height of the dump is increased.

To ensure progression of the mine beyond 5<sup>th</sup> year, a scenario has been evaluated considering the entire land within the lease area is available for dumping and thus external dumping shall be done in the southern extremities of the block.

As per the Mining Sequence followed in the Mining Plan/Feasibility Report, it is estimated that at the end of 25<sup>th</sup> year, total OB volume generated would be ~2040 Mcum to deliver 404.5 Mte of coal. The total internal dumping space created would accommodate ~1175 Mcum (upto RL of +360m) of OB while the Mining Plan envisages backfill of total OB generated (1738.64 Mcum) till 25<sup>th</sup> year by re-handling the temporary external dump. Evidently, the accommodation of total OB internally is not feasible and so re-handling of

OB is not possible. As it happens, the total external dump space beyond the pit boundary of 25<sup>th</sup> year is ~ 175 Mcum upto an RL of +360m. Therefore, even after utilizing the entire land available for external dump, the total dump accommodation in 25<sup>th</sup> year would be 1350 Mcum (External+Internal) while the total OB generated would be ~2040 Mcum. It is clear that there is no space for dumping available for ~690 Mcum of OB.

Stage-wise generation of OB and availability of dumping space (upto RL of +360m), considering the entire land within the block is available for dumping, for 5<sup>th</sup>, 10<sup>th</sup> and 15<sup>th</sup> year has been determined. The details are given below in table 3-3.

Table 3-3. Stage wise estimated OB generated and space available for OB accommodation

Year	Coal (Mte)	Estimated OB (Mcum)	Total Dump accommodation upto RL of +360m (Mcum)			Remarks
			External	Internal	Total	
5	44.50	204	688	11	689	Dumping space adequate
10	134.50	675	544	209	753	Dumping space adequate
15	224.50	1160	403	507	910	Dumping space inadequate

It is evident from the above table that mining operation will come to a halt between 10<sup>th</sup> and 15<sup>th</sup> year due to non-availability of sufficient dumping space for OB. Even when the External Dump height is increased to 120m above ground level (4 deck) upto a RL of +390m, the total OB accommodation in external and internal dump will increase to only ~1070 Mcum, thus forcing the mine operation to discontinue in 14<sup>th</sup> year.

Therefore, the examination of the Mining Plan has led to the conclusion that overall, this Mining Plan does not seem to be practical and workable. Mineable coal and mining life given in mining plan not feasible. Also dump accommodation as suggested in mining plan is not feasible. There is calculation error in stripping ratio as well.

### **3.2 ALTERNATE FEASIBLE OPTION**

One of the scope of the work is to provide an alternate feasible option for opencast mining if the Mining Plan is found to be impractical. It is understood from the above that mine operation in accordance with the two entry scenario and mining sequence in Approved Mining Plan is not feasible in the Talaipalli Block since opencast mining cannot progress beyond 5<sup>th</sup> year. It is also apparent that even when the entire land within the block is made available for external dumping and height of external dump within the block is increased to 120m above ground level, mine operation cannot continue beyond 14<sup>th</sup> year.

Taking into consideration the dumping constraint due to inadequate dumping space, an alternate feasible opencast mining strategy has been designed to extract maximum coal from opencast mining. Also, the mining sequence has been determined to minimize the strip ratio. A tentative calendar programme, OB disposal schedule and lead for OB/Coal has also been worked out. Schematic stage plans at an interval of 5 year has been provided in the report. Additionally, due to change in pit design and mining sequence, an alternate coal evacuation/handling strategy has been suggested.

#### **3.2.1 OPENCAST MINING STRATEGY**

Opencast mining for the Talaipalli coal block has been proposed upto Seam III as suggested in the mining plan to maximize the recovery of coal. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping. The rated capacity for the block is proposed to be 18.00 Mtpy.

Similar to Approved Mining Plan, a two-entry scenario has been envisaged: one on the north eastern side and the other on the western side. However, due to lack of adequate dumping space, the western quarry is proposed to stop after 5<sup>th</sup> years of operation and

only eastern quarry will continue thereafter. This will optimize the mineable coal and increase the life of the mine thereby conserving coal.

### **3.2.1.1 MINE BOUNDARY**

The mine boundary for the western and eastern quarry has been delineated taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

#### **WEST PIT**

The west pit has been proposed upto Seam VII and will operate for 5 year only. This is due to the fact that backfilling of western pit would be required after 5 years to create adequate dumping space for the subsequent year's DB to be dumped. Also, the pit is designed upto VII i.e. 110m depth as there is lack of space for the pit to go upto Seam II in 5 years which is at a depth of ~250m. The pit boundaries for the western pit is given below:

**Northern Boundary** : Foot of the hill in northwest and 7.5m from the block boundary

**Southern Boundary** : Extent of the pit upto 5 year of operation

**Eastern Boundary** : 7.5m from the block and extent of the pit upto 5 year of operation

**Western Boundary** : 7.5m from the block boundary

### **EAST PIT**

The East pit has been proposed upto Seam III. The major considerations for delineation of Eastern Pit boundary are strip ratio minimization and requirement of external dump space within the block. The pit boundaries for the eastern pit is given below:

**Northern Boundary** : 7.5m from the block boundary

**Southern Boundary** : 100m from the block for conveyor corridor and magazine

**Eastern Boundary** : 60m from Kelo rover and 7.5m from block boundary

**Western Boundary** : Fault F1 and an arbitrary line considering low strip ratio zone and leaving sufficient external dump space in the western side

### **3.2.1.2 MINEABLE RESERVE**

For furnishing account of reserves, Net Geological Reserve has been arrived by taking geological loss of 10 % from Gross Geological Reserve. Mining loss of 5 % has been taken to arrive at the open-castable mineable reserves.

Total open-castable mineable reserve has been estimated as 411.55 Mte at a strip ratio of 4.60 cum/te. Tentative Reserve assessment for opencast mining is given below in table 3-4:

Table 3-4: Mineable reserve assessment for Opencast Mining

Particulars	Value in Mte
Net Geological Reserve as per GR	1267.15
Open-castable Net Geological Reserve	575.78
Net Geological Reserve blocked in batter	142.45
Available Net Geological Reserve for Opencast Mining	433.33
Less: Mining Loss@ 5%	21.67
<b>Mineable Reserve for Opencast Mining</b>	<b>411.66</b>

Seam-wise mineable reserve for opencast mining is furnished below in table 3-5:

Table 3-5: Seam-wise Mineable Reserve

Seams	Net Geological Reserve (Mte)	Mineable Reserve (Mte)
X-LA	0.00	0.00
X-LB	0.20	0.19
X-TOP	2.73	2.59
X-BOT	23.95	22.75
IX-L2	7.95	7.55
IX-L1	10.09	9.59
IX	40.46	38.44
VIII	51.58	49.00
VII	2.17	2.06
VI-TOP	10.28	9.77
VI-MID	67.34	63.98
VI-BOT	1.42	1.35
V-TOP	3.39	3.22
V-MID	12.80	12.16
V-BOT	18.27	17.36
IV-TOP	38.35	36.44
IV-MID	57.85	54.96
IV-L	14.13	13.43
IV-BOT	32.11	30.51
III-L	11.34	10.77
III	26.91	25.56
<b>TOTAL</b>	<b>433.33</b>	<b>411.66</b>



### **3.2.1.3 PRODUCTION TARGET AND LIFE OF PROJECT**

Considering the Pit geometry and total thickness of coal in the block, the production target has been kept same as 18.00 Mty proposed in the Mining Plan.

For the rated capacity of 18.00 Mty and considering the mineable reserve of 411.66 Mte, the production life of Talaipalli mine is estimated to be 26 years.

### **3.2.1.4 MINING SEQUENCE AND SCHEDULE**

The mining operation in Talaipalli block has been envisaged to be done through two entry. One entry will be in the north eastern side and other entry will be in the western side. As the physical possession of land is taken, equipment will be deployed to drive two access trench on either side to reach the bottommost seam and then this two pit viz. West Pit and East Pit will advance towards the dip side.

The west pit is proposed upto Seam VII and once the base seam is reached in 4<sup>th</sup> year of operation, it will advance towards the dip. The west pit is proposed only for 5 years since operating the west pit further beyond 5 years will lead to inadequate dumping space for external dump and thus it will become an impediment to continuity in coal production. The west pit will be utilized for backfilling OB from eastern pit after 5 years.

The east pit is proposed upto Seam III and is the main pit which will operate till end of the life. During 5<sup>th</sup> year of operation, coal production from both the pit will reach 18.00 Mty. After 5 years, the east pit will independently produce 18.00 Mty till 25<sup>th</sup> year of mine operation.

Internal dump will start once sufficient void is created in the pit. It has been proposed to start internal dumping in east pit from 6<sup>th</sup> year of mine operation. The external dump is

proposed to be done on the western side of the east pit and western external dump shall be merged with internal dump of the east pit after 10<sup>th</sup> year.

The mine parameters for the east and west pit is given below in table 3-6:

Table 3-6: Mine Parameters

Sl. No.	Parameters	Unit	Value	
			East Pit	West Pit
1	Maximum depth	M	350	110
2	Maximum strike length: along the Mine Floor along the Mine Surface	Km	3.60	1.10
		Km	4.20	1.40
3	Minimum strike length: along the Mine Floor along the Mine Surface	Km	2.25	0.90
		Km	2.90	1.05
4	Maximum dip rise length: on the Mine Floor on the Mine Surface	Km	2.40	0.50
		Km	3.20	0.95
5	Minimum dip rise length: on the Mine Floor on the Mine Surface	Km	2.10	0.40
		Km	3.10	0.83
6	Area: On the Mine Floor On the Mine Surface	ha	775.70	43.43
		ha	1171.45	111.93

The calendar plan of mining operations has been formulated based on the adopted sequence of opencast minefield development, optimum conditions of mining operations for the entire life of the planned opencast mine.

The target capacity of 18.00 Mtpa of ROM coal has been proposed to be achieved in the 5<sup>th</sup> year of mine opening . The peak volume of OB excavation is 91.08 Mcum per annum. The production schedule is given in table 3-7 below:

Table 3-7: Tentative Production Schedule

Year	Coal (Mte)			Comm. Coal (Mte)	QB (Mcum)			Comm. QB (Mcum)	Strip Ratio (Cum/te)	Comm. SR (cum/te)
	East Pit	West Pit	Total		East Pit	West Pit	Total			
1	0.90	0.60	1.50	1.50	4.12	3.14	7.26	7.26	4.84	4.84
2	2.00	2.00	4.00	5.50	9.17	10.47	19.63	26.89	4.91	4.89
3	4.00	4.00	8.00	13.50	18.33	20.93	39.26	66.16	4.91	4.90
4	8.00	4.00	12.00	26.50	41.24	20.93	62.17	128.33	4.76	4.84
5	14.35	3.65	18.00	44.50	66.52	19.11	85.63	213.96	4.76	4.81
6	18.00		18.00	62.50	91.08		91.08	305.03	5.06	4.88
7	18.00		18.00	80.50	91.08		91.08	396.11	5.06	4.92
8	18.00		18.00	98.50	91.08		91.08	487.19	5.06	4.95
9	18.00		18.00	116.50	91.08		91.08	578.26	5.06	4.96
10	18.00		18.00	134.50	88.68		88.68	666.94	4.93	4.96
11	18.00		18.00	152.50	81.10		81.10	748.04	4.51	4.91
12	18.00		18.00	170.50	81.10		81.10	829.13	4.51	4.86
13	18.00		18.00	188.50	81.10		81.10	910.23	4.51	4.83
14	18.00		18.00	206.50	81.10		81.10	991.32	4.51	4.80
15	18.00		18.00	224.50	78.67		78.67	1070.00	4.37	4.77
16	18.00		18.00	242.50	77.00		77.00	1147.00	4.28	4.73
17	18.00		18.00	260.50	77.00		77.00	1224.01	4.28	4.70
18	18.00		18.00	278.50	77.00		77.00	1301.01	4.26	4.67
19	18.00		18.00	296.50	77.00		77.00	1378.02	4.26	4.65
20	18.00		18.00	314.50	80.24		80.24	1458.26	4.46	4.64
21	18.00		18.00	332.50	80.88		80.88	1539.14	4.49	4.63
22	18.00		18.00	350.50	80.88		80.88	1620.02	4.49	4.62
23	18.00		18.00	368.50	80.88		80.88	1700.90	4.49	4.62
24	18.00		18.00	386.50	80.88		80.88	1781.79	4.49	4.61
25	18.00		18.00	404.50	80.88		80.88	1862.66	4.49	4.60
26	7.16		7.16	411.66	32.19		32.19	1894.85	4.50	4.60
<b>Total</b>	<b>397.41</b>	<b>14.25</b>	<b>411.66</b>		<b>1820.27</b>	<b>74.57</b>	<b>1894.85</b>		<b>4.60</b>	

### **3.2.1.5 MINING SYSTEM AND SYSTEM PARAMETERS**

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.

With due consideration to geo-mining characteristics of the deposit and as envisaged in the Mining Plan, the mine is proposed to be worked by shovel-dumper combination as well as Surface Miner.

Design of mining system has been done considering safety guidelines of Directorate General of Mines Safety (DGMS). However, during mine operations, the safety rules, regulations and various circulars issued by DGMS should be strictly followed and adhered to.

The height of the shovel-benches in OB varies from inter-burden thickness to 10-12m. The width of the working benches has been considered as 40m and the width of non-working benches has been considered as 25m. Considering the flat dip ( $4^{\circ}$ - $8^{\circ}$ ) of the seams, it is proposed to excavate the OB from advancing benches by inclined layers parallel to seam floor. This eliminates the need to cut new horizons from the side of seam roof and simplifies water drainage from the benches to central sump.

The slope of each bench is proposed as  $70^{\circ}$ . But the overall running slope in working faces will be around  $20^{\circ}$ . The ultimate pit slope is varies between 33 deg to 42 deg.

Persistent bands of thickness more than 1m present in coal seams are proposed to be mined separately.

Bench height of OB dumps formed by Shovel-Dumper system will be 30m and slope of individual dump benches will be 37° (equal to angle of natural repose of OB material). Width of berm between two adjacent benches will be 30 m.

Proposed System Parameters are tabulated and given below in table 3-8.

Table 3-8: System Parameters

Sl. No.	Particulars	Unit	Pit	Dump
1	Bench height	m	10-12	30
2	Working bench width	m	40	30
3	Nonworking bench width	m	25	30
4	Bench slope	Deg.	70	37

Above mentioned system parameters are indicative in nature. Referring to Regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020, It is imperative on part of the owner to carry out slope stability study to determine acceptable system parameters i.e. overall slopes of permanent dump and pit walls.

### 3.2.1.6 COAL AND OB TRANSPORTATION

OB will be transported through flank roads in both the pit to external OB dumps and Internal OB dumps.

Coal in both the pit is proposed to be transported through ramps and flank roads. Coal from east pit will be transported to mobile crushing arrangement at the surface and thereafter to Coal dispatch center by surface conveyors. Coal from west pit shall be directly transported to coal dispatch center through trucks since the pit is proposed to be operated only for 5 years and providing conveyor for surface transport will make it redundant after 5 years.

The lead for OB shall vary from about 3.00-7.25 km over the life of the mine. For West Pit, the average lead for external dumping vary from 3.25-3.75 km. For East Pit, the average lead for internal dumping vary from 3.00-3.50 km while the average lead for external dumping vary from 6.75-7.25 km in initial 10 years and thereafter it vary from 6.00-6.50 km for next 5 years. The lead for external dumping after 15<sup>th</sup> year will be same as lead for internal dumping.

The lead for coal vary from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal vary from 4.50-5.00 km. For East Pit, the average lead for coal vary from 2.50-4.00 km.

The lead estimation is tentative and may be estimated each year in the yearly operation plan.

### 3.2.2 WASTE DISPOSAL STRATEGY

It is envisaged that initially for 5 years, all the OB generated will be dumped externally. The external dump is proposed to be located in the western side of the east pit leaving 100m distance from east pit boundary. Once sufficient void is created after 5 years of operation, internal dumping will start and some OB will be dumped in the de-coaled area.

Initially the OB from both the east and west pit will be dumped externally as shown in the 5<sup>th</sup> year stage plan. However, after 5 years, the west pit will cease to operate and thereafter it will be backfilled with the OB generated by the east pit. This is necessary to create adequate dumping space for continuity of mine operation.

The external dumping will continue till 15<sup>th</sup> year and thereafter only tiny amount of OB of around ~1 Mcum per year will be dumped externally in the region between external dump toe and east pit boundary.

The Approved Mining Plan has proposed re-handling of OB back into the void but there is no space within the pit for re-handling and so re-handling has not been envisaged.

Out of the total OB of 1894.85 Mcum, it is estimated that 510.05 Mcum (~27%) will be required to be dumped externally and rest 1384.80 Mcum (~73%) will be dumped internally. The final height of the external dump is proposed to be around 120m above ground level upto an RL of +410m and final height of the internal dump is around 90m above ground level upto an RL of +375m. This will ensure optimization of the life of the mine to extract maximum mineable coal. However, a slope stability study will be imperative to determine final dump height and final dump slope as per regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020.

Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 37° (equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 90 m. Overall slope of dump works out to be 22°- 24°. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.

During mining operation, OB dump stability, high-wall slope stability for OB bench parameters, and maximum OB dump height should be adopted and modified as per the scientific study and DGMS permission.

Final stage dump plan, as well as stage plans also show the location of external/internal dumps showing RL as well as volume of dump.

The year-wise dumping schedule is provided in table 3-9 below:

Table 3-9. Tentative Dump Schedule

Year	External Dump		Internal Dump		Total OB	
	Annual	Cummulative	Annual	Cummulative	Annual	Cummulative
1	7.26	7.26		0.00	7.26	7.26
2	19.63	26.89		0.00	19.63	26.89
3	39.26	66.16		0.00	39.26	66.16
4	62.17	128.33		0.00	62.17	128.33
5	85.63	213.96		0.00	85.63	213.96
6	34.21	248.17	56.87	56.87	91.08	305.03

Year	External Dump		Internal Dump		Total OB	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
7	34.21	282.39	56.87	113.73	91.08	396.13
8	34.21	316.60	56.87	170.60	91.08	487.29
9	34.21	350.81	56.87	227.48	91.08	578.45
10	34.21	385.01	56.87	284.35	91.08	669.61
11	22.40	407.41	56.70	341.05	81.30	748.04
12	22.40	429.81	56.70	397.75	81.30	829.13
13	22.40	452.21	56.70	454.45	81.30	900.23
14	22.40	474.61	56.70	511.15	81.30	991.32
15	22.40	497.01	56.27	567.85	78.67	1070.00
16	1.60	498.61	75.40	643.25	77.90	1147.90
17	1.60	500.21	75.40	718.65	77.90	1224.80
18	1.60	501.81	75.40	794.05	77.90	1301.70
19	1.60	503.41	75.40	869.45	77.90	1378.60
20	1.60	505.01	78.04	947.49	80.24	1458.26
21	0.84	505.85	80.04	1027.53	80.88	1539.14
22	0.84	506.69	80.04	1107.57	80.88	1620.02
23	0.84	507.53	80.04	1187.61	80.88	1700.90
24	0.84	508.37	80.04	1267.65	80.88	1781.78
25	0.84	509.21	80.04	1347.69	80.88	1862.66
26	0.84	510.05	31.35	1384.02	32.19	1894.85

### 3.3 COAL HANDLING AND DISPATCH ARRANGEMENT

The mine is proposed to work through two quarries: East Pit and West pit. Talaspalli mine is planned for the production of 1.80 Mtpa of ROM coal from mine. As proposed in the Approved Mining Plan, coal will be produced through shovel dumper and surface mixer (-300 mm size). Therefore, crushing of coal will also be required for handling and dispatch. Total coal produced from Talaspalli Project will be loaded into railway wagon at nearby new proposed railway siding through silo and RLS for final dispatch. A railway siding has been proposed railway in the south-western part of the block for coal loading and dispatch.



Coal handling plant is proposed to cater entire production of coal from OCP and accordingly facilities of receiving, required crushing system, conveying, reclamation of coal from stockpile with conveying through belt conveyors to site and loading into rail wagon through Rapid load out system.

#### **Eastern quarry:**

The proposed coal handling system includes receiving of ROM coal at surface. ROM coal from eastern quarry will be transported at surface through dumpers/trucks which will be received in receiving hoppers for conveying of coal through belt conveyors.

Suitable receiving arrangement for coal produced through shovel dumper /surface miner (-300 mm size) in Truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. These receiving arrangement for coal have been proposed near mine quarry mouth to minimize the truck/dumper movements. The receiving pit/ station may be shifted as per the mine advancement and requirement during mine operation.

At this stage, truck receiving hoppers are considered, however, suitable alternative receiving arrangement either through reclaim feeder/ Chain feeder/Truck receiving station may also be considered at later stage according to mine condition and space availability at receiving pits.

ROM Blasted coal produced and transported through dumper shall also be received at surface in receiving hopper of crusher. These coal will be crushed up to (-) 100 mm size with suitable capacity of crushers/ sizers.

The above proposed receiving and crushing station have been proposed for eastern quarry and at the eastern side of the mine. It shall be shifted as per the mine advancement of eastern quarry.

Coal from receiving station and crushers shall be conveyed through suitable capacity belt conveyors along the eastern and southern boundary of the eastern quarry at surface.

through series of conveyors. Further this coal will be conveyed and stored into stockpile through stacker conveyors. The stockpile may be placed near proposed silo in the space provided for infrastructures.

**Western quarry:**

Coal produced from western quarry shall be transported by truck/ dumpers at surface and received in a hopper of crusher for crushing coal up to {-}100 mm size. This crushing station for coal will be placed at a suitable location near proposed stockpile for Silo loading arrangement. This crushed coal shall also be reclaimed into suitable capacity belt conveyor and fed to proposed stockpile. The life of this quarry is about five years only as such coal crushing and handling/ conveying set up may be provided accordingly.

**Loading & Despatch:**

Coal from stockpile will be reclaimed through suitable capacity feeders/reclaimers and fed to proposed silos through suitable capacity of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having pre-weigh hoppers with loading Silo. Two nos. silo will be placed on two different rail lines of proposed railway siding for loading of coal into railway wagons. Both the silos are connected with the bridge conveyors for feeding of coal into silos to ensure flexibility in loading.

## CHAPTER 4

### CONCLUSION AND RECOMMENDATIONS

#### 4.1 KEY FINDINGS AND RECOMMENDATIONS

In light of the review of the Approved Mining Plan and technical feasibility study done in the earlier chapter, some of the key findings are summarised below:

- The mine operation as per Approved Mining Plan is not feasible and if executed, will cease to operate in 5<sup>th</sup> year and beyond. This is because of the fact that designated dumping space in the Mining Plan for temporary external dump is not adequate and there would be no space left for dumping OB in 5<sup>th</sup> year of operation.
- It is also evident that even if the entire land within the lease area is made available for dumping and external dump height is increased to 120m above ground level as opposed to 60m in the Mining Plan, the mine will still not be able to operate beyond 14<sup>th</sup> year when the mining sequence of the Approved Mining Plan is followed.
- The mineable reserve for opencast mining as per Approved Mining Plan is 843.69 Mte at an average strip ratio of 4.48 cum/te for a life of 52 years. This mine cannot operate for 52 years attributable to the lack of land available within the block for accommodating OB. Also, while examining the pit design of the Mining Plan, it was found that the total mineable coal with opencast mining would be ~790.80 Mte at an average strip ratio of ~5.07 cum/te assuming there is no dumping space constraint and the mine operation is feasible for the entire projectized area in the Mining Plan.

- The Approved Mining Plan envisages total coal production of 404.50 Mte of coal at an average strip ratio of 4.30 cum/te for first 25 years, which is the contract period of MDO appointed by NTPC. Although mining till 25<sup>th</sup> year as per design of Mining Plan is impractical, the average strip ratio to deliver 404.50 Mte of coal in accordance with the sequence of the Mining Plan would be around ~5.04 cum/te assuming there is no dumping space constraint and mine operation is feasible till 25<sup>th</sup> year.
- A feasible option has been prepared after detailed analysis of the geo-mining parameters of the block and it has been ascertained that the total mineable coal from opencast mining would be around ~411.65 Mte at an average strip ratio of 4.50 cum/te as opposed to 843.69 Mte at an average strip ratio of 4.48 cum/te given in the Mining Plan. This is due to inadequate space available within the block for accommodation of OB. Additionally, the life of the mine would be around 26 years as opposed to 52 years in the Mining Plan.
- Pit boundary, mining sequence, external dump location and final height of the external dump is proposed to be changed to ensure continuity of mine operation and to extract maximum coal from opencast mining.
- Mine system parameters is proposed to be modified to ensure optimization of dump generation and creation of void. The change in bench parameters would necessitate review of equipment configuration proposed in the Approved Mining Plan.
- Two pit operation has been envisaged for 5 years and thereafter only east pit can continue since continuance of west pit will become a hindrance to coal production in subsequent years due to inadequate dumping space.

- Re-handling of OB has not been envisaged as there is no space within the pit for accommodating re-handled external dump.
- Since the west pit will operate only for 5 years, it is prudent to use conveyor transport only for east pit and coal from west pit (~14.25 Mtpa) shall be directly transported to the coal dispatch centre through trucks for 5 years.
- The lead for OB shall vary from about 3.00-7.25 km and the lead for coal vary from about 2.50 – 5.00 km over the life of the mine. The lead may be estimated each year in the year-wise operation plan.

In view of the above findings, it is evident that the current Mining Plan appears to be impractical. Therefore it is imminent to modify the Mining Plan and get the competent approval considering the proposed alternate feasible option since all the crucial parameters viz. opencast-able mineable reserves, strip ratio, opencast mine boundary, calendar programme of excavation, opencast mine life, dumping location and dump schedule, lead distance, system parameters etc. would significantly change from the Approved Mining Plan.

## ANNEXURES

## ANNEXURE-I: Letter from NTPC requesting CMPDI to be Independent Consultant



Ref No: NTPC/2016-HQ/2016/002/002

17.08.2016

To  
 Sh. A. K. Rana  
 Director (Technical)  
 Planning & Design,  
 CMPDI,  
 Kanker Road,  
 Ranchi.

Sub: Consultancy for review of Mining Plan of Talaspalli Coal Block as Independent Consultant

Dear Sir,

Talaspalli coal block, located in Mand Pargana (colliery), Chhatisgarh, was initially allocated by Ministry of Coal on 28.07.2008. At the time of allocation, the block was originally assigned to NTPC through MoU signed by Ministry of Coal and preparation of Conceptual Report (CR) on 14.07.2008. Later completion of about 100 tonnes (TMS) of coal, it started to about 20 to 40 TMS per day. CR was received on 29.05.2009.

After receipt of the CR, NTPC appointed In-house Coal Management & Marketing Pvt. Ltd (ICMML) as consultant for preparation of Mining Plan on 24.05.2009. Mining Plan prepared by ICMML was approved by Ministry of Coal for a rated capacity of 18 MTPA, on 01.02.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

Key features of Approved Mining Plan as given in table:

Sr.	Mineral Reserves (MMT)	Overburden (M Cum.)	Stripping Ratio (Cum:St)	Life of the Mine (Yrs)
1.	841.00	1772.07	4.25	12
2.	404.00	1198.74	6.30	25

Subsequent to the cancellation of allocation of Talaspalli coal block (as per part of 2004 JOR order by Hon'ble Supreme Court of India on Sep '14, the block was re-allocated to NTPC on 05.02.2015.

NTPC appointed M/s. Thakari Earthmovers Private Limited (TEMP), as Mine Development Operator (MDO) on 26.08.2008 for development and operation of Talaspalli Coal Block. During the contract period (TEMP) has excavated 404.00 million tonnes of coal at an average indicative Stripping Ratio of 4.20 Cum:St for 25 years including re-handling of 104 M Cum. of OB dumped in temporary external dump.

TEMP, after the award of contract, through various correspondence and meetings, claimed that as per their calculations 404 MMT of coal can't be extracted at a stripping ratio of 4.20 Cum:St as specified in the approved Mining Plan. As per their calculation by various pit designs, stripping ratio is varying between 4.20 to 1.20 Cum:St. Further, TEMP, claims that excess OB generated cannot be accommodated in the designated dump as per the approved Mining Plan and 100% of handling of OB is also not possible. TEMP, also stated that two pit operations is not feasible at the stripping ratio and mine operations would become difficult after 3 years of operations if they follow the approved Mining Plan.

(Signature)

For Mining Plan Section, P/Plan, Jorh Road, Jorh, Sunderbani District, West Bengal, India.  
 Registered Office: 10/10, Market, Sunderbani District, West Bengal, India. Phone: 91-33-2511111. Fax: 91-33-2511111. Email: ntpc@ntpc.co.in





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**NTPC Limited**  
A MAJOR COMPANY OF CIL

Page 3

4. A detailed report to be submitted including the findings of the routine work covering all the points above.

You are requested to kindly take up this consultancy assignment on urgent basis. Cost of the assignment/fee of CIL/CIL shall be taken care of perfectly in this report, we would like you to complete this task for the next date of meeting of the Delhi High Court is scheduled to be held on 27.07.2021.

Thanking you,

Yours faithfully,

Parth Mander  
 Executive Director (Coal Mining)  
 e-Mail: parthmander@nptc.coil  
 Mobile: 9826461024





File No.NA-410/4/2020-NA

F.No NA-410/4/2020-NA  
 Government of India  
 Ministry of Coal  
 One Nominated Authority  
 11111

R.No.120- 1st Floor, F-Wing  
 Shastri Bhawan, New Delhi,  
 Dated: 07<sup>th</sup> October 2021

**OFFICE MEMORANDUM**

Subject : Review of status of production of coal mines allocated by the Nominated Authority on 04.10.2021- Annexure of Minutes of Meeting etc.

The undersigned is directed to refer to subject mentioned above and to circulate herewith the minutes of the captioned meeting for information and necessary action (if any) please.

Encl. As Above



( Manish Uniyal )

Under Secretary to the Government of India

To:

1. Allocation of coal mines
2. DS(NA) /CM(R)
3. All Staff members of NA Section, MoC / LE/MB/ LC/PD/ PMU

Copy to:-

1. PSO to Secretary (Coal) PPS to AS & NA

Minutes of the meeting chaired by Additional Secretary (MN)/ Nominated Authority (Ministry of Coal), Govt. of India on 04<sup>th</sup> October 2021 at 11:00 AM regarding coal production from CMSP Coal Blocks.

The list of participants is at Annexure-1.

At the outset, Nominated Authority (NA) welcomed all the participants. He emphasized on the need for enhancement in coal production considering huge surge in demand arising from thermal power plants especially in month of October and November 2021. He informed that CIL has increased coal production and especially dispatch up to 20% over previous year and is under pressure to increase further to meet domestic coal demand. It was also noticed that coal production has been impacted due to heavy rain in eastern part of the country while coal demand has been elevated in country since economy is on recovery path. NA urged allottees to explore possibilities in enhanced coal production especially in Talabira II & III, Manoharpur, Tatalpalli, Pachwara North and Gare Palma sector III coal mines. It was also informed that policy for allowing 50 % sale of coal from captive mines will be notified in a day or two and it will encourage allottees to increase coal production. A brief presentation on coal production status (mine wise) were made :-

**1. Sarisalohi (M/s CESC Limited)**

It was observed that against an annual target of 3.5 MT, only 0.975 MT has been produced till September 2021. Allottee informed that a part of the mine is affected by fire and a public road passes through the mine and they are unable to produce coal to full capacity. It was informed that in next 6 to 8 months, road diversion will be completed. Allottee further informed that they will not be able to meet PRC due to fire and pending DGMS approval. NA advised allottee to achieve at least previous year production of 2.0 MTPA and follow up with concerned authorities for pending approvals and issues and asked allottee whether any intervention is required from MOC. Allottee replied that they will approach NA, if required.

**2. Balgaon (M/s Sunflag Iron & Steel Limited)**

Allottee was absent in the meeting.

**3. Parza East and Kanta Basan (M/s Rajasthan Rajya Vidyut Utpadan Nigam Limited)**

It was informed by allottee that mine has produced 6.02 MT till August 2021 and they will achieve PRC of 15 MT during this financial year. NA asked allottee to explore possibilities of increase in annual production capacity of the mine as it has sufficient coal reserve. Allottee informed that they have applied for expansion of environmental clearance and they will go for higher PRC provided they are able to get enhanced EC and forest land.

**4. Amelia North (M/s Jaiprakash Power Venture Limited)**

It was observed that 1.32 MT coal has been produced till August 2021 against an annual target of 2.8 MT and allottee informed that they will achieve PRC in this financial year like previous year. NA asked allottee to explore possibilities of increase in annual production capacity of the mine.

**5. Gare Palma IV-4 (M/s Hindalco Industries Limited)**

Allottee informed that PRC of opencast (OC) part of the mine is 0.56 MT and till date they have produced 0.3 MT this year and informed that CSIDC land is yet to be transferred from State Government in their name and this has adversely affected coal production and they will achieve target of 0.56 MT by March 2022 if CSIDC land is transferred to them.

Regarding underground (UG) portion of mine with PRC of 0.44 MT, allottee informed that working from UG method is not possible and they are working on conversion from UG to DG mine.

**6. Kathautia (M/s Hindalco Industries Limited)**

It was observed that only 0.095 MT coal has been produced till August in this financial year against annual target of 0.8 MT. Allottee informed that due to land issue and pending CNT permission they are not able to achieve scheduled production and in this connection they have submitted letters to Secretary (Mines & Geology) GoJ for help. Allottee further informed that there are 800 houses over mine area which needs to be shifted though the payment were made in 2016 itself but land is not received yet. NA advised allottee to approach Secretary (Mines & Geology) GoJ and resolve all pending issues at the earliest.

**7. Sial Ghogri (M/s RCCPL Private Limited)**

Allottee informed that 0.073 MT coal has been extracted till September in this financial year and they are able to extract only 40% of coal since roof condition is very poor. It was further informed that they are in process of opening new tunnel and coal production will be increased from 12000 ton per month to 18000 ton per month from October 2021 onwards.

**8. Marki Mangli-I (M/s Topworth Urja & Metals Limited)**

It was informed that against an annual target of 0.3 MT, only 32900 tonne has been produced till September, 2021. Allottee informed that there were some land issue which has affected coal production and now it has been resolved and about 30,000 ton coal production will be produced in October, 2021 and it will further improve to 35000 ton - 40000 ton per month from November onwards.

**9. Barjora (M/s West Bengal Power Development Corporation Limited)**

It was observed that there was no coal production in this financial year yet. Allottee informed that coal production will start in this month and will achieve coal production of around 0.35 MT till March 2022 as only 0.36 MT coal reserve is left and mine will be closed.

**10. Barjora North (M/s West Bengal Power Development Corporation Limited)**

It was informed that 0.81 MT coal were produced last year and 0.54 MT till date in this financial year. Allottee further informed that about 1.5 MT coal will be produced this year. NA advised for increase in coal production especially in October and November 2021. Allottee assured that they are regularly monitoring the mine operations and will try to enhance the coal production in coming months.

**11. Pachwara North (M/s WBPDCL)**

Allottee informed that 4.13 MT coal were produced last year and 3.97 MT coal has been produced till September this year. Allottee further informed that they will certainly produce about 8.0 MT by March 2022 and will try for even 10 MT. NA advised allottee for more coal production. Allottee informed that only forest clearance is the challenge and acquisition of 325 acres of land from Government of Jharkhand is under process. It is expected that they will get this land by end of this month and will submit to forest department for further clearance. Allottee assured that they will achieve coal production up to 15 MTPA after getting forest clearance. NA advised allottee to ask for any assistance if required from Ministry of Coal and allottee replied that they will approach MoC for assistance if required.

**12. Tara East & West (M/s WBPOCL)**

It was observed that coal production has not started. Alottee informed that MDO was appointed previously, however, appointment has been terminated and they are in the process of appointment of new MDO.

**13. Gangaramchak, GangaramchakBhadrula (M/s WBPOCL)**

It was observed that coal production has not started this year yet. Alottee informed that due to heavy rain canal overflowed and roads were washed down. Alottee further informed that roads are under preparation and they will produce 1.0 MT (PRC) by March 2022.

**14. Tadicherla-4 (M/s Telangana State Power Corporation)**

It was informed by allottee that they have achieved 1.3 MT coal production till date against PRC of 2.5 MT. Alottee further informed that they will certainly be able to produce 2.5 MT coal this year, however they will try to achieve PRC of 2.5 MT. As advised by NA, allottee assured that 2 lakh ton more coal will be produced in next two months.

**15. Dalanga (M/s NTPC)**

Alottee informed that they have produced 1.8 MT coal till September this year and will produce 5.25 MT coal in this financial year.

**16. Tataipati (M/s NTPC)**

It was observed that only about 0.28 MT coal has been produced till August 2021. Alottee informed that coal production is stuck up due to dispute with MDO as approved Mine Plan has been challenged by MDO and there were coal impications associated. The matter was jointly referred to CMPDL for verification and CMPDL has advised for revision of Mine Plan. In this regard allottee has also invited MDO for further discussions and next hearing is on 21 October 2021. Alottee assured that the matter will be resolved in next few months.

**17. Gara Palma IV-E (M/s Ambuja Cement Limited)**

It was observed that coal production is only about 0.133 MT till August 2021. Alottee informed that opencast mining is in operation and they are achieving their monthly production target. Alottee further informed that there is an issue of road diversion due to which coal production is affected and informed that tender work for the same is still pending and sought assistance from MoC in this matter. NA advised allottee to share details and assured all needed help in this connection.

Alottee also informed that underground mining has not started as DGMS approval is awaited. Alottee is hopeful of starting coal production shortly and assured that about 1.8 lakh ton coal will be produced from underground and 7 lakh ton overall from the mine this year.

**18. Chatti Baraitu & Chatti Baraitu South (M/s NTPC)**

It is observed that coal production has not started due to MDO appointment issue. Alottee informed that they have finalized the MDO and work will be awarded in next few days. Alottee further informed that there is also encroachment over mine area and they are pursuing the matter with district and state authorities. It was also informed that they will not be able to produce coal this year due to difficulty in land acquisition and production will start from next year.

**19. Hiranidhari (M/s NTPC)**

It is observed that coal production has not started mainly due to MDO appointment issue. Alottee informed that they are not getting adequate bids, however, in the current bidding process bids will be opened on 14<sup>th</sup> of this month and MDO appointment will be made by March 2022. Alottee further informed that there are other challenges such as handing over of forest land by Government of Jharkhand to them since last 02 years. There are 400 houses whose asset evaluation has been completed and allottee is constantly pursuing the matter with State Government. Alottee sought assistance in R&R, Land acquisition and handover of forest land from MoC. NA assured that all assistance will be provided from ministry.

**20. Mancharpur (M/s OCPL)**

Alottee informed that they have produced 1.56 MT coal till September this year and will produce 4.5 MT coal in this financial year as per mine plan. NA advised allottee to explore possibilities of increased coal production this year as the mine has capacity for more coal production and informed that the directives for selling 50% coal in open market from Ministry of Coal will be issued in a day or two. Alottee assured that they will try to achieve 5.5 MT coal production this year after such encouragement from Ministry of Coal.

**21. Gane Palma Sector II (M/s CSPGCL)**

Alottee was absent in the meeting.

**22. Talabira-II & III (M/s MLC India Limited)**

Alottee informed that they have achieved coal production of 1.87 MT till September 2021 and will be able to produce 4.0 MT in this financial year as per approved mine plan. NA advised allottee to enhance coal production as the mine has more capacity of coal production. Alottee assured that they will produce 5.0 MT coal this year and 8.0 MT next year if 50 % sale of coal is allowed in open market. NA informed that directive allowing 20 % sale of coal from captive mines will be issued in a day or two.

**23. Baran] I, II, III, IV, Kiloni and Manradeep (M/s KPCL)**

Alottee informed that they had started coal production from March 2021 but due to heavy rain mine got flooded. Alottee further informed that dewatering is going on and assured that in a month coal production will increase, however, PC stage II is a challenge and achievement of PRC is possible only when forest land is transferred to them. It was informed that MoEF&CC has sought fresh consent of Gram Sabha while it was done in case of prior allottee and for resolving this they sought help of ministry. NA advised allottee to increase coal production capacity of mine as it has sufficient reserve and assured all support to them. Alottee informed that PRC can be increased from 2.5 MT to 3.7 MT per annum and they are working on that.

**24. Trans Damodar (M/s The Durgapur Project Limited)**

Alottee informed that coal production has been affected adversely due to heavy rain in monsoon season and assured that coal production will pick up from October month and they will be able to produce 1.0 MT (PRC) coal by March 2022. NA advised allottee to enhance coal production in next two months.

**25. Marki Mangli-III (M/s B S Ispat Ltd)**

It was observed that only 0.052 MT coal has been produced till August 2021. Alottee informed that coal production has started in May 2021 but coal production is not picking up due to few

local and administrative issues in August 2021 and heavy rain in September 2021. Alottee assured that coal production will increase in coming months and they will achieve PRC (0.21 MT) in this financial year.

#### 26. Anihagan (M/s OCL Iron & Steel Ltd)

Alottee informed that the company has come under NCLT.

#### 27. Chotia (M/s BALCO)

Alottee informed that they have surrendered the mine and requested State government for terminating the mining lease but they have not received any response from the State.

#### 28. Bisherpur (Ultratech Cement Ltd)

It is observed that coal production has not started yet. Alottee informed that due to delay in completion of lift drive and ramp duty calculation coal production has not started. Alottee further informed that all pending issue has been resolved and they will start coal production in November 2021 and will produce 2 lakh coal in this financial year and 7.5 lakh ton coal from next year onwards.

#### 29. Sullyari (M/s APMDCL)

Alottee informed that they have got mine opening permission on 13.8.2021 and they will start coal production shortly. Alottee further informed that few structures have been erected during the year 2014-16 in this block when there was no allottee, however, they are following up with district administration and will resolve the issue in the current month itself. Alottee assured that they will produce 2.5 MT coal by March 2022 as per mine plan.

At the end, Nominated Authority emphasized to enhance coal production and advise all Alottee to at least achieve PRC deadlines of this financial year. NA also stated that it will be highly appreciated if coal production may be increased in October and November 2021 seeking huge demand from all over the country.

Annexure - 01

#### List of participants from Ministry of Coal:-

S.No.	Name
1	Shri M. Nagaraju, Additional Secretary and Nominated Authority
2	Shri Ajteesh Kumar, Deputy Secretary
3	Shri Jitendra Kumar, Chief Manager (Mining)
4	Shri Manish Uniyal, Under Secretary
5	Smt Swati, Manager
6	Shri Mahesh Pimpransu, Team Leader, PMU
7	Shri Rohit Sharma, SME, PMU
8	Shri Manish Chand, Manager
9	Shri Ashaek Kumar, ASO
10	Young Professionals

## List of participants from Companies:-

S. No.	List of Companies
1	CEO, OCPIL
2	MD KPCL
3	Dr. YRK Rao, Director
4	Shri Dgesh Bhatia Hindalco Industries Ltd
5	Shri Vivek Mehra, Hindalco Industries Ltd
6	Shri Manish Chakraborty, Hindalco Industries Ltd
7	Shri Debashyri Sen, CFSC
8	Shri Sandeep Kumar Jain, HOOPIL
9	Shri Dhanraj Khan
10	Shri B S Chaudhary
11	Shri M N Jha, JapraKash Associates Ltd
12	Shri Rishi, Chota Mines, BALCO
13	Shri Shivanappa Kantam, Ambuja Cementa Ltd.
14	Shri S N Chawla, Refresh Associates Ltd.
15	Shri B P Mishra, Mahi Mangoli
16	Shri Partha Mazumder NTPC
17	Shri Syed Khadry, Ultratech Cementa Ltd
18	Representative from APMDC SITE
19	Representative from APMDC HQ
20	Representative from KPCL Delhi
21	Representative from WBDCI
22	Representative from Durgapur Projects Ltd
23	Representative from NICA
24	CMD, IRFVUN



**KUDLAPPA B**

**From:** PARTHA MAZUMDER  
**Sent:** 06 October 2021 22:10  
**To:** ANOOP SINGH BISHT  
**Cc:** Mr Sanjeev Kassi; C K MONDOL; SANTOSH KUMAR VI HOCP  
**Subject:** Re: Update on Talaspali Mine Plan  
**Attachments:** Brief Report on CMFOI\_MoP\_06.10.21.docx

Dear Sir,

In reference to your trailing email, please find attached herewith a BRIEF.

सादर / Warm regards,

पार्थ मजुमदार / Partha Mazumder  
 Regional Executive Director (Coal Mining)  
 इन्टीपीसी / NTPC Ltd.  
 Coal Mining Headquarter  
 Ginni Plaza, Opp. Chulia Police Station  
 Ranchi 834001 (Jharkhand)

मोबाइल / Mobile [9650996364](tel:9650996364) / 8744076364

---

**From:** ANOOP SINGH BISHT <anoopsinghbisht@vsnl.in>  
**Sent:** Monday, October 4, 2021, 1:15 PM  
**To:** C K MONDOL <CKMONDOL@NTPC.CO.IN>  
**Cc:** Mr Sanjeev Kassi <sanjeev\_kassi@nic.in>; PARTHA MAZUMDER <PARTHAM@NTPC.CO.IN>  
**Subject:** Update on Talaspali Mine Plan

CAUTION: This Email has been sent from outside the Organization. Unless you trust the sender, Don't click links or open attachments as it may be a Phishing email, which can steal your information and compromise your Computer.

Dear Sir

Please refer telephonic conversation with CI(Thermal) today.

2. Kindly Provide information on anomalies, if any, in Mine plan earlier approved for Talaspali.

Regards,

**(Anoop Singh Bisht)**

Union Secretary (Thermal)

Ministry of Power

Ph. No. 011-23719710



### Brief on Mining Plan of Talajgall - CMPDL's Observations

#### **Background**

NTPC appointed M/s. Tarsari Earthmovers Private Limited (TEMPL) as MCO on 26.08.2020 for development and operation of Talajgall mine. During the contract period, TEMPL has to extract 404.50 MMt of coal at an average stripping ratio of 4.30 Cu:mt for 25 years including re-handling of 264.52 Million Cu:mt. of OB dumped in temporary external dump.

After award during preparation of draft Operational Plan, TEMPL disputed the Mining Plan (prepared by M/s. AC&M, the consultant appointed by NTPC in 2009), approved by Ministry of Coal in 2010, claiming that there would be excess OB generation and it cannot be accommodated in the designated temporary external dump. Moreover, 100% backfilling of OB will not be possible. Further, TEMPL also stated that two pit operations (East & West) are not feasible and mine operations would become unprofitable after 8 years of operations if they follow the approved Mining Plan.

NTPC had series of discussions with TEMPL, and asked them to submit a feasible solution for start of mine operation. In the review of these discussions, TEMPL, on 24.05.2021, communicated the notice of rescinding of Project Agreement to NTPC, and also filed a Commercial Suit that before Hon'ble Delhi High Court. They also prayed for stay in regard to appropriation of their BGS by NTPC.

During the hearing on 13.05.2021, Hon'ble Court didn't consider their request for stay and advised for mutual discussion for amicable resolution in next two months' time by keeping the notice of rescinding of Project Agreement under stay. Accordingly, discussions held between NTPC and TEMPL for reaching of the issues. Matter was also referred to Ministry of Power and Ministry of Coal.

In the review meeting of Secretary (Coal) held on 16.05.2021, NTPC briefed the issues raised by TEMPL, challenging the Mining Plan, already approved by MOC in the year 2010. Subsequently, NTPC, in a meeting with Nominated Authority & Addl. Secretary, MOC held on 13.05.2021, also briefed these issues. As deliberated, CMPDL was engaged as an independent Consultant for reviewing the approved Mining Plan and the workings of TEMPL, and also to suggest a feasible solution for working of the mine. Accordingly, CMPDL took up this assignment and submitted its Technical Feasibility Note on 07.09.2021.

#### **Brief of the Technical Feasibility Note of CMPDL**

As per their workings, mining operations would not be feasible, as per the approved Mining Plan, beyond 08th year considering two-pit operations. Due to non-availability of dumping space for OB, inadequate mine life for backfilling, more land would be required (beyond 25 yrs. boundary) for OB dumping. Moreover, total mineable reserves of 60.60 MMt in entire mine life of 52 yrs., as considered in the approved Mining Plan, would not be possible to extract and the mine life would come down to 25 years.

Sl	Particulars	Approved Mining Plan	CMPDL's Workings	Observations/Comments by CMPDL
1.	As per MCO Contract (25 yrs) a) Mineable Reserves b) Strip Ratio	404.50 MMt 4.30 cu:mt	411.86 MMt 4.60 cu:mt	Mine is workable for 25 years at a SR 4.60 cu:mt considering single pit operation and re-handling of overburden.
2.	For Initial 8 Years a) Mineable Reserves b) Strip Ratio	44.50 MMt 4.32 cu:mt	44.50 MMt 4.31 cu:mt	Two pits are workable, simultaneously for initial five (5) years only. East Pit to continue for mine life of 25 years.
3.	OB Qty. in External Dump	264.52 M.cu.m	270.05 M.cu.m	Additional land required for OB dumping (ie beyond 25 yrs mine boundary).
4.	Re-handling of OB	Conditional	Not Possible	No adequate mine land available for backfilling.
5.	Average Lead for Coal & OB	2 to 3 Km	Coal : 2.50 Km OB : 2-7.25 Km	

**THRIVENI EARTHMOVERS PRIVATE LIMITED****A World Class Mine Developer Operator**

CIN: U60231TZ1993FTC006875



TEML/TL/Contracts/2021-2022  
19<sup>th</sup> October, 2021

To,  
The Head of Project,  
Tatapali CMP,  
NTPC Limited, Lalkote Road,  
Sharghuda, Dist: Raigarh - 481111  
Chhattisgarh state.

**Sub:** Agreement Ref. No. CE-7014(XD2R)-S-CE-PA-055 dated 25.04.2020 – Development and Operation of Tatapali Coal Block. Classifications consequent to CMPDL report - Reg.

**Ref:** Our good faith discussions on 17<sup>th</sup> October 21 through VC.

Dear Sir,

Thank you for your time and availability for our discussions on the proposed next steps with regard to the Tatapali project subsequent to the Central Mine Planning & Design Institute Ltd (CMPDL) report on a viable and feasible solution. We put forth the points that have been deliberated on 17<sup>th</sup> Oct-21 based on the CMPDL report.

1. Technically there are many parameters (Leak distance, lift height, waste dump location etc) which have changed with respect to the Original (and approved) Mine plan. The mineable reserve too has significantly changed for the entirety. There is variance in all major aspects, such as mine pit boundary for 25 years, life of mine and reduction in mineable reserve, strip ratio, dumping schedule, dump slope stability study, corresponding Environment Clearance amendments and DGMS approvals etc.
2. Three aspects need to be incorporated into a new mine plan which will have to be approved by the regulatory authorities. The revised (and approved) mine plan constitutes an important document which would form the base thereafter for the projects operating life as well as the 25 years contract period.
3. We can propose and discuss a new mining fee once the revised mine plan is finalized and approved by the concerned regulatory authorities. The new mining fee will need to factor in the variability of the project based on the equipment selection and investments envisaged under the approved mine plan.
4. The Project Agreement will need amendments/revisions based on the approved mine plan.

You are also requested to consider whether there would be any further changes to the CMPDL recommended waste dump option. We would consider your request on how the coal production could be ramped up quickly.

We look forward to continuing our discussions in the week commencing 26.10.2021.

This is for your information and records please.

Thanking You,  
Yours Sincerely,  
For Thriveni Earthmovers Private Limited

Authorized Signatory

CC - RED (Coal Mining) - NTPC HQ, Raigarh



• Thriveni Earthmovers Private Limited, Tatapali CMPDL Block, Lalkote, Raigarh, Chhattisgarh-481111  
 • Helpline No: 1424444, PFT: Raigarh, 064 / Raigarh, 064/4444444 / Email: [hr@thriveni.com](mailto:hr@thriveni.com)  
 • M: 98260 00000, 98260 00000, 98260 00000 / T: 064111 / Email: [hr@thriveni.com](mailto:hr@thriveni.com)  
 • P: 064111 / 2021-2022-2023



एन टी पी सी लिमिटेड  
 (एन टी पी सी लिमिटेड)  
**NTPC Limited**  
 (A Govt. of India Enterprise)

Ref. No. CMHQ/Talaspali Mining plan/2021/91/27

Date: 26.10.2021

To,  
 The Non-Reserved Authority & Additional Secretary,  
 Ministry of Coal,  
 Government of India,  
 Shastri Bhawan,  
 New Delhi-110001

Sub: Update on Talaspali Mining Plan with the Technical Report submitted by CMPDIL as Independent Consultant.

Dear Sir,

As you are kindly aware that M/s. Thriuvan Earthmovers Pvt. Ltd. (TEMPL) was awarded with the contract for development & operation of Talaspali Coal Block on 25.08.2020. But, NTPC has not been able to start the mining operations because of the disputes raised by the MOC challenging the mining plan, already approved by MOC in the year 2010.

In the review meeting of Secretary (Coal) held on 18.06.2021, NTPC briefed the issues raised by TEMPL. Subsequently, NTPC also briefed these issues in your meeting held on 13.05.2021. As deliberated, CMPDIL was engaged as an Independent Consultant for reviewing the approved Mining Plan and the workings of TEMPL and also to suggest a feasible solution for working of the mine.

Accordingly, CMPDIL took up this assignment and submitted its Technical Feasibility Note on 01.09.2021 (Brief enclosed). NTPC and TEMPL are presently deliberating on the Technical Feasibility Note of CMPDIL to find out the way forward, mutually.

Meanwhile, Hon'ble Delhi High Court had asked NTPC and TEMPL to resolve the matter amicably by holding settlement talks without prejudice to their respective rights and contentions. Next hearing is now scheduled on 28.12.2021.

This is for your kind information please.

Thanking you,

*(Signature)*

Yours faithfully,

*(Signature)*

(Partha Manojor)

Regional Executive Director (Coal Mining)

Mobile: 9830290204

Email: partham@npsc.co.in

बिड़ला खाना नुमाइश: एनटीपीसी लिमिटेड, एन-बी ब्लाक, मुक्ति खाना सेक्टर, मुक्ति, 88 20001 (जर्मन)

Coal Mining Headquarters, NTPC Limited, Ginn Plaza, Opposite Chula Petrol Station, Chula, New Delhi-110001 (Jarkant)

Registered Office | NTPC Bhawan, SCOPE Complex, T. Institutional Area, Laxmi Nagar, New Delhi-110002

www.npsc.co.in



### Brief on Mining Plan of Talaspali - CMPDL's Observations

#### **Background**

NTPC appointed M/s. Thores Earthmovers Private Limited (TEMPL) as MCO on 25.05.2020 for development and operation of Talaspali mine. During the contract period, TEMPL has to extract 404.50 MMt of coal at an average stripping rate of 4.30 Cu mt for 25 years including re-handling of 294.52 Million Cu m<sup>3</sup> of O&B dumped in temporary external dump.

After award during preparation of final Operational Plan, TEMPL disputed the Mining Plan (prepared by M/s. ACMM, the consultant appointed by NTPC in 2009), approved by Ministry of Coal in 2010, claiming that there would be excess O&B generation and it cannot be accommodated in the designated temporary external dump. Moreover, 100% handling of O&B will not be possible. Further, TEMPL also stated that two pit operations (East & West) are not feasible and mine operations would become unviable after 5 years of operations, if they follow the approved Mining Plan.

NTPC had series of discussions with TEMPL and asked them to submit a feasible solution by start of mine operation. But, in the mid-way of these discussions, TEMPL, on 04.05.2021, communicated the notice of rescinding of Project Agreement to NTPC, and also filed a Commercial Suit that before Haryana Delhi High Court. They also prayed for stay in regard to availability of their DCOs by NTPC.

During the hearing on 10.05.2021, Haryana Court didn't consider their request for stay and advised for mutual discussion for amicable resolution in next two months' time by keeping the notice of rescinding of Project Agreement under abeyance. Accordingly, discussions held between NTPC and TEMPL for resolving of the issues. Matter was also referred to Ministry of Power and Ministry of Coal. Hearing was held on 21.10.2021 and the next hearing is scheduled for 28.12.2021.

In the review meeting of Secretary (Coal) held on 10.05.2021, NTPC briefed the issues raised by TEMPL, challenging the Mining Plan, already approved by MOC in the year 2010. Subsequently, NTPC, in a meeting with Nominated Authority & Addl. Secretary, MOC held on 13.05.2021, also briefed these issues. As deliberated, CMPDL was engaged as an Independent Consultant for reviewing the approved Mining Plan and the workings of TEMPL, and also to suggest a feasible solution for working of the mine. Accordingly, CMPDL took up the assignment and submitted its Technical Feasibility Note on 07.05.2021.

#### **Brief of the Technical Feasibility Note of CMPDL**

As per their workings, mining operations would not be feasible, as per the approved Mining Plan, beyond 25th year considering two-Pit operations. Due to non-availability of dumping space for O&B, inadequate mine-walk for backfilling, more land would be required (beyond 25 yrs. Boundary) for O&B dumping. Moreover, sizeable reserves of 843.20 MMt (in entire mine life of 52 yrs.), as considered in the approved Mining Plan, would not be possible to extract and the mine life would come down to 25 years.

Sl	Particulars	Approved Mining Plan	CMPDL's Workings	Observations/Comments by CMPDL
1.	For MCO Contract (20 yrs) a) Minable Reserves b) Strip Ratio	404.50 MMt 4.30 cu mt	411.05 MMt 4.68 cu mt	Mine is workable for 20 years at a STR 4.30 cu mt considering single pit operation and no re-handling of overburden.
2.	For initial 5 Years a) Minable Reserves b) Strip Ratio	44.50 MMt 4.37 cu mt	44.30 MMt 4.81 cu mt	Two pits are workable, simultaneously for initial five (5) years only. First Pit to continue for mine life of 25 years.
3.	O&B Qty. in External Dump	294.52 Mcu m	510.25 Mcu m	Additional land required for O&B dumping (beyond 25 yrs mine boundary).
4.	Re-handling of O&B	Considered	Not Possible	No alternate mine exit available for handling.
5.	Average Land for Coal & O&B	2 to 2.5 Km	Coal: 2.5-5 Km O&B: 3-7.25 Km	



**NTPC Limited**

(A Government of India Enterprise)  
**SSC - Coal Mining(Ranchi)**

Coal Mining HQ, Ginni Plaza Chulia, Opposite- Chulia Police Station  
Ranchi  
Jharkhand- 834001, India  
Telephone No. : Fax No. :

Service Purchase Order

PAN No. : AAACH0258D  
CIN No. : L40101DL1975001007008

Purchase Order No. : 860023968/108/1074 Date : 18.11.2021 ( version : 8 )

To  
IT (ISM) DHANBAD  
INDIAN INSTITUTE OF TECHNOLOGY  
INDIAN SCHOOL OF MINES ADM. BLOCK  
DHANBAD  
Jharkhand  
India - 826004  
Tel. 0326 2036202  
E-Mail : ig@iitmdhanbad.ac.in

Vendor Code : 1186522

**Kind Attention** : Sh. Shri. Shankar Pat  
**Subject** : Engaging M/s IT - ISM as an Expert Advice and Technical Vetting of Technical Feasibility Note of Talapali Coal Block prepared by CMPDIL.  
**NET NO.** : 860023968/108/1074 Dated 18.11.2021  
**Your Offer No.** :  
**Your Reference** :  
**Our Reference** : NET Number : 860023968/108/1074, NET Date : 18.11.2021

Dear Sir,

This has reference to our above mentioned NET, Your offer and subsequent discussions. We are pleased to accept your offer, opened on 18.11.2021 and confirm having awarded on you the work of Engaging M/s IT - ISM as an Expert Advice and Technical Vetting of Technical Feasibility Note of Talapali Coal Block prepared by CMPDIL of total value INR 800,000 (Rupee - SIX LAKH ONLY) mentioned in the scope of work, terms & conditions, Bill of materials etc.

The duration of the service period shall be from 24.11.2021 to 14.12.2021. Though the duration of contract shall remain same, the actual date of commencement of the contract shall be as per the direction of EIC, AGM (ENGG) shall be EIC for this work.

This service purchase order along with its annexure is being issued to you in duplicate. We request you to return the duplicate copy of this service purchase order, duly signed on each page by your authorized signatory in token of your unequivocal acknowledgment of the same within 15 days from the date of this service purchase order. If no communication is received within 15 days of receipt of Purchase Order, it will be treated that order has been accepted in entirety.

We thank you for the interest shown by you in our project and the cooperation extended to us. We expect to receive your continued cooperation in future also.

Thanking You,  
For & on behalf of NTPC Limited

SR.MANAGER (CBM)

Enclosures :

**Name of Work:****(Bill of Quantity)**

Engaging M/s IIT - ISM as an Expert Advice and Technical Vetting of Technical Feasibility Note of Talapalli Coal Block prepared by CMPDIL

Sl No.	Code	Description	Unit	Quantity	Net Price	Amount	Long Text
--------	------	-------------	------	----------	-----------	--------	-----------

**Delivery/Invoicing Address:**

10/4 Coal Mining HeadQuarters  
Coal Mining HQ, Ginni Haza Ranchi  
Jharkhand  
834001  
India

Invoicing to be done on

GST No - 20AAAACN02260120

10		IIT-ISM - Expert Advice	LOT	1.000	600,000.00	600,000.00	
----	--	-------------------------	-----	-------	------------	------------	--

Tax: IN Central GST-ND @ 9.00 % Extra

IN State GST-ND @ 9.00 %

10.10		IIT-ISM - Expert Advice	LFS	1	600,000.0000	600,000.00	
-------	--	-------------------------	-----	---	--------------	------------	--

TOTAL OF BOQ PART : 00010 INR 600000.00

Amount 600000.00

Other Charges 0.00

Net Amount on BOQ PART : 00010 INR 600000.00

Net Total Amount INR 600,000.00

Less Rebate/Amount INR 0.00

Grand Total INR 600,000.00

INR SIX LAKH ONLY

**Terms & Conditions****Payment Terms**

The payment terms for the assignment shall be as below:

- i. 50 % of the consultancy fee as mobilization fees at the time of award of work.
- ii. 25 % of the consultancy fee within one week of submission of the draft report.
- iii. 25 % of the consultancy fee within one week of submission of final report.

**Payment Mode**

EFT

Invoice to be raised on delivery/invoice address against the given PO line items.

**Special Instruction**

- 1 Total Contract Value Rs 6.00.000/- excluding GST.
- 2 Contract Period The time schedule for the assignment is Three (03) weeks from the date of receipt of LOA.
- 3 GST GST shall be paid extra @ 18% as per GST rule.
- 4 Payment Terms The payment terms for the assignment shall be as below.
  - i. 50 % of the consultancy fee as mobilization fees at the time of award of work.
  - ii. 25 % of the consultancy fee within one week of submission of the draft report.
  - 25 % of the consultancy fee within one week of submission of final report.
- 5 Defect Liability Period Not applicable
- 6 Security Deposit Not applicable
- 7 Liquidated damages (LD) Not applicable
- 8 Contract Agreement Not applicable
- 9 All other terms & conditions shall be as per agency budgetary offer



Break up of Price (For Service Related Lines Only)

Sl No.	Service Code	Description	Qty.	UOM	Rate	Premium	Discount	Addl Discount	Net Rate	Value
10 10		IT-ISM - Expert Advice	1	LPS	600,000.00	0.00	0.00	0.00	600,000.00	600,000.00

### SCOPE OF WORK

**00010 : IIT-ISM - Expert Advice****1.0 Scope of Services**

1.1 The scope of services of IIT-ISM for Expert Advice and Technical Vetting of Technical Feasibility Note of Talapalli Coal Block prepared by CMPDIL.

1.2 Scope of work shall be as follows.

- a) Technical review of Technical Feasibility Note prepared by CMPDIL.
- b) Technical review of Approved Mining Plan and Findings of TEMPL
- c) Suggestions/Expert advice for modification for sustainable mine operations.

1.3 The report shall be prepared in two volumes

- A. Volume # I : Text
- B. Volume # II : Plates

**2.0 Time Schedule**

The time schedule for the assignment is Three (03) weeks from the date of receipt of LOA.

**3.0 Deliverables**

Draft Report - 02 copies along with one set of A3 drawing and soft copy Final Report - 02 copies along with one set of A3 drawing and soft copy

**4.0 Terms of Payment**

The payment terms for the assignment shall be as below:

- i) 50 % of the consultancy fee as mobilization fees at the time of award of work.
- ii) 25 % of the consultancy fee within one week of submission of the draft report.
- iii) 25 % of the consultancy fee within one week of submission of final report.

Prepared By:

VEERA SURESH RABBA

List of Documents

Please note that below documents are needed to be provided along with Invoice.

S.No.	Document Description
-------	----------------------

**NTPC VENDOR PAYMENT PORTAL & PAYMENT PROCEDURE**

1. For all the cases where payment documents are to be directly submitted to NTPC (excluding Payment through Bank cases) the Invoice and supporting document(s) as required in the Purchase Order have to be Digitally Signed with class II or III digital signature and uploaded in the NTPC Vendor Payment Portal <https://pradip.ntpc.co.in/VendorFinal/Login.jsp>

In such cases, there will be no requirement of physical copy of invoice & documents except for Lorry Receipts (LRs)/ Delivery Challan, which are normally sent along with the material/ transporter. Bank Guarantees to be sent in original wherever applicable

2. From 15.5.2020, NTPC will accept only digitally signed Invoice & supporting documents from Vendors for direct payment cases. Submission of documents in physical form shall not be accepted by NTPC unless otherwise asked for in the PO

For such cases of physical submission Vendors are required to send complete set of documents including invoice etc. addressed to the "Invoice Receipt Center" of the Delivery/ Invoicing Address as mentioned in the Purchase Order Annexure 1/ BOQ Sheet

While submitting the Invoice/ Bills & related documents in physical form Vendors are required to mention the following details on the top of the envelope:

- a Invoice/Bill reference No
- b NTPC PO No / Package no
- c NTPC Vendor Code as per PO

In addition to above, vendors are requested to mention their correspondence E-mail & Mobile No in the Covering Letter, through which invoice processing related information/clarification request may be sent

3. Vendors can track / monitor the status of payments from the Vendor payment portal. Help documents are available in the portal. Vendors are requested to make full use of the Vendor Payment Portal

4. For payment cases through bank, all original documents are to be submitted in bank as per terms of PO



## INTER OFFICE MEMO

FROM: Company Secretary

TO: Shri Partha Mazumder  
RED (Coal Mining)Through  
e-mail  
only

REF NO. : 01:SEC:BM:8

DATED : 29.12.2021

SUBJECT : Brief status of Talaipalli Mine

---

Please find enclosed extracts from the Minutes of 506<sup>th</sup> Meeting of the Board of Directors held on 30<sup>th</sup> November, 2021 on the above subject for your information and necessary action.

Encl.: As above

*Nandini Sarkar*  

---

**(Nandini Sarkar)**

**EXTRACTS FROM THE MINUTES OF 506<sup>th</sup> MEETING OF THE BOARD OF DIRECTORS HELD ON TUESDAY, 30<sup>TH</sup> NOVEMBER, 2021**

**11180 Item No. 506.1.8 Brief status of Talaipalli Mine**

Director (Commercial) informed that Thriveni Earthmovers Pvt. Ltd. (TEMPL) had been appointed as MDO on 26<sup>th</sup> August 2020 for development and operation of Talaipalli Coal Block. As per the provisions of Project Agreement, TEMPL had submitted the Draft Operational Plan to NTPC. In the plan and during the meetings held with NTPC, they raised issues like the variance in stripping ratio, excess OB removal, no land for temporary OB dumping etc., challenging the Mining Plan approved by Ministry of Coal in the year 2010. NTPC discussed with TEMPL in various meetings and tried to resolve the issues within the ambit of the contract. Suddenly, in the midway of discussions, TEMPL, vide letter dated 4<sup>th</sup> May 2021, chose to rescind the project agreement and filed a Commercial Civil Suit before Hon'ble Delhi High Court on 4<sup>th</sup> May 2021 appealing for the declaration of the Project Agreement as void, return of the Performance Bank Guarantees and payment for the losses incurred by TEMPL. During the hearing, Hon'ble High Court asked NTPC and TEMPL to resolve the matter amicably by holding settlement talks without prejudice to the respective rights and contentions. NTPC and TEMPL mutually approached CMPDIL as an Independent Consultant for review of the Mining Plan and workings submitted by TEMPL. CMPDIL reviewed the Approved Mining Plan and submitted a technical feasibility note on 7<sup>th</sup> September 2021. NTPC and TEMPL are presently deliberating on the Technical Feasibility note of CMPDIL to find out the way forward, mutually.

Director (Commercial) then furnished the following brief comparison between the approved Mining Plan and Technical Note of CMPDIL:

Sl	Particulars	Approved Mining Plan	CMPDIL's Workings	Observations/Comments by CMPDIL
1	<b>For MDO Contract (25 yrs)</b>			
	a) Mineable Reserves	404.50 MMT	411.66 MMT	Mine is workable for 26 years at a SR 4.60 cu.m/t considering single pit operation and no re-handling of overburden.
	b) Strip Ratio	4.30 cu.m/t	4.60 cu.m/t	
2.	<b>For Initial 5 Years</b>			
	a) Mineable Reserves	44.50 MMT	44.50 MMT	Two pits are workable, simultaneously for initial five (5) years only. East Pit to continue for mine life of 26 years.
	b) Strip Ratio	4.32 cu.m/t	4.81 cu.m/t	
3	OB Qty. in External Dump (Million Cu.m.)	264.52	510.05	Additional land required for OB dumping (i.e beyond 25 years mine boundary)
4.	Re-handling of OB	Considered	Not Possible	No adequate mine void available for backfilling.
5.	Average Lead for Coal & OB (Km.)	2-3	Coal : 2.5-5 OB : 3-7.25	

Director (Commercial) then informed that NTPC had, vide e-mail dated 6<sup>th</sup> October 2021 informed Ministry of Power regarding technical note of CMPDIL vis-à-vis Approved Mining Plan of Talaipalli. NTPC had also informed Ministry of Coal on 26<sup>th</sup> October 2021

*Nandini Sarkar*

4/2

that NTPC and TEMPL were deliberating on the Technical Note of CMPDIL for the way forward solution. Nominated Authority, Ministry of Coal had, vide letter dated 12<sup>th</sup> November 2021, requested NTPC to take necessary actions to enhance the coal production up to maximum possible extent from Talaipalli mine in this financial year.

Briefing the Board on the actions taken by NTPC in the meanwhile, Director (Commercial) stated that NTPC had approached IIT-ISM, Dhanbad on 19<sup>th</sup> November 2021 for vetting of the Technical Feasibility Note submitted by CMPDIL. IIT-ISM had started the work and is likely to revert by 15<sup>th</sup> December 2021. NTPC had also approached CMPDIL on 15<sup>th</sup> November 2021 for preparation of new Mining Plan for Talaipalli mine. Budgetary offer, in this regard, is expected soon from CMPDIL. Because of the change of land schedule proposed by CMPDIL in their above-referred Technical Feasibility Note, NTPC had approached MECON on 22<sup>nd</sup> November 2021 for preparation of the Environment Management Plan so that an amendment on the Environment Clearance can be obtained from MOEF&CC.

Director (Commercial) also stated that considering the uncertainty in the main MDO contract of Talaipalli, in the year 2019, NTPC started coal production from a small pit (Talaipalli South Pit) which is beyond the boundary of the main pits, by awarding a contract to M/s. SS Chhatwal & Co. (SSCCPL). Total coal extraction quantity was specified as 1.88 Million MT in a period of 2 years. Re-handling of 66 lakh Cu.m. of overburden, after extraction of the above-referred quantity of coal, was also kept in the scope of the contract. This contract was started from 26<sup>th</sup> June 2019 and NTPC had, till 25<sup>th</sup> November 2021, produced about 1.4 Million Tonnes of coal from this pit. Recently, SSCCPL had expressed its inability to further continue with the coal extraction from this pit and had stopped the mine operations from 25<sup>th</sup> November 2021 and the matter was under discussion. In view of the uncertainty created over the existing MDO contract, and in order to continue with the mining operations in Talaipalli, a proposal for extension of the South Pit with a targeted coal extraction quantity of 6.03 Million Tonnes had been initiated and was under approval. All the clearances and land are available for start of the mine operations in this extended South Pit. However, the re-handling of Overburden & in-pit dumping, proposed in the existing contract of SSCCPL, would have to be stopped so as to keep the pit ready for further extraction going into the deep.

The Board noted the information.

.....

*Nandini Sarkar*

**KUDLAPPA B**

**From:** SANJIV KUMAR SINGH  
**Sent:** 12 January 2022 07:10  
**To:** KUDLAPPA B  
**Subject:** Final Report, Talajpalli Coal Mine  
**Attachments:** Final Report, Talajpalli Coal Mine.pdf

[Get Outlook for Android](#)

**From:** Sheo Raj <sheoshankar@itiam.ac.in>  
**Sent:** Wednesday, January 12, 2022 10:36:55 PM  
**To:** PARTHA MAZUMDER <PARTHAM@NTPC.CO.IN>; SANJIV KUMAR SINGH <SANJIVKUMARSINGH@NTPC.CO.IN>  
**Cc:** Head Mining <meew@itiam.ac.in>; Director IT IAM Dhanbad <director@itiam.ac.in>  
**Subject:** Final Report, Talajpalli Coal Mine

**CAUTION:** The Email has been sent from outside the Organization. Please see back the sender. Don't click links or open attachments as it may be a Phishing email, which can steal your information and compromise your Computer.

Dear Sir,

Please find attached the final report of Talajpalli.

We extend our sincere thanks to you and the NTPC for providing an opportunity to work together on this assignment.

We look forward to hearing from you and working together in future on such assignments.

Kind Regards,  
 Sheo Shankar Raj  
 Professor, IT - IAM, Dhanbad







## Expert Advice and Technical Vetting of Technical Feasibility Note of Talaipalli Coal Block prepared by CMPDIL



**December 2021**

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**List of Abbreviations**

<b>Mt</b>	Million metric tons
<b>Mbcm</b>	Million bank cubic meters
<b>AMP</b>	Approved Mining Plan
<b>MECL</b>	Mineral Exploration Corporation Limited
<b>CMPDIL</b>	Central Mine Planning and Design Institute Limited
<b>RoM</b>	Run of Mine
<b>TEMPEL</b>	Tracked Earth Movers Private Limited
<b>Mty</b>	Million metric tons per year



## DISCLAIMER

Given the mandate and the timeline of the work, this report is a high-level review of Approved Mining Plan of Talaspalli Coal Mine (AMP), TEMPL's findings of the AMP, and the Technical Feasibility Note of Talaspalli Coal Block prepared by CMPDIL.

All the data and plans provided with the CMPDIL's technical note has been relied upon and interpreted for the technical suggestions and the vetting of the report or developing any new insights about the mining strategy and sustainability of the operation.

IIT-ISM has not reviewed the MINEX Resource Model of Talaspalli coal mine for any volume calculations. However, validations of overburden volumes have been performed on the mine stage plans (AutoCad drawings) provided by NTPC as part of the Technical Feasibility Note of CMPDIL. The level of accuracy of volume calculation would be in the range of  $\pm 10-15\%$ .

Further, this report is for the NTPC's own use and not for the use of any third party.



## CHAPTER 1

### Background

#### 1.1. Introduction

IIT-ISM has been approached by NTPC for an Expert Advice and Technical Vetting of Technical Feasibility Note of Talaipalli Coal Block prepared by CMPDIL.

Talaipalli coal block is located in the eastern part of Mand-Raigarh Coalfield in the state of Chhatisgarh. The coal block has been allotted to NTPC by Ministry of Coal (MoC), vide letter no 13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement of proposed 4000MW Lara Integrated Power Project, approximately 60 km. away from the coal block.

Mining plan of Talaipalli coal block was prepared by Advanced Coal Management & Marketing Pvt. Ltd (ACMM), New Delhi on behalf of NTPC in 2009 and got approved by Ministry of Coal for a rated capacity of 18 MMTPA, on 31.03.2010. Subsequently, the various statutory clearances were obtained on the basis of this approved Mining Plan to develop and operate the mine (Table 1.1)

**Table 1.1. List of Statutory Clearances.**

<b>Description</b>	<b>Date of Clearance</b>
Approval of mining plan	31.03.2010
Environment Clearance (EC)	02.01.13/13.11.15 (Rev.)
Forest Clearance (FC)	Stage I: 05.11.12; Stage II: 29.01.14; 23.05.17(Rev.)
Consent to Establish (CTE)	06.01.15
Consent to Operate (CTO)	17.03.16
Tripartite Escrow Agreement (Banker, CCO & NTPC)	15.05.14 & 04.09.17
DGMS Permission	19.01.18
Coal Controllers Permission	31.01.18

Based on the approved mine plan and the subsequent approvals (Table 1.1), NTPC appointed M/s. Thriveni Earthmovers Private Limited (TEMPL or the Contractor) as MDO on 26.08.2020 for

development and operation of Talaiipalli coal mine. TEMPL disputed the technical viability of the mining plan and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Later on, at the direction of the Hon'ble Delhi High Court, NTPC and TEMPLE agreed to engage CMPDIL as the Independent Consultant for reviewing the approved Mining Plan and the workings of TEMPL and to suggest a feasible solution for working of the mine. CMPDIL took up this assignment and submitted its Technical Feasibility Note on 07<sup>th</sup> 2021.

NTPC has approached IIT-ISM for the expert advice and technical vetting of CMPDIL's Technical Feasibility Report (hereinafter referred as CMPDIL Report or Report) along with a high level review of the approved mine plan (AMP) and the findings of TEMPL, and has engaged IIT-ISM for the said services vide purchase order no. 5500039397-108-1074, dated, 19.11.2021.

### 1.2. Scope of Work

The scope of as proposed by IIT-ISM through its proposal dated, 14.11.2021, has agreed for the following scope of work:

- Technical review of Technical Feasibility Note prepared by CMPDIL,
- Technical review of Approved Mining Plan and Findings of TEMPL, and
- Suggestions/Expert advice for modification for sustainable mine.

### 1.3. Exclusions

The Scope of Work for this work does not include the followings,

- Review, development and / or modification of Minex resource model.
- Modification of the quarry plan. Any modification in the mine plan suggested / recommended by IIT-ISM shall be undertaken by NTPC. Should NTPC require any alteration in the mining plan, IIT-ISM would be able to do it under a separate agreement beyond the scope of work of this proposal.
- Any environment impact assessment study. Should NTPC require any assistance in completing the environment impact assessment study, IIT-ISM would be able to do under a separate agreement beyond the scope of work of this proposal.

## CHAPTER 2

### Review of Approved Mining Plan

#### 2.1. Geological Parameters of the coal mine

Tataipalli Coal Block ("Coal Block") is located in the eastern part of Mand-Rajgarh Coalfield. The area of the block is approximately 20 sq. km. Major part of the block is covered by Batakar rock formations. As per the geological plan provided by NTPC, the barren measure rocks occur in the southern part of the block. A small patch of Barren Measure rock is also noticed in the north western part of the block (Figure 2.1). Geological succession of rocks is shown in Table 2.1.



Fig. 2.1. Geological Plan of Tataipalli Coal Block

**Table 2.1. Geological Succession of Lithologies**

<b>Formation</b>	<b>Thickness (m)</b>	<b>Lithology</b>
Recent	0.50 – 18.00	Soil, alluvium
Baram Measures	18.80 – 143.00	Shale, fine to medium grained sandstone and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakar Rocks	30 – 596	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, lime clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir Rocks	1.00 – 54.30	Khakee, greenish shale & sandstone, occasional pebbly
Basement		Metamorphic rock

### 2.1.1. Structure of the coal formation

As shown in the geological plan (Figure 2.1), the general strike direction of coal seams in the coal block is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. As reported from the approved mine plans, the dip of the coal seams varied from 4° to 8° towards south-west (Figure 2.1).

A total of 12 numbers of faults have been reported in the coal block as per the approved mine plan. The details are provided in Table 2.2.

**Table 2.2. Details of Faults**

<b>Fault no.</b>	<b>Location</b>	<b>Trend</b>	<b>Fault Type</b>	<b>Throw</b>
<b>F1-F1</b>	Northern part passing near B11 No. MNRT-24, 87, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	<b>20 – 85m</b>
<b>F2-F2</b>	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	<b>0 – 10m</b>
<b>F3-F3</b>	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	<b>30 – 35m</b>
<b>F4-F4</b>	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	<b>30 – 150m</b>
<b>F5-F5</b>	Northern western part through B11 MNRT-62	East-West	Strike fault	<b>35m</b>
<b>F6-F6</b>	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	<b>15 – 25m</b>
<b>F7-F7</b>	Northern part passing through MNRT-11	NW - SE	Oblique fault	<b>20m</b>
<b>F8-F8</b>	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	<b>60-105m.</b>
<b>F9-F9</b>	Northern part passing through MNRT-101 RT-4 & MNRT-11	East West to curvilinear	Strike / Oblique Fault	<b>25m</b>
<b>F10-F10</b>	Northern part passing through RT-7	NE-SW	Oblique / Curvilinear	<b>0 - 10m</b>
<b>F11-F11</b>	Southern part	NW-SE	Curvilinear	<b>0 – 10m</b>
<b>F12-F12</b>	Southern part	NW-SE	Oblique	<b>25 m</b>

Most of the faults are restricted to the northern part of the block. Faults: F1, F4 and F8 are major faults with larger throw.

### 2.1.2. Coal Seams

There are 27 coal seams + horizons in the coal block namely, XLA, XLB, X TOP, X BOT, IXL2, IXL1, IX, VIII, VII, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, III3, III2, III1, II, II L & I. The sequence of coal seams along with inter-burdens are shown in Table 2.3.

**Table 2.3. Sequence of Coal Seams & Inter-burdens / Partings**

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	XLA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	XLB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.96			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0

<b>12</b>	<b>VI Bot</b>	<b>0.48</b>	<b>1.75</b>			<b>0.50-1.0</b>
	<b>Parting</b>			<b>2.80</b>	<b>23.45</b>	<b>14.0-21.0</b>
<b>13</b>	<b>V Top</b>	<b>0.50</b>	<b>3.09</b>			<b>0.50-1.50</b>
	<b>Parting</b>			<b>9.09</b>	<b>18.94</b>	<b>11.5-18.5</b>
<b>14</b>	<b>V Mid</b>	<b>0.15</b>	<b>3.73</b>			<b>0.50-2.50</b>
	<b>Parting</b>			<b>4.55</b>	<b>15.95</b>	<b>0.50-12.0</b>
<b>15</b>	<b>V Bot</b>	<b>0.30</b>	<b>5.40</b>			<b>0.50-2.0</b>
	<b>Parting</b>			<b>15.16</b>	<b>30.14</b>	<b>17.0-23.0</b>
<b>16</b>	<b>IV Top</b>	<b>0.54</b>	<b>5.78</b>			<b>2.5-5.0</b>
	<b>Parting</b>			<b>5.30</b>	<b>20.13</b>	<b>6.0-10.0</b>
<b>17</b>	<b>IV Mid</b>	<b>0.09</b>	<b>7.24</b>			<b>3.5-7.0</b>
	<b>Parting</b>			<b>0.75</b>	<b>6.95</b>	<b>3.5-5.5</b>
<b>18</b>	<b>IV L</b>	<b>0.23</b>	<b>4.99</b>			<b>0.50-2.0</b>
	<b>Parting</b>			<b>0.70</b>	<b>4.55</b>	<b>0.50-2.0</b>
<b>19</b>	<b>IV Bot</b>	<b>0.55</b>	<b>5.67</b>			<b>1.5-3.5</b>
	<b>Parting</b>			<b>8.05</b>	<b>21.54</b>	<b>14.0-17.0</b>
<b>20</b>	<b>III L</b>	<b>0.10</b>	<b>3.25</b>			<b>0.50-1.5</b>
	<b>Parting</b>			<b>24.57</b>	<b>44.55</b>	<b>33.0-39.0</b>
<b>21</b>	<b>III</b>	<b>0.06</b>	<b>5.97</b>			<b>2.0-5.5</b>
	<b>Parting</b>			<b>31.1</b>	<b>55.90</b>	<b>33.0-51.0</b>
<b>22</b>	<b>II L.3</b>	<b>0.50</b>	<b>3.09</b>			<b>&lt;0.90</b>
	<b>Parting</b>			<b>13.39</b>	<b>40.9</b>	<b>28.0-38.0</b>
<b>23</b>	<b>II L.2</b>	<b>0.07</b>	<b>2.68</b>			<b>&lt;0.90</b>
	<b>Parting</b>			<b>5.0</b>	<b>60.39</b>	<b>35.0</b>
<b>24</b>	<b>II L.1</b>	<b>0.05</b>	<b>1.54</b>			<b>&lt;0.60</b>
	<b>Parting</b>			<b>1.27</b>	<b>20.59</b>	<b>3.0-14.0</b>
<b>25</b>	<b>II</b>	<b>0.13</b>	<b>5.92</b>			<b>1.5-2.5</b>
	<b>Parting</b>			<b>0.37</b>	<b>3.89</b>	<b>0.50-2.0</b>
<b>26</b>	<b>II L</b>	<b>0.05</b>	<b>2.45</b>			<b>&lt;0.60</b>
	<b>Parting</b>			<b>Around</b>		
<b>27</b>	<b>I</b>	<b>0.22</b>	<b>0.55</b>			<b>27</b>

## 2.2. Mining parameters

As per the approval mining plan, the proposed mining method is open cast mining with shovel-dumper-surface mine equipment systems. Open cast mining is proposed up to the floor coal seam III. Final stage quarry plan and quarry parameters are shown in Figure 2.3, and Table 2.4.

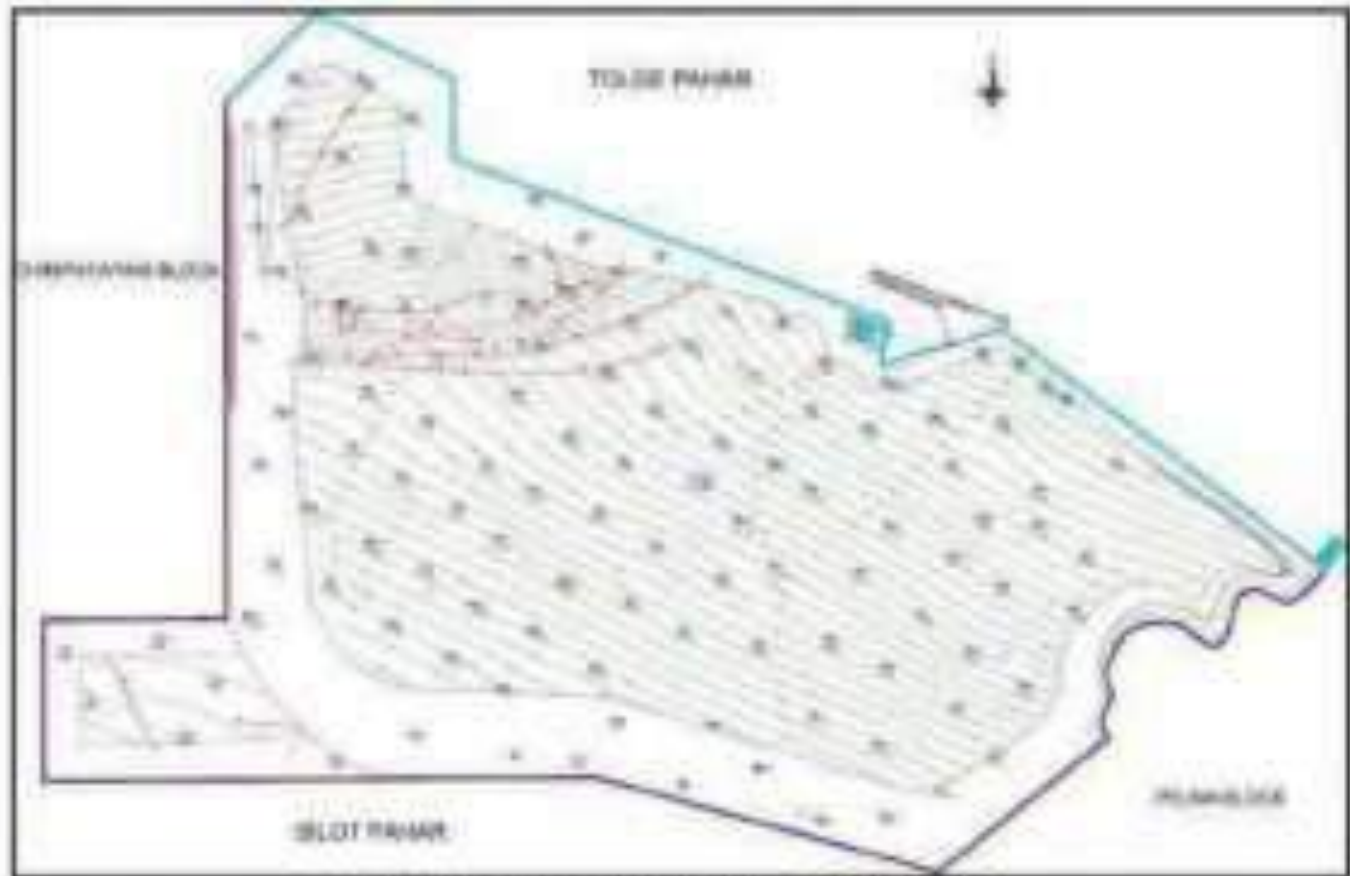


Figure 2.2. Final stage quarry plan of AMP

Table 2.4. Mining parameters

Sl. No.	Description of Mining Parameters	Values
1	Project Details	Area - 21.13 km <sup>2</sup>
2	Reserves (MT)	Gross Geological Reserves (MT) 1400.58 Net Geological Reserves (MT) 1260.52 Miscible Reserves <sup>1</sup> : Extractable- OC 843.68 UG 17.57 Coal Stocked in buffer & batter: 300.00 Mining Losses Considered @ 5% : 44.80
3	Pit Parameters (m)	Max. depth of OC mine 404



		Strike lengths (m):	
		Max.	6690
		Min.	1370
		Dip- rise lengths (m):	
		Max.	4760
		Min.	3060
4	Annual Coal Target Output (MT)	OC:	18.0
		UG:	0.72
5	Life of the Mine (LOM) (Years)	OC:	2* + 52 = 54
	(*: Mine construction period)	UG:	4* + 26 = 30
6	Average Specific gravity of coal	1.65	
7	Equipment Systems Proposed for Mining	OC: Shovel – Dumper for Overburden, and a combination of Shovel / Loader – Dumper and Surface Miner for Coal.	
8	Average lead for Coal and Overburden (km)	UG: Continuous Miner & Shuttle-Car Combination 2-3	
9	Overall coal quality, Grade - "B" Non-coking	U.H.V (K.Cal. /Kg.)	
		Min. - 1310	Max. 5892
		Ash %	
		Min. 17.50	Max. 45.10
		Moisture %	
		Min. 1.20	Max. 11.00

\* - Construction period

### 2.3. Mine development strategy:

Mine development strategy envisaged in approved mine plan has left a barrier of 7.5m on the surface from the adjoining coal block boundaries and 60m barrier from Kelo river on the eastern side of the Talaipalli coal block. Infrastructure facilities of the project such as MGR, workshop, store, sub-station, office etc. are proposed in the S-W corner of the property. These infrastructure facilities have blocked the coal which have been proposed to be extracted towards the end of the mine life when these infrastructures would be dismantled completely.

Given a large annual capacity (18.0 MTPA) of the mine and a high stripping ratio (4.30), high-capacity mining equipment have been proposed for coal extraction, overburden removal and the auxiliary

operations of the mine. Approved mining plan envisaged two pit mining operations at eastern & western extremities respectively of the coal block with respective east and west pit external dumps for overburden dumping in the initial years (Figure 2.3)



Figure 2.3. Two-pit mining operation at the end of 1<sup>st</sup> year operation of AMP

### 2.3.1. Calendar program of excavation and dumping schedule:

Both east and west pit advance towards the dip directions and finally merge to become a single pit at the end of 20 years of mining operation. Internal dumping / backfilling is envisaged to begin in the 5<sup>th</sup> year of mining operation once sufficient void is created within the pit. In the absence of land available for external dumping beyond the leasehold boundary / coal bearing area, initial overburden produced up to 4<sup>th</sup> year of quarry operation (115.94 million m<sup>3</sup>) is to be put entirely as an external dump on the lease hold (herein after referred as "External" or "On - Pit Dump") (Figure 2.3) on the dip side. In the 5<sup>th</sup> year of mining operation, the

majority of the OB is dumped externally, only 12.29 million  $m^3$  is accommodated internally (Table 2.7).

Year wise coal extraction and overburden removal program of east and west pits for initial five year are shown in Table 2.5.

**Table 2.5. Coal production and overburden removal program of east and west pit**

Years	Coal (Mt)		OB (Mbcm)		Total Coal (Mt)	Total OB (M.cum)
	East	West	East	West		
1	0.45	1.05	2.45	5.2	1.5	7.65
2	1.03	2.97	5.18	13.86	4	19.04
3	1.68	6.32	7.06	26.94	8	34
4	2.13	10.87	8.93	46.32	13	55.25
5	5.48	12.52	23.04	53.46	18	76.5

Note: Calendar program of excavation for east and west pit after 5<sup>th</sup> year till the merger of the pit is not provided.

From 5<sup>th</sup> year to 8<sup>th</sup> year, due to the lack of space available for internal dumping, the total overburden quantity of 306 million  $m^3$  is split into external dump (148.58 million  $m^3$ ) to be placed on the on-pit dump and internal dump (157.42 million  $m^3$ ). From 9<sup>th</sup> year onward, no external dumping is proposed as the entire overburden quantity is accommodated in the internal dump for the balance period of the mine life. The entire external dump (total quantity - 264.52 million  $m^3$ ) is re-handled back to within the quarry from 9<sup>th</sup> year until 20<sup>th</sup> year. The two quarries will finally merge in the 20<sup>th</sup> year of mining operation. 25 years calendar program of excavation and dumping are shown in Table 2.6 and 2.7 respectively.

Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 60m is above the general quarry surface up to an RL value of +360m. Each tier of OB dump bench is of 30m height and berm width 30m, resulting into an ultimate dump slope is 22 degrees.

Table 2.6. Calendar Program of coal production and overburden removal

Year	Coal Mt	Cumm. coal MT	Volume of overburden (Natural)				Volume of Overburden (Adjusted)			
			Current OB M.cum	Cumm. OB M.cum	Current SR Cum/t	Average SR Cum/t	Current OB M.cum	Cumm. OB M.cum	Current SR Cum/t	Average SR Cum/t
			1	1.50	1.50	6.00	6.00	4.00	4.00	7.65
2	4.00	5.50	15.99	21.99	4.00	4.00	19.04	26.69	4.76	4.85
3	8.00	13.50	31.98	53.97	4.00	4.00	34.00	60.69	4.25	4.50
4	13.00	26.50	51.97	105.94	4.00	4.00	55.25	115.94	4.25	4.38
5	18.00	44.50	71.96	177.90	4.00	4.00	76.50	192.44	4.25	4.32
6	18.00	62.50	71.91	249.81	4.00	4.00	76.50	268.94	4.25	4.30
7	18.00	80.50	71.47	321.27	3.97	3.99	76.50	345.44	4.25	4.29
8	18.00	98.50	71.47	392.74	3.97	3.99	76.50	421.94	4.25	4.28
9	18.00	116.50	71.47	464.21	3.97	3.98	76.50	498.44	4.25	4.28
10	18.00	134.50	71.47	535.67	3.97	3.98	76.50	574.94	4.25	4.27
11	18.00	152.50	70.05	605.72	3.89	3.97	76.50	651.44	4.25	4.27
12	18.00	170.50	69.86	675.58	3.88	3.96	76.50	727.94	4.25	4.27
13	18.00	188.50	69.86	745.44	3.88	3.95	76.50	804.44	4.25	4.27
14	18.00	206.50	69.86	815.30	3.88	3.95	76.50	880.94	4.25	4.27
15	18.00	224.50	69.86	885.16	3.88	3.94	76.50	957.44	4.25	4.26
16	18.00	242.50	69.86	955.02	3.88	3.94	76.50	1033.94	4.25	4.26
17	18.00	260.50	75.30	1030.32	4.18	3.96	78.30	1112.24	4.35	4.27

18	18.00	278.50	76.91	1107.24	4.27	3.98	78.30	1190.54	4.35	4.27
19	18.00	296.50	76.91	1184.15	4.27	3.99	78.30	1268.84	4.35	4.28
20	18.00	314.50	76.91	1261.06	4.27	4.01	78.30	1347.14	4.35	4.28
21	18.00	332.50	76.91	1337.98	4.27	4.02	78.30	1425.44	4.35	4.29
22	18.00	350.50	76.91	1414.89	4.27	4.04	78.30	1503.74	4.35	4.29
23	18.00	368.50	76.91	1491.80	4.27	4.05	78.30	1582.04	4.35	4.29
24	18.00	386.50	76.91	1568.72	4.27	4.06	78.30	1660.34	4.35	4.30
25	18.00	404.50	76.91	1645.63	4.27	4.07	78.30	1738.64	4.35	4.30
26	18.00	422.50	76.91	1722.54	4.27	4.08	78.30	1816.94	4.35	4.30
27	18.00	440.50	74.91	1797.45	4.16	4.08	80.10	1897.04	4.45	4.31
28	18.00	458.50	74.90	1872.36	4.16	4.08	80.10	1977.14	4.45	4.31
29	18.00	476.50	74.90	1947.26	4.16	4.09	80.10	2057.24	4.45	4.32
30	18.00	494.50	74.90	2022.16	4.16	4.09	80.10	2137.34	4.45	4.32
31	18.00	512.50	74.90	2097.06	4.16	4.09	80.10	2217.44	4.45	4.33
32	18.00	530.50	79.58	2176.65	4.42	4.10	80.10	2297.54	4.45	4.33
33	18.00	548.50	82.28	2258.92	4.57	4.12	80.10	2377.64	4.45	4.33
34	18.00	566.50	82.28	2341.20	4.57	4.13	80.10	2457.74	4.45	4.34
35	18.00	584.50	82.28	2423.48	4.57	4.15	80.10	2537.84	4.45	4.34
36	18.00	602.50	82.28	2505.75	4.57	4.16	80.10	2617.94	4.45	4.35
37	18.00	620.50	84.07	2589.83	4.67	4.17	80.10	2698.04	4.45	4.35
38	18.00	638.50	87.35	2677.18	4.85	4.19	87.84	2785.88	4.88	4.36
39	18.00	656.50	87.35	2764.52	4.85	4.21	87.84	2873.72	4.88	4.38
40	18.00	674.50	87.35	2851.87	4.85	4.23	87.84	2961.56	4.88	4.39

41	18.00	692.50	87.35	2939.22	4.85	4.24	87.84	3049.40	4.88	4.40
42	18.00	710.50	86.54	3025.76	4.81	4.26	87.84	3137.24	4.88	4.42
43	18.00	728.50	85.60	3111.37	4.76	4.27	87.84	3225.08	4.88	4.43
44	18.00	746.50	85.60	3196.97	4.76	4.28	87.84	3312.92	4.88	4.44
45	18.00	764.50	85.60	3282.57	4.76	4.29	87.84	3400.76	4.88	4.45
46	18.00	782.50	82.56	3365.13	4.59	4.30	87.84	3488.60	4.88	4.46
47	18.00	800.50	73.84	3438.97	4.10	4.30	87.84	3576.44	4.88	4.47
48	15.00	815.50	61.53	3500.50	4.10	4.29	73.20	3649.64	4.88	4.48
49	10.00	825.50	41.02	3541.52	4.10	4.29	48.00	3697.64	4.80	4.48
50	7.00	832.50	96.52	3638.04	13.79	4.37	32.41	3730.05	4.63	4.48
51	6.00	838.50	74.52	3712.56	12.42	4.43	25.98	3756.03	4.33	4.48
52	5.19	843.69	64.51	3777.07	12.43	4.48	21.04	3777.07	4.05	4.48
<b>Total</b>	<b>843.69</b>		<b>3777.07</b>				<b>3777.07</b>			

Table 2.7. Overburden dumping schedule up to 25<sup>th</sup> year of operation

Year	External Dump		Internal Dump		Rehandling		Total OB (Meum)	
	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
1	7.65	7.65	0	0	0	0	7.65	7.65
2	19.04	26.69	0	0	0	0	19.04	26.69
3	34	60.69	0	0	0	0	34	60.69
4	55.25	115.94	0	0	0	0	55.25	115.94
5	64.21	180.15	12.29	12.29	0	0	76.5	192.44
6	45.38	225.53	31.12	43.41	0	0	76.5	268.94
7	21.17	246.7	55.33	98.74	0	0	76.5	345.44
8	17.82	264.52	58.68	157.42	0	0	76.5	421.94
9	0	264.52	76.5	233.92	8.12	8.12	76.5	498.44
10	0	264.52	76.5	310.42	18.13	26.25	76.5	574.94
11	0	264.52	76.5	386.92	18.13	44.38	76.5	651.44
12	0	264.52	76.5	463.42	18.13	62.51	76.5	727.94
13	0	264.52	76.5	539.92	25.42	87.93	76.5	804.44
14	0	264.52	76.5	616.42	25.42	113.35	76.5	880.94
15	0	264.52	76.5	692.92	25.42	138.77	76.5	957.44
16	0	264.52	76.5	769.42	25.42	164.19	76.5	1033.94
17	0	264.52	78.3	847.72	25.42	189.61	78.3	1112.24

<b>18</b>	0	264.52	78.3	926.02	25.42	215.03	78.3	1190.54
<b>19</b>	0	264.52	78.3	1004.32	25.42	240.45	78.3	1268.84
<b>20</b>	0	264.52	78.3	1082.62	24.07	264.52	78.3	1347.14
<b>21</b>	0	264.52	78.3	1160.92		264.52	78.3	1425.44
<b>22</b>	0	264.52	78.3	1239.22		264.52	78.3	1503.74
<b>23</b>	0	264.52	78.3	1317.52		264.52	78.3	1582.04
<b>24</b>	0	264.52	78.3	1395.82		264.52	78.3	1660.34
<b>25</b>	0	264.52	78.3	1474.12		264.52	78.3	1738.64



### 2.3.2. Equipment Configurations and deployment Schedule

Following equipment configurations for overburden removal, coal extraction and various auxiliary operations of the mine have been proposed in the approved mine plan (Table 2.8.).

**Table 2.8. Equipment Configuration and Phasing**

Sl. No.	Equipment	Size	Nos.	Year of Operation				
				1	2	3	4	5
<b>A. Overburden Removal</b>								
1	Electric Shovel	35 Cum	4				2	4
2	Electric Hydraulic Shovel	20 Cum	8	1	2	5	7	8
3	Electric Hydraulic Shovel	4.5 Cum	11	3	8	8	8	11
4	Rear Dumper	240T	41				21	41
5	Rear Dumper	190T	76	8	18	43	67	76
6	Rear Dumper	50 T	92	21	61	61	67	92
7	Electric Drill	311 mm	3				1	3
8	Elec. Drill	250 mm	13	2	4	8	11	13
9	Diesel Drill	160 mm	9	2	3	5	7	9
10	Dozer	450 HP	6	2	5	6	6	6
11	Dozer with ripper	850 HP	5	1	2	3	4	5
<b>B. Coal Extraction</b>								
1	Diesel Hydraulic Shovel	12 Cum	1			1	1	1
2	Diesel Hydraulic Shovel	4.5 Cum	3	1	2	2	3	3
3	Surface Miner	2200	4				1	4
4	Front end loader	4.5 cum	4				2	4
5	Rear Dumper	35 T	38				19	38
6	Rear Dumper	120T	10			10	10	10
7	Rear Dumper	50 T	26	8	16	18	26	26
8	Elec. Drill	250 mm	2			1	2	2
9	Diesel Drill	160 mm	3	1	2	3	3	3
10	Dozer	450 HP	3	1	1	2	3	3
11	Dozer with ripper	850 HP	3			1	3	3
<b>C. Common (Auxiliary Operations)</b>								

1	Grader	280 HP	8	2	4	6	7	8
2	Hydraulic Shovel	6.5 Cum	2		1	2	2	2
3	Crane	100 T	4	1	2	3	3	4
4	Crane	30 T	4		1	2	2	4
5	Crane	8 T	6	1	2	2	4	6
6	Crane	5 T	4		1	2	3	4
7	Diesel Backhoe	1.0 Cum	6	2	3	4	5	6
8	FE Loader	5-6 Cum	3	1	2	2	3	3

The top overburden is proposed to be mined by 35.0 m<sup>3</sup> Rope Shovel and 240 T Rear Dump (RD) Truck combinations, thick intervening partings / inter-burdens are proposed to be mined by 20.0 m<sup>3</sup> Rope Shovel and 190 T RD Truck combinations, and the thin partings / inter-burdens are proposed to be mined by 4.5 m<sup>3</sup> hydraulic shovels and 35 – 50 T RD Trucks.

For coal extraction, 12.0 m<sup>3</sup> hydraulic shovels and RD 120 T trucks are proposed for thick coal seams, 4.5 m<sup>3</sup> hydraulic back-hoes and 35 – 50 T RD Trucks for thin seams. In addition, Surface Miner in combination with 4.50 m<sup>3</sup> Front End Loaders (FELs) and 35 T RD Trucks have been proposed to extract up to 40% of the coal.

IIT-ISM is of the view that it is difficult comment on the fleet size and the deployment schedule of various equipment configurations proposed for overburden / inter-burdens removal and coal productions in the mining plan., as the calendar program of excavation in the approved mining plan does not provide the year wise break-ups of Top OB, Thick Partings / Inter-burdens and Thin Partings / Inter-burdens, and also the seam wise production details. The details of estimation of productivities for various equipment configurations are also not provided in the mining plan.

While detailed production planning is not within the scope of the present work, IIT – ISM is happy to provide the estimate of productivities of various equipment systems proposed for Tallaipalli coal mine (Table 2.9 to 2.13). These estimates can be used by NTPC for estimating the fleet sizes of various equipment systems to be deployed in the mine.

**Table 2.9. Estimation of Productivity and Fleet of 35.0 cum. Shovel – RD 240 T Dumpers**

		Particulars	Value	Unit.
Assumptions		Swell Factor	0.74	#
		Bucket Fill factor of Shovel	90%	#
		Bucket Capacity of Shovel	35	cum
		Volumetric Capacity of Dumper (Struck Capacity)	130	cum.
		Bucket Cycle Time	0.6	min*
		Spotting time of dumper	0.6	min *
		Factors Allowed for Travelling, Positioning etc.	0.85	#
		Annual working hours of shovel	6000	hrs.
		Av. Speed of Dumper	30	kmph*
		Lead	2.5	km*
		Dumper Spotting, Unloading & Waiting Time	2	min.*
		Working Dumper Availability	80%	#
1	Average standard hourly output of 35.0 m <sup>3</sup> shovel	1864.8	cum.	
2	Annual output of 35.0 m <sup>3</sup> Shovel	9510480	cum	
3	240 T dumpers fleet size for one shovel	6	#	
4	Annual output of 240 T RD Trucks	1585080	cum	
5	Average hourly output of RD Trucks	310.8	cum	

**Table 2.10. Estimation of Productivity and Fleet of 20.0 cum. Shovel – RD 190 T Dumpers**

		Particulars	Value	Unit.
Assumptions		Swell Factor	0.74	#
		Bucket Fill factor of Shovel	90%	#
		Bucket Capacity of Shovel	20	cum.
		Volumetric Capacity of 190 T Dumpers	101	cum.
		Bucket Cycle Time	0.6	min*
		Spotting time of dumper	0.6	min.*
		Factors Allowed for Travelling, Positioning etc.	0.85	#
		Annual working hours of shovel	6000	hrs.

	Av. Speed of Dumper	30	kmph*
	Lead	2.5	km*
	Dumper Spotting, Unloading & Waiting Time	2	min.*
	Working Dumper Availability	80%	#
1	Average standard hourly output of 20.0 m <sup>3</sup> shovel	1141.714286	cum.
2	Annual output of 20.0 m <sup>3</sup> Shovel	5822742.857	cum.
3	190 T dumpers fleet size for one shovel	5	#
4	Annual output of 190 T RD Trucks	1164548.571	cum.
5	Average hourly output of 190 T RD Trucks	228.3428571	cum.

**Table 2.11. Estimation of Productivity and Fleet of 12.0 cum. Hyd. Shovel – RD 120 T Dumpers**

		Particulars	Value	Unit.
Assumptions		Swell Factor	0.74	#
		Bucket Fill factor of Shovel	90%	#
		Bucket Capacity of Shovel	12	cum.
		Volumetric Capacity of 120 T Dumpers	70	cum.
		Bucket Cycle Time	0.45	min*
		Spotting time of dumper	0.6	min *
		Factors Allowed for Travelling, Positioning etc.	0.85	#
		Annual working hours of shovel	6000	hrs.
		Av. Speed of Dumper	30	kmph*
		Lead	2.5	km*
		Dumper Spotting, Unloading & Waiting Time	2	min.*
		Working Dumper Availability	80%	#
	1	Average standard hourly output of 12.0 m <sup>3</sup> shovel	871.85	cum.
	2	Annual output of 12.0 m <sup>3</sup> Shovel	4446458.18	cum.
	3	120 T dumpers fleet size for one shovel	6	#
4	Annual output of 120 T RD Trucks	741076.36	cum.	
5	Average hourly output of 120 T RD Trucks	145.31	cum.	

**Table 2.12. Estimation of Productivity and Fleet of 4.5 cum. Hyd. Backhoe – RD 35 T Dumpers**

		Particulars	Value	Unit.
Assumptions		Swell Factor	0.74	#
		Bucket Fill factor of Shovel	80%	#
		Bucket Capacity of Shovel	4.5	cum.
		Volumetric Capacity of 190 T Dumpers	16	cum
		Bucket Cycle Time	0.4	min.*
		Spotting time of dumper	0.4	min.*
		Factors Allowed for Travelling, Positioning etc.	0.85	#
		Annual working hours of shovel	6000	hrs.
		Av. Speed of Dumper	25	kmph*
		Lead	2.5	km*
		Dumper Spotting, Unloading & Waiting Time	1.5	min.*
		Working Dumper Availability	80%	#
	1	Average standard hourly output of 4.5 m <sup>3</sup> shovel	319.68	cum
	2	Annual output of 4.5 m <sup>3</sup> Shovel	1630368	cum.
3	35 T dumpers fleet size for one shovel	10	#	
4	Annual output of 35 T RD Trucks	163036.8	cum.	
5	Average hourly output of 35 T RD Trucks	31.97	cum	

**Table 2.13 (a). Estimation of Productivity of Surface Miner (SM 2200)**

Particulars	Value	Units
Sp. Gravity (Coal)*	1.5	#
B (Cutting Width) *	2.2	meter
T (Cutting Depth) *	0.2	meter
V (SM Speed) *	20	meter / minutes
Q (B*T*V*60) (Productivity)	528	cum / hour
Factor for manoeuvring etc. *	75%	%

Hourly productivity	396	cum/ hour
	594	tons/hour
Working hours	5000	hours
Annual productivity	2970000	tons
	1980000	cum

\*: Assumptions

**Table 2.13 (b). Estimation of FEL-Truck Fleet for each Surface Miner.**

	Particulars	Value	Unit.
Assumptions	Swell Factor	0.74	#
	Bucket Fill factor of FEL	80%	#
	Bucket Capacity of FEL	4.5	cum.
	Volumetric Capacity of 35 T Truck	16	cum.
	Bucket Cycle Time	1	min*
	Truck Spotting Time	0.5	min.*
	Factors for Travelling, Positioning etc. of FEL	85%	#
	Annual working hours of FEL	6000	hrs.
	Av Speed of Truck	20	kmph*
	Lead	2.5	km*
	Truck Spotting, Unloading & Waiting Time at Delivery	1.5	min.*
	Working Trucks Availability	75%	#
	1	Average standard hourly output of 4.5 m <sup>3</sup> shovel	142.08
2	Annual output of 4.5 m <sup>3</sup> Shovel	724608	cum.
3	35 T dumpers fleet size for one shovel	6	#
4	Annual output of 35 T RD Trucks	120768	cum.
5	Average hourly output of 35 T RD Trucks	23.68	cum.
6	Number of FEL per Surface Miner	3	#
7	Number of Trucks per Surface Miner	18	#

### 2.3.3. Mining Benches

Benches are the most distinguishing feature of a surface mine and one of the busiest areas of operation. Benches are crucial for surface mining operations as they have to accommodate all the major mining activities such as blasting, excavation, loading, hauling etc. Mining operations take place in multiple benches. To access the different benches a road or ramp are created. The width and steepness of the road and ramp depends upon the type and size of the equipment to be accommodated. Depending upon the operating requirements and the push back design, the mining benches can be classified into working benches and non-working (inactive) benches.

Stable slopes to the benches are extremely important for safe mining operations. At the same time slope angle is an important geometric consideration which has significant economic impacts. Normally bench should be as steep as possible within the reasonable factor of safety to ensure better economic returns. A typical initial design value of 70° bench slope angle may be considered. A thorough bench slope stability analysis may be essential to maximize the economic gain and strike a balance between safety and economy of operation. IIT – ISM recommends the following bench geometries for safe and efficient operations of various equipment systems / configuration of Talaspalli coal mine:

**Table 2.14. Mining benches geometry**

Sl. No.	Equipment Configuration	Bench Height (m)	Bench Width (m)		Length of Bench (m)	Bench Slope (°)
			Working Bench	Non-working Bench		
1	35.0 cum Shovel – 240 T Dumpers	20.00	50.00	30.00	300 - 400	65 - 70°
2	20.0 cum. Shovel – 190 T Dumpers	15.00	50.00	30.00	300 - 400	65 - 70°
3	12.0 cum. Shovel – 120 T Dumpers	15.00	40.00	25.00	300 - 400	65 - 70°
4	4.5 cum. Shovel – 35 T Dumpers	5.0 - 6.0	30.00	25.00	200 - 300	65 - 70°
5	Surface Miners – FEL – 35 T	4.5 cum.	100 - 150	-	500	60 - 65°

Above mentioned system parameters are indicative in nature based on equipment configuration, working efficiency and safety requirements of mining operations. However, the requirements

according to the DGMS **Regulation no. 106, CMR 2017, and Circular no. 3, 2020** must be carried out for slope stability study to determine acceptable system parameters i.e. overall slopes of permanent dump and pit walls



## CHAPTER 3

### Review of Findings of TEMPL

M/s TEMPL, the appointed MDO of Tallaipalli coal mine by NTPC, has disputed the approved mining plan strategy on four potential grounds - i) TEMPL observed that 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/ton by 25<sup>th</sup> year of mine operation as specified in the approved Mining Plan (AMP), ii) there would be an excess OB quantity than envisaged in the AMP which would not be able to be accommodated in the designated internal and external dump areas, iii) 100% backfilling by re-handling of temporary external dump / on pit dump as envisaged in the AMP is not feasible, iv) TEMPL observed that production will stop after 10 year if the two pit approach as proposed in the AMP is followed, and v) TEMPL claimed that the average lead overburden transportation will be 2 to 3 kms more than the average lead indicated in the AMP.

#### 3.1. TEMPL's observations about excess overburden quantity till 25<sup>th</sup> year mining operation

M/S TEMPL has prepared its own estimate of mineable coal reserve and stripping ratio (Table 3.1) based on the approved 25<sup>th</sup> year mine plan (Figure 3.1.).

**Table 3.1. TEMPL Reserve Statement on the basis of 25<sup>th</sup> year approved mine plan.**

Description	UoM	Values (TEMPL)	Value (AMP*)	Variations
Coal Reserve (by open cast mining method)	Million Tons	409.70	404.50	+ 5.30
Waste Adjusted	Million BCM	2143.00	1738.64	+ 404.36
Strip Ratio	BCM / Ton	5.23	4.30	+ 0.93



Figure 3.1. 25<sup>th</sup> year approved mining plan.

TEMPL estimated the total coal quantity of 409.70 Mt. against the AMP estimated quantity of 404.50 Mt up to 25<sup>th</sup> years. Likewise, total overburden quantity has been estimated as 2143.00 million tons against the approved mine plan overburden quantity of 1728.64 (adjusted) and 1645.63 million tons (natural) up to 25<sup>th</sup> year. This resulted into a revised stripping ratio of 5.23 as against the AMP stripping ratio of 4.30 (adjusted) and 4.07 (natural).

The above observations of TEMPL, provides a significant deviation in the overburden quantity of the mine having a huge commercial impact during the life of the contract. However, TEMPL's claim is not substantiated by the detailed engineering drawing and the calculation sheets.

Further, TEMPL modified the mining sequence to arrive at a revised mining plan of 25<sup>th</sup> years (Figure 3.2), which provided a superior outcome than the approved mining plan from mining point of view (Table 3.2).

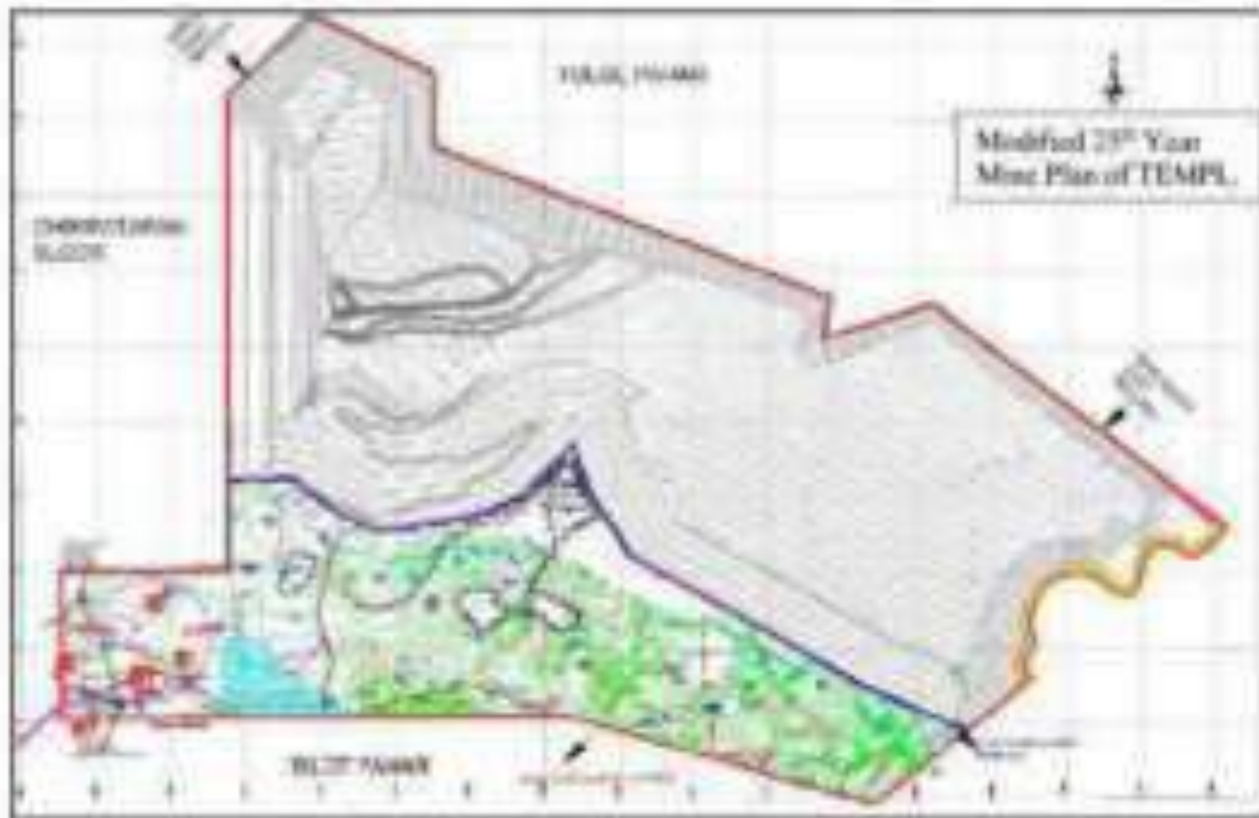


Figure 3.1. 25<sup>th</sup> year pit operation plan modified by TEMPL.

Table 3.2. TEMPL optimized Reserve Statement of 25 years operation.

Details	UoM	Value	Value (AMP*)	Variations
Coal Reserve (by open cut mining method)	Million Tons	405.00	404.50	+ 0.50
Waste Adjusted	Million BCM	1992.00	1738.04	+ 253.88
Strip Ratio	BCM/Ton	4.92	4.30	+ 0.60

**Disclaimer by MS. TEMPL:** The above designs are based on information provided and assumptions made. TEMPL is not responsible for the accuracy or veracity of its sources.

In the modified 25<sup>th</sup> year mining plan of TEMPL, the estimated coal quantity was reduced to 404.50 (a minor reduction of 0.50 Mt), the estimated total overburden quantity got reduced to 1992.00 (still carrying a variation of over 14.50 % from approved mining plan), and the stripping ratio was also reduced to 4.92 (a variation of over 13.90% from the approved mine plan). However, the findings of TEMPL is based on high-level assumptions and does not claim the accuracy of the results.

However, IIT-ISM is of the view that the revised mining plan does carry the merit, a much more detailed engineering plan may be sought from TEMPL or an expert agency may be engaged to look into details of the mining plan to improve accuracy and engineering aspects of the mining plan from implementation point of view.

**3.2. M/S. TEMPL claims that there is less dumping space at the designated dumping area and there won't be the feasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan**

M/S TEMPL's claim, based on the study of the approved mining plan, shows a shortfall of dumping space by as high as 943 million bcm up to 25<sup>th</sup> year of mining operation (Table 3.3.).

**Table 3.3. Assessment of dumping space by TEMPL**

Details	UoM	TEMPL Estimate	AMP Estimate
Waste mined up to 25 <sup>th</sup> years	Million bcm	2143.00	1738.60
In-pit dump capacity	Million bcm	1200.00	NA
No space for dumping	Million bcm	943.00	NA

However, after modification of the mining plan which brings an improvement (Figure 3.3), the short fall in the dumping space is reduced to 542 million bcm (Table 3.4.)

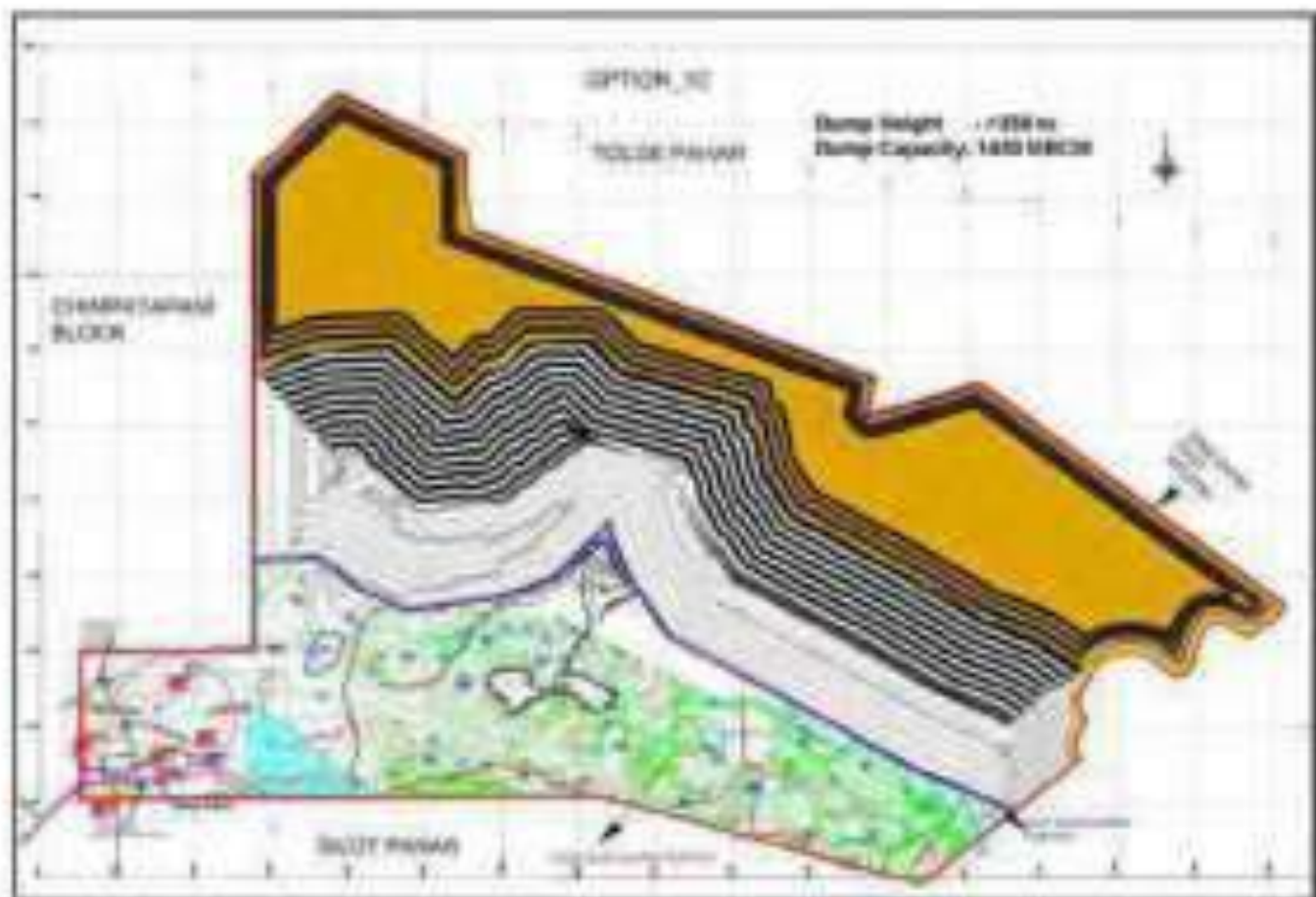


Figure 3.3. 25<sup>th</sup> year mine plan showing OB dumps.

Table 3.4. TEMPL Dumping Scenarios as per optimized 25<sup>th</sup> Year Mine Plan.

Details	UsM	Modified Mining Plan Estimate	AMP Estimate
Waste Mine (25 <sup>th</sup> Year)	Million bcm	1592.00	1738.00
In-pit dump capacity	Million bcm	1450.00	NA
No space for dumping (Swall Factor - 23%)	Million bcm	542.00	NA

Though, the TEMPL's claim is on the basis of a high-level indicative diagram (Figure 3.3) which certainly carry a merit, but in absence of a detailed engineering (drawings and calculations), IIT-ISM is not in position ascertain the accuracy of TEMPL's claim. An expert agency may be engaged to look into detailed engineering aspects of the mining plan to ascertain the accuracy and implementability of

the mining plan. No justification is provided for swell factor calculations which has been assumed as 23%. IIT-ISM does not take cognizance of SRK mine plan as it is not a key stakeholder in this case.

**3.3. TEMPL claim that production will stop after 10 years if Double Pit approach is followed. Whereas, with Single Pit approach the production continues till the 25th year.**

Approved mining plan envisages two pit operations at eastern & western extremities respectively of the coal block. Two access tracks and box cuts have been opened (Figure 2.1). Both east and west pit advance towards the dip direction and finally merge at the end of 20 years of mining operation. Internal dump will begin once sufficient void is created within the pit in the 5<sup>th</sup> year of mining operation. In absence of land outside the leasehold, all the overburden generated up to 5<sup>th</sup> year and thereafter part overburden up to 10<sup>th</sup> year of quarry operation is proposed outside the quarry operation on the dip side within the lease hold area to be re-handled back from 10<sup>th</sup> year of operation.

TEMPL has disputed this mining strategy saying that with two pit operation strategy, the coal production from the mine will stop in the 10<sup>th</sup> years as both pit operations would be bound by the on pit / external dump (Figure 3.4 and Table 3.5).

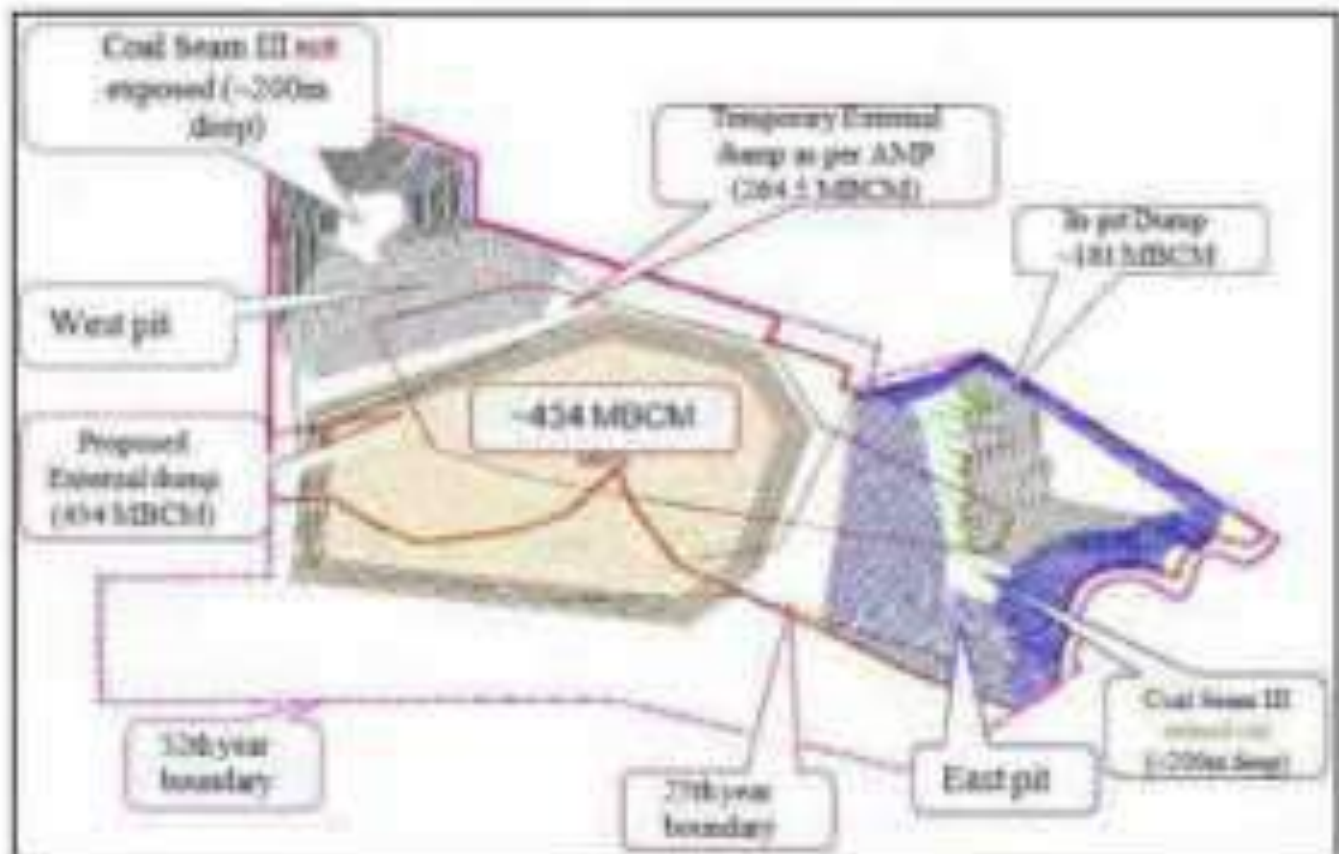
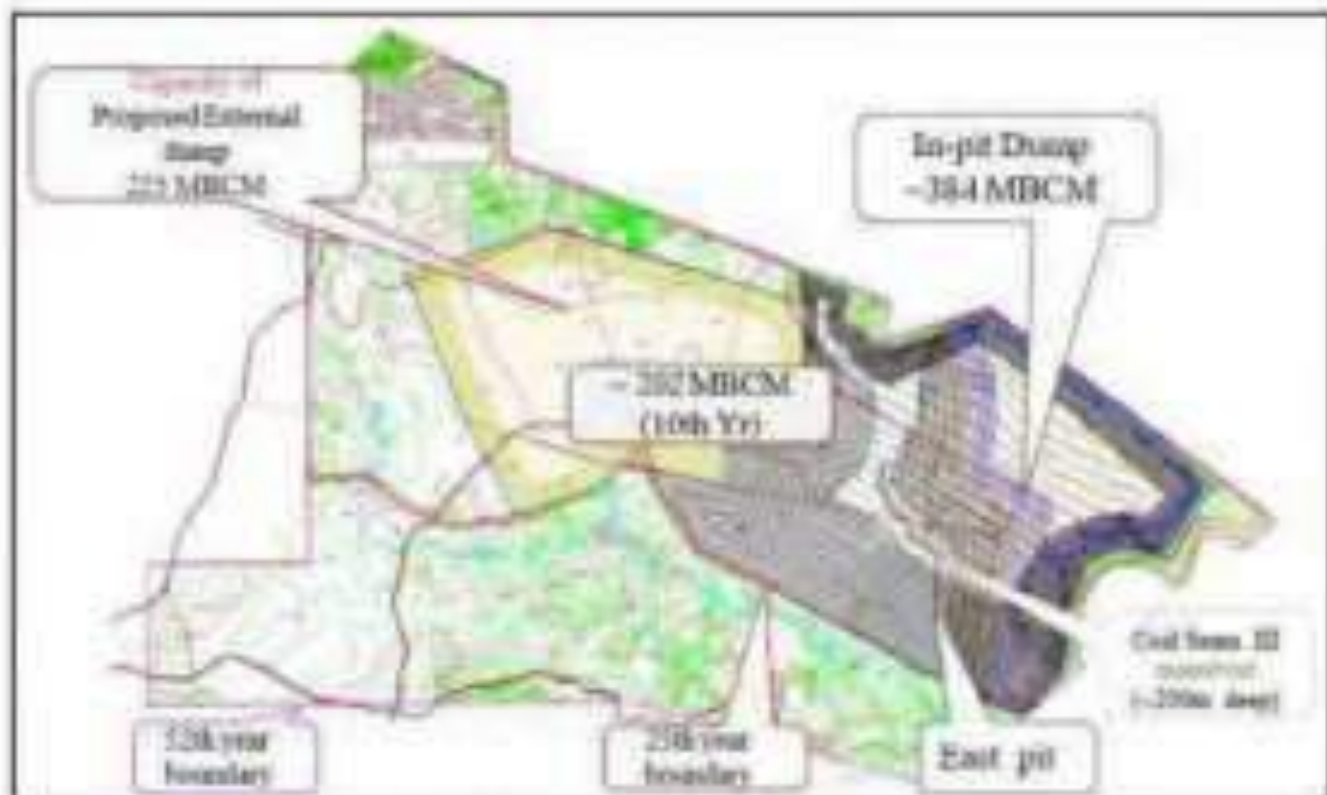


Figure 3.4. Two pit operation at the end of 10 years.

Table 3.5. Coal and Overburden Quantities in 10<sup>th</sup> Year of Operation.

Details	UoM	Values
Coal extracted	Million tons	132.00
Waste generated	Million bcm	302.00
In-pit dumping	Million bcm	181.00

However, the single pit operation strategy starting with East pit proposed by TEMPL can continue the production till 25<sup>th</sup> year (Figure 3.5).

Figure 3.5. Single pit operation in 10<sup>th</sup> year.Table 3.6. TEMPL Reserve Statement of Single Pit Operation in 10<sup>th</sup> Year.

Details	UoM	Values
Coal extracted	Million tons	132.00
Waste generated	Million bcm	987.00

In-pit dumping	Million bcm	384.00
----------------	-------------	--------

IIT-ISM does not completely agree with the observations of TEMPL. IIT-ISM is of the view that TEMPL has not provided enough information in terms of engineering drawings (year-wise operating plans), estimation of internal and external dump quantities (year-wise) and calendar program of excavation showing the coal and overburden quantities (year-wise) from East and West respectively from 5<sup>th</sup> to 10<sup>th</sup> years of mining operations. In absence of these information, it is not possible to substantiate the TEMPL's claim that two pit operations would not be feasible after 10<sup>th</sup> year of operations. Rather, in a single pit operation, there is a high risk of the mining operation to be bound by the external dump which can stop the mining operation.

Prima-facie from Figure 3.4, it still seems possible to accommodate extra quantities of overburden in the external dump by increasing its height the dump due to the availability of space and thus continuing the two-pit operation in the 10<sup>th</sup> year. From 10<sup>th</sup> to 20<sup>th</sup> year of mining operation, a detailed study in terms of developing engineering plans and designs to ascertain that the operation does not stop as the intensity of operation increase due to re-handling of external dump.

**3.4. M/S. TEMPL claimed that the lead distance will be increased by 2 to 3 kms compared to the average lead indicated in the approved mining plan.**

IIT – ISM is of the view that there is a need to calculate average lead distance for overburden dumping at least at 5 years intervals to ascertain the claim. In absence this data TEMPL's claim does not exist.



## CHAPTER 4

**Review of Technical Feasibility Note of Talaipalli Coal Block prepared by CMPDIL**

CMPDIL technical Note of Talaipalli Coal Block broadly contained two parts: i) Review of opencast mining strategy of AMP with reference to mineable reserves, overburden quantities, average stripping ratio and waste disposal schedule, and ii) an alternate mining plan strategy of Talaipalli Coal Block to optimize coal extraction and the coal evacuation strategy, if the AMP is not found to be workable.

Approved Mining Plan (AMP) was examined by CMPDIL with volumetric calculations of coal and overburden quantities using MINEX ROM model prepared by MECL. AMP contained only the 1<sup>st</sup> to 5<sup>th</sup> years, and 25<sup>th</sup> years and Final stage (52<sup>nd</sup> mining plans. 10<sup>th</sup> year, 15<sup>th</sup> year and 20<sup>th</sup> year mining plan was missing). Therefore, CMPDIL reviewed these mining plans as per the mining sequence proposed in the AMP for the reserves and overburden quantities (Table 4.1 and 4.2).

**Table 4.1. Comparison of Mineable Reserve, OB volume and Stripping Ratio**

Year	As per Approved Mining Plan (AMP)			As per CMPDIL based on AMP Design		
	Coal (Mt.)	OB (Mbcm)	Stripping Ratio (cum/t)	Coal (Mt.)	OB (Mbcm)	Stripping Ratio (cum/te)
5	44.5	192.44	4.32	36.08	165.07	4.58
25	404.5	1738.64	4.3	430.5	2169.66	5.04
52 (Final)	843.69	3777.07	4.48	790.81	4008.5	5.07

\*Not Workable according to design of Approved Mining Plan as discussed later

**Table 4.2. Variations of Reserve, OB volume and Stripping Ratio**

Year	Variations (%)		
	OB (Mbcm)	Coal (Mt.)	Stripping Ratio (cum/te)
5	-14%	-19%	6%
25	25%	6%	17%
52 (Final)	6%	-6%	13%

Till the 5<sup>th</sup> year mine plan of AMP, while there was a decrease in the coal reserve as per CMPDIL estimates by 19% (from 44.50 Mt in the AMP to 36.08 Mt in the CMPDIL estimate), the decrease in overburden quantity is also 14% (from 192.44 Mbcm to 165.07 Mbcm) leading to a net increase in the stripping ratio by 6%. IIT-ISM is of the view that these variations are well within the expected accuracy level of the

In the 25<sup>th</sup> year mine plan, there is a marginal increase in the coal reserve of CMPDIL estimates by 6% (from 404.50 Mt to 430.5 Mt), the increase in overburden quantity is quite high at 25% (from 1738.64 Mbcm to 2169 Mbcm) leading to an increase in the stripping ratio by 17%. In the final year (52<sup>nd</sup> year) mining plan there has been a decrease in the coal reserve of CMPDIL estimates by 6% (from 843.69 Mt to 790.81.5 Mt), and an increase in overburden quantity is by 6% (from 3777.07 Mbcm to 4000.8 Mbcm) leading to an increase in the stripping ratio by 13%.

It is pertinent to note that a similar study carried out by TEMPL till the 25<sup>th</sup> year mining plan showed a variation of 5.30 Mt in coal (from 404.50 Mt to 409.70 Mt) and 1404.36 Mbcm in overburden (from 1738.64 Mbcm to 2143.00 Mbcm) leading to a net increase in stripping ratio from 4.30 to 5.30 (Table 3.1). However, TEMPL workings were not based on detailed engineering as CMPDIL's. Therefore, IIT-ISM considers the CMPDIL's study more authentic and accepts the outcomes.

#### **4.1. Waste Disposal and Overburden Dumping Plan**

AMP has proposed to dump 264.52 Mbcm overburden (from 1<sup>st</sup> year to 9<sup>th</sup> Year) in the external dump and re-handle the same back to the internal dump from 10<sup>th</sup> year to 20<sup>th</sup> year in a systematic manner as the two pit operations advanced and finally merge together in the 20<sup>th</sup> year. The temporary external dump is 60m above the ground level with maximum RL. of +360m. A particular area in the dip side within the block has been designated for temporary external dump (Figure 3.4).

CMPDIL reviewed the dump plan and concluded that the maximum OB that can be accommodated in the proposed temporary external dump area is ~178 Mbcm at a swell factor of 1.2 (The "swell factor" is defined as the ratio of the bank to loose weight densities of excavating material). Therefore, 264.52 Mbcm of OB cannot be accommodated in the temporary external dump as envisaged in the AMP. IIT-ISM is of the view is that this is a serious bottle neck to carry out the mining operation beyond 10<sup>th</sup> year.

Further, CMPDIL has estimated that to deliver 44.50 Mt. of coal till the 5<sup>th</sup> year of operation, total overburden to be removed will be approximately ~204 Mbcm instead of 192.44 Mbcm as proposed in the AMP, an additional ~11 Mbcm with a variation in the excavation area (CMPDIL estimated only 36.08 Mt coal and 165.07 Mbcm of overburden from the same excavation area proposed until 5<sup>th</sup> year of the AMP) (Table 4.1.). Further, it has been estimated that at the end of 5<sup>th</sup> year of mining operation, the total internal dump capacity created in the mine void is 11.00 Mbcm as against 12.29 Mbcm estimated in the AMP (a variation of approximately 11.7%) (Table 4.3). There will be shortage of space to accommodate approximately 15.0 Mbcm of overburden which is ~7% variation together in external and internal dumps. IIT-ISM is of the view that a variation of ~7% is well within the acceptable limits and there would not be a problem in continuing with the operation until the 5<sup>th</sup> year as per the AMP.

**Table 4.3. Estimation of OB produced and its accommodation in the designated dump at the end of 5 year**

Year	Estimated OB (Mbcm)	Total OB accommodated (Mbcm)			Remarks
		External	Internal	Total	
5	204	178	11	189	Shortage of space for ~15 Mbcm of OB

Prima-facie from Figure 3.4, it still seems possible to accommodate extra quantities of overburden in the external dump by increasing its height the dump due to the availability of space and thus continuing the two-pit operation in the 10<sup>th</sup> year. From 10<sup>th</sup> to 20<sup>th</sup> year of mining operation, a detailed analysis with proper engineering design and the plans was required to ascertain that the operation does not stop as the intensity of operation increase due to re-handling of external dump.

Accordingly, CMPDIL carried out this exercise by increasing the height of temporary external dump to 90m above the ground level up-to a RL of +390m, the maximum overburden quantity in the revised external dump would increase to ~251 Mbcm from 178 Mbcm in the dump up to +360m level. Thus following the natural excavation plan (249 Mbcm - un-adjusted), the mining operation is going to be feasible till 6<sup>th</sup> year. However, if the advance stripping is continued till the 6<sup>th</sup> year stage, total OB generated would be ~268 Mbcm and total OB accommodation in internal dump would be short by ~25

Mbcm. So, the mine operation will stop in 6<sup>th</sup> year, even if the height of the dump is increased. Further, to ensure progression of the mine beyond 5<sup>th</sup> year, CMPDIL evaluated the dumping options considering the entire land within the lease area is available for dumping and thus external dumping was to be done in the southern extremities of the block.

CMPDIL estimated that to deliver 404.50 Mt of coal till 25<sup>th</sup> year of mining operation, a total of ~2040 Mbcm of overburden will be generated following the mining sequence proposed in the AMP. CMPDIL has analyzed the availability of space for internal and external dumping for 5<sup>th</sup>, 10<sup>th</sup> and 15<sup>th</sup> years of mining operation up to the RL of +360m as shown in Table 4.4.

**Table 4.4. Stage-Wise Estimation of OB generated and Dumping Space**

Year of Operation	Coal (Mt.)	Estimated OB (Mbcm)	Total Dump accommodation up-to RL of +360m (Mbcm)			Remarks
			External	Internal	Total	
5	44.50	204	688	11	689	Dumping space adequate
10	134.50	675	544	209	753	Dumping space adequate
15	224.50	1160	403	507	910	Dumping space inadequate

Further, CMPDIL estimated that up to 25<sup>th</sup> year of mining operation, the total internal dumping space created would be ~1175 Mbcm (up-to RL of +360m) of OB while the Mining Plan envisaged to re-handle and backfill the entire OB (1738.64 Mbcm) generated as per the AMP till 25<sup>th</sup> year of mining operation. Evidently, the accommodation of total OB internally would not be feasible and hence the mining operation would not happen till 25<sup>th</sup> year of operation.

CMPDIL further explored the possibilities to accommodate more overburden dumps by increasing the dump height level to +390m (4 decks of 30m each). CMPDIL estimated that even with an increase in the final dump height to +390m, total designed space for overburden dump would be ~1070 Mbcm, thus making the mining operation not feasible beyond 14<sup>th</sup> year.

In the 25<sup>th</sup> year of mining operation, CMPDIL estimated the total external dump space beyond 25<sup>th</sup>

year pit boundary is ~ 175 Mbcm up-to an RL. of -360m. Therefore, even after utilizing the entire land available for external dump, the total dump accommodation in 25<sup>th</sup> year would be 1350 Mbcm (External + Internal) while the total OB generated would be ~2040 Mbcm. It is clear that there is no space for dumping available for ~ 690 Mbcm of OB.

Therefore, the examination of the Mining Plan has led to the conclusion that overall, this Mining Plan does not seem to be practical and workable for 25 years as a lot of errors are there in the estimation of internal and external dump quantities. Mineable coal and mining life given in mining plan is not feasible. Also dump accommodation as suggested in mining plan is not feasible. There is calculation error in stripping ratio as well.

ITT-ISM agrees with the estimation of overburden dumps within the lease hold areas at different years of mining operations and endorses the view of CMPDIL that it would be difficult to carry out the mining operation beyond 15<sup>th</sup> years due to serious issues associated with excavation and dumping schedule.

#### 4.3. Alternative Mine Plan Option of CMPDIL

In the light of the above findings of the AMP, CMPDIL, thoroughly reviewed the mining strategy of Tallapalli coal mine. CMPDIL suggested an alternative mining strategy based on the maximization of coal extraction, optimize overburden removal and dumping schedule, still meeting the coal production requirements of 18.0 Mt.

The alternative mining plan maximized the coal extraction with less surface area up to Seam III so that more overburden can be accommodated in external and internal dump. The alternative mining plan still followed two – pit operation – one on the north eastern side and the other on the western side. However, due to lack of adequate dumping space, the western quarry is terminated 5<sup>th</sup> year of mining operation after mining coal up to seam VI to a maximum depth of 110m (Figure 4.1), so that the void and the space thus created could be utilized for additional quantities of overburden generated from eastern pit in the subsequent years.

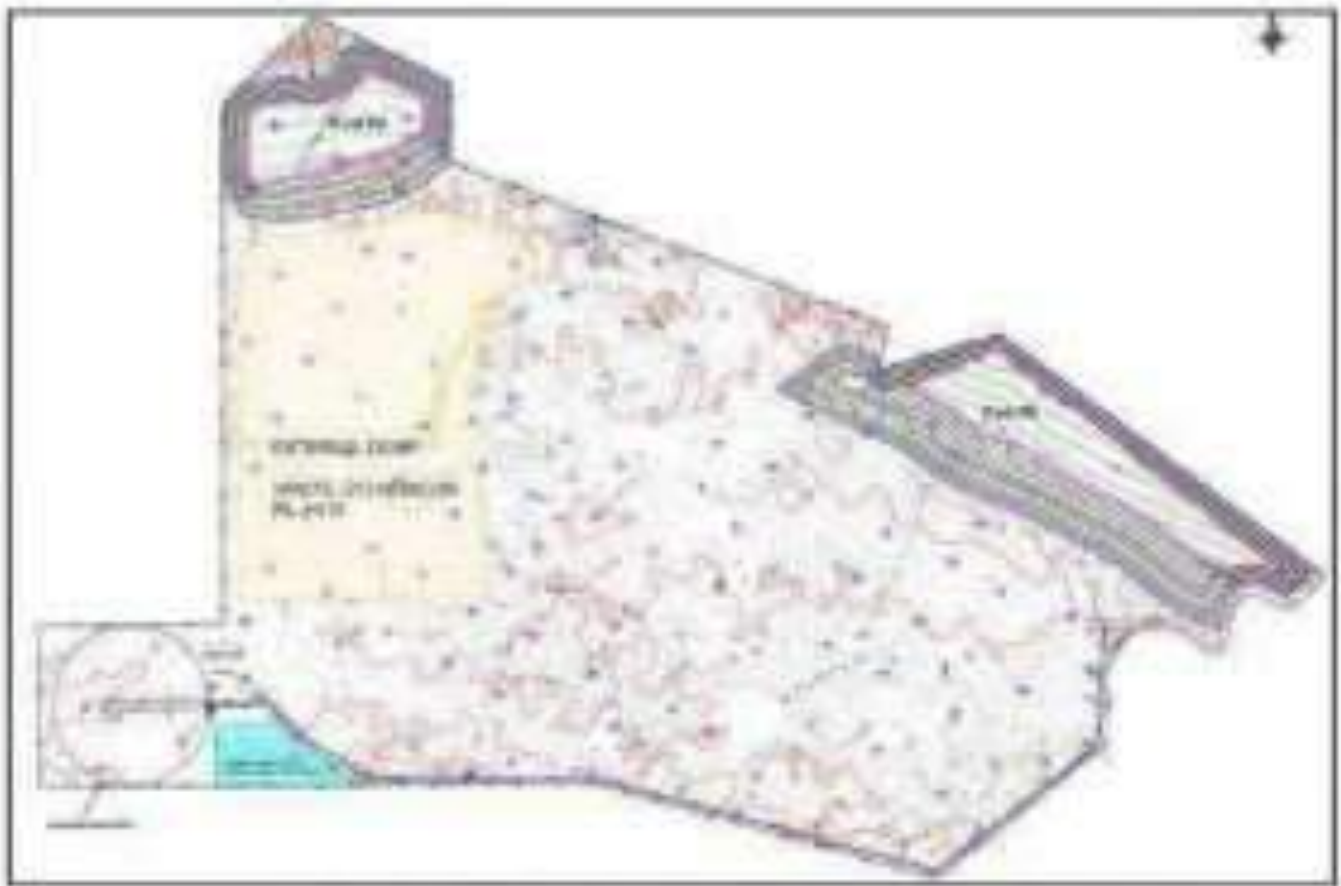


Figure 4.1. Mining plan at the end of 5<sup>th</sup> year of operation

A tentative calendar programme of excavation and CD disposal schedule of the alternative mining plan is shown in Table 4.3.

Table 4.5. Calendar Program of Excavation of Alternative / Modified Mining Plan

Year	Coal (Mt)			Cummt. Coal (Mt)	OB (Mbcm)			Cummt. OB (Mbcm)	Strip Ratio (Cum/t)	Cummt. SR (cum/t)
	1	2	3		1	2	3			
1	0.9	0.6	1.5	1.5	4.12	3.14	7.26	7.26	4.84	4.84
2	2	2	4	5.5	9.17	10.47	19.63	26.89	4.91	4.89
3	4	4	8	13.5	18.33	20.93	39.26	66.16	4.91	4.9
4	9	4	13	26.5	41.24	20.93	62.17	128.33	4.78	4.84
5	14.35	3.65	18	44.5	66.52	19.11	85.63	213.96	4.76	4.81
6	18		18	62.5	91.08		91.08	305.03	5.06	4.88
7	18		18	80.5	91.08		91.08	396.11	5.06	4.92
8	18		18	98.5	91.08		91.08	487.19	5.06	4.95
9	18		18	116.5	91.08		91.08	578.26	5.06	4.96
10	18		18	134.5	88.68		88.68	666.94	4.93	4.96
11	18		18	152.5	81.1		81.1	748.04	4.51	4.91
12	18		18	170.5	81.1		81.1	829.13	4.51	4.86
13	18		18	188.5	81.1		81.1	910.23	4.51	4.83
14	18		18	206.5	81.1		81.1	991.32	4.51	4.8
15	18		18	224.5	78.67		78.67	1070	4.37	4.77
16	18		18	242.5	77		77	1147	4.28	4.73
17	18		18	260.5	77		77	1224.01	4.28	4.7
18	18		18	278.5	77		77	1301.01	4.28	4.67
19	18		18	296.5	77		77	1378.02	4.28	4.65
20	18		18	314.5	80.24		80.24	1458.26	4.46	4.64
21	18		18	332.5	80.88		80.88	1539.14	4.49	4.63
22	18		18	350.5	80.88		80.88	1620.02	4.49	4.62
23	18		18	368.5	80.88		80.88	1700.9	4.49	4.62
24	18		18	386.5	80.88		80.88	1781.78	4.49	4.61
25	18		18	404.5	80.88		80.88	1862.66	4.49	4.6
26	7.16		7.16	411.66	32.19		32.19	1894.85	4.5	4.6
<b>Total</b>	<b>397.41</b>	<b>14.25</b>	<b>411.66</b>		<b>1820.27</b>	<b>74.57</b>	<b>1894.85</b>			<b>4.60</b>

Mining plans of 10<sup>th</sup> year, 15<sup>th</sup> year and 20<sup>th</sup> year developed by CMPDII, are shown in Annexure I

#### 4.3.1. Mine Boundary

The mine boundary for the western and eastern quarry was fixed taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining

**West Pit:** The west pit was designed up-to Seam VII at a maximum depth of 110m to be operated in the initial 5 years. This was required in order to create more space for dumping of overburden needed in the subsequent years for the overburden of the East Pit (Table 4.4). The coal extraction was limited to seam VI because it was not possible to reach seam III (at a depth of 250m in 5<sup>th</sup> year) in the constrained geological conditions considering the dumping requirements. The West pit boundary is determined by the following conditions:

- Northern Boundary** : Foot of the hill in northwest and 7.5m from the block boundary
- Southern Boundary** : Extent of the pit up-to 5<sup>th</sup> year of operation
- Eastern Boundary** : 7.5m from the block and extent of the pit upto 5 year of operation
- Western Boundary** : 7.5m from the block boundary

**East Pit:** The East pit is proposed up-to Seam III. The major considerations for the fixing of Eastern Pit boundary were the requirements of space for external dumping within the block boundary and minimization of overburden quantity still meeting the coal production requirements. The East pit boundaries was determined by the following conditions

- Northern Boundary** : 7.5m from the block boundary
- Southern Boundary** : 100m from the block for conveyor corridor and magazine
- Eastern Boundary** : 60m from Kelo tower and 7.5m from block boundary
- Western Boundary** : Fault F1 and an arbitrary line considering low strip ratio zone and leaving sufficient external dump space in the western side

The East pit will operate till end of the life. Till 5<sup>th</sup> year of operation, coal production from both the pit will reach 18.00 Mtpy. Internal dump will start once sufficient void is created in the pit. After 5 years, the east pit will independently produce 18.00 Mtpy till 25<sup>th</sup> year of mine operation by open cast mining (Table 4.4). It has been proposed to start internal dumping in east pit from 6<sup>th</sup> year of



mining operation when the sufficient void is created within the pit. At the same time the backfilling will also be done in the West pit from 9<sup>th</sup> year. By 10<sup>th</sup> year of mining operation (Figure 4.2), the West pit will be completely filled and merged with the external dump, and the external dump will also begin merging with the internal dump of East pit.

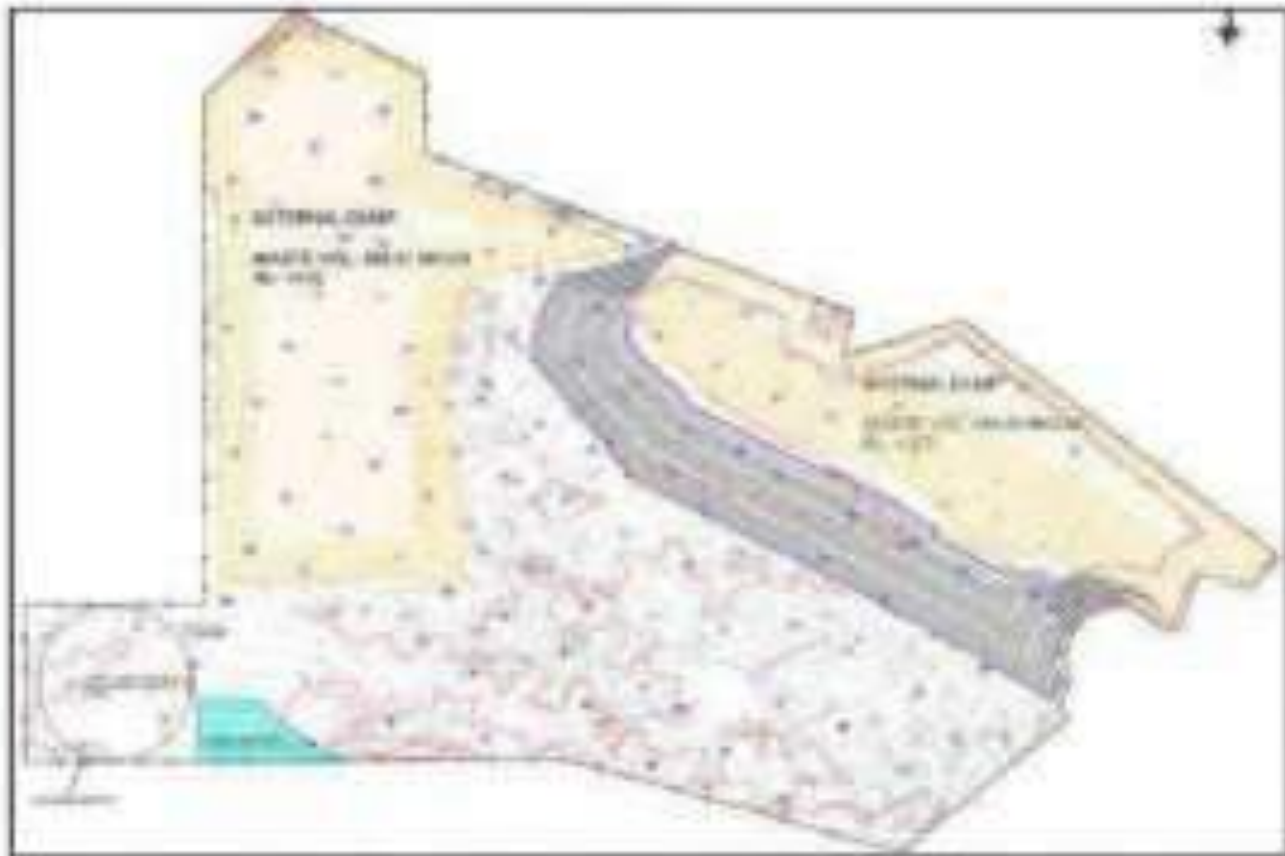


Figure 4.3. 10<sup>th</sup> year mining operation showing external and internal dumps.

Overburden removal from East pit peaks in the 6<sup>th</sup> year of operation at 91.08 Mbcm and continues till the 9<sup>th</sup> year before it tapers down to 88.68m in the 10<sup>th</sup> year and 81.10 Mbcm from 11<sup>th</sup> to 14<sup>th</sup> year.

#### 4.3.2. Reserve Statement

Statement of reserve as per the revised pit design is shown in Table 4.6.

Table 4.6. Resource and Reserve Statement of Alternative Mining Plan

Particulars	Value in Mt
Net Geological Reserve as per GR	1267.17

Net Geological Reserve by Open Cast Mining Method	575.78
Net Geological Reserve blocked in batter	142.45
Available Net Geological Reserve for Opencast Mining	433.33
Less: Mining Loss@ 5%	21.67
Mineable Reserve for Opencast Mining	411.66

Net Geological Reserve is arrived considering a geological loss of 10 % from Gross Geological Reserve (Resource) and mining loss of 5 % leading to a final total reserve of 411.66 Mt at a stripping ratio of 4.60 cum/t. Seam-wise resource (geological reserve) and reserve (mineable reserve) statements are shown in Table 4.7.

**Table 4.7. Seam-Wise Resource and Reserve Statement**

Seams	Net Geological Reserve (Mt)	Mineable Reserve (Mt)
X-LA	0.00	0.00
X-LB	0.20	0.19
X-TOP	2.73	2.59
X-BOT	23.95	22.75
IX-L2	7.95	7.55
IX-L1	10.09	9.59
IX	40.46	38.44
VIII	51.58	49.00
VII	2.17	2.06
VI-TOP	10.28	9.77
VI-MID	67.34	63.98
VI-BOT	1.42	1.35
V-TOP	3.39	3.22
V-MID	12.80	12.16
V-BOT	18.27	17.36
IV-TOP	38.35	36.44
IV-MID	57.85	54.96

IV-L	14.13	13.43
IV-BOT	32.11	30.51
III-L	11.34	10.77
III	26.91	25.56
<b>TOTAL</b>	<b>433.33</b>	<b>411.66</b>

Table 4.8. Final pit design parameters

Sl. No.	Parameters	Unit	Value	
			East Pit	West Pit
1	Maximum depth	Meter	350	110
2	Maximum strike length:	Km.		
	Mine Floor		3.60	1.10
	Mine Surface		4.20	1.40
3	Minimum strike length:	Km		
	Mine Floor		2.25	0.90
	Mine Surface		2.90	1.05
4	Maximum dip-rise length:	Km		
	Mine Floor		2.40	0.50
	Mine Surface		3.20	0.95
5	Minimum dip-rise length:	Km		
	Mine Floor		2.10	0.40
	Mine Surface		3.10	0.83
6	Area:	Hectare		
	Mine Floor		775.70	43.43
	Mine Surface		1171.45	111.93

#### 4.4. Overburden dumping strategy

Alternative mining plan envisaged that in the initial 5 years, all the OB generated from east and west pit will be dumped externally (Figure 4.1). The external dump will be located in the western side of the east pit leaving 100m distance from east pit boundary. Once sufficient void is created after 5 years of operation, internal dumping will start in the east pit in the de-coaled area. However, after 5 years, the west pit will cease to exist and the void of the west pit will be utilized to place the overburden generated in the west pit - 666.96 (74-590). By 10<sup>th</sup> year the west pit will be completely filled and merged with the external dump carrying - 666.96 Mbcm of overburden generated from mining operation (Table 4.8). The external dumping will be continuing till 15<sup>th</sup> year and thereafter only tiny amount of OB of around -13.04 Mbcm will be dumped till 26<sup>th</sup> year of operation. No re-handling of external dump back to the east pit is proposed, thus saving huge amount of money for the project. However, based on the environmental impact assessment study, the final void may be left to serve as the water storage for ground water recharging or may be completely reclaimed by flushing external and internal dumps, followed by development of an environment friendly land use for the neighboring society.

Out of the total overburden of 1894.85 Mbcm, -510.05 Mbcm (-27%) will be dumped externally and the balance 1384.80 Mbcm (-73%) will be dumped internally. The final height of the external dump is will be be -120m above ground level up-to an RL. of +410m. The final height of the internal dump will be around 90m above ground level up-to an RL. of +375m. The dumps will be formed in benches with individual bench heights of 30m each and a bench width of 30m. To ensure the safety of dump, scientific slope stability study will be required for the final dump design under the **regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020 to ensure the safety of operation.** The year-wise dumping schedule is provided in Table 4.9 below:

**Table 4.9. Tentative Dumping Schedule**

Year	External Dump		Internal Dump		Total OB	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
1	7.26	7.26		0.00	7.26	7.26
2	19.63	26.89		0.00	19.63	26.89
3	39.26	66.16		0.00	39.26	66.16
4	62.17	128.33		0.00	62.17	128.33

5	85.63	213.96		0.00	85.63	213.96
6	34.21	248.17	56.87	56.87	91.08	305.03
7	34.21	282.38	56.87	113.73	91.08	396.11
8	34.21	316.59	56.87	170.60	91.08	487.19
9	34.21	350.80	56.87	227.46	91.08	578.26
10	34.21	385.01	54.47	281.93	88.68	666.94
11	22.40	407.41	58.70	340.63	81.10	748.04
12	22.40	429.81	58.70	399.33	81.10	829.13
13	22.40	452.21	58.70	458.02	81.10	910.23
14	22.40	474.61	58.70	516.72	81.10	991.32
15	22.40	497.01	56.27	572.99	78.67	1070.00
16	1.60	498.61	75.40	648.39	77.00	1147.00
17	1.60	500.21	75.40	723.80	77.00	1224.01
18	1.60	501.81	75.40	799.20	77.00	1301.01
19	1.60	503.41	75.40	874.61	77.00	1378.02
20	1.60	505.01	78.64	953.25	80.24	1458.26
21	0.84	505.85	80.04	1033.29	80.88	1539.14
22	0.84	506.69	80.04	1113.33	80.88	1620.02
23	0.84	507.53	80.04	1193.37	80.88	1700.90
24	0.84	508.37	80.04	1273.41	80.88	1781.78
25	0.84	509.21	80.04	1353.45	80.88	1862.66
26	0.84	510.05	31.35	1384.80	32.19	1894.85

CMPDII, has estimated the lead overburden varying from about 3.00-7.25 km over the life of the mine. For west pit, the average lead for external dumping is estimated to vary from 3.25-3.75 km. For east pit, the average lead of internal dumping is estimated to vary from 3.00-3.50 km. The average lead for external dumping from east pit is estimated to vary from 6.75-7.25 km in initial 10 years and thereafter from 6.00-6.50 km for next 5 years. The lead for external dumping after 15<sup>th</sup> year is estimated to be 3.0

3.50 km. IIT-ISM is of the view that there is an opportunity to optimize haulage network of overburden transport on a year-to-year basis on the basis of annual operating plan which has the potential to reduce the lead distance of overburden transport.

#### 4.5. Coal handling and dispatch arrangements

Coal from both the pit is proposed to be transported to surface by the trucks which would then be fed into a mobile crushing arrangement and thereafter to coal dispatch center by surface conveyors. Coal from west pit shall be directly transported to coal dispatch center, as the pit will be operational only for 5 years, therefore, any capital investment for conveyor system would not be a viable option.

As per the Approved Mining Plan, coal will be produced through a shovel dumper and surface miner equipment systems. Surface miner equipment system is expected to produce 40% of the coal, i.e., 7.2 Mtpy (<100 mm size). Therefore, crushing of coal will also be required for handling and dispatch. The entire coal produced from Talaiipalli Project (18.0 Mtpy) will be transported / dispatched through railways. Loading into the rail wagon at the railway siding will be through Silos and Rapid Loading System (RLS). Therefore, a railway siding is proposed in the south-western part of the block for coal loading and dispatch.

As the coal handling plant (CHP) is proposed to cater entire production of coal, accordingly facilities of receiving station, crushing & conveying system up to the silo will be established for RLS into the railway wagons. The lead for coal varies from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal varies from 4.50-5.00 km.

##### 4.5.1. Coal handling system of East Pit:

East quarry will have a separate receiving station for ROM coal at the mine mouth before it is crushed and conveyed to the central dispatch arrangement. The proposed coal handling system includes receiving of ROM coal at surface. The receiving pit / station and the mobile crusher unit will be shifted as the mine advances during the operation. The proposed receiving and crushing stations are proposed at the southern side of the mine at a suitable location.

For East Pit, the average lead for coal varies from 2.50-4.00 km. The lead estimation is tentative and may be estimated each year in the yearly operation plan.

##### 4.5.2. Coal handling systems for west pit:

Coal produced from western quarry shall be transported by truck/ dumpers at surface and received in a

hopper of crusher for crushing coal up to (-)100 mm size. This crushing station for coal will be placed at a suitable location near proposed stockpile for Silo loading arrangement. The coal up to the crushing station shall be transported from the mine via trucks.

#### **4.5.3. Loading & Dispatch Arrangements**

The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading Silo. Two nos. of silos are proposed with two different rail lines of at the railway siding for loading of coal into railway wagons. Both the silos will be connected with the bridge conveyors for feeding of coal into silos to ensure flexibility in loading.

## CHAPTER 5

### Technical Vetting of CMPDIL Report and Suggestions to Improve Sustainability of Tallaipalli Coal Mine

IIT-ISM examined the approved mine plan (AMP) of Tallaipalli coal block, findings of TEMPL, and technical report of Tallaipalli coal mine prepared by CMPDIL with the following observations.

While prima-facie the overall mining strategy of NTPC's approved mining plan looked sound, the variations in year wise estimated quantities of coal and overburden, estimated quantity of internal and external dump to accommodate overburden volume produced as per the AMP was questioned by both Thivani Earthmovers Private Limited (TEMPL) and the CMPDIL. TEMPL raised four potential problems in the AMP - i) TEMPL observed that 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/ton by 25<sup>th</sup> year of mine operation as specified in the approved Mining Plan (AMP), ii) there would be an excess OB quantity than envisaged in the AMP which would not be able to be accommodated in the designated internal and external dump areas, iii) 100% backfilling by re-handling of temporary external dump / on pit dump as envisaged in the AMP is not feasible, iv) TEMPL observed that production will stop after 10 year if the two pit approach as proposed in the AMP is followed, and v) TEMPL claimed that the average lead overburden transportation will be 2 to 3 kms more than the average lead indicated in the AMP.

CMPDIL examined the AMP to validate the volumetric calculations of coal and overburden quantities. CMPDIL used MINEX ROM model prepared by MECL for volume calculations. As the AMP contained only the 1<sup>st</sup> to 5<sup>th</sup> years, 25<sup>th</sup> years and Final stage (52<sup>nd</sup> year) mining plans (10<sup>th</sup> year, 15<sup>th</sup> year and 20<sup>th</sup> year mining plan was missing), CMPDIL reviewed these mining plans as per the mining sequence of AMP for estimation of reserves, overburden quantities and dumping strategy. The key findings of CMPDIL and IIT-ISM's comments are as below:

- Till the 5<sup>th</sup> year mine plan of AMP, while there is a decrease in the coal reserve as per CMPDIL estimates by 19% (from 44.50 Mt in the AMP to 36.08 Mt in the CMPDIL estimate), the decrease in overburden quantity is also 14% (from 192.44 Mbcm to 165.07 Mbcm) leading to a net increase in the stripping ratio by 6%. As the validation of ROM model was not in the scope of IIT-ISM's



work, therefore, these figures were accepted & relied upon by IIT-ISM. The variations in the stripping ratios are well within the expected level of accuracy. As per 10% of the report, IIT-ISM sees a possibility of errors in estimation of coal reserve and overburden quantity in the approved mining plan.

- Further, CMPDIL estimated that to deliver 44.50 Mt. of coal till the 5<sup>th</sup> year of operation, total overburden to be removed will be approximately 264 Mbcm instead of 192.44 Mbcm as proposed in the AMP, an additional ~11 Mbcm with a variation in the area of excavation (CMPDIL estimated only 36.08 Mt coal and 165.07 Mbcm of overburden in the same excavation area proposed until 5<sup>th</sup> year by the AMP). Further, it has been estimated that at the end of 5<sup>th</sup> year of mining operation, the total internal dump capacity created in the mine void is 11.00 Mbcm as against 12.29 Mbcm estimated in the AMP (a variation of approximately 1.29 Mbcm). There will be shortage of space to accommodate approximately 15.6 Mbcm of overburden which is ~7% variation together in external and internal dumps. IIT-ISM is of the view that there is a possibility to accommodate this extra volume with a minor modification in the year wise operational plan. Therefore, there should not be a problem in continuing with the operation until the 5<sup>th</sup> year as per the AMP.
- CMPDIL analyzed the availability of space for internal and external dumping for 5<sup>th</sup>, 10<sup>th</sup> and 15<sup>th</sup> years of mining operation up to the RL. of ~360m, it was observed that the mining operation would stop before the year 15 as there will be a shortfall for dumping space to accommodate ~200 Mbcm extra overburden generated during the operation.

CMPDIL further explored the possibilities to accommodate more overburden dumps by increasing the dump height level to ~390m. CMPDIL estimated that even with an increase in the final dump height to ~390m, total designed space for overburden dump would be ~1070 Mbcm as against the total dumping requirements of 1160 Mbcm in the 15<sup>th</sup> year. IIT-ISM does not quite agree with CMPDIL's observation that the mine will not be able to move beyond 14<sup>th</sup> year, the shortfall in the quantity is less than 13% and there would be a possibility to further increase the height at least 5 – 10m which can accommodate the shortfall in the quantity of dumping space in the 15<sup>th</sup> year.

CMPDIL has not provided any estimate of overburden removal and space for dumping beyond 15<sup>th</sup> years and up to 24<sup>th</sup> year. Therefore, to conclude that the mine will not progress beyond 15<sup>th</sup> year may be pre-mature. In absence of detailed drawings and data submitted by CMPDIL in support their calculations, IIT-ISM has only relied on CMPDIL's estimations and tried to extrapolate few

estimations based on its professional experience and subject matter expertise. CMPDIL has also not provided the estimates for 20<sup>th</sup> year so that IIT-ISM could review the scenarios between 15<sup>th</sup> and 20<sup>th</sup> year.

In the 25<sup>th</sup> year mine plan, there is a marginal increase in the coal reserve of CMPDIL estimates, by 6% (from 404.50 Mt to 430.5 Mt), the increase in overburden quantity is quite high at 25% (from 1738.64 Mbcm to 2169 Mbcm) leading to an increase in the stripping ratio by 17%. It was pertinent to note that a similar study carried out by TEMPL till the 25<sup>th</sup> year mining plan showed a variation of 5.30 Mt in coal (from 404.50 Mt to 409.70 Mt) and 1404.36 Mbcm in overburden (from 1738.64 Mbcm to 2143.00 Mbcm) leading to a net increase in stripping ratio from 4.30 to 5.30 (Table 3.1). However, TEMPL workings were not based on detailed engineering as CMPDIL's. Since the review of MINEX ROI model was not in the scope of IIT-ISM's work, IIT-ISM considers the CMPDIL's analysis and accepted these outcomes.

- According to the CMPDIL's calculations, to deliver 404.50 Mt of coal till 25<sup>th</sup> year of mining operation of the AMP, a total of ~ 2040 Mbcm of overburden will be generated following the mining sequences proposed in the AMP. In the 25<sup>th</sup> year of mining operation, CMPDIL estimated the total external dump space beyond 25<sup>th</sup> year pit boundary is ~ 175 Mbcm up to an RL of -360m. Therefore, even after utilizing the entire space for dumping, the total accommodation of dump in the 25<sup>th</sup> year would be 1350 Mbcm (External + Internal) while the total OB generated would be ~2040 Mbcm. It is clear that there is no space for dumping available for ~690 Mbcm of OB. CMPDIL has not estimated nor provided the detailed drawings and information in support of its calculation for 25<sup>th</sup> year of mining operations of the approved mining plan. CMPDIL has also not estimated the dumping space beyond -360m level as it has done so in the alternative mining plan.
- The examination of the AMP by CMPDIL has, thus led to the conclusion that overall AMP's mining plan strategies are not workable unless it is further modified / optimized from excavation and dumping point of view. The errors have been found in the estimation of coal and overburden quantities, internal and external dump quantities etc. which can make the implementation of AMP un-feasible. IIT-ISM agrees with the findings of CMPDIL report that there will be a bottleneck in implementing the AMP unless the AMP is modified to address the above issues (Figure i and v of Annexure 1).

Accordingly, CMPDIL suggested modifications in the mining plan in order to improve excavation and the dumping strategy of Talaipalli coal mine. IIT-ISM has reviewed the modified mining plan

proposed by CMPDIL, with following observations:

- CMPDIL analyzed the geo-mining conditions / parameters of Talaipalli coal block to ascertain mining of coal takes place for at least for a minimum period of 25 years. In the alternate / modified mining plan, CMPDIL has estimated total mineable coal by opencast mining method to be 411.66 Mt at an average strip ratio of 4.60 cum/t for a period of 26 years at an annual production rate of 18Mty from 5<sup>th</sup> year of mining operation. Beyond this limit, open cast mining method is not proposed because of the dumping space bottleneck as the operation becomes bound by the external dump. The modified mining plan still follows the two pit operations as proposed in the AIMP - one on the north eastern (East Pit) side and the other on the western side (West Pit). However, due to lack of adequate dumping space, the western quarry is terminated in the 5<sup>th</sup> year of mining operation after mining coal up to seam VI up to a maximum depth of 110m, so that the mine void and the space thus created could be utilized for additional quantities of overburden generated from eastern pit in the subsequent years. The East pit will operate till end of the life up to seam III, and up to a maximum depth of ~350m. There is a scope to increase the internal dump height with proper dump slope study by 20 – 30m thus increasing the capacity of internal dump and reducing the external dump quantity, thus de-bottle necking the mining operation beyond 26 years. An expert professional agency may be engaged to carry this study.
- Till 5<sup>th</sup> year of operation, coal production from both the pit will reach 18.00 Mty. Internal dump will start once sufficient void is created in the pit. After 5 years, the east pit will independently produce 18.00 Mty till 25<sup>th</sup> year of mining operation. It has been proposed to start internal dumping in east pit from 6<sup>th</sup> year of mining operation when the sufficient void is created within the pit. At the same time the complete backfilling will also be done of the West pit from 6<sup>th</sup> year. By 10<sup>th</sup> year of operation, the West pit will be completely filled and merged with the external dump, and the external dump will also begin merging with the internal dump of keeping a barrier of 100m between the excavation of the east pit and the dumping area. IIT-ISM does not find any bottleneck in continuing the operation till 10<sup>th</sup> year (Figure vi and vii of Annexure I).
- IIT-ISM has also analyzed the dumping scenario in the 15<sup>th</sup> and 20<sup>th</sup> year (Figure ix and figure x of Annexure I) and finds a scope of increasing the total dump quantity by 3 to 5% in the existing dump plan.
- Out of the total overburden of 1894.85 Mbcm, ~ 510.05 Mbcm (~ 27%) is proposed to be dumped externally and the balance 1384.80 Mbcm (~ 73%) internally. The final height of the external dump

is will be ~120m above ground level up-to an RL of +410m. The final height of the internal dump will be around 90m above ground level up-to an RL of +375m. IIT-ISM reviewed the available dumping space (Internal + External + West Pit Void) and finds an scope to increase the overburden dump quantity by 3 – 5%, up to 2000 Mcum (Figure x). Further, the dumps will be formed in benches with individual bench heights of 30m each and a bench width of 30m. IIT-ISM is of the view that there exists a scope to increase the height internal dump by another tier of 20-30m thus de-bottle necking and continuing the operation beyond 26<sup>th</sup> years and making available additional coal reserve.

- IIT-ISM has carried out a high-level study of the average overburden transportation lead in the 5<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup>, 20<sup>th</sup> and 25<sup>th</sup> year of operation (Table 5.1)

**Table 5.1. Approximate Average Lead for Overburden Transportation**

Years of Operation	Average Lead (km)	
	Internal Dump	External Dump
5th Year	-	4.50
10th Year	4.2	5.10
15th Year	4.8	-
20th Year	4.8	-
25th Year	4.5	-

- As the life of the west pit is only 5 years, a truck transport is proposed for coal transportation up to the railway siding instead of a conveyor transport which could eventually have a larger environmental foot print than the truck transport considering its installation and dis-mantling in a 5 years' timeframe, in addition to its economic viability. For the east pit, conveyor transport is proposed from the mouth of the pit until the railway siding.
- CMPDEL has estimated the lead overburden varying from about 3.00-7.25 km over the life of the mine. For west pit, the average lead for external dumping is estimated to vary from 3.25-3.75 km. For east pit, the average lead of internal dumping is estimated to vary from 3.00-3.50 km. The average lead for external dumping from east pit is estimated to vary from 6.75-7.25 km in initial 10 years and thereafter from 6.00-6.50 km for next 5 years. The lead for external dumping after 15<sup>th</sup> year is estimated to be 3.0 – 3.50 km.
- The entire coal produced from Talaipalli Project (18.0 Mt) will be transported / dispatched through railways. Loading into the rail wagon at the railway siding will be through Silos and Rapid Loading System (RLS).

- The lead for coal varies from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal will vary from 4.50-5.00 km.

Following suggestions of IIT-ISM may be considered which may have the bearing on the sustainability and viability of the alternative / modified mining plan of CMPDIL:

- As proposed by CMPDIL, the dumps (both internal and external) will be formed in benches with individual bench heights of 30m each and a bench width 30m. However, while reviewing the 25<sup>th</sup> years plan, it is found the individual bench width is 40m instead of 30m as suggested in the text. This could have a significant impact on the quantities of internal dump and consequently delimiting the mining operation at 26<sup>th</sup> year as proposed by CMPDIL. A representative cross section extracted from 25<sup>th</sup> year mining plan is shown in (Figure x, Annexure I).
- Alternative - modified mining plan sterilizes large quantity of coal to be mine by open cast mining method. The new mining plan extracts only ~ 411.66 Mt of coal for a period of 26 years as against the total mineable coal reserve of 843.69 Mt for a period of 52 years because no re-handling of external dump is proposed. This aspect may be looked into with detailed mine planning with an objective to further optimize the mining sequence.
- As per the alternative - modified mining plan, open cast mining ceases in the 26<sup>th</sup> year (becomes bound by the external dump). In case this alternative mining plan of CMPDIL is adopted, NTPC should explore possibilities of High Wall Mining on the final high wall faces of the open cast mine to maximize the extraction of coal.
- IIT-ISM suggests flushing of internal and external dump for the reclamation of final void of the east pit to develop a land form for a better land use and minimize environmental impacts of mining. While doing so IIT-ISM proposes to take into confidence the community around for sustainable land usage post mining.
- Both the AMP and CMPDIL report suggest application of Surface Miners in the windrowing options to mine ~40%, i.e., ~7.2 Mt of coal. IIT-ISM is of the view that as the mine has the provisions of crushing and conveying the entire coal produced from the Tallaipalli coal mine, and there is no requirement of selective coal mining, a cost benefit analysis of surface miner equipment system (Surface Miner + FEL + Trucks) vis-a-vis the shovel dumper equipment system (Shovel + Truck + Blasting) should be performed.
- IIT-ISM is of the view that there is an opportunity to optimize haulage network of overburden

transport on a year-to-year basis on the basis of annual operating plan which has the potential to reduce the lead distance of overburden transport.

Annexure 1

Figure L 5<sup>th</sup> year modified mining plan of CMPDIL.

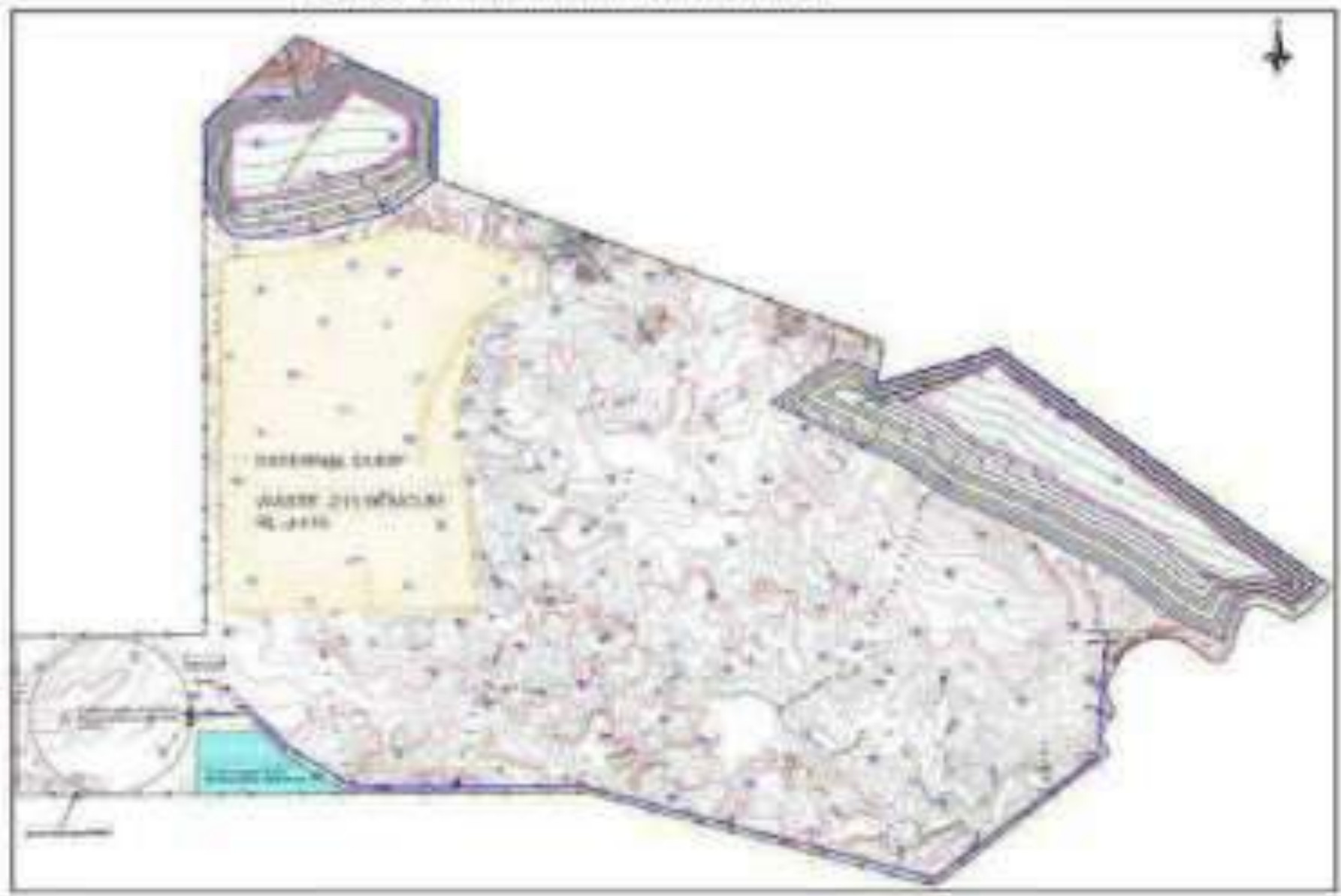


Figure 8. 10<sup>th</sup> year modified mining plan of CNPBL.

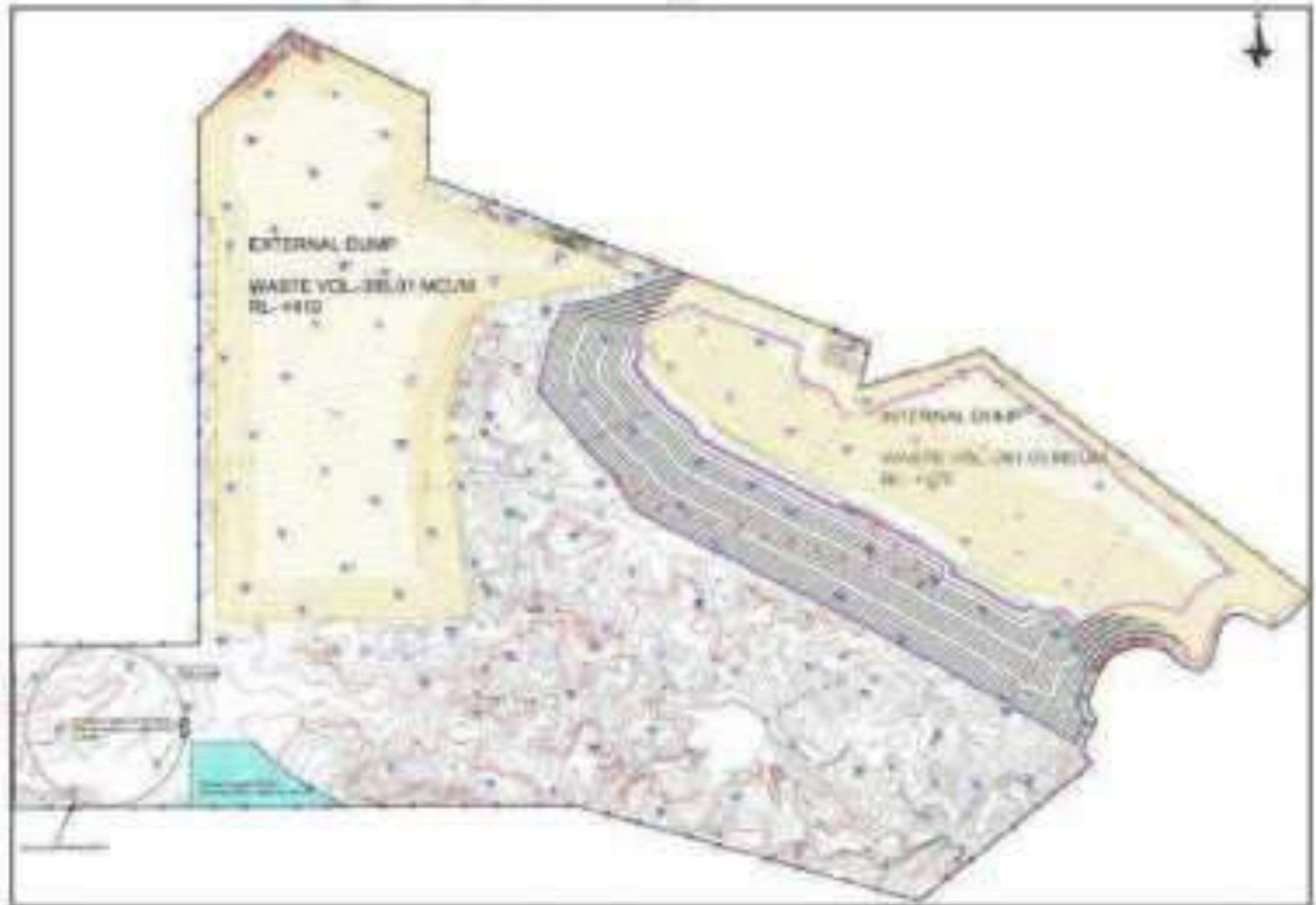




Figure 10. 15<sup>th</sup> year modified mining plan of CNPDL.

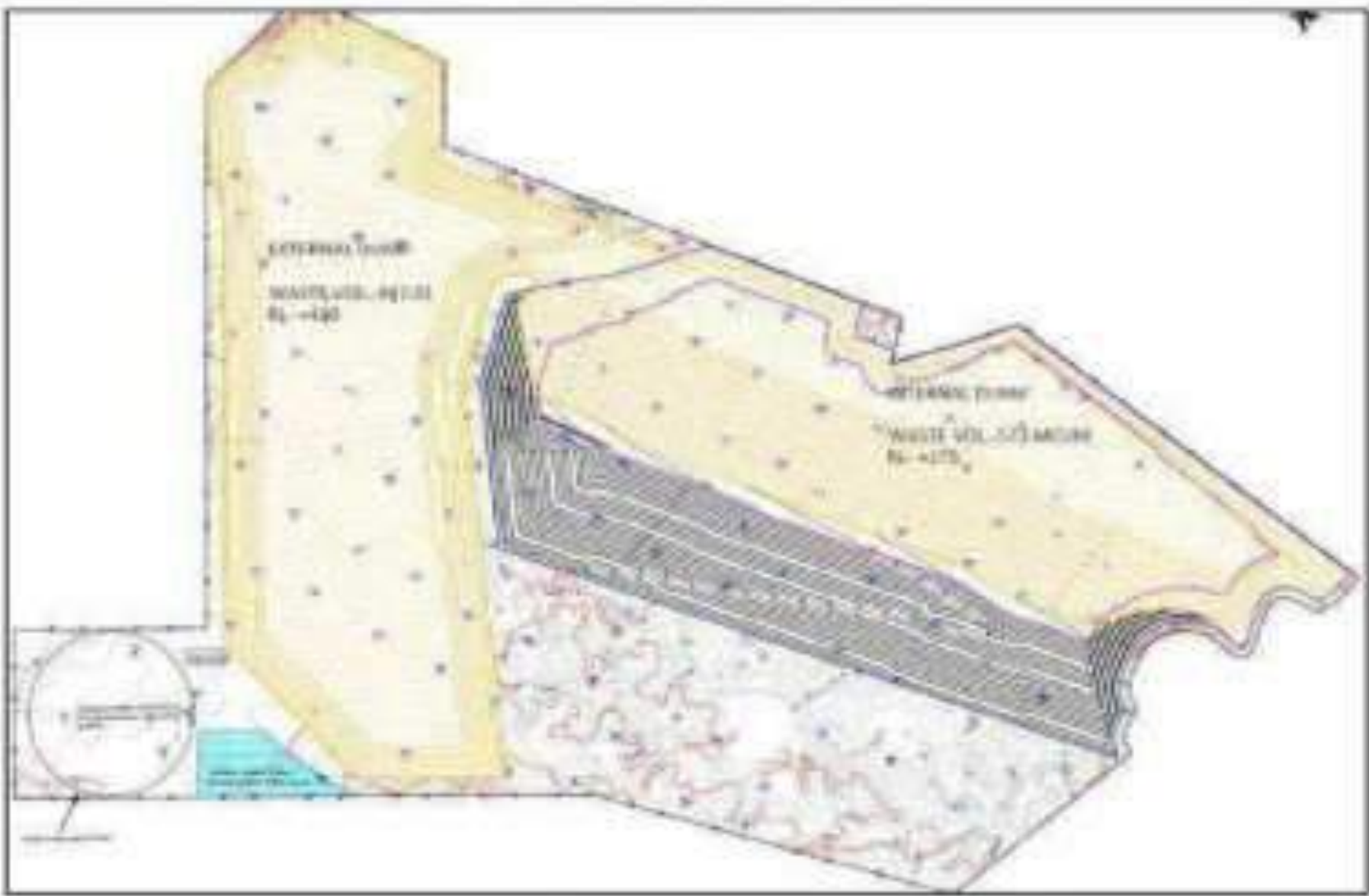


Figure 16. 20<sup>th</sup> year modified mixing plan of CMPDIL.

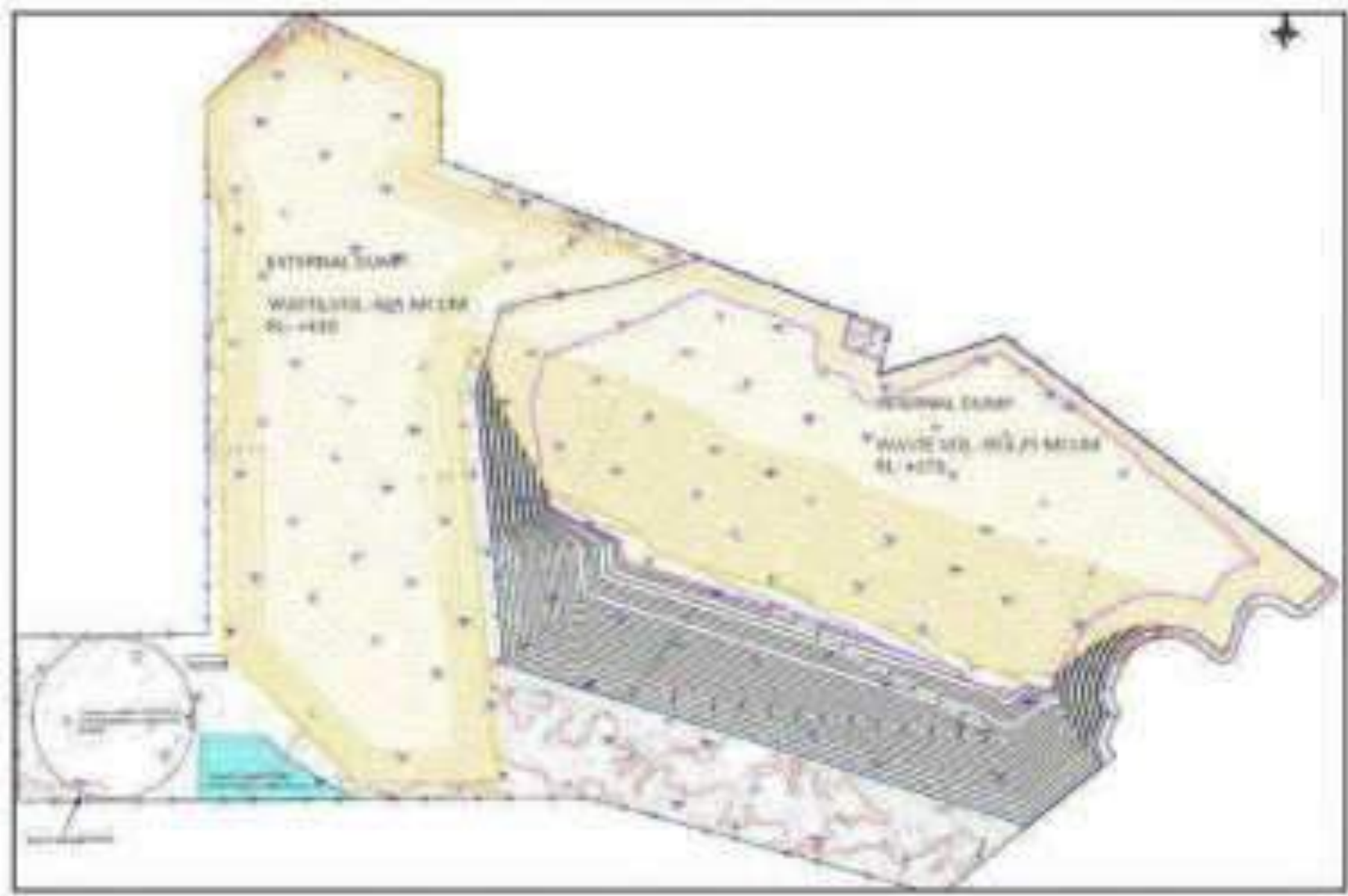


Figure 6, 25<sup>th</sup> year modified mining plan of CMPDHL

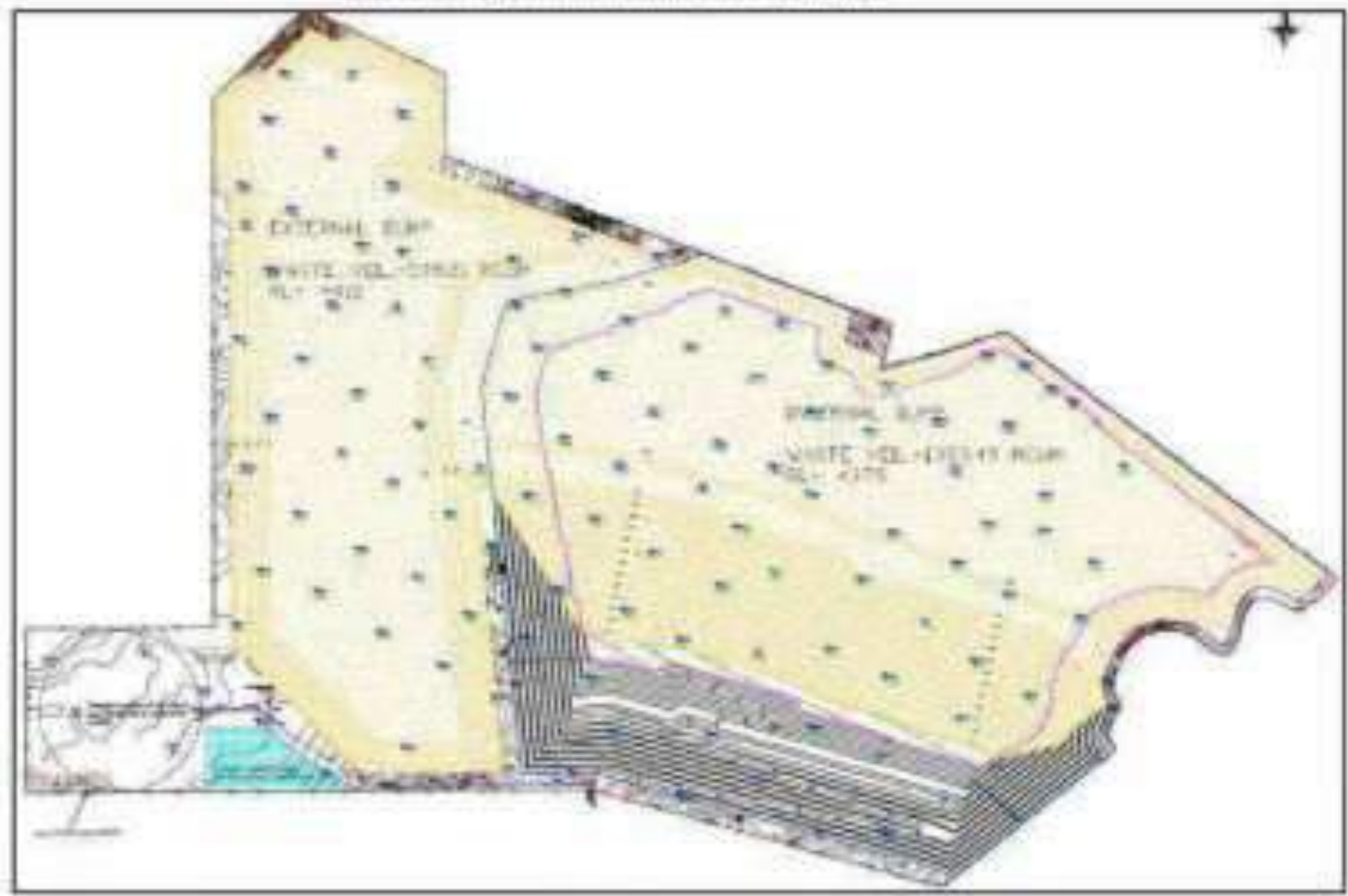
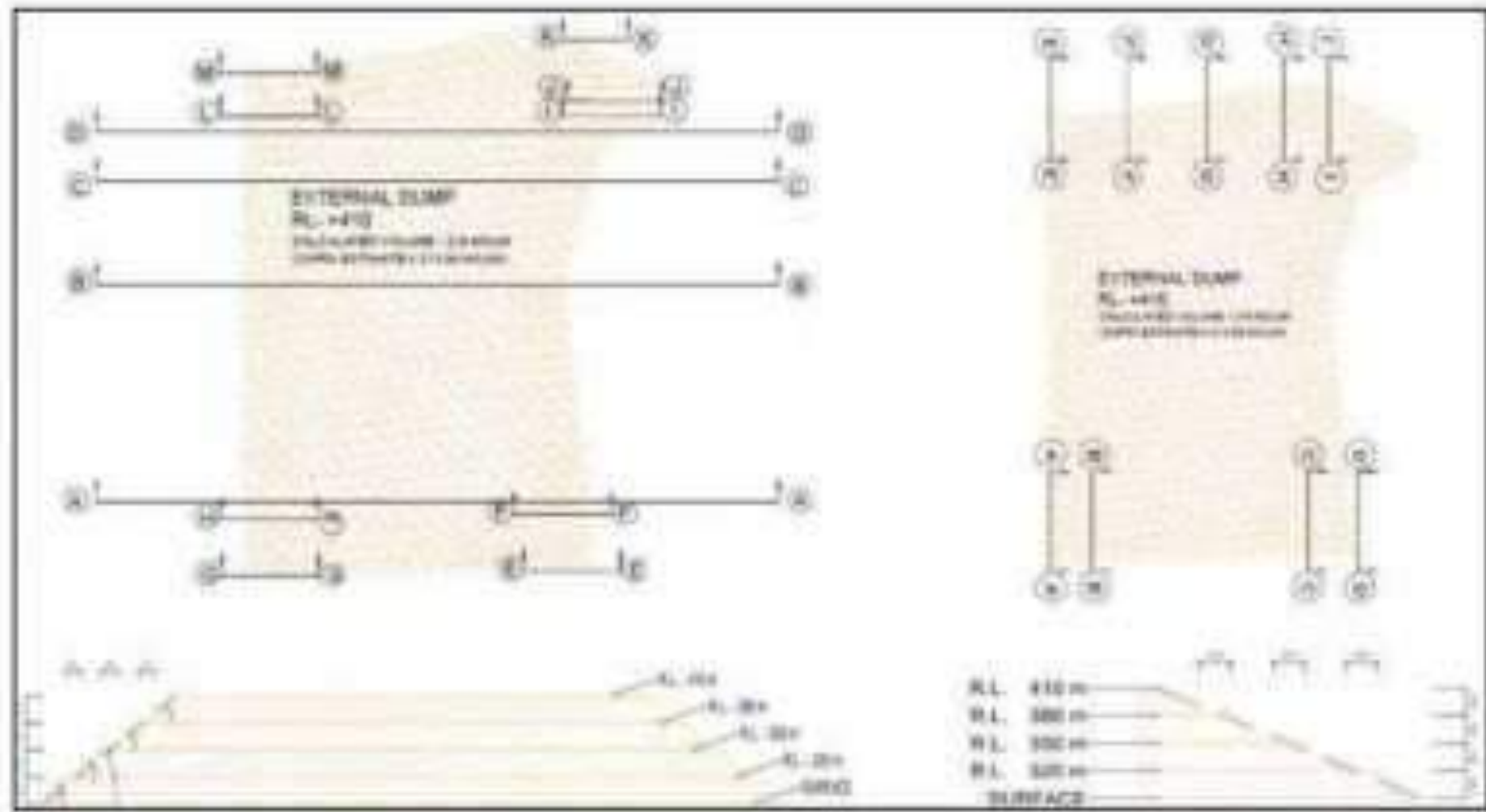
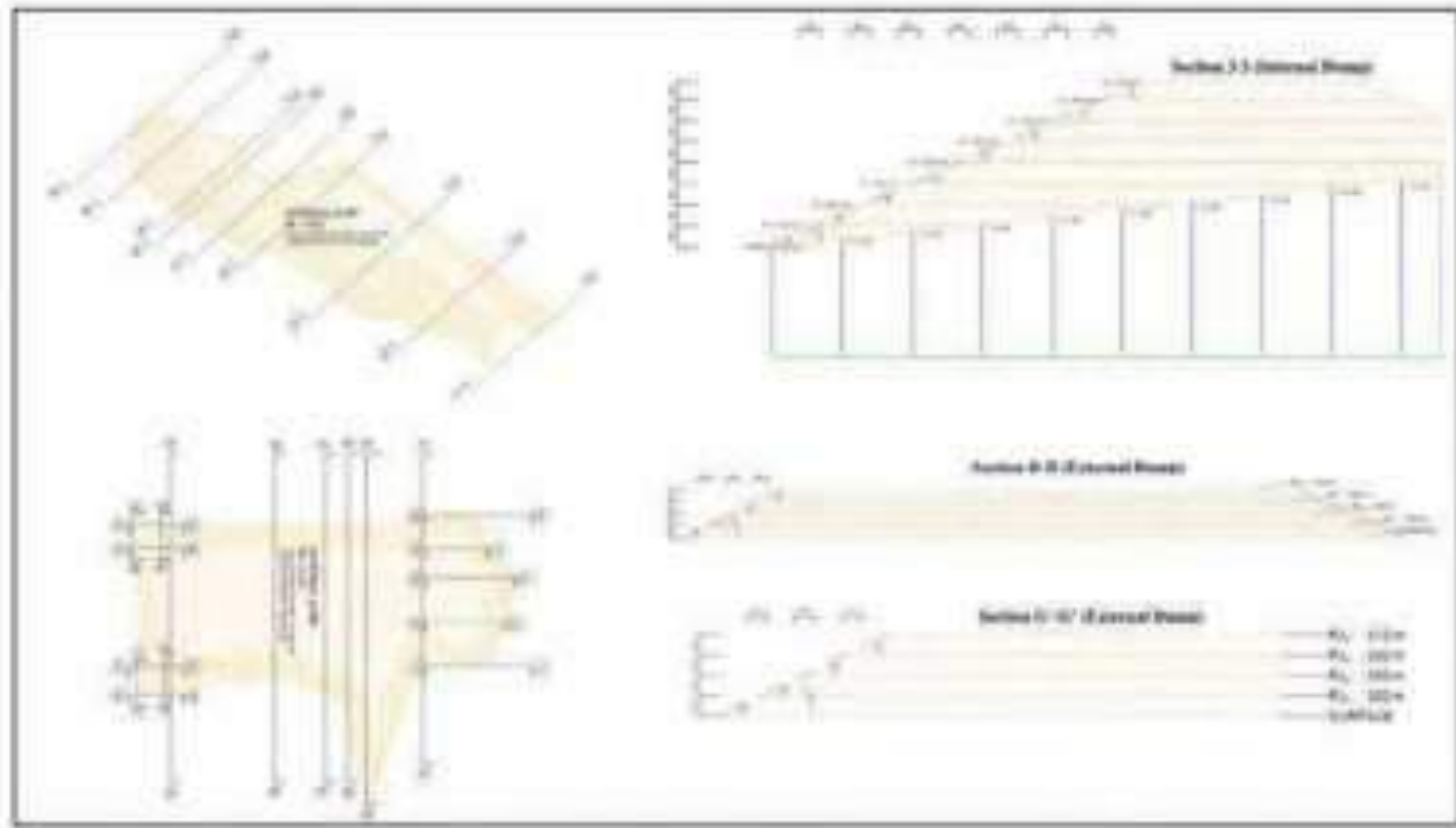


Figure vI. Estimated Dump Quantities in the 5<sup>th</sup> Year of Mining Operation



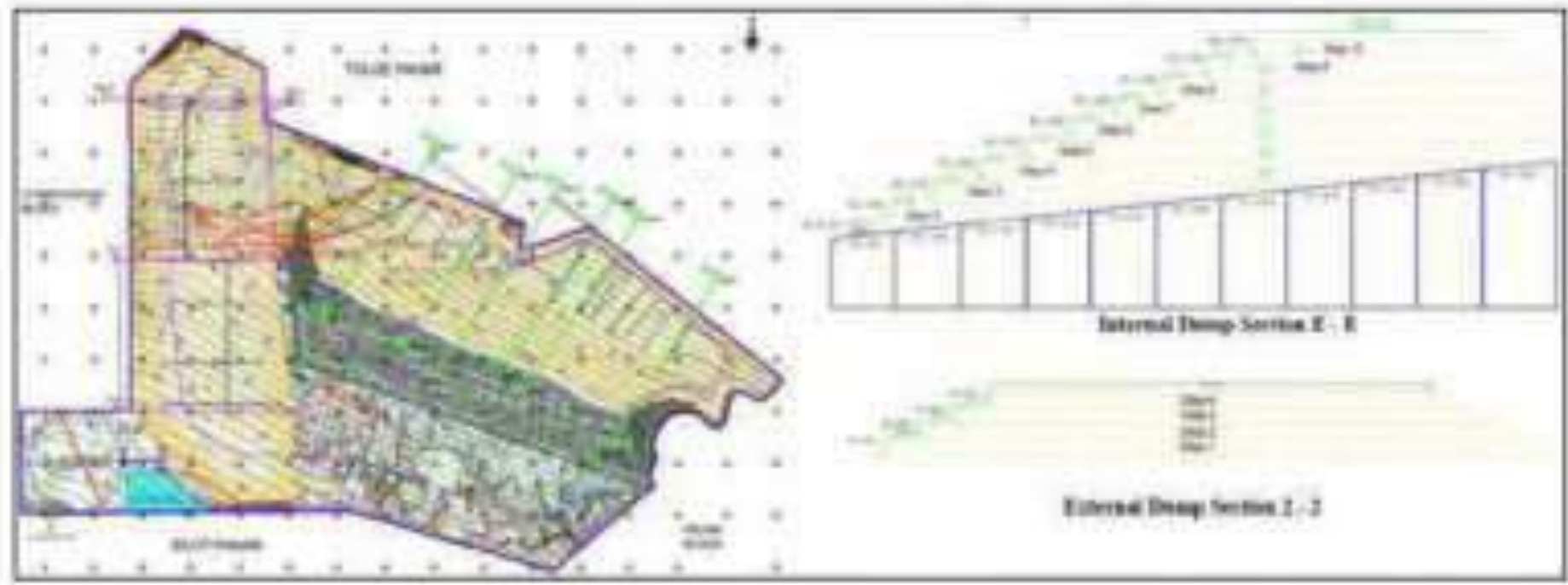
Estimated Dump Quantities 5th Year (Mean)		
External Dump	Internal Dump	Total
-216	Nil	-216

Figure vii. Estimated Dump Quantities in the 18<sup>th</sup> Year of Mining Operation.



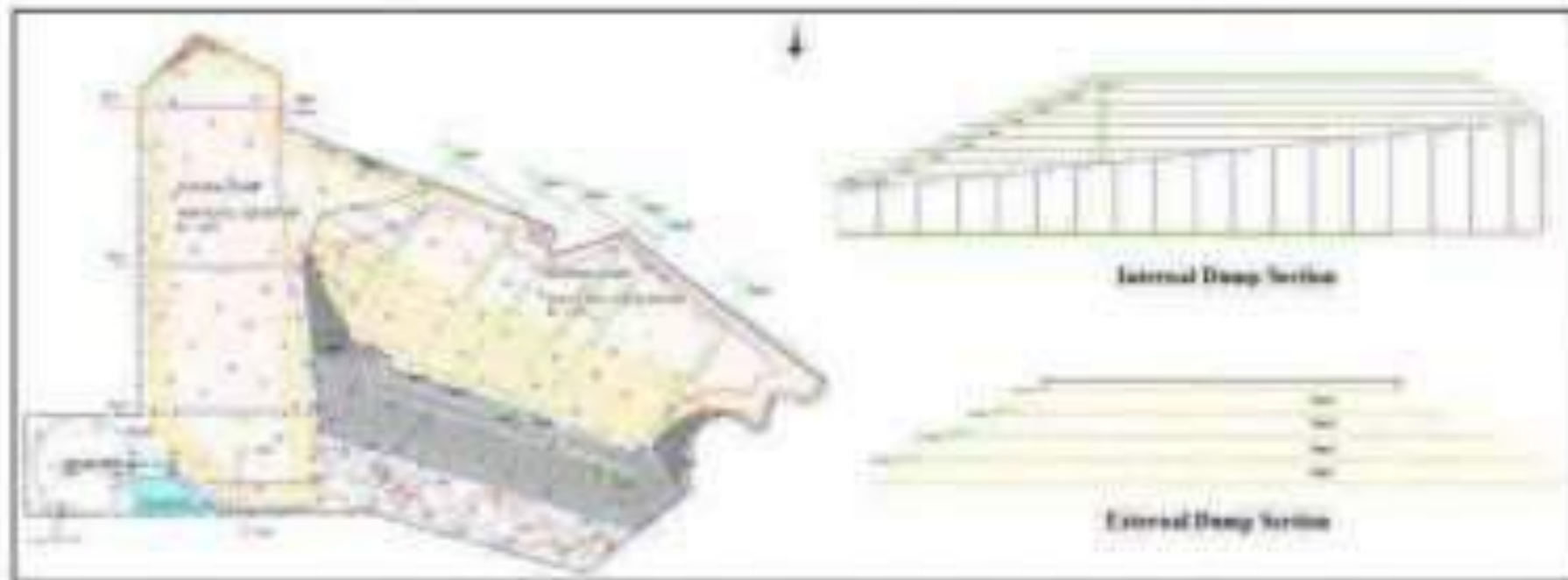
Estimated Dump Quantities of 18th Year (Mt/ann)			
External Dump	Internal Dump		Total
~370	East Pit	West Pit	~730
	~290	~30	

Figure viii. Estimated Dump Quantities in the 15<sup>th</sup> Year of Mining Operation.



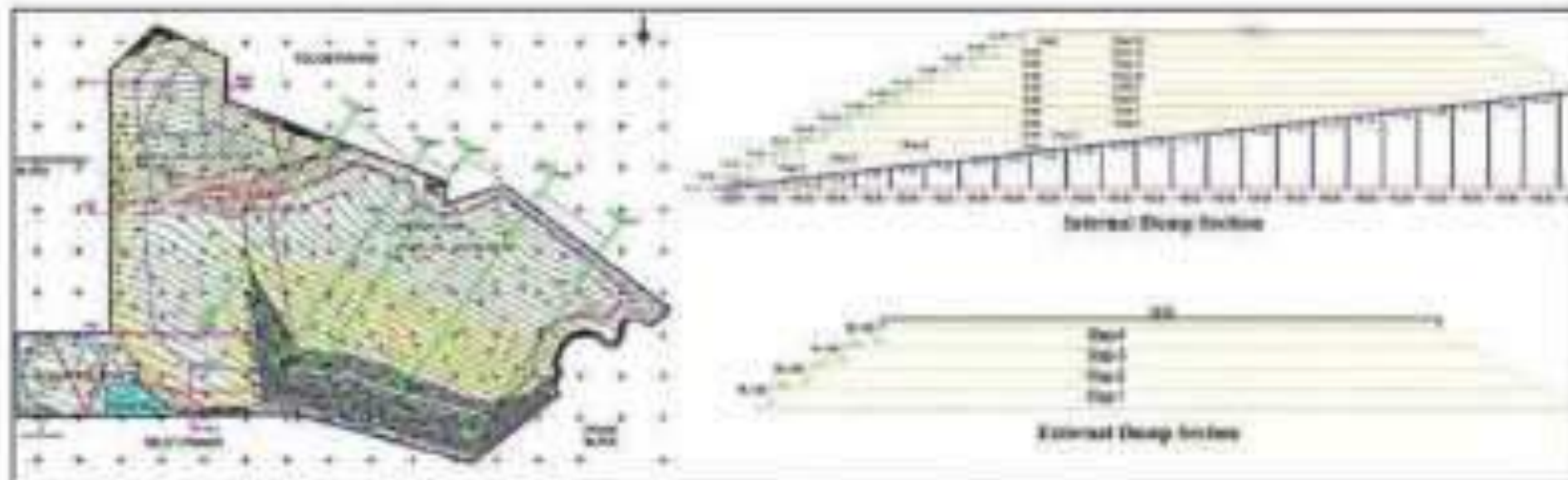
Estimated Dump Quantities of 15 <sup>th</sup> Year (Mcum)			
External Dump	Internal Dump		Total
-471	East Pit	West Pit	-1081
	-540	-30	

Figure 15. Estimated Dump Quantities in the 20<sup>th</sup> Year of Mining Operation.



Estimated Dump Quantities of 20 <sup>th</sup> Year (Mcu)			
External Dump	Internal Dump		Total
-520	East Pit	West Pit	-1450
	-800	-70	

Figure 3. Estimated Dump Quantities in the 25<sup>th</sup> Year of Mining Operation.



Estimated Dump Quantities of 25th Year (Metric)			
External Dump	Internal Dump		Total
	East Pit	West Pit	
-490	-1440	-70	-2000





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NTPC Limited

ताम्रद्वारा / Talspathi

Reference: 1071/TLCMP/Min/2021/P-168/192

Dated: 18.01.2022

M/s. Thivani Earthmovers Private Limited  
C/o. NTPC, Post: Raikara  
Taluk: Gharghoda, Dist: Raigarh  
Chhattisgarh, Pincode-496111

Kind Attn: Sh K Ramkumar, Sr. GM(Operations)

Subject: Reply to TEMPL's project proposal letter dated 16.12.2021

**References:**

- I. LOA ref. no. CS-7014-602(R)-S-CS-LOA-6960 dated 26.03.2020
- II. Project Agreement ref. no CS-7014-602(R)-S-CS-1 OA-6960 dated 23.03.2020
- III. TEMPL's recindment Notice ref. no. TEMPL/TL/Contracts/2021-22/08 dated 04.05.2021
- IV. Commercial CA4-Suit dated 04.05.2021 filed by TEMPL before Hon'ble Delhi High Court;
- V. NTPC's letter dated 06.06.2021
- VI. Hon'ble Delhi High Court's hearings held on 06.06.2021, 10.06.2021 & 27.07.2021 & 21.10.2021 and corresponding High Court Orders issued
- VII. Discussions held between NTPC and TEMPL on 14.05.2021 & 21.05.2021
- VIII. NTPC's LOA ref. no. NTPC/CM-HQ/TLCMP/2021/02 dated 01.06.2021 placed on CMPDI on behalf of both M/s. NTPC and M/s. TEMPL for review of Mining plan for TLCMP as Independent Consultant.
- IX. CMPDI's Technical Feasibility Note ref. no. 05/Q-381/E-331185(R) dated 07.06.2021
- X. Discussion held between NTPC and TEMPL on 09.10.2021 based on CMPDI's Technical Feasibility Note
- XI. TEMPL's letter ref. no. TEMPL/TL/Contracts/2021-22/08 dated 16.10.2021.
- XII. NTPC's letter ref. no: 1071/TLCMP/Min/2021/P-168/189 dated 20.10.2021
- XIII. Discussion held between NTPC and TEMPL on 27.10.2021 & MOM dated 27.10.2021
- XIV. TEMPL's letter ref. no. TEMPL/TL/Contracts/2021-22/08 dated 12.11.2021.

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एनटीपीसी लिमिटेड, टांसपाथी, रायचूर, छत्तीसगढ़ राज्य, भारत।  
NTPC Limited, Talspathi, Raigarh, Chhattisgarh State, India.  
विशेष नोट: इस दस्तावेज़ में उल्लिखित जानकारी केवल सूचना के लिए है।  
Special Note: The information mentioned in this document is for information only.  
एनटीपीसी लिमिटेड, टांसपाथी, रायचूर, छत्तीसगढ़ राज्य, भारत।  
NTPC Limited, Talspathi, Raigarh, Chhattisgarh State, India.



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- XV. NTPC's letter ref. no.1071/TL/CM/Min/2021F-168/191 dated 26.11.2021.  
 XVI. Discussion held between NTPC and TEMPL on 30.11.2021  
 XVII. TEMPL's Project Proposal ref. No. TEMPL/TL/Contracts/2021-22/15 dated 10.12.2021 based on CMPDL Report.

Dear Sir,

1. This has reference to abovementioned correspondences & discussions held between NTPC and TEMPL, Delhi High Court's Order dated 10.05.2021 and CMPDL's Technical Feasibility Note ref. no. DS/O-281/E-031165(R) dated 07.09.2021.
2. Without prejudice to our rights available under the Contract, for taking forward the amicable settlement discussions in-line with Delhi High Court's order dated 10.05.2021, NTPC vide letter dated 26.11.2021 requested TEMPL to submit their proposal along with acceptance, if any, of CMPDL Report, which shall be subject to approval of mining plan and other statutory clearances.
3. Despite showing initial reluctance, you have submitted a tentative non-binding & without prejudice commercial proposal on 10.12.2021. As per the proposal, instead of taking care of the core issues highlighted by CMPDL, which have any commercial overtones, you have submitted revised mining fee (which is also tentative) in the range of Rs. 1450 to 1650 per tonne of Coal delivered at rail loading point against the awarded mining fee of Rs.776.56 per tonne vide LOA dated 26.06.2020. Further, you have also suggested working of Vast pit for initial two to three years whilst the Mine Plan gets made & approved as a separate Adhoc arrangement.
4. At the outset we would say that your proposal is not a step towards making the awarded contract workable but an attempt to somehow wriggle out of the same. Be that as it may, to keep the record straight, NTPC is giving its observations on your Project proposal dated 10.12.2021 which is as under:
  - i. NTPC floated tenders for selection of MDO for Talaspali coal mine, twice, first in 2015 and the second in 2019. In both tenders, Geological Report and Approved Mining Plan, in totality with all annexures, plans etc. were shared by NTPC as part of the Bidding documents, for prospective bidders to plan accordingly and to bid for award of the contract.

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- f. Needless to mention that TEMPL participated in the aforesaid tendering processes held twice, as referred in Para 4(f) above. Therefore, TEMPL was in possession of this 'Approved Mining Plan' since the year 2010 and had ample time to work out on the volumes of waste, area required to handle the waste etc. and to reassure yourself with the technical details of the block furnished in the Approved Mining Plan.
- g. TEMPL never raised any queries during Pre-bid conferences or Pre-Bid queries in both the occasions, or at any stage during tendering processes regarding apprehensions w.r.t. Approved Mining Plan. Also it is to be mentioned that, Clause of 3.2 (b) of the Project agreement indicates the following:

Quote

"The Mine Operator hereby acknowledges and agrees that it has been allowed access to the Site, has had sufficient time to thoroughly review the RFP Document and has carried out its own inspection of the Site and its surroundings before the submission of Proposal and has made its own assessment as to the physical conditions, geology and geotechnical characteristics of the Site and its surroundings (including water, atmospheric and sub-surface conditions or characteristics)."

Unquote

- iv. As per Clause 2 of Schedule 2 of Project Agreement and ITB Clause 5.2, the Mine Operator shall be responsible for getting all other approvals/clearances necessitated by change of Mining Plan during the operation stage, from the Statutory Authorities, if required without any cost implications to NTPC. All the costs shall be borne by the Mine Operator.
- v. It is further to be noted that as per provisions of tender documents during Pre-award stage, Mining Fee quoted by MDO was for entire scope of work in accordance with provisions of Bidding documents inter-alia ITB, Project Agreement, Approved Mining Plan, etc. Accordingly, LDA for the subject Contract was issued to TEMPL based on their Nil Deviation Bid accepting all terms & conditions of tender documents. Therefore, it may be considered that MDO had already considered the risk in their Bid.



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associated under the Contract in their Mining Fee after assessing technical data, geology and geotechnical characteristics of the Site.

- v. We would also like to place on record, that there is no change of acquisition of new additional data. Even during the infill drilling being carried out by TEMPL in East and West Pit of Talspali coal block, on comparison of the core logs recovered by TEMPL with the litho logs available in the GRL, no deviations were observed.
- vi. Subsequently, after award, TEMPL prepared the Draft Operational Plan and Project Design Memorandum (PDM) in variance to the Approved Mining Plan and the schemes provided in the project agreement and cited the issues like Slipping rate, non-availability of OB dump space, etc. To which, NTPC assured TEMPL that the same shall be addressed and dealt as per the provisions of project agreement.
- vii. In this regard, a series of meetings were held from December 2018 to April 2021, and both parties were working for feasible solution for early start of mining operations and sustainable coal production within the ambit of Project Agreement and accordingly, in the last meeting held on 30.04.2021, TEMPL assured to come back with the feasible solution on 03.05.2021.
- viii. TEMPL vide letter dated 04.05.2021 purportedly rescinded the project agreement ab-initio and also filed Commercial civil Suit before High Court of Delhi on 04.05.2021.
- ix. NTPC without prejudice to its rights, in the interest of Nation and for both the parties, on 08.05.2021 offered an opportunity to TEMPL for withdrawal of notice for rescindment and come forward for amicable resolution of the issue within the framework of the contract. The matter also came up for hearing on 10.05.2021, wherein both the parties agreed for initiating amicable settlement discussion without prejudice to rights of each party, and further the rescindment notice of TEMPL has been kept under abeyance during the amicable settlement discussion.
- x. Amicable settlement discussions were held between NTPC and TEMPL on 14.05.2021 & 21.05.2021. During the meetings, NTPC asked Mr TEMPL to submit their workings/Modals/levels to study jointly in detail for



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feasible solution. However, M/s TEMPL repeatedly insisted for consulting the third party including CMPDIL for resolution of the issues.

- xi. With an aim to clear the stalemate and to start mining operations without any further delay, vide NTPC's LOA ref. no. NTPC/CM-HQ/TLCMP/2021/02 dated 01.08.2021, CMPDIL was appointed as Independent Consultant for review of Mining plan for TLCMP on behalf of both M/s. NTPC and M/s. TEMPL.
- xii. CMPDIL submitted its Technical Feasibility Note on 07.09.2021 CMPDIL relied upon MNEX Model, Geological Report, Approved Mining Plan and other Stage Plans/data of Talaipali Coal block, provided by NTPC for preparation of Technical Feasibility Note.
- xiii. CMPDIL in it's Disclaimer to Technical Feasibility Note, submitted as under:

*"For the preparation of this Report, the MNEX Model, Approved Mining Plan and other Stage Plans/data for Talaipali Coal block as provided by NTPC Ltd has been relied upon by CMPDIL. CMPDIL has not verified data provided by NTPC Ltd for accuracy and does not warrant the accuracy of, or make any other warranties or representations regarding this Report if there is any discrepancy in the data provided by NTPC Ltd. Further, this Technical review is a broad assessment and is subject to refinement in the detailed planning. We have done our best to ensure that the alternate feasible option for Opencast Mining of Talaipali coal block provided to the client is the most feasible option in the existing circumstances. We do not claim that this is the only and/or best option for the purpose.*

*No assurance is given that a position contrary/different to the opinions expressed herein will not be asserted by any person, entity, authority and/or sustained by an appellate authority or a court of law."*

- xi. CMPDIL after review of approved Mining Plan concluded as below:
  - Mining Plan does not seem to be practical and workable.
  - Mineable coal and mining life given in mining plan is not feasible.
  - Dump management as suggested in mining plan is not feasible.
  - There is calculation error in stripping ratio as well.

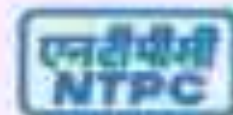


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The above observations of CMPDL were for the whole approved mining plan stretching to 52 years and these observations are not where applicable to the mining operations to be carried for in the currency of the subject contract which is for 25 years. NTPC is of opinion that, the above observation must be limited to the project for life of 52 years and not applicable on the present contract of 25 years. CMPDL has nowhere mentioned that the existing Mine Plan is not workable for 25 years which is the duration of contract. Needless to mention that the Project Agreement itself provides for the provision for amendment/change of Mine Plan and surely for the period after 25 years, there shall be a Mine Plan as per the requirement and position available at site at the relevant time.

Further, NTPC would like to place it on record that CMPDL, for the estimation and computation error of Stopping ratio which is normally expected in Approved Mining plan, termed it as calculation error.

- xvi. Further, as per the scope of work, an alternate feasible solution to start operations in both East and West pits of Talaspali is given by CMPDL. This feasible solution has been worked out by CMPDL after considering various mining options, which can be considered as conceptual mining plan. This feasible solution considers changes in mine parameters such as slope, depth, lead, etc. OB dump Management etc. in comparison to approved Mining Plan.
- xvii. As per the feasible solution of CMPDL, West Pit will operate only for the first 5 years. The mineable reserves are 411.66 MT with an average strip ratio of 4.62 Cum/Tonne for mine life of 26 years according to the proposed feasible solution by CMPDL.
- xviii. The dumping location and schedule of the overburden to be handled in the feasible solution suggested by CMPDL, is different from the approved Mining Plan. These major changes as part of feasible solution were suggested by CMPDL to maximize the mineable reserves of the coal block. Further, height of external dump is 120m from OGL and internal dump is 90 m from OGL. Due to these suggested changes, the lead for overburden removal has been increased from 2 - 3 Km to 3.5 - 7 Km whereas for coal extraction the lead has been increased from 2 -



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3 Km to 2.5 to 5 Km. Apart from this, CMPDL also recommended changes in mine infrastructure like DHP.

- ix. Further, after receipt of the above "Technical feasibility Note" from CMPDL, meeting were held between NTPC and TEMPL on 09.10.2021, 27.10.2021 and 30.11.2021.
- xi. Without prejudice to rights available under the Contract, during the meeting held between NTPC and TEMPL on 27.10.2021, for proceeding in the way of amicable settlement, following were discussed:
- NTPC and TEMPL agreed that CMPDL's Technical Solution Report is a "Conceptual Mine Plan" at this stage, which needs further work to shape it up with a fair amount of detailing.
  - Based on the CMPDL report, NTPC asked TEMPL to submit a revised proposal for proceeding further. TEMPL indicated that the commercial offer would be a ball park figure given the CMPDL work is conceptual at this stage and as work progresses with detailing the fee number would invariably change. TEMPL to confirm the dates of its proposal submission in the next 2-3 days.
  - TEMPL and NTPC agreed that establishing a process forward is important and NTPC would consider that subsequent to TEMPL's final proposal submission and meetings thereafter.
- xii. Initially, TEMPL vide letter dated 12.11.2021 refused to give the project proposal and further raised following issues:
- Given the findings in the CMPDL Report, it may not be advisable and feasible to progress till a draft mining plan is prepared and submitted to the competent authority for approval.
  - A fresh mining plan would also necessarily entail charges/amendments to other clearances including but not limited to the environmental clearance. Would there be any aspects or changes to the EC and other statutory clearances/ approvals.
  - Whilst we both progress on further work including fee estimation, Thriant would request for NTPC indemnifying us as the MDO against losses, damages, claims etc arising from this process and the above noted steps, and that the settlement is legally valid and tenable. This is relevant and important to ensure that the continuity of the project is not imperilled in the future through legal



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challenges to any settlement arrived at between NTPC and TEMPL.

xiii. In response, NTPC vide letter dated 26.11.2021 addressed above concerns as below:

- Submission of tentative proposal based on the CMPDIL note will only pave way for progress in amicable settlement and start of mining operations, rather than waiting for revision of mining plan. However, the proposal can be firmed up after revision of mining plan. Hence, your proposal can be substantiated by the present CMPDIL report.
- Regarding changes in the statutory clearances or approvals emerging due to change in mining plan shall be dealt as per the provisions of project agreement.
- Regarding your concern No. 3 pertaining to claim for losses and damages. Your plea for any claims of indemnification towards losses, damages, claims etc. that may arise due to this process as stated in your letter dated 12.11.2021 is also not acceptable to NTPC and the same is denied.

Further on acceptance of CMPDIL report, it was replied that, nothing herein should be construed as an admission of CMPDIL Report dated 07.09.2021 on the subject matter and the assertions and statements made by you in this letter or any other letters and discussions in the matter.

5. From the above paragraphs, it is well established that, obligation to bid for the work with open eyes lies with TEMPL, especially when it was bidding in 2015 and 2019. But in any case, to keep the contract continued as it is a work of public importance, NTPC entertained the comments of TEMPL regarding strip ratio, etc and also agreed to send the matter to CMPDIL jointly for comments, but the same does not mean that we have accepted that the Mine Plan is flawed or unworkable.

6. Now coming to CMPDIL's Technical Feasibility Note for Talepali Coal Block, without prejudice NTPC has following to observe:

- CMPDIL's Technical Feasibility report is based on the data/inputs provided by NTPC i.e., Geological report, MINEX Model, Stage Plans/data etc. which were also used for preparation of approved





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Mining Plan. No new technical documents / inputs have been furnished by NTPC to CMPDL for preparation of Technical Feasibility Report and same is indicated in Disclaimer to Technical Feasibility Note of CMPDL. Further, as mentioned in disclaimer, the Technical review by CMPDL is a broad assessment and is subject to refinement in the detailed planning. Accordingly, it may be prudent to consider that the Technical Feasibility Report is a conceptual Mining Plan based on certain assumptions like Geological losses & Mining losses, angle of slope for Dumps (external & internal both) for working Batches (Coal & Oil) etc. which may need further detailing & optimization during preparation of Mining Plan. It is also indicated in CMPDL report's Disclaimer that no assurance is given that a position contrary/different to the opinions expressed herein will not be asserted by any person, entity, authority and/or sustained by an appellate authority or a court of law.

- Further, it is pertinent to mention that M/s. TEMPL in its recruitment Notice has mentioned studies of three different agencies on Mining Plan and all three agencies have worked out different Stripping Ratio. Whereas M/s. CMPDL has also worked out a Stripping Ratio which is also different from studies of all three agencies of TEMPL. A brief comparison of these studies is placed below:

Sl. No.	Agency Name	Stripping ratio	Agency of
1	M/s. ACMI - Approved Mining Plan	4.30	M/s. NTPC
2	M/s. TEMPL	4.82	M/s. TEMPL
3	M/s. ThyssenKrupp	5.12	M/s. TEMPL
4	M/s. BPC	4.36	M/s. TEMPL
5	M/s. M&M&C	5.17	M/s. TEMPL
6	M/s. CMPDL	4.30*	M/s. TEMPL & M/s. NTPC

\* for alternative feasible solution



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- All the above studies were based on the same set of Data/inputs. During any of the above studies conducted by respective agencies, no further Geological exploration or borehole drilling has been done and no new data has been generated.
  - In view of above, it may be considered that CMPDIL's Technical Feasibility report is preliminary report & not a sacrosanct one.
  - Moreover, the acceptance of CMPDIL Technical Feasibility report by NTPC as indicated in MOM dated 27.10.2021, was for the intention of proceeding further in the way of amicable settlement without prejudice to rights available under the Contract. It shall not be construed as overshadowing the already approved mining plan provided as a part of Contract unless it is revised and approved by MoC.
7. In view of above, NTPC is of opinion that proposal submitted by TENPL is based on CMPDIL's conceptual Mining Plan, which is preliminary report & not a sacrosanct one. Hence, any techno-commercial negotiation based on CMPDIL's preliminary Report after award of Contract will be pre-mature at this stage and also not within the frame work of the Contract.
8. Regarding following issues/extra works which may arise due to Technical Feasibility Note of CMPDIL or any other works which may arise after the revision of mining plan, NTPC assures as below:
- i. **Stripping Ratio:** As per Clause 14 of Project Agreement, Mine Operator shall in consultation with and subject to final approval of the Owner, finalise an Approved Annual Production Plan (AAPP) including details of Annual Contracted Quantity, coal removal sequencing, average Strip Ratio, overburden and iron-burden removal guard/scafor etc. for the following Operating Year. Such Rolling Annual Production Plans shall be consistent with the approved Mining Plan for the relevant period. For any variation in stripping ratio for nth Operating Year as specified in AAPP w.r.t. average Strip Ratio indicated under the Contract, Mining Fee shall be adjusted as per the formulae indicated under Schedule 11 of Project Agreement.

Further As per Clause 2 of Schedule 2 of Project Agreement and ITB Clause E.3, the Mine Operator shall be responsible for getting all other



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approvals/clearances necessitated by change of Mining Plan during the operation stage, from the Statutory Authorities, if required without any cost implications to NTPC. All the costs shall be borne by the Mine Operator.

Also, as per Clause 7.1.1 of Project Agreement,

For any:

(a) change in law; and/or  
 (b) consent, approval or license, available or obtained for the Project, being issued or changed (which shall deem to include any change in interpretation or application) by any Authority after seven (7) days prior to the scheduled date of submission of Project Proposal, otherwise than for default of the Mine Operator,

the compliance of which affects the costs, expenses and obligation of either Party, the Mining Fee and the obligations of the affected Party shall be reasonably adjusted to the extent that the Party has been affected in the performance of any of its obligations under the terms of this Agreement to be supported by documentary evidence, unless and otherwise specifically excluded or separately provided elsewhere in the Project Agreement.

- i. **Changes in Lease, Lift & other Mining Parameters:** Shall be dealt as per scope and provisions of Project Agreement.
  - ii. **Changes in MEMW configuration:** NTPC shall deal such changes as per the Provisions of Project Agreement.
  - iii. **Impacts due to any revisions in Statutory Clearance and approvals:** Same shall be dealt as per the provisions of Project Agreement i.e., clause 7.1.1 of Project Agreement.
  - iv. **Change in CMP scheme:** Shall be dealt as per scope and provisions of Project Agreement.
9. As per the feasibility solution suggested in Technical Feasibility Note of CMPDCL, Talaspali coal mine is workable for the currency of the contract and for extraction contracted quantity of coal with the above identified preliminary variations. NTPC in the above paragraphs has already assured to address the above identified preliminary variations within the ambit of project agreement.



# THRIVENI EARTHMOVERS PRIVATE LIMITED

A World Class Mine Developer Operator

CIN: U80201TT21889PTC0098178



Ref: TEMPL/TL/Contracts/2021-22/12  
January 28, 2022

Without Prejudice  
Commercial in Confidence

To,  
The General Manager  
Head of the Project  
NTPC Limited,  
Lakshya Road, PO: Gharghoda,  
Ragam 496111  
Chhattisgarh

Sub: NTPC letter dated 18.01.2022 - Reply  
Ref: Your letter no:1071/TLCMP/SAV2021/F-186/182 dated 18.01.2022

Dear Sir,

This is in reference to your letter dated 18.01.2022, which came as a surprise to us, given our indicative commercial proposal had been submitted to you on 10.12.2021 (as requested by you) and we had not heard further from you or engaged on the same after 10.12.2021.

While we reserve our rights to respond to your letter dated 18.01.2022 and adopt appropriate remedies under law and contract, by way of this letter we, once again, encourage you to kindly review the CMPDI final report dated 22.09.2021, and the ensuing consequences, which are not so minor as suggested by you. CMPDI's scrutiny and rejection of the Approved Mine Plan makes the project unwarrantable on the present technical parameters, and will lead to complete disruption of the mining operations after Year 5. The CMPDI report states the same in unambiguous terms.

Our small offer dated 10.12.2021, as requested by you by your letter dated 28.11.2021, is based on CMPDI's alternative and conceptual proposal. The said offer, based on completely new technical parameters, should not be conflated with the Approved Mining Plan, since as pointed by CMPDI and also accepted by you, the new technical parameters will require the preparation and approval of a fresh Mining Plan and (most importantly) Environmental Clearance. The present Environmental Clearance dated 02.01.2013 (revalidated by the MOEF on 28.10.2016) is rendered redundant with the changed technical parameters proposed by CMPDI.

25

• Thriveni Office - Chhattisgarh, Lakshya Road, PO: Gharghoda, Raigarh, Chhattisgarh - 496111  
• Office - 44 - Lakshya Road, PO: Gharghoda, Raigarh, Chhattisgarh - 496111  
• Office - 44 - Lakshya Road, PO: Gharghoda, Raigarh, Chhattisgarh - 496111  
• Office - 44 - Lakshya Road, PO: Gharghoda, Raigarh, Chhattisgarh - 496111  
• Office - 44 - Lakshya Road, PO: Gharghoda, Raigarh, Chhattisgarh - 496111

# THRIVENI EARTHMOVERS PRIVATE LIMITED

A World Class Mine Developer Operator

CIN: U0221121HRFTCO00676



By means of the present letter, we once again request NTPC to engage with us in good faith and without the threat of coercive steps, and withdraw the Notice of Termination Ref No.: 1071/TLMP/Mv2021/F-158/192 dated 18.01.2023. We request you to bear in mind that CMPDI is the Central Government designated body for scrutiny and review of mining plans, and thus its report has to be considered appropriately. We further request you to bear in mind that even the Agreement contemplates a 30 day period for good faith discussions, which opportunity has not been availed of till now.

It is reiterated that the CMPDI Final Report further validated the major variations and fundamental variations from the Approved Mining Plan (the bidding document). The main headline differences are below for your ready reference:

- Mineable Reserves, and life of mine
- Quantity, Location, Dump Height, Slope of Dump
- Permanent External Dumping of Cill
- Lead Distance
- West pit dysfunctional after 3<sup>rd</sup> year
- Mining Equipment Changes
- Infrastructure Changes

We look forward to a meaningful engagement,  
Thanking you,

Yours sincerely,  
For Thriveni Earthmovers Private Limited

**Authorized Signatory**

CC

- (i) The Director (Commercial), NTPC Limited, Noida
- (ii) Additional Secretary, Government of India, Ministry of Power, New Delhi

• Regd Office: 231100C, Tagore Park, PO Sector 14B, Gurgaon, HR, India  
 122001  
 • 100% MNC owned. P.O. Sector 14B, Gurgaon, HR, India  
 • 107 22115, Udyog-Vihar, Faridkot, Punjab - 151001 (I)  
 • 107 22115, Udyog-Vihar, Faridkot, Punjab - 151001 (II)  
 • 107 22115, Udyog-Vihar, Faridkot, Punjab - 151001 (III)





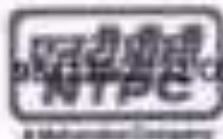
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Dear Sir,

1. This has reference to abovementioned correspondence & discussions held between NTPC and TEMPL. Delhi High Court's Order dated 10.05.2021 and CMPDIL's Technical Feasibility Note ref. no. DEO-361 E-201185(R) dated 07.08.2021, TEMPL's Project Proposal dated 10.12.2021, NTPC's letter dated 18.01.2022 and TEMPL's letter dated 28.01.2022, 12.02.2022 & 05.03.2022.
2. Before proceeding to reply against the TEMPL's letters dated 28.01.2022, 12.02.2022 & 05.03.2022, we like to place following points on record and we hope that this will make you clear about the status of CMPDIL Technical Feasibility Report.
  - a. CMPDIL under no statute and authority, has been vested with legal right to cancel or make null and void an Approved Mining plan. Such authority solely lies with the Ministry of Coal who is the approving Authority under the existing Statutes.
  - b. Hence, until Approving Authority grants approval for the revised mining plan proposed by Project Proposer for Talapalli coal block, the existing approved mining plan for Talapalli is very much valid.
  - c. Review of approved mining plan by CMPDIL, will be just an opinion of one of the experts out of many and to remind you, your attention is drawn towards the disclaimer contained in the Technical Feasibility Report. CMPDIL, categorically states it is one of the report and take no guarantee in saying this is the only possible solution or option.
  - d. Further due to CMPDIL report your assumption or inferring that the statutory clearances for the project accorded by various authorities have become redundant is a misrepresentation of facts. Hence no existing statutory clearances of Talapalli coal mining project have become redundant on account of CMPDIL report. In this regard, please refer MOC guidelines dated 29.05.2023.
  - e. Regarding requirement of Amendment in Environment Clearance (EC), Refer to MOEF Circular dated 14.05.2020, where no such amendment in EC is required.
3. Coming to your letters dated 28.01.2022, 12.02.2022 & 05.03.2022, NTPC as a responsible organisation has analysed the CMPDIL report in depth including its consequences and with an aim to resolve issues we accepted the report to the extent it take the project forward and express our stand to consider the CMPDIL report as a conceptual plan and not a final one. NTPC doesn't accept all other contents and trespassing conclusions made in loose language by CMPDIL with a disclaimer. Further, those comments are for life of the mine which is 52 years and in no manner affects your contract which is for 25 years and hence M/s TEMPL has no locus stand to extrapolate those conclusions on the status of the Contract awarded. Further, NTPC can demonstrate that there are optimised solution which can be designed for enhancing the mineable reserves, optimisation of stripping ratio and also the Leads.
4. Further, based on the conceptual plan of CMPDIL report, NTPC asked from your project proposal to find an Amicable Solution to the issue raised by you, whereas your project proposal was devoid of any item-wise breakup or supported by any logic in arriving the revised proposal by way of catastrophic increase in mining fees. In addition to the above, you are very







HEAD OF BUSINESS DEVELOPMENT, CMPDI HQ  
**NTPC Limited**

(A Government of India Enterprise)  
**SSC - Coal Mining(Ranchi)**

Coal Mining HQ, Gini Plaza Chulia, Opposite- Chulia Police Station  
 Ranchi  
 Jharkhand- 834001, India  
 Telephone No. : Fax No. :

**Service Purchase Order**

PAN No. : AAACN0250D  
 CIN No. : LA01012L197500000798

Purchase Order No. : 950040823-108-1074 Date : 06.05.2022 ( version : 8 )

Vendor Code: 1010568

To  
 CENTRAL MINE PLANNING & DESIGN INSTITUTE LTD.  
 GONDWANA PLACE, KANKE ROAD  
 RANCHI  
 Jharkhand  
 India - 834008  
 Tel: 06617765190  
 E-Mail: [info@cmptdi.org](mailto:info@cmptdi.org)

Subject : Consultancy Service to CMPDI, for preparation of Conceptual Mine, Mining Plan and Feasibility Report of Talasahi Coal Block.  
 NIT NO. : 99001300211081074 Dated 05.05.2022  
 Your Offer No. :  
 Your Reference :  
 Our Reference : Tender Reference Number/NTPC/SSC - Coal Mining(Ranchi)/6000230022  
 Tender ID-2022, NTPC, 83945\_1  
 LOI-ref LOI - 1074-108-9500230022 Dated: 06.05.2022

Dear Sir,

This has reference to our above mentioned NIT. Your offer and subsequent discussions. We are pleased to accept your offer issued on 05.05.2022 and confirm having awarded on you the work of Consultancy Service to CMPDI, for preparation of Conceptual Mine, Mining Plan and Feasibility Report of Talasahi Coal Block of total value INR 47,776,000.00 (Rupees FOUR CRORE SEVENTY SEVEN LAKH SEVENTY THOUSAND ONLY) mentioned in the scope of work, special terms & conditions. B/B of quantities etc.

The duration of the service period shall be from 06.05.2022 to 08.07.2022. Though the duration of contract shall remain same, the actual date of commencement of the contract shall be as per the decision of EIC, GMR/KORA (Concerned dept) shall be EIC for this work.

This service purchase order along with its annexure is being issued to you in duplicate. We request you to return the duplicate copy of this service purchase order, duly signed on each page by your authorized signatory in token of your unequivocal acknowledgment of the same within 15 days from the date of this service purchase order. If no communication is received within 15 days of receipt of Purchase Order, it will be treated that order has been accepted in entirety.

We thank you for the interest shown by you in our project and the cooperation extended to us. We expect to receive your continued cooperation in future also.

Thanking You,  
 For & on behalf of NTPC Limited

DEPARTMENTAL HEAD (CAM)

Enclosures :

*Accepted*  
*24/05/2022*



Name of Work:

(Bil of Quantity)

Consulting Service to CMPDI, for preparation of Conceptual Note, Mining Plan and Feasibility Report of Takapat Coal Block

Sl No.	Code	Description	Unit	Quantity	Net Price	Amount	Long Text
--------	------	-------------	------	----------	-----------	--------	-----------

## Delivery/Working Address:

101 Coal Mining Road/Garden  
Coal Mining HQ, Govt Plaza, Ranchi  
Jharkhand  
834001  
India

Proposed to be done on:

BQI No.: 2024/2022/001

10		Sitevisit Service	NO	1000	47,700.00	47,70,000.00	
----	--	-------------------	----	------	-----------	--------------	--

Tax: No Central GST and State GST. Extra

in amount of 0.00 %

10.10		Sitevisit service for preparation of Co.	1/NO	1	47,70,000.00	47,70,000.00	
-------	--	--	------	---	--------------	--------------	--

TOTAL OF BQI PART : 00010 INR 4770000.00Amount 4770000.00Other Charges 0.00Net Amount in BQI PART : 00010 INR 4770000.00Net Total Amount INR 47,70,000.00Less Retain Amount INR 0.00Grand Total INR 47,70,000.00

INR FOUR CRORE SEVENTY SEVEN LAKH SEVENTY THOUSAND ONLY

*Accepted*  
*29/05/2022*



## 985230/2022-O HEAD OF BUSINESS DEVELOPMENT, CMPDI HQ

Terms & Conditions**Payment Mode:**

EFT

Invoice to be raised on delivery/invoice address against the given PO line items.

**Special instruction:**

- 1 Total Contract Value: Rs.4.77.70,000/- excluding GST.
- 2 Contract Period: 8 (Eight) Months from the ZERO Date. The ZERO date will start from the date of receipt of work order along with initial payment as per payment terms.
- 3 GST shall be paid extra @ 18% as per GST rule.
- 4 Payment Terms: The payment terms for the assignment shall be as follows:
  - (i) 30% of the total consultancy fee along with GST shall be paid as initial payment along with work order.
  - (ii) 20% of the total consultancy fee along with GST shall be paid after submission of conceptual report.
  - (iii) 20% of the total consultancy fee along with GST shall be paid after submission of Draft Mining plan.
  - (iv) 2% of the total consultancy fee along with GST shall be paid on submission of Final Mining Plan.
  - (v) 15% of the total consultancy fee along with GST shall be paid on submission of Draft Feasibility Report.
  - (vi) 5% of the total consultancy fee along with GST shall be paid on submission of Final Feasibility Report.
- 5 Security Deposit: Not applicable.
- 6 Liquidated damages (LD): Not applicable.
- 7 Contract Agreement: Not applicable.
- 8 All other terms & conditions shall be as per NTPC tender document.

*Akash*  
*60*  
*24/10/2022*



363236/222 O-G HEAD OF BUSINESS DEVELOPMENT, CMPDI HQ

Break up of Price (For Service Related Lines Only)

Sl No.	Service Code	Description	Qty.	UOM	Rate	Premium	Discount	Addl Discount	Net Rate	Value
10-10		Consultancy service for	1	LPH	41775.000	0.00	0.00	0.00	41775.000	41775.000
		preparation of			.00				0.000	0.000

*Accepted*  
*34/10/2022*



SCOPE OF WORK**80018 : Consultancy Service**

A) The Scope of services, Deliverables, Terms of Payment and Time Schedule of this assignment is as per the budgetary offer of CMPDI vide letter dated 01.04.2022.

**B) Description Period****A. Conceptual Plan**

1 Submission of Conceptual Plan 02 months from Zero date

**B. Mining Plan**

1 Submission of Draft Mining Plan 06 months after submission of conceptual plan

2 Submission of Final Mining Plan 15 days from receipt of observations on Draft Mining plan from NTPC

**C. Feasibility Report**

1 Submission of Draft Feasibility Report 02 months from Submission of Final Mining Plan

2 Submission of Final Feasibility Report 15 days Month from receipt of observations on Draft Feasibility Report from NTPC

The payment terms for the assignment shall be as follows:

- i) 30% of the total consultancy fee along with GST shall be paid as initial payment along with work order.
- ii) 20% of the total consultancy fee along with GST shall be paid after submission of conceptual report.
- iii) 20% of the total consultancy fee along with GST shall be paid after submission of Draft mining plan.
- iv) 5% of the total consultancy fee along with GST shall be paid on submission of Final Mining Plan.
- v) 15% of the total consultancy fee along with GST shall be paid on submission of Draft Feasibility Report
- vi) 5% of the total consultancy fee along with GST shall be paid on submission of Final Feasibility Report

Prepared By:

MEENA SURESH RAMBA

*Accepted*  
*24/07/2022*



HEAD OF BUSINESS DEVELOPMENT, CMPDI HQ

List of Documents

Please note that below documents are needed to be provided along with Invoice.

S.No.	Document Description
-------	----------------------

*Accepted*  
*log*  
*4/15/22*



*[Faint, illegible handwritten text]*

382230/2023/O/o HEAD OF BUSINESS DEVELOPMENT, CMPDI HQ

### NTPC VENDOR PAYMENT PORTAL & PAYMENT PROCEDURE

1. For all the cases where payment documents are to be directly submitted to NTPC (excluding Payment through Bank cases), the Invoice and supporting document(s) as required in the Purchase Order have to be Digitally Signed with class II or III digital signature and uploaded in the NTPC Vendor Payment Portal: <http://www.nptcltd.com/In/Vendor/Invoice/Login.jsp>.

In such cases, there will be no requirement of physical copy of invoice & documents except for Lorry Receipts (LR) Delivery Challan, which are normally sent along with the material/ transporter. Bank Guarantees to be sent in original wherever applicable.

2. From 15.6.2023, NTPC will accept only digitally signed Invoice & supporting documents from vendors for direct payment cases. Submission of documents in physical form shall not be accepted by NTPC unless otherwise asked for in the PO.

For such cases of physical submission, Vendors are requested to send complete set of documents including invoice etc. addressed to the "Invoice Receipt Centre" of the (Delivery/ Invoicing Address as mentioned in the Purchase Order Annexure II BOQ Sheet).

While submitting the Invoice/ Bills & related documents in physical form, Vendors are required to mention the following details on the top of the invoice:

1. Invoice/Bill reference No.
2. NTPC PO No./ Package no.
3. NTPC Vendor Code as per PO

In addition to above, vendors are requested to mention their correspondence E-mail & Mobile No. in the Covering Letter, through which invoice processing related information/correction request may be sent.

3. Vendors can track / monitor the status of payments from the Vendor payment portal. Help documents are available in the portal. Vendors are requested to make full use of the vendor Payment Portal.

4. For payment cases through bank, all original documents are to be submitted to bank as per terms of PO.

*Accepted*  
*AS*  
 24/11/2023





Through Speed post /Email

File No. NA-110/8/2022-NA  
Government of India/भारतसर्वकार  
Ministry of Coal/कोयला मंत्रालय  
D/o Nominated Authority / नामनिर्दिष्ट प्राधिकारी का कार्यालय

\*\*\*\*\*

R.No.510-P, Shastri Bhawan, New Delhi-110001  
Dated: June 23, 2022

**OFFICE MEMORANDUM**

**Subject:** Minutes of the review meeting chaired by the Hon'ble minister of coal to review coal supply to power sector from allocated coal blocks on 17.06.2022.

\*\*\*\*\*

The undersigned is directed to refer to subject mentioned above and to enclose herewith the Minutes of captioned meeting for circulation please.



(Manish Uniyal)  
(Under Secretary to the Government of India)  
Tel:011-23384106

To,

1. PS to Hon'ble Minister of Coal
2. PPS to Secretary (Coal) / PPS to AS & NA
3. Adviser to Secretary (Coal)
4. Director (NA) / Director (Tech./NA)
5. All Staff Members of NA Section
6. The concerned block allocations as per Annexure-I

**MINUTES OF THE REVIEW MEETING CHAIRED BY THE HON'BLE MINISTER OF COAL TO REVIEW COAL SUPPLY TO POWERS SECTOR FROM ALLOCATED COAL BLOCKS ON 17.06.2022.**

\*\*\*\*\*

List of participants is enclosed as Annexure-I.

2. Hon'ble Minister of Coal held a meeting to review coal supply to power sector from allocated coal blocks. A presentation was given related to overall coal production and dispatch status for FY 2022-23 from allocated coal blocks and specially related to coal blocks of NTPC, DVC, THDC, RRVJNL, WBPDC and KPCL. Additional Secretary (MN) stated in the beginning that review of performance is based on the commitment made by the companies during review meeting in the beginning of the financial year and not based on PRC or target coal production as per mining plan.

**3. NTPC: -**

It was observed that only 3.402 MT coal has been produced against pro-rata target of 4.308 MT till 15 June 2022 and thus achievement is only 80 % of the target. The shortage in coal production is mainly from Talaipalli and Pakri Barwadih mine. M/s NTPC made the following comments:

- i) Talaipalli mine- Work order for MDO were given in time but MDO failed to start mining due to some issues in mining plan. A new MDO contract will be awarded by end of this month and thereafter coal production will increase, and they will achieve target production of 2.0 MT in this financial year.
- ii) Dulunga mine: - Coal production is in-line with the target, and they will produce 7.0 MT coal in this financial year which is equivalent to PRC.
- iii) Chatti Bariatu & Chatti Bariatu South mine: - MDO contract has been awarded and OB removal has started. Coal production will start from July month, and they will achieve target production of 2.0 MT in this financial year.
- iv) Pakri Barwadih mine: - About 90 % of pro rata target production has been achieved and they are moving more resources and coal production will improve in coming months. About 40000 t/day coal is presently produced and they will increase it 45000-50000 t/day from next month and they will produce 15 MT coal by end of this financial year. They are facing problems in 2 villages and that will be resolved soon.

Hon'ble minister observed that more coal should have been produced from Pakri Barwadih & Dulunga mines and also observed that large coal stocks are lying at Talaipalli & Pakri Barwadih coal mines. He stated that why coal supply from CIL to NTPC is not being rationalized as has been done in case of State GENCOs in case where linked coal blocks are not producing up to the mark. He directed Chairman, NTPC that the annual target for coal production of NTPC be increased from 26 MT to 28 MT in current year and mine wise commitment to that extent shall be finalized.

Secretary (Coal) stated that CIL is supplying more than the FSA quantity to all power sector consumers including NTPC. For the NTPC, committed coal supply from CIL is 5.42 lakh ton /day, however, about 5.6 lakh ton/day is being supplied in addition to coal supplies from Talabira mine and from SCCL.

#### 4. DVC:-

Tubed mine: - It was observed that coal production has not yet started. M/s DVC stated that MDO has been appointed and acquisition of GM land & Raiyat land is under process. Mining activity will start from July and coal production will start from September month. They will achieve the target coal production of 1.0 MT coal in this financial year.

Secretary (Coal) stated that DVC is not lifting sufficient coal from RCR mode, 3 lakh ton coal was to be taken from CCL through RCR mode and that have not started. They have got coal stock for 15 days and that should be used first.

Hon'ble minister stated that the PRC of mine is 6.0 MT and directed for increase the coal production target for current year from 1 MT to 1.5 MT.

#### 5. Tehri Hydro Development Corporation Ltd (THDC): -

Amelia mine: - It was observed that coal production has not yet started. M/s THDC stated that the end - use-plant is scheduled to be commissioned in year 2023-24. MDO has been appointed in May 2022 and mining activity will start from August.

Secretary (Coal) stated that the stripping ratio of the mine is low and there are plants of NTPC in vicinity. They should immediately start coal production and should not wait for commissioning of its own end-use-plants and coal may be given to NTPC plants.

Hon'ble minister stated that the PRC of mine is 5.6 MT and directed for increasing the coal production target for the current year from 1.0 MT to 2.0 MT.

#### 6. Rajasthan Rajya Vidyut Utpadan Nigam Ltd (RRVUNL): -

Parsa East & Kanta Basan mines and Parsa mine: - M/s RRVUNL informed that mining has not started in phase -II of PEKB mine and in Parsa mine due to resistance of local villagers. Police protection given by local administration has also been withdrawn recently. They are presently producing about 40000 ton/day and about 3.16 MT coal has been produced against pro rata target of 3.32 MT by 15.06.2022.

Secretary (Coal) stated that they can produce 15 MT coal from about 47 MT unexploited coal of phase-I of PEKB itself in current year. He also observed that PEKB is under-reporting coal stock position and advised them not to do so as ministry will help supply of coal in case of any shortage.

#### 7. WBPDC: -

It was observed that M/s WBPDC has produced 3.06 MT coal against pro rata target of 2.735 MT till 15 .06.2022, however, more coal could have been produced from Pachwara North mine. M/s WBPDC stated

that coal production from Pachwara North mine is from non-forest area and production will further improve after grant of FC-II of forest area and they will produce 15 MT during current year from this mine. Part approval for CA land has been obtained from State cabinet and approval for remaining land of about 250 acres will be obtained shortly.

Secretary (Coal) stated that coal supply from CIL has been increased and about 4.5 rakes/day are being supplied and this will help in building coal stock for 7 days consumption. He advised WBPDCI to lift slacks of BCCL and CCL and slacks will be kept out of FSA. WBPDCI agreed to take slacks provided it is beyond the FSA quantity.

#### 8. KPCL :-

Baranj I,II,III,IV ,Kilori and Manora dip :- it was observed that pro rata coal production is in line with the target. M/s KPCL stated that 16 % of their coal requirement is fulfilled through captive blocks and coal stock at their power houses are in range of 2-4 days consumption. MoEF&CC has granted FC-II but Maharashtra government has not yet transferred the forest land to them for mining. Additional Secretary (MN) informed that the issue of transfer of forest land has been taken up at level of Principal Secretary of State.

Hon'ble minister advised them to increase the annual production capacity by 40 % from 2.5 MTPA as they have sufficient coal reserve. M/s KPCL assured that after grant of FC-II, they will go for enhanced PRC.

#### Mandakini mine:-

It was stated that EC and FC have been obtained and mining lease and land acquisition are still pending. M/s KPCL stated that the main challenge they are facing is the demand of higher compensation by villagers. They are regularly talking with the villagers and district administration is helping in resolving the compensation issue. In case of high compensation that the villagers are demanding, the mine will become economically unviable.

In the end, Hon'ble minister directed all allottees to achieve the coal production target during the current year as given to them and resolve the pending issues expeditiously.

#### 9. The meeting ended with Vote of Thanks to the Chair.

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**LIST OF OFFICERS PRESENT IN THE MEETING**

<b>Coal Ministry</b>		
<b>S. No.</b>	<b>Name (S/Shri/Smt./Dr.)</b>	<b>Designation</b>
1.	Pralhad Joshi	Minister of Coal
2.	Anil Kumar Jain	Secretary (Coal)
3.	Vinod Kumar Tiwari	Additional Secretary (Coal)
4.	M. Nagaraju	Additional Secretary & Nominated Authority
5.	Vismita Tej	Joint secretary
6.	Mukesh Choudhary	Director (CPD)
7.	Ajitesh Kumar	Director (NA)
8.	Marapally Venkateshwarlu	Director (Tech./NA)
9.	Jitendra Kumar	Chief Manager, NA office
10.	Manish Uniyal	Under Secretary
<b>Allottees</b>		
<b>S. No.</b>	<b>Name (S/Shri/Smt./Dr.)</b>	<b>Designation</b>
1.	Gurdeep Singh	CMD, NTPC
2.	C K Mondal	Director, NTPC
3.	Rajeev kumar Vishnoi	CMD, THDC
4.	R K Soral	Director (Prjects), RRVUNL
5.	Chanchal Goswami	Director (Mining), WBPCL
6.	M S Srikar	MD, KPCL
7.	R.N.Singh	CMD,DVC

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RESTRICTED CIRCULATION



*cmpdi*  
A Mine Action Company



**Mining Plan  
(Including Mine Closure Plan)  
(1st Modification)**

FOR

**TALAIPELLI COAL BLOCK**

Under Rule 22E of Mineral Concession Amendment Rules, 2020

Mand-Raigarh Coal Field,  
District-Raigarh, State-Chhattisgarh

**Block Area- 2119.40 Ha**

**Rated Capacity- 25.0 Mty  
Peak Capacity- 25.0 Mty**

**Volume-I  
(Text & Annexures)**

**Mine Plan Preparing Agency (MPPA): CMPDI, RANCHI**

MPPA CERTIFICATE NO.: NABETIARA-MPPAIA/010  
ISSUE DATE : 20<sup>TH</sup> OCTOBER, 2021

**NATIONAL THERMAL POWER CORPORATION LIMITED**

(A Public Sector undertaking)  
NTPC Bhawna, Core 7, Scope Complex  
Institutional Area, Lodhi Road  
New Delhi-110003, Ph: 011-24360071

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**B. INDEX OF CHAPTERS**

Sl. no.	Particulars	Page no
1	Checklist	vii-viii
2	Project Information	1-6
3	Exploration Geology, Seam sequence, Coal quality and Reserve	7-15
4	Mining	16-30
5	Safety Management	31-33
6	Infrastructure Facilities proposed and their location	34-39
7	Land Requirement	40-42
8	Environment Management	43-43
9	Progressive & Final Mine Closure Plan	44-52

**C. INDEX FOR LIST OF ANNEXURES**

Sl. No.	Title of the Appendix	Details	Reference
I	Copy of allotment order/vesting order/Existing Mining lease	Allotment Order no. 103/31/2015/NA dated 08 Sep 2015 Corrigendum no. 1 to the allotment order vide order no. 103/31/2021/NA dated 16 Nov 2022	Annexure-I
II	Certificate of Qualified person(QP)/ Accredited Mining Plan preparing agency(MPPA) if the project area is confined within the vested/allotted block boundary/existing mining lease area  Where the project area extend beyond the block boundary, a certificate of Qualified person(QP)/Accredited Mining Plan preparing agency (MPPA) should be supported with a certificate of state Government mines and Geology department must be attached which should specify a) Intent of state government for grant of lease beyond the vested geological boundary b) Non-existence of Coal/ Lignite in the area beyond the vested/allotted geological block boundary/existing mining lease to rule out the issue of encroachment and use of coal bearing area(beyond the vested/allotted block boundary/existing mining lease) in the mining plan		Annexure-II
III	Approval of the Company Board		Annexure-III
IV	Copy of earlier approval of mining plan	Letter no. 13016/29/2003-CA-I dated 31 <sup>st</sup> March 2010	Annexure-IV
V	Plan/chart showing schedule of implementation of Mine closure activities(Progressive and final closure) with duration of important activities		Annexure-V
VI	Non – refundable Application fee		Annexure-VI
VII	Expert review Report		Annexure-VII
VIII	Other Documents		



## MINING PLAN &amp; WINE CLOSURE PLAN FOR TALAI PALLI COAL BLOCK



SL. No.	Title of the Appendix	Details	Reference
a	Environmental Clearance	Letter no. 11015/279/2009-IA.II(M) dated 02 <sup>nd</sup> January 2013 & Letter no. J-11015/279/2009-IA.II(M) Pt. file dated 28 <sup>th</sup> October, 2015	Annexure-VIIIA
b	Forest Clearance	F. No. 8-18/2012-FC dated 28 <sup>th</sup> January 2014	Annexure-VIIIB
c	Cardinal points of the block boundary		Annexure-VIIIC
d	Hydrogeological Report		Annexure-VIIID
e	Non-applicability of Mining Lease for the Land acquired under CBA (Acquisition & Development) Act, 1957- Letter from Ministry of Coal to Chattisgarh Govt.	F no. 13016/59/2015-CA-III dated 12.02.2016	Annexure-VIIIE
f	Note on Underground Mining		Annexure-VIIIF
g	Slope Stability Report		Annexure-VIIIG

**D. INDEX OF LIST OF PLANS/DRAWINGS  
ATTACHED/ ENCLOSED AS PLATES**

Plate	Details	Plate No.																																										
1	Location Plan	Plate-1																																										
2	Plan certified by Qualified person(QP)/Accredited Mining Plan preparing agency(MPPA) if the project area is confined within the vested/allotted block boundary and Where the project area extends beyond the block boundary a plan certified by Qualified person(QP)/Accredited Mining Plan preparing agency(MPPA) should be supported with a plan with cardinal point coordinates duly certified by the state Government Mines and geology Department Plan in support of Annexure -II	Plate-2																																										
3	KML file of the Proposed lease area, Project Area and geological block (Soft copy of the same included in CD)	Plate-3																																										
4	Cadastral Plan showing approved Block boundary vis-à-vis proposed/existing mining lease and Mine boundary superimposed over it in distinct color, showing land use and infrastructure etc.	Plate-4																																										
5	Geological Plan showing all the boreholes drilled and proposed to be drilled showing allotted block boundary and required lease area	Plate-5																																										
6	Representative Graphic Lithologs	Plate-6																																										
7	Surface plan showing drainage system	Plate-7																																										
8	Conceptual plan showing infrastructure facilities including colony, boundary of mining area, mine entries, roads including road diversion alignment etc	Plate-8																																										
9	Tentative land use plan showing land type (Govt, Forest and tenancy land) with its data source.	Plate-9																																										
10	Floor Contour Plan Seam Folio Plan, ISO-Grade Plan	<table border="1"> <thead> <tr> <th>Seam</th> <th>Floor Contour</th> <th>Seam Folio</th> </tr> </thead> <tbody> <tr><td>X-LA</td><td>10A</td><td>10A'</td></tr> <tr><td>X-LB</td><td>10B</td><td>10B'</td></tr> <tr><td>X-TOP</td><td>10C</td><td>10C'</td></tr> <tr><td>X-BOT</td><td>10D</td><td>10D'</td></tr> <tr><td>IX-L2</td><td>10E</td><td>10E'</td></tr> <tr><td>IX-L1</td><td>10F</td><td>10F'</td></tr> <tr><td>IX</td><td>10G</td><td>10G'</td></tr> <tr><td>VIII</td><td>10H</td><td>10H'</td></tr> <tr><td>VI-TOP</td><td>10J</td><td>10J'</td></tr> <tr><td>VI-MID</td><td>10K</td><td>10K'</td></tr> <tr><td>VI-BOT</td><td>10L</td><td>10L'</td></tr> <tr><td>V-TOP</td><td>10M</td><td>10M'</td></tr> <tr><td>V-MID</td><td>10N</td><td>10N'</td></tr> </tbody> </table>	Seam	Floor Contour	Seam Folio	X-LA	10A	10A'	X-LB	10B	10B'	X-TOP	10C	10C'	X-BOT	10D	10D'	IX-L2	10E	10E'	IX-L1	10F	10F'	IX	10G	10G'	VIII	10H	10H'	VI-TOP	10J	10J'	VI-MID	10K	10K'	VI-BOT	10L	10L'	V-TOP	10M	10M'	V-MID	10N	10N'
Seam	Floor Contour	Seam Folio																																										
X-LA	10A	10A'																																										
X-LB	10B	10B'																																										
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VIII	10H	10H'																																										
VI-TOP	10J	10J'																																										
VI-MID	10K	10K'																																										
VI-BOT	10L	10L'																																										
V-TOP	10M	10M'																																										
V-MID	10N	10N'																																										

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



Plate	Details	Plate No.		
		V-BOT	10O	10O'
		IV-TOP	10P	10P'
		IV-MID	10Q	10Q'
		IV-BOT	10S	10S'
		IIIL	10T	10T'
		III	10U	10U'
		II	10Y	10Y'
11	Cross- section showing coal seams	Plate -11		
12	Plan showing existing and proposed surface layout	Plate - 12		
	<b>OPENCAST(OC) MINES</b>			
13	Plan showing total thickness and overburden thickness and stripping ratio	Plate-13		
14	Final stage quarry plan showing haul road alignment	Plate-14		
	<b>CLOSURE PLAN</b>			
20	Post mining land use plan	Plate - 20		
21	Progressive Mine closer plan / Stage plan indicating stages	Year	Plate no.	
		1 st	21A	
		3 rd	21B	
		5 th	21C	
		PRC	21D	
	End Of life	21E		
22	Reclamation Plan	Plate - 22		

**E. LIST OF ABBREVIATIONS USED**

SL No.	Abbreviation	Expanded Form
1	AMSL	Above Mean Sea Level
2	AMP	Approved Mining Plan
3	BGL	Below ground Level
4	CV	Calorific value
5	CMPDIL	Central mine planning and Design Institute Ltd.
6	CMDPA	Coal Mine Development and Production Agreement
7	CPCB	Central Pollution Control Board
8	Cum	Cubic meter
9	DGMS	Directorate General of Mine Safety
10	DGM	Directorate of Geology and Mining
11	EIA	Environment Impact Assessment
12	EMP	Environment Management Plan
13	E&M	Electrical & Mechanical
14	FC	Forest clearance
15	GCV	Gross calorific value
16	Govt	Government of India
17	GR	Geological Report
18	GSI	Geological survey of India
19	HFL	High Flood Level
20	HEMM	Heavy Earth Moving Machinery
21	Ha	Hectare
22	IMD	India Meteorological Department
23	k.Cal/kg	Kilo Calorie per Kilogram
24	LTPA	Lakh Tonne per Annum
25	MTPA	Million Tonne per Annum
26	MM3	Million Cubic metre
27	MM3B	Million cubic metre Bank
28	MM3L	Million Cubic metre loose
29	m	Metre
30	Mte	Million tonne
31	ML	Mining lease
32	MoC	Ministry of coal
33	MoEF & CC	Ministry of Environment, Forest & climate change
34	MGR	Merry-Go-Round
35	MDO	Mine Developer-cum-Operator
36	NAAQ	National Ambient Air Quality Standards
37	NTU	Units of measurement of turbidity
38	NH	National Highway
39	OC	Opencast

SL No.	Abbreviation	Expanded Form
40	OB	Overburden
41	OGL	Original Ground Level
42	OBR	Overburden
43	OHE	Overhead Equipment
44	PRC	Peak Rated Capacity
45	QP	Qualified person
46	R&R	Rehabilitation & Re-settlement Plan
47	RoM	Run of Mine
48	RH	Relative Humidity
49	RLS	Rapid Loading System
50	SPM	Suspended Particulate Matter
51	SC	Scheduled Cast
52	SH	State highway
53	ST	Scheduled tribe
54	STPP	Super Thermal Power Plant
55	TDS	Total Dissolved Solid
56	TPD	Tonne per day
57	TS	Top soil
58	UG	Under Ground
59	UHV	Useful heat value
60	VM	Volatile Matter

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPELLI COAL BLOCK

**CHECKLIST**

Details		(✓)(*)
	Expert-review report	(✓)
Text	Project Information	(✓)
Text	Exploration, Geology, seam sequence, Coal Quality and Reserve	(✓)
Text	Mining	(✓)
Text	Safety Management	(✓)
Text	Infrastructure facilities proposed and their location	(✓)
Text	Land Requirement	(✓)
Text	Environment Management	(✓)
Text	Progressive & Final mine closure Plan.	(✓)
Annexure	Copy of allotment order/vesting order	(✓)
Annexure	Certificate of Qualified person(QP)/ Accredited Mining Plan preparing agency(MPPA) if the project area is confined within the vested/allotted block boundary/existing mining lease area Where the project area extend beyond the block boundary, a certificate of Qualified person(QP)/Accredited Mining Plan preparing agency (MPPA) should be supported with a certificate of state Government mines and Geology department must be attached which should specify a) Intent of state government for grant of lease beyond the vested geological boundary/existing mining lease b) Non-existence of Coal/ Lignite in the area beyond the vested/allotted geological block boundary/existing mining lease to rule out the issue of encroachment and use of coal bearing area(beyond the vested/allotted block boundary/existing mining lease) in the mining plan	(✓)
Annexure	Approval of the Company Board	(✓)
Annexure	Copy of earlier approval of mining plan	(✓)
Annexure	Plan/chart showing schedule of implementation of Mine closure activities(Progressive and final closure) with duration of important activities	(✓)
Annexure	Expert review Report carried out by an Accredited Mining Plan Preparing Agency(MPPA)	(✓)
Annexure	Other Document	(✓)
Plates	Location Plan	(✓)
Plates	Plan certified by Qualified person(QP) /Accredited Mining Plan preparing agency(MPPA) if the project area is confined within the vested/allotted block boundary and Where the project area extends beyond the block boundary a plan certified by Qualified person(QP)/Accredited Mining Plan preparing agency(MPPA) should be supported with a plan with cardinal point coordinates duly certified by the state Government Mines and geology Department Plan in support of Annexure -I	(✓)
Plates	Printed copy of KML file superimposed in the recent(not older than one year from the base date ) dated satellite image duly certified by Accredited Agency should also be attached (Soft copy of KML file is include in CD) Note: the soft copy of the KML file shall also be part of the Soft copy of the mining plan.	(✓)
Plates	Cadastral Plan showing approved Block boundary vis-à-vis proposed/existing mining lease and Mine boundary superimposed over It in	(✓)

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPELLI COAL BLOCK



*cmpdi*  
Central Mine Planning and Design Institute

Details		{✓}(x)
	distinct color, showing land use and infrastructure etc	
Plates	Geological Plan showing all the boreholes drilled and proposed to be drilled showing allotted block boundary and required lease area	{✓}
Plates	Representative Graphic Lithologs	{✓}
Plates	Surface plan showing drainage system, contour, preferably at 3 m interval, location of BH(Bore hole)	{✓}
Plates	Conceptual plan showing infrastructure facilities including colony, boundary of mining area, mine entries, roads including road diversion alignment etc	{✓}
Plates	Tentative land use plan showing land type (Govt, Forest and tenancy land) with its data source with its data source.	{✓}
Plates	Floor contour plans and seam folio plans, ISO-grade plans	{✓}
Plates	Cross- section showing coal seams	{✓}
Plates	Plan showing existing and proposed surface layout	{✓}
Plates	Plan showing total thickness and overburden thickness and stripping ratio	{✓}
Plates	Final stage quarry plan showing haul road alignment	{✓}
Plates	Post mining land use plan	{✓}
Plates	Progressive mine closer plan/stage plans	{✓}
Plates	Reclamation Plan	{✓}

## Chapter 1: Project Information

### 1.1 INTRODUCTION

	<b>Parameters</b>	<b>Details</b>
1.1.1	Name of Coal / Lignite Block	Talaipalli Coal Mining Block
1.1.2	Name of the Coalfield/ Lignite Field	Mand Rajgarh Coalfield
1.1.3	Issue date of Mining Plan/ Mine Closure Plan	April 2023
1.1.4	Linked End Use Plant	Lara ETPP (4000 MW)
1.1.5	Distance of End use plant from the pit head of the project in km	70 Km
1.1.6	Mode of Coal Transport	By Rail

### 1.2 LOCATION, TOPOGRAPHY AND COMMUNICATION

1.2.1	Location of coal deposit (District and State)	District – Rajgarh, State – Chhattisgarh
1.2.2	Communication: FWD roads, railway lines, Air	Road from Rajgarh town via Gharghora to Ambikapur (SH) at 25 km. Rajgarh Rail station on Howrah Bombay main railway line is 55 Km from the block. Nearest Airport is Jhansuagarh at a distance of 100 Km.
1.2.3	Availability of power supply, water etc.	Water from Kelo River, and Permanent Power is available from 132 KV / 33 KV NTPC Substation at Rakera village within block.
1.2.4	Prominent physiographic features, drainage pattern, natural water courses, rainfall data, highest flood level	Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. The subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south. HFL for the Kelo river is 279 m.  The monsoon period extends from mid-June to September with an average annual mean rainfall of 1620 mm.
1.2.5	Important surface features within the project area and major diversion or shifting involved	No such important surface features within the project. There is no involvement of major diversion or shifting.



**1.3 DETAILS OF THE ALLOTMENT AGREEMENT**

1.3.1	Name the Allottee	NTPC Ltd (A Govt of India Enterprise)
1.3.2	Details of allotment/ vesting order	Earlier Date of allotment: 25.01.2006 Date of re-allotment: 08.09.2015 (Order no. 103/31/2015/NA dated 08 Sep 2015)
1.3.3	Name and address of the applicant	NTPC Bhawan , Scope Complex, Institutional Area, Lodhi Road, New Delhi 110003
1.3.4	Name of the Previous allottee of the Block	NTPC Ltd.
1.3.5	Starting Date of the Mine as per CMDPA	May 2019
1.3.6	Rated Capacity as per CMDPA	18MTY
1.3.7	Production Schedule as per opening permission (meeting provisions of CMDPA if any)	As per CMDPA
1.3.8	End Use of Coal/Lignite as per allotment order if any	Lara STPP (4000 MW), Chattisgarh
1.3.9	Cardinal points co-ordinates of the Block boundary	Attached as Annexure VIII

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



## 1.4 DETAILS OF THE PREVIOUS APPROVAL OF MINING PLAN

1.4.1	Date of Approval	31.03.2010																																																																													
1.4.2	Conditions, if any	1) The mining company shall take all necessary precaution regarding safety of mine workings, persons, deployed therein 2) Mining lease to be acquired shall not encroach into any other coal block 3) The approval of the mining plan is without prejudice to the requirement of approvals																																																																													
1.4.3	Scheduled year of start of production	2012 (as per earlier approved Mining Plan) 2019 (as per CMDPA after re-allotment in 2015)																																																																													
1.4.4	Proposed year of achieving the targeted production	2016 (as per earlier approved Mining Plan) 2023 (as per CMDPA after re-allotment in 2015)																																																																													
1.4.5	Date of actual commencement of mining operations, if operations already started	15 <sup>th</sup> October 2019 (Allotment was cancelled by Hon'ble Supreme Court in 2014 and the block was re-allotted to NTPC in September 2015)																																																																													
1.4.6	Likely date of mining operations, if operations not yet started & reasons for non-commencement of operations	Not applicable																																																																													
1.4.7	Planned production and actual levels achieved in last 3 years (Coal in Mte, OB in MM <sup>3</sup> , SR in M <sup>3</sup> /Mte)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: center;">Planned Production</th> </tr> <tr> <th rowspan="2">Year</th> <th colspan="2">Coal "Mte"</th> <th rowspan="2">OB "MM<sup>3</sup>"</th> <th rowspan="2">SR "MM<sup>3</sup>/ce"</th> </tr> <tr> <th>UG</th> <th>OC</th> </tr> </thead> <tbody> <tr> <td>2019-20</td> <td></td> <td>0.625</td> <td>3.188</td> <td>5.10</td> </tr> <tr> <td>2020-21</td> <td></td> <td>2.542</td> <td>12.396</td> <td>4.88</td> </tr> <tr> <td>2021-22</td> <td></td> <td>5.667</td> <td>25.273</td> <td>4.46</td> </tr> <tr> <td>2022-23 (projected)</td> <td></td> <td>10.083</td> <td>42.854</td> <td>4.25</td> </tr> <tr> <td><b>Total</b></td> <td></td> <td><b>18.917</b></td> <td><b>83.711</b></td> <td><b>4.43</b></td> </tr> <tr> <th colspan="5" style="text-align: center;">Actual Production</th> </tr> <tr> <th rowspan="2">Year</th> <th colspan="2">Coal "Mte"</th> <th rowspan="2">OB "MM<sup>3</sup>"</th> <th rowspan="2">SR "MM<sup>3</sup>/ce"</th> </tr> <tr> <th>UG</th> <th>OC</th> </tr> <tr> <td>2019-20</td> <td></td> <td>0.19</td> <td>2.07</td> <td>10.89</td> </tr> <tr> <td>2020-21</td> <td></td> <td>0.81</td> <td>3.71</td> <td>4.58</td> </tr> <tr> <td>2021-22</td> <td></td> <td>0.41</td> <td>2.45</td> <td>5.98</td> </tr> <tr> <td>2022-23 (projected)</td> <td></td> <td>2.00</td> <td>12.21</td> <td>6.11</td> </tr> <tr> <td><b>Total</b></td> <td></td> <td><b>3.41</b></td> <td><b>20.44</b></td> <td><b>5.99</b></td> </tr> </tbody> </table>				Planned Production					Year	Coal "Mte"		OB "MM <sup>3</sup> "	SR "MM <sup>3</sup> /ce"	UG	OC	2019-20		0.625	3.188	5.10	2020-21		2.542	12.396	4.88	2021-22		5.667	25.273	4.46	2022-23 (projected)		10.083	42.854	4.25	<b>Total</b>		<b>18.917</b>	<b>83.711</b>	<b>4.43</b>	Actual Production					Year	Coal "Mte"		OB "MM <sup>3</sup> "	SR "MM <sup>3</sup> /ce"	UG	OC	2019-20		0.19	2.07	10.89	2020-21		0.81	3.71	4.58	2021-22		0.41	2.45	5.98	2022-23 (projected)		2.00	12.21	6.11	<b>Total</b>		<b>3.41</b>	<b>20.44</b>	<b>5.99</b>
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## MINING PLAN &amp; WINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



1.4.8	Statutory obligations vis- a-vis compliance status in a tabular form	<b>Activity</b>	<b>Date of Achievement</b>
		Env. Clearance	02.01.13/13.11.15
		Forest Clearance	Stage-I: 05.11.12; Stage-II: 29.01.14; 23.05.17(Rev)
		Consent to Establish	06.01.15
		Consent to Operate	17.03.16
		Tripartite Escrow Agreement (Banker, COO & NTPC)	15.05.14 & 04.09.17
		DGMS Permission	19.01.18
		Coal Controllers permission	31.01.18
1.4.9	Reasons for difference between the planned and actual production levels	MDO contract ran into legal dispute and subsequently contract was terminated on 4 <sup>th</sup> July 2019. However, mining operation was started on a small patch in Oct 2019 contractually in the area beyond the disputed MDO contract by appointing an agency	

## 1.5 PARAMETERS OF APPROVED MINING PLAN VIS-A-VIS PROPOSED MINING PLAN

		Approved Mining Plan	Proposed Mining Plan
1.5.1	Block Area in "Ha"	2113 Ha	2119.40 Ha
1.5.2	Block Area Projectised "Ha"	2113 Ha	2119.40 Ha
1.5.3	Lease area "Ha"	2113 Ha	2119.40 Ha
1.5.4	Project Area "Ha"	2113 Ha	2119.40 Ha
1.5.5	Life of the Project "Yrs"	OC- 54 years UG- 34 years	OC-31 years UG- to be planned later
1.5.6	Minimum and Maximum Depth of working "m"	Minimum depth : 70 m Maximum depth: 404 m	Minimum depth : 30 m Maximum depth: 340 m
1.5.7	Net Geological Block "Ha"	2113 Ha	2119.40 Ha (After DGPS survey)
1.5.8	Production Target "MTPA"	OC-18 MTPA UG- 0.72 MTPA	OC- 25 MTPA UG- to be planned later
1.5.9	Seams Available "As per GR"	27 nos of correlatable coal seams/splits viz: X-LA, X-LB, X-TOP, X-BOT, IX-L2, IX-L1, IX, VIII, VII, VI-TOP, VI-MID, VI-BOT, V-TOP, V-MID, V-BOT, IV-TOP, IV-MID, IV-L, IV-BOT, III L, III, II L3, II L2, II L1, II L, I	27 nos of correlatable coal seams/splits viz: X-LA, X-LB, X-TOP, X-BOT, IX-L2, IX-L1, IX, VIII, VII, VI-TOP, VI-MID, VI-BOT, V-TOP, V-MID, V-BOT, IV-TOP, IV-MID, IV-L, IV-BOT, III L, III, II L3, II L2, II L1, II L, I

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



1.5.10	Seams not considered for Mining with Reasons	Seams II L1, II L and Seam I has not been considered for mining as they are poorly developed in the block and have non-mineable thickness.	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
1.5.11	Gross Geological Reserve "Mt"	1400.57 Mt	1407.94 Mt
1.5.12	Net Geological Reserve "Mt"	1260.52 Mt	1267.145 Mt (as per GR)
1.5.13	Blocked Reserve "Mt"	OC- 336.69 Mt UG- 59.56 Mt	OC- 408.74 Mt UG- Will be planned later
1.5.14	Minable Reserve "Mt"	OC-888.08 Mt UG- 17.57 Mt	OC- 664.80 Mt UG- will be planned later
1.5.15	Extractable Reserves "Mt"	OC-843.69 Mt UG- 17.57 Mt	OC- 631.56 Mt UG- will be planned later
1.5.16	% of Extraction/ recovery	68.32 % (OC+UG)	58.82% (for OC only ) UG mining to be done after exhaustion of OC mine
1.5.17	Reserve Depleted (till the base date) Reserves " Mt"	Nil	OC- 3.41 Mt (projected upto FY 2022-23)
1.5.18	Balance Extractable reserve "Mt"	OC-841.80 Mt UG- 17.57 Mt	OC- 628.15 Mt UG- will be planned later
1.5.19	Average Grade	F	G11
1.5.20	OB in MM3	3777.07 MM3	2734.58 MM3
1.5.21	SR M3/te	4.48 M3/te	4.33 M3/te
1.5.22	Mining Technology	OC- Shovel Dumper and Surface Miner UG- Continuous Miner and Shuttle Car	OC- Shovel Dumper and Surface Miner UG- to be planned later
1.5.23	Coal Beneficiation envisaged	Not envisaged	Not envisaged
1.5.24	Handling of Rejects	Not Applicable	Not Applicable
1.5.25	Land use pattern "Ha"		
1	Excavation Area	2079.56	1839.85
2	Top soil Dump		Rehanded and spread on Dumps

**MINING PLAN & WINE CLOSURE PLAN FOR TALAIPELLI COAL BLOCK**

3	External Dump		Rehandled and backfilled
4	Safety Zone	33.44	29.10
5	Other Use		19.73
6	Infrastructure area		189.60
7	Green Belt		17.16
8	Undisturbed Area		23.96
	Total	2113	2119.40
1.5.26	Reasons for revision	<p>M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talaiipalli Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL claimed that as per their calculations 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.92 to 5.25 Cum/t. Along with this, the issue of accommodation of excess GB in the designated dump area including temporary external dump and unfeasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan was raised by M/s TEMPL.</p> <p>Subsequently, M/s TEMPL chose to rescind the contract 04.05.21 and filed a Commercial Civil Suit before Hon'ble Delhi High Court.</p> <p>Subsequent to few hearings and submissions made by both the Parties, NTPC and TEMPL jointly approached CMPDIL for technical solution. CMPDIL suggested for modification of Mining plan is necessary for start of mining operations. Meanwhile, NTPC terminated the contract on 08.03.22.</p> <p>For floating of fresh NIT, as per CMPDIL's suggestion, modification of Mining plan is necessary.</p>	

### Chapter 2: Exploration, Geology, Seam Sequence, Coal Quality and Reserve

	Parameters	Details	
2.1	DETAILS OF THE BLOCK		
2.1.1	Particulars of adjacent blocks: North, South, East, West	North: Unexplored South: Unexplored and Divide of Sand-Block	East: Palma West: Chintapure Extension Block and Divide of Sand-Block
2.1.2	Location of the Block (District/State)	Talapalli Coal Block is located in the eastern part of Mand-Rajamah area, District Rajamah, State Chhattisgarh Latitude: 22° 13' 20" N to 22° 16' 12" N Longitude: 83° 25' 40" E to 83° 30' 10" E Talapalli block is covered by Survey of India top sheet No. 64W/ 4VII (R 1:5000)	
2.1.3	Area of the Block 'Ha'	2119.40 Ha	
2.1.4	Area of the geological block projected 'in Ha' (Area of the geological block considered for updation of coal reserve)	2119.40 Ha	
2.1.5	Balance area yet to be Projected 'Ha'	NIL	
2.1.6	Likely Reserve in the area yet to be projected 'Mts'	UG-193.61 Mt (to be planned at the exhaustion of the OC mine)	
2.1.7	Cardinal Point Co-ordinates of the non-coaliferous bearing area existing mining lease outside the allotted Geological Coal/Lignite Block (Duly certified in line with para 1.8 of the Guideline, if fresh mining lease required)	Attached as Annexure VIII C	
2.1.8	Certificate of authorised person/agency if the project area is confined within the vested/allotted block boundary and  Where the project area extends beyond the block boundary a certificate of authorised person/agency should be supported with a certificate of State Government mines and Geology department must be attached, which should specify (a) extent of the state government for grant of lease beyond the vested geological	The Geological Block area and the Project area are same. Project area doesn't contain any area outside the block boundary Certificate attached as Annexure II	

	<p>boundary. (b) non-existence of Coal/Lignite in the area beyond the vested allotted geological block boundary to rule out the issue of encroachment and use of coal bearing area (beyond the vested/allotted block boundary) in the mining plan.</p> <p>The Project area, Lease area and geological block area in 'He' shall also be envisaged.</p>	
2.1.9	KML file of the Proposed lease and geological block.	A KML file as on 25.10.2022 is furnished in Plate no. B. A softcopy of the KML file also provided along with the softcopy documents.
2.1.10	Whether the proposed project area is confined within the allotted block boundary, if not, the reason for deviation from allotted block boundary may be given.	Yes. The proposed project area is confined within the allotted block boundary.
2.1.11	If the project area extends outside the allotted block boundary, confirmation about non-occurrence of coal/lignite in the area under reference needs to be furnished.	Not applicable.
2.1.12	Type of the Project (Operating / under implementation) and year of Starting.	Operating. Operation started in 2018.
<b>2.2</b>	<b>EXPLORATION, GEOLOGY AND ASSESSMENT OF RESERVE</b>	
2.2.1	Regional geological set up of the area, local geology, structure, stratigraphic sequence, characteristics of the lithological units (coal seams/partings/overburden).	<p>Mand-Rajgarh Coalfield lies in the drainage basin of Mahanadi. It represents a part of the south-eastern periphery of a vast cauldron of sedimentary basin, known as Sri-Mahanadi Gondwana Master Basin. Mand-Rajgarh Coalfield along with its-Hingra coalfield towards south-west and Korba-Hausla towards west and north-west constitute the large NW-SE trending asymmetrical synformal master basin.</p> <p>The extensive occurrences of Rajgarh and Supra-Rajgarh rocks amidst isolated Talchir outcrops spanned between latitudes N21° 45' to 22° 42' and longitudes E83° 01' to E 83° 44', constitutes Mand-Rajgarh Coalfield. It is situated between D-River Coalfield in the southeast and Korba Coalfield in the northwest with more or less similar stratigraphic and tectonic setting. The coal measures in the Mand-Rajgarh basin are exposed in three well defined patches due to erosion of the overlying Permian rocks along the drainage of the prominent rivers.</p>





		<p>However a small patch of Barren Measure is also noticed in the north western part of the block. The geological succession is given below:</p> <table border="1"> <thead> <tr> <th>Formation</th> <th>Thickness (m)</th> <th>Lithology</th> </tr> </thead> <tbody> <tr> <td>Recent</td> <td>0.50 – 18.00</td> <td>Soil, alluvium</td> </tr> <tr> <td>Barren Measures</td> <td>18.80 – 143.00</td> <td>Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands</td> </tr> <tr> <td>Barakars</td> <td>30.00 – 596.00</td> <td>Fine, medium and coarse grained felspathic grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams</td> </tr> <tr> <td>Talchir</td> <td>1.00 – 54.30</td> <td>Khakee, greenish shales &amp; sandstone, occasional pebbly</td> </tr> <tr> <td>Basement</td> <td></td> <td>Metamorphics</td> </tr> </tbody> </table> <p>The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4 to 8 towards South-west. The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data with throw varying from 0-150m. Out of 12, three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. Barren Measure Formation is preserved in a limited area in the</p>	Formation	Thickness (m)	Lithology	Recent	0.50 – 18.00	Soil, alluvium	Barren Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands	Barakars	30.00 – 596.00	Fine, medium and coarse grained felspathic grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams	Talchir	1.00 – 54.30	Khakee, greenish shales & sandstone, occasional pebbly	Basement		Metamorphics
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		<p>north-western part of the block. Remaining area is structurally free except two relatively minor faults.</p> <p>The sequence of Coal seams is given below:</p> <table border="1"> <thead> <tr> <th rowspan="2">S. 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<tr><td>18</td><td>1228</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>19</td><td>1229</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>20</td><td>1230</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>21</td><td>1231</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>22</td><td>1232</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>23</td><td>1233</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>24</td><td>1234</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>25</td><td>1235</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>26</td><td>1236</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>27</td><td>1237</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> 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<tr><td>38</td><td>1248</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>39</td><td>1249</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>40</td><td>1250</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>41</td><td>1251</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>42</td><td>1252</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>43</td><td>1253</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>44</td><td>1254</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>45</td><td>1255</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>46</td><td>1256</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>47</td><td>1257</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>48</td><td>1258</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>49</td><td>1259</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>50</td><td>1260</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>51</td><td>1261</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>52</td><td>1262</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>53</td><td>1263</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>54</td><td>1264</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>55</td><td>1265</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>56</td><td>1266</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>57</td><td>1267</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>58</td><td>1268</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>59</td><td>1269</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>60</td><td>1270</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>61</td><td>1271</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>62</td><td>1272</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>63</td><td>1273</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>64</td><td>1274</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>65</td><td>1275</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>66</td><td>1276</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>67</td><td>1277</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> 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<tr><td>78</td><td>1288</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>79</td><td>1289</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>80</td><td>1290</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>81</td><td>1291</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>82</td><td>1292</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>83</td><td>1293</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>84</td><td>1294</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>85</td><td>1295</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>86</td><td>1296</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>87</td><td>1297</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>88</td><td>1298</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>89</td><td>1299</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>90</td><td>1300</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>91</td><td>1301</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>92</td><td>1302</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>93</td><td>1303</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>94</td><td>1304</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>95</td><td>1305</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>96</td><td>1306</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>97</td><td>1307</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>98</td><td>1308</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>99</td><td>1309</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>100</td><td>1310</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>101</td><td>1311</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>102</td><td>1312</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>103</td><td>1313</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>104</td><td>1314</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>105</td><td>1315</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>106</td><td>1316</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>107</td><td>1317</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>108</td><td>1318</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>109</td><td>1319</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>110</td><td>1320</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>111</td><td>1321</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>112</td><td>1322</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>113</td><td>1323</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>114</td><td>1324</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>115</td><td>1325</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>116</td><td>1326</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>117</td><td>1327</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>118</td><td>1328</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>119</td><td>1329</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>120</td><td>1330</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>121</td><td>1331</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>122</td><td>1332</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>123</td><td>1333</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>124</td><td>1334</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>125</td><td>1335</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>126</td><td>1336</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>127</td><td>1337</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>128</td><td>1338</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>129</td><td>1339</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>130</td><td>1340</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>131</td><td>1341</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>132</td><td>1342</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>133</td><td>1343</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>134</td><td>1344</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>135</td><td>1345</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>136</td><td>1346</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>137</td><td>1347</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>138</td><td>1348</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>139</td><td>1349</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>140</td><td>1350</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>141</td><td>1351</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>142</td><td>1352</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>143</td><td>1353</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>144</td><td>1354</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>145</td><td>1355</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>146</td><td>1356</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>147</td><td>1357</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>148</td><td>1358</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>149</td><td>1359</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>150</td><td>1360</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>151</td><td>1361</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>152</td><td>1362</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>153</td><td>1363</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>154</td><td>1364</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>155</td><td>1365</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>156</td><td>1366</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>157</td><td>1367</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>158</td><td>1368</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>159</td><td>1369</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>160</td><td>1370</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>161</td><td>1371</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>162</td><td>1372</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>163</td><td>1373</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>164</td><td>1374</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>165</td><td>1375</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>166</td><td>1376</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>167</td><td>1377</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>168</td><td>1378</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>169</td><td>1379</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>170</td><td>1380</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>171</td><td>1381</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>172</td><td>1382</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>173</td><td>1383</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>174</td><td>1384</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>175</td><td>1385</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>176</td><td>1386</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>177</td><td>1387</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>178</td><td>1388</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>179</td><td>1389</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>180</td><td>1390</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>181</td><td>1391</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>182</td><td>1392</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>183</td><td>1393</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>184</td><td>1394</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>185</td><td>1395</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>186</td><td>1396</td><td>0.2</td><td>0.3</td><td>0.0</td><td>0.0</td><td>0.0000</td></tr> <tr><td>187</td><td>1397</td></tr></tbody></table>	S. No.	Coal Seams	Thickness of coal (m)		Thickness of overlying (m)		Thickness (m)	Minimum	Maximum	Minimum	Maximum	1	1211	0.4	0.6	0.0	0.0	0.0000	2	1212	0.2	0.3	0.0	0.0	0.0000	3	1213	0.2	0.3	0.0	0.0	0.0000	4	1214	0.2	0.3	0.0	0.0	0.0000	5	1215	0.2	0.3	0.0	0.0	0.0000	6	1216	0.2	0.3	0.0	0.0	0.0000	7	1217	0.2	0.3	0.0	0.0	0.0000	8	1218	0.2	0.3	0.0	0.0	0.0000	9	1219	0.2	0.3	0.0	0.0	0.0000	10	1220	0.2	0.3	0.0	0.0	0.0000	11	1221	0.2	0.3	0.0	0.0	0.0000	12	1222	0.2	0.3	0.0	0.0	0.0000	13	1223	0.2	0.3	0.0	0.0	0.0000	14	1224	0.2	0.3	0.0	0.0	0.0000	15	1225	0.2	0.3	0.0	0.0	0.0000	16	1226	0.2	0.3	0.0	0.0	0.0000	17	1227	0.2	0.3	0.0	0.0	0.0000	18	1228	0.2	0.3	0.0	0.0	0.0000	19	1229	0.2	0.3	0.0	0.0	0.0000	20	1230	0.2	0.3	0.0	0.0	0.0000	21	1231	0.2	0.3	0.0	0.0	0.0000	22	1232	0.2	0.3	0.0	0.0	0.0000	23	1233	0.2	0.3	0.0	0.0	0.0000	24	1234	0.2	0.3	0.0	0.0	0.0000	25	1235	0.2	0.3	0.0	0.0	0.0000	26	1236	0.2	0.3	0.0	0.0	0.0000	27	1237	0.2	0.3	0.0	0.0	0.0000	28	1238	0.2	0.3	0.0	0.0	0.0000	29	1239	0.2	0.3	0.0	0.0	0.0000	30	1240	0.2	0.3	0.0	0.0	0.0000	31	1241	0.2	0.3	0.0	0.0	0.0000	32	1242	0.2	0.3	0.0	0.0	0.0000	33	1243	0.2	0.3	0.0	0.0	0.0000	34	1244	0.2	0.3	0.0	0.0	0.0000	35	1245	0.2	0.3	0.0	0.0	0.0000	36	1246	0.2	0.3	0.0	0.0	0.0000	37	1247	0.2	0.3	0.0	0.0	0.0000	38	1248	0.2	0.3	0.0	0.0	0.0000	39	1249	0.2	0.3	0.0	0.0	0.0000	40	1250	0.2	0.3	0.0	0.0	0.0000	41	1251	0.2	0.3	0.0	0.0	0.0000	42	1252	0.2	0.3	0.0	0.0	0.0000	43	1253	0.2	0.3	0.0	0.0	0.0000	44	1254	0.2	0.3	0.0	0.0	0.0000	45	1255	0.2	0.3	0.0	0.0	0.0000	46	1256	0.2	0.3	0.0	0.0	0.0000	47	1257	0.2	0.3	0.0	0.0	0.0000	48	1258	0.2	0.3	0.0	0.0	0.0000	49	1259	0.2	0.3	0.0	0.0	0.0000	50	1260	0.2	0.3	0.0	0.0	0.0000	51	1261	0.2	0.3	0.0	0.0	0.0000	52	1262	0.2	0.3	0.0	0.0	0.0000	53	1263	0.2	0.3	0.0	0.0	0.0000	54	1264	0.2	0.3	0.0	0.0	0.0000	55	1265	0.2	0.3	0.0	0.0	0.0000	56	1266	0.2	0.3	0.0	0.0	0.0000	57	1267	0.2	0.3	0.0	0.0	0.0000	58	1268	0.2	0.3	0.0	0.0	0.0000	59	1269	0.2	0.3	0.0	0.0	0.0000	60	1270	0.2	0.3	0.0	0.0	0.0000	61	1271	0.2	0.3	0.0	0.0	0.0000	62	1272	0.2	0.3	0.0	0.0	0.0000	63	1273	0.2	0.3	0.0	0.0	0.0000	64	1274	0.2	0.3	0.0	0.0	0.0000	65	1275	0.2	0.3	0.0	0.0	0.0000	66	1276	0.2	0.3	0.0	0.0	0.0000	67	1277	0.2	0.3	0.0	0.0	0.0000	68	1278	0.2	0.3	0.0	0.0	0.0000	69	1279	0.2	0.3	0.0	0.0	0.0000	70	1280	0.2	0.3	0.0	0.0	0.0000	71	1281	0.2	0.3	0.0	0.0	0.0000	72	1282	0.2	0.3	0.0	0.0	0.0000	73	1283	0.2	0.3	0.0	0.0	0.0000	74	1284	0.2	0.3	0.0	0.0	0.0000	75	1285	0.2	0.3	0.0	0.0	0.0000	76	1286	0.2	0.3	0.0	0.0	0.0000	77	1287	0.2	0.3	0.0	0.0	0.0000	78	1288	0.2	0.3	0.0	0.0	0.0000	79	1289	0.2	0.3	0.0	0.0	0.0000	80	1290	0.2	0.3	0.0	0.0	0.0000	81	1291	0.2	0.3	0.0	0.0	0.0000	82	1292	0.2	0.3	0.0	0.0	0.0000	83	1293	0.2	0.3	0.0	0.0	0.0000	84	1294	0.2	0.3	0.0	0.0	0.0000	85	1295	0.2	0.3	0.0	0.0	0.0000	86	1296	0.2	0.3	0.0	0.0	0.0000	87	1297	0.2	0.3	0.0	0.0	0.0000	88	1298	0.2	0.3	0.0	0.0	0.0000	89	1299	0.2	0.3	0.0	0.0	0.0000	90	1300	0.2	0.3	0.0	0.0	0.0000	91	1301	0.2	0.3	0.0	0.0	0.0000	92	1302	0.2	0.3	0.0	0.0	0.0000	93	1303	0.2	0.3	0.0	0.0	0.0000	94	1304	0.2	0.3	0.0	0.0	0.0000	95	1305	0.2	0.3	0.0	0.0	0.0000	96	1306	0.2	0.3	0.0	0.0	0.0000	97	1307	0.2	0.3	0.0	0.0	0.0000	98	1308	0.2	0.3	0.0	0.0	0.0000	99	1309	0.2	0.3	0.0	0.0	0.0000	100	1310	0.2	0.3	0.0	0.0	0.0000	101	1311	0.2	0.3	0.0	0.0	0.0000	102	1312	0.2	0.3	0.0	0.0	0.0000	103	1313	0.2	0.3	0.0	0.0	0.0000	104	1314	0.2	0.3	0.0	0.0	0.0000	105	1315	0.2	0.3	0.0	0.0	0.0000	106	1316	0.2	0.3	0.0	0.0	0.0000	107	1317	0.2	0.3	0.0	0.0	0.0000	108	1318	0.2	0.3	0.0	0.0	0.0000	109	1319	0.2	0.3	0.0	0.0	0.0000	110	1320	0.2	0.3	0.0	0.0	0.0000	111	1321	0.2	0.3	0.0	0.0	0.0000	112	1322	0.2	0.3	0.0	0.0	0.0000	113	1323	0.2	0.3	0.0	0.0	0.0000	114	1324	0.2	0.3	0.0	0.0	0.0000	115	1325	0.2	0.3	0.0	0.0	0.0000	116	1326	0.2	0.3	0.0	0.0	0.0000	117	1327	0.2	0.3	0.0	0.0	0.0000	118	1328	0.2	0.3	0.0	0.0	0.0000	119	1329	0.2	0.3	0.0	0.0	0.0000	120	1330	0.2	0.3	0.0	0.0	0.0000	121	1331	0.2	0.3	0.0	0.0	0.0000	122	1332	0.2	0.3	0.0	0.0	0.0000	123	1333	0.2	0.3	0.0	0.0	0.0000	124	1334	0.2	0.3	0.0	0.0	0.0000	125	1335	0.2	0.3	0.0	0.0	0.0000	126	1336	0.2	0.3	0.0	0.0	0.0000	127	1337	0.2	0.3	0.0	0.0	0.0000	128	1338	0.2	0.3	0.0	0.0	0.0000	129	1339	0.2	0.3	0.0	0.0	0.0000	130	1340	0.2	0.3	0.0	0.0	0.0000	131	1341	0.2	0.3	0.0	0.0	0.0000	132	1342	0.2	0.3	0.0	0.0	0.0000	133	1343	0.2	0.3	0.0	0.0	0.0000	134	1344	0.2	0.3	0.0	0.0	0.0000	135	1345	0.2	0.3	0.0	0.0	0.0000	136	1346	0.2	0.3	0.0	0.0	0.0000	137	1347	0.2	0.3	0.0	0.0	0.0000	138	1348	0.2	0.3	0.0	0.0	0.0000	139	1349	0.2	0.3	0.0	0.0	0.0000	140	1350	0.2	0.3	0.0	0.0	0.0000	141	1351	0.2	0.3	0.0	0.0	0.0000	142	1352	0.2	0.3	0.0	0.0	0.0000	143	1353	0.2	0.3	0.0	0.0	0.0000	144	1354	0.2	0.3	0.0	0.0	0.0000	145	1355	0.2	0.3	0.0	0.0	0.0000	146	1356	0.2	0.3	0.0	0.0	0.0000	147	1357	0.2	0.3	0.0	0.0	0.0000	148	1358	0.2	0.3	0.0	0.0	0.0000	149	1359	0.2	0.3	0.0	0.0	0.0000	150	1360	0.2	0.3	0.0	0.0	0.0000	151	1361	0.2	0.3	0.0	0.0	0.0000	152	1362	0.2	0.3	0.0	0.0	0.0000	153	1363	0.2	0.3	0.0	0.0	0.0000	154	1364	0.2	0.3	0.0	0.0	0.0000	155	1365	0.2	0.3	0.0	0.0	0.0000	156	1366	0.2	0.3	0.0	0.0	0.0000	157	1367	0.2	0.3	0.0	0.0	0.0000	158	1368	0.2	0.3	0.0	0.0	0.0000	159	1369	0.2	0.3	0.0	0.0	0.0000	160	1370	0.2	0.3	0.0	0.0	0.0000	161	1371	0.2	0.3	0.0	0.0	0.0000	162	1372	0.2	0.3	0.0	0.0	0.0000	163	1373	0.2	0.3	0.0	0.0	0.0000	164	1374	0.2	0.3	0.0	0.0	0.0000	165	1375	0.2	0.3	0.0	0.0	0.0000	166	1376	0.2	0.3	0.0	0.0	0.0000	167	1377	0.2	0.3	0.0	0.0	0.0000	168	1378	0.2	0.3	0.0	0.0	0.0000	169	1379	0.2	0.3	0.0	0.0	0.0000	170	1380	0.2	0.3	0.0	0.0	0.0000	171	1381	0.2	0.3	0.0	0.0	0.0000	172	1382	0.2	0.3	0.0	0.0	0.0000	173	1383	0.2	0.3	0.0	0.0	0.0000	174	1384	0.2	0.3	0.0	0.0	0.0000	175	1385	0.2	0.3	0.0	0.0	0.0000	176	1386	0.2	0.3	0.0	0.0	0.0000	177	1387	0.2	0.3	0.0	0.0	0.0000	178	1388	0.2	0.3	0.0	0.0	0.0000	179	1389	0.2	0.3	0.0	0.0	0.0000	180	1390	0.2	0.3	0.0	0.0	0.0000	181	1391	0.2	0.3	0.0	0.0	0.0000	182	1392	0.2	0.3	0.0	0.0	0.0000	183	1393	0.2	0.3	0.0	0.0	0.0000	184	1394	0.2	0.3	0.0	0.0	0.0000	185	1395	0.2	0.3	0.0	0.0	0.0000	186	1396	0.2	0.3	0.0	0.0	0.0000	187	1397
S. No.	Coal Seams	Thickness of coal (m)			Thickness of overlying (m)		Thickness (m)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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**MINING PLAN & MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK**

2.2.8	Whether any further exploration/study is required or suggested and time frame in which it is to be completed	No
2.2.9	Year wise future programme of exploration	NA
2.2.10	Overall borehole density within the block (no/ sq. km) approx	5.52 bhs/sq km
2.2.11	No of Seams available as per GR (Geological Report)	27 nos of correlatable coal seams/splits viz: X-LA, X-LB, X-TOP, X-BOT, IX-L2, IX -L1, IX, VIII, VII, VI-TOP, VI-MID, VI-BOT, V-TOP, V-MID, V-BOT, IV-TOP, IV-MID, IV-L, IV-BOT, III L, III, II L3, II L2, II L1, II, II L, I
2.2.12	Seams not considered for Mining with Reasons	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining. Further below seams cannot be mined by OC method due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
2.2.13	Dip of the Seam	The general strike is NW-SE with south-westerly dip of 4-8 deg
2.2.14	Seam wise thickness, depth and reserve	

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



Seam	Thickness Range (m)	Depth Range (m)	Net Geological Reserve (Mts)	Blocked Reserve (Mts)					Available Reserve (Mts)	
				Highwall Barrier	River/Canal /Road/ Infra	Barrier	Un-economical	Total Blocked	UG	DC
N-LA	0.20-1.06	21.46-165.78	3.54	0.00	0.10	3.43		3.43		0.10
N-LB	0.30-1.28	14.52-177.58	4.85	0.08	0.38	4.45		4.57		0.28
N-TOP	0.40-1.60	10.97-137.19	14.13	1.62	0.75	4.75		7.12		7.00
N-BOT	1.6-8.1	12.28-192.93	80.41	8.91	10.04	5.83		24.79		55.62
N-L2	1.2-2.55	10.78-225.31	28.96	3.35	3.73	2.26		9.34		19.62
N-11	0.35-1.85	10.78-225.31	24.79	4.48	3.41	1.67		9.56		14.74
N1	0.95-6.95	11.87-238.02	102.33	14.48	10.20	5.46		30.15		72.18
N11	2.06-6.64	7.95-256.47	128.25	20.02	12.46	9.26		41.64		86.61
N4	0.10-3.90	58.20-270.08	15.46	5.04	5.13	2.11		12.30		3.16
V-TOP	0.37-3.42	12.08-312.32	34.29	5.76	4.34	4.62		14.72		19.58
V-MID	3.09-10.01	9.96-321.49	180.92	33.84	15.29	15.83		64.73		116.19
V-BOT	0.29-1.75	12.43-328.50	10.94	1.37	0.15	5.09		6.61		4.38
V-TOP	0.50-3.09	12.44-347.15	17.01	4.40	2.48	2.62		9.50		7.42
V-MID	0.15-3.73	15.57-360.80	36.36	9.32	7.68	5.59		17.59		18.57
V-BOT	0.30-6.40	22.96-377.50	42.20	8.58	2.72	6.63		18.28		23.92
IV-TOP	0.54-5.78	10.87-405.19	93.37	25.12	2.79	10.58		37.99		55.33
IV-MID	0.93-7.24	19.55-425.07	145.48	35.80	12.67	10.90		59.37		86.11
IV-L	0.23-4.99	23.78-400.13	31.13	5.99	0.44	5.29		11.33		19.80
IV-BOT	0.55-5.67	28.39-407.70	73.49	17.86	4.36	3.91		26.13		46.05
II-L	0.10-3.25	42.78-421.12	33.04							
II	0.65-5.97	80.11-466.90	80.05							
II-L3	0.50-3.09	115.68-570.84	17.96							
II-L2	0.07-2.68	129.88-549.90	8.41							
II-L1	0.05-1.54	185.01-578.05	6.97							
I	0.19-5.97	199.41-581.16	42.29							
I-L	0.05-2.45	241.50-502.44	4.39							
I-L	0.22-0.95	326.35-481.72	0.00							
Total			3267.15	209.86	98.26	100.51	0.00	408.74	0.00	664.80

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



Mining Leases	Extractable Reserve (Mtpa)		As on Base Date (Mtpa)*							Reason not considered for mining	
	UG	OC	Depletion of Reserve			Balance Reserve					
			Highwall	UG	OC	Highwall	UG	OC	Total		
0.01		0.10							0.10	0.10	
0.01		0.25							0.25	0.25	
0.35		6.65			0.06				6.59	6.59	
2.78		52.84			0.68				52.16	52.16	
0.98		18.64			0.25				18.39	18.38	
0.99		18.75			0.25				18.50	18.50	
3.61		68.57			1.00				67.57	67.57	
4.13		82.28			1.15				81.13	81.13	
0.18		3.37							3.37	3.37	
0.98		18.60							18.60	18.60	
5.81		110.38							110.38	110.38	
0.22		4.11							4.11	4.11	
0.17		7.05							7.05	7.05	
0.93		17.64							17.64	17.64	
1.20		22.72							22.72	22.72	
2.73		53.04							53.04	53.04	
4.32		82.09							82.09	82.09	
0.99		18.81							18.81	18.81	
2.40		45.66							45.66	45.66	
											To be considered for UG Mining after exhaustion of OC mine
											Unmineable
	33.24	0.00	631.56	0.00	0.00	3.40	0.00	0.00	628.15	628.15	

\* upto 2023-23

Note: Seam III L and below seams shall be considered for UG mining after exhaustion of OC mine.

2.2.15

Methodology of reserves estimation (also mention if any software package has been used)

Basic assumptions and considerations for reserve estimations are listed below. Minex Package has been utilized for resource estimation

- i) The isochrones, isograde and the floor contours, Iso-OB, Iso depth lines have been generated by Minex Software.
- ii) The open cast reserves have been estimated on the basis of 1-100 thickness for the seams from seam XLA to IV Bottom, where all the carbonaceous bands and obvious bands individually or collectively upto 1m. thickness have been included in the seam & >1m bands have been excluded.

		<p>iii) The reserves have been estimated on 1-30 thickness for the seams from III L to II L as underground reserve.</p> <p>iv) Reserves are not estimated for BCS, &amp; IP seam thicknesses.</p> <p>v) The opencast reserves are estimated for 1 m and above seam thickness &amp; at 1 m thickness interval. For underground reserves estimation minimum workable thickness has been considered as 0.50m, 0.90, 1.2, 1.50 m thickness and onward at 0.50 m thickness interval. The highly disturbed zone between fault F8, F9, F4, F7 and F5 area, the reserve have been estimated in indicated category for all the seams.</p> <p>vi) Iso-overburden &amp; Iso-quarry lines are generated through model upto the floor of seam-IV Bottom. The Iso-overburden lines are compared with combined coal thickness to generated C: OB lines, sub sector wise.</p> <p>vii) A 60 m barrier zone is left for Kelo River and its tributary as nala.</p> <p>viii) All volumes of coal are estimated by Minex Software Model and reserves are estimated as:  <math>\text{Gross Reserves} = \text{Area} \times \text{Thickness} \times \text{Sp. Gravity of Coal}</math></p> <p>ix) A 10% deduction has been made from the gross proved reserves to arrive at the net-in-situ proved reserves available in the block for open cast potential and underground area where as 100% gross reserves are considered for Indicated category.</p>
2.2.16	Average GCV "Kcal/Kg"	4214 Kcal/kg (G-11)
2.2.17	Gross Geological Reserve of the block "Mte"	1407.94 Mt
2.2.18	Net Geological Reserve of the block "Mte"	1267.15 Mt
2.2.19	Mineable Reserve of the block "Mte"	OC- 664.80 Mt UG- will be planned later
2.2.20	Blocked Reserve "Mte"	OC- 408.74 Mt UG- Will be planned later
2.2.21	Corresponding extractable Reserve of the block "Mte"	OC- 631.68 Mt UG- will be planned later

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPELLI COAL BLOCK



2.2.22	Percentage of Extraction	58.82% (for OC only) UG mining to be done after exhaustion of OC mine
2.2.23	Reserve already depleted (Base date of Mining Plan)	OC- 3.41 MI (projected upto FY 2022-23)
2.2.24	Balance Reserve (as on Base Date)	OC- 628.15 MI UG- will be planned later

### Chapter 3: Mining

	<b>Parameters</b>	<b>Details</b>
<b>3.1</b>	<b>MINING METHOD</b>	
3.1.1	Existing method of mining if the mine is under operation	Opencast Mining – Coal extraction with Surface Miner and OB removal with Shovel-Dumper
3.1.2	Proposed method of mining with justification on suitability of method of mining	<p><b>PROPOSED METHOD OF MINING</b></p> <p>Considering the geo-mining characteristics of the block, dumping space constraints and for conservation of resource, it is proposed to extract the coal reserves upto Seam IV BOT using open cast mining Method because of following reasons –</p> <p>i) Occurrence of multiple seam with a significant number having low thickness between 0.5m-1.5m. Also, some seams are thick and are above 5m in thickness. Coal loss in such seam conditions can be minimized by opencast mining method.</p> <p>ii) The existence of very low cover for entry to bottom-most seam considered (Seam-IV BOT) in the eastern part of the block makes opencast mining an obvious choice.</p> <p>The deposit has therefore been proposed for mining by opencast method up to the Seam IV BOT Floor. Seam below IV BOT shall be considered for UG mining after exhaustion of OC mine.</p> <p><b>Seams encountered in Talaiipalli Block:</b></p> <p>A total of 27 Coal Seams have been encountered in Talaiipalli Block. The sequence of coal seams is given below:</p>



## MINING PLAN &amp; WNE CLOSURE PLAN FOR TALAI PALLI COAL BLOCK



S. No.	Coal Seam	Thickness of Coal Seam (m)		Thickness of Parting (m)		Downcast Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA Parting	0.2	1.08	5.41	11.9	0.50-0.90
2	X LB Parting	0.3	1.28	8.27	11.88	0.50-0.90
3	Y Top Parting	0.4	1.6	0.7	1	1.00-1.35
4	X Bottom Parting	1.8	8.1	2.3	20.15	3.5-6.5
5	Y L1 Parting	1.3	2.55	12.68	29.68	8.2-12.0
6	Z L1 Parting	0.30	1.85	5.65	15.87	1.2-2.0
7	Z Parting	0.86	5.58	0.3	18.35	2.5-6.0
8	VIII Parting	1.86	8.64	17.68	42.01	4.0-6.5
9	VII Parting	0.1	2.0	1.08	17.48	10.0-15.0
10	VI Top Parting	0.37	2.42	0.56	3.25	4.0-4.0
11	V Middle Parting	1.02	10.01	0.65	1.98	1.2-2.0
12	VI Bottom Parting	0.88	1.75	1.4	22.45	0.50-1.0
13	V Top Parting	0.9	2.00	3.05	18.94	14.0-31.0
14	V Bottom Parting	0.15	2.71	8.55	15.25	0.50-2.00
15	IV Middle Parting	0.2	6.4	15.88	40.88	0.50-2.0
16	IV Top Parting	0.54	5.78	7.3	20.18	2.5-5.0
17	V Middle Parting	0.22	2.24	0.25	8.55	6.0-10.0
18	V L Parting	0.22	4.29	0.7	4.15	3.2-7.0
19	IV Bottom Parting	0.35	3.67	8.05	21.58	3.5-5.5
20	III Parting	0.1	1.25	24.57	41.55	0.50-1.0
21	III Parting	0.68	5.87	8.7	30.88	13.0-38.0
22	II L2 Parting	0.5	2.00	13.25	40.5	2.0-5.5
23	II L2 Parting	0.07	1.08	5	80.30	1.0-2.0
24	II L1 Parting	0.05	1.58	1.27	20.88	0.50-1.0
25	I Parting	0.19	5.82	0.27	1.39	1.2-3.5
26	I L Parting	0.22	2.42			0.50-2.0
27		0.62	1.25		Ground 35.0 m	0.50-2.0

Seam I is poorly developed in the block. Hence resource of this seam has not been assessed.

Out of the above, seams workable by opencast are: from topmost X LA to IV BOTTOM seam due to constraint of space for dumping. The remaining have underground potential.

Geo-Mining Characteristics of workable seams for DC					
S. No.	Particulars	Unit			Usual/ Mean
			Minimum (m)	Maximum (m)	
I	Coal Seam Thickness				
	X LA	m	0.20	1.04	0.50-0.95
	X LB	m	0.30	1.28	0.50-0.90
	X Top	m	0.40	1.60	1.00-1.15
	X Bot	m	1.60	8.10	3.5-6.0
	IX L2	m	1.20	2.55	1.2-2.0
	IX L1	m	0.36	1.95	1.2-2.0
	IX	m	0.98	8.98	3.5-6.0
	VIII	m	2.08	8.64	4.0-8.5
	VII	m	0.10	3.90	0.50-1.0
	VI Top	m	0.37	3.42	1.2-3.0
	VI Mid	m	3.09	10.01	5.0-9.0
	VI Bot	m	0.48	1.75	0.50-1.0
	V Top	m	0.50	3.09	0.50-1.50
	V Mid	m	0.15	3.73	0.50-2.50
	V Bot	m	0.3	5.4	0.50-2.0
	IV Top	m	0.54	5.78	2.5-5.0
	IV Mid	m	1.02	7.22	3.5-7.0
	IV L	m	0.24	4.97	0.50-2.0
	IV Bot	m	0.55	5.67	1.5-3.5
II	Thickness of Parting				
	Parting X LA & X LB	m	5.41	11.7	6.0-9.3
	Parting X LB & X TOP	m	3.37	14.80	4.0-6.0
	Parting X TOP & X BOT	m	0.80	2.88	1.0-2.0
	Parting X BOT & IX L2	m	2.30	20.15	3.5-16.5
	Parting IX L2 & IX L1	m	13.59	21.54	17.0-18.5
	Parting IX L1 & IX	m	6.65	11.87	6.0-8.0
	Parting IX & VIII	m	6.30	16.15	9.0-12.0
	Parting VIII & VII	m	17.68	42.01	20.0-25.0
	Parting VIII & VI TOP	m	1.08	17.44	4.0-14.0
	Parting VI TOP & VI MID	m	0.56	3.25	0.5-1.5
	Parting VI MID & VI BOT	m	0.85	5.98	1.0-2.0
	Parting VI BOT & V TOP	m	2.80	23.45	14.0-21.0
	Parting V TOP & V MID	m	9.09	18.94	11.5-16.5
	Parting V MID & V BOT	m	4.55	15.95	0.50-12.0
	Parting V BOT & IV TOP	m	15.16	30.14	17.0-23.0
	Parting IV TOP & IV MID	m	5.30	20.13	6.0-10.0

		Pering IV MD & W/L	m	0.75	4.95	3500
		Pering IV L & V BOP	m	0.75	4.95	3500
III	Seam Gradient	degree				4.95
IV	Maximum Depth	m				340
V	Specific Gravity	kg/m <sup>3</sup>				
		- Coal				1.25
		- Overburden				2.4
<p><b>CHOICE OF TECHNOLOGY</b></p> <p>The operational factors include</p> <ul style="list-style-type: none"> <li>➤ Multi-Seam operation involving 10 seams for 1000</li> <li>➤ Effective seam thickness varying from 1.00 to 5.00 m with majority of seams having less effective thickness varying from 1.00 to 2.50m.</li> <li>➤ Mild seam gradient.</li> <li>➤ OB with varying parting thickness.</li> </ul> <p>Based on the above factors surface mine has been considered for extraction of coal as surface mine eliminates blasting in coal. Blasting in comparatively less thick coal seams leads to higher overburden of extracted coal.</p> <p>As removal of overburden with varying parting thickness requires flexible operation, shovel-dumper combination with conventional system of mining i.e. inclined drag has been considered for removal of overburden.</p> <p>For a rated capacity of 25.0 Mtpa, it is proposed to deploy 10-12 Cum Hydraulic Shovelbackhoe and 20-22 Cum Hydraulic shovelbackhoe with 100T and 200T Rear Dumper respectively for OB. For Coal, Surface Miner with Front End Loader and 80T Dumper shall be deployed.</p> <p><b>CONSTRAINTS ON MINE DEVELOPMENT</b></p> <p>The following constraints in opencast working of the deposit have been envisaged:</p>						

		<ul style="list-style-type: none"> <li>• The block area being surrounded by coal bearing blocks and hills in all sides, availability of any land for external dumping, outside the block area appears remote.</li> <li>• Kelo river flowing along the north-eastern side of the block</li> <li>• Presence of about 08 villages (fully or partly) within the proposed mining area.</li> <li>• High initial Depth of base seam in the western side due to presence of several faults and high stripping ratio especially in the western side of the block requires huge amount of temporary external dump in the dip side which needs to be re-handled later.</li> </ul> <p><b>PIT FORMULATION STRATEGY:</b></p> <p>As the block area is surrounded by coal bearing blocks on all sides and reserve forest, there is no availability of any land for external dumping outside the block area.</p> <p>The mine boundary for the pit has been delineated taking into consideration block boundary, surface features, strip ratio and <b>external dump space required for continuity of mining.</b></p> <p>Considering the above, the pit is formulated with maximum possible external OB dump on the dip side within the block to be re-handled later and internal dumping in the de-coaled area.</p> <p><b>Pit optimization has been done considering constraint on space availability for dumping of waste.</b></p> <p>The pit boundary has been fixed leaving safety barrier, conveyor corridor along the eastern, southern and western boundary. Also, the infrastructural facilities (MGR, Silos, workshop etc) is proposed to be located in the south-west corner of the block.</p> <p>The proposed Pit has been formulated considering Seam IV as base seam. Seam IV has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 50-60m below seam IV increases the OB</p>
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		<p>handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. So, Opencast mining for the Talaiipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal.</p> <p>Considering the above quarry surface within the block has been delineated as follow:</p> <table border="1"> <thead> <tr> <th>North</th> <th>East</th> <th>South</th> <th>West</th> </tr> </thead> <tbody> <tr> <td>50m from Block boundary, foothill of the Tolge Hill in NW and leaving area for UG infrastructure in north near BH MNRT-92.</td> <td>60m from edge of Kelo river and 50m from Block boundary</td> <td>50m from block boundary</td> <td>50m from Block boundary and leaving area for infrastructure in south-west</td> </tr> </tbody> </table> <p><b>RATED CAPACITY:</b></p> <p>Revised Mining Plan for Talaiipalli Coal Block has been prepared for a rated/peak capacity of 25.0 Mty of Coal from Opencast mine. This output is considered based on thickness of multiple coal seams (19 No. of Coal Horizons for OCP) and strike length of ~5 Km</p> <p><b>BASIC PROJECT AND MINE PARAMETERS:</b></p> <p>The basic project parameters and mine parameters is given below:</p> <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Parameters</th> <th>Unit</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Net Geological Reserve</td> <td>Mt</td> <td>1267.145</td> </tr> <tr> <td>2</td> <td>Extractable Reserve by OC method</td> <td>Mt</td> <td>631.56</td> </tr> <tr> <td>3</td> <td>OB Volume</td> <td>Mcum</td> <td>2734.58</td> </tr> <tr> <td>4</td> <td>Stripping ratio</td> <td>Cum/t</td> <td>4.33</td> </tr> <tr> <td>5</td> <td>Target Capacity</td> <td>Mt/year</td> <td>25</td> </tr> <tr> <td>6</td> <td>Tentative Mine life</td> <td>Years</td> <td>31</td> </tr> </tbody> </table>	North	East	South	West	50m from Block boundary, foothill of the Tolge Hill in NW and leaving area for UG infrastructure in north near BH MNRT-92.	60m from edge of Kelo river and 50m from Block boundary	50m from block boundary	50m from Block boundary and leaving area for infrastructure in south-west	Sl. No.	Parameters	Unit	Value	1	Net Geological Reserve	Mt	1267.145	2	Extractable Reserve by OC method	Mt	631.56	3	OB Volume	Mcum	2734.58	4	Stripping ratio	Cum/t	4.33	5	Target Capacity	Mt/year	25	6	Tentative Mine life	Years	31
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Sl. No.	Parameters	Unit	Value
1	Maximum depth	m	340
2	Usual strike length: along the Mine Floor	m	4800
	along the Mine Surface	m	5300
4	Usual dip rise length: on the Mine Floor	m	2500
	on the Mine Surface	m	3200
6	Area: On the Mine Floor	ha	1301.10
	On the Mine Surface	ha	1839.85

**SEQUENCE OF MINING:**

The block has NW-SE strike of around 5 km. Opencast mining for the Talaipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal and effective dump management. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping and infrastructures. The peak rated capacity for the block is proposed to be 25.00 Mtpy.

To ensure availability of adequate quantity of coal and early reaching of target capacity, a two-entry scenario has been envisaged: one on the north eastern side and the other on the north-western side. Seam IV will be accessed from both the side which will form the base of the quarry. Then working front of both the quarry will advance towards south and towards each other eventually merging into a single quarry with full strike length after about 9-10 years.

In the initial years, simultaneous working of mechanized opencast mine and the projected belowground mine may pose operational problems due to massive production from the opencast unit. As such, it is considered prudent to start underground mine work after exhaustion of opencast workings.

		<p>OB will be transported through flank roads to Internal OB dumps and temporary external OB dumps in dip side. Coal is proposed to be transported through ramps and flank roads. Coal from both pit in initial years and also after merger of the pit will be transported to mobile coal handling arrangement at the surface in both eastern and western side and thereafter to Coal dispatch center by surface conveyors.</p> <p>It is proposed to use conventional method of mining viz. inclined slicing with excavators/ loaders loading coal and waste into Dumpers for hauling.</p> <p>The mining operation in the block is continuing in the southern part of the block since October 2019 through outsourcing means upto seam VIII. This south pit is projected to extract 2.81 Mt of coal by the end of FY 2022-23. This pit will extend for another 3 years after FY 2022-23. The projected coal production and OB removal from this south pit and its extension is given below:</p> <table border="1"> <thead> <tr> <th rowspan="2">Year</th> <th rowspan="2">Calendar Year</th> <th colspan="2">Existing South Pit and its extension</th> </tr> <tr> <th>Coal (Mte)</th> <th>OB (Mcum)</th> </tr> </thead> <tbody> <tr> <td>Upto Base Yr FY 2022-23</td> <td>Upto Base Yr FY 2022-23</td> <td>2.81</td> <td>16.01</td> </tr> <tr> <td>1</td> <td>2023-24</td> <td>1.50</td> <td>11.10</td> </tr> <tr> <td>2</td> <td>2024-25</td> <td>2.03</td> <td>11.77</td> </tr> <tr> <td>3</td> <td>2025-26</td> <td>1.58</td> <td>5.91</td> </tr> <tr> <td colspan="2"><b>Total</b></td> <td><b>7.92</b></td> <td><b>44.80</b></td> </tr> </tbody> </table> <p>Moreover, the work for mining operation through outsourcing means in the north-western side has already been awarded for 5 years upto Seam VIII. The pit will be opened in the north west side as per the proposed mine entry and the mine will produce about 14.69 Mt of coal with 46.63 Mcum of OB removal in the 5 years out of which 0.80 Mt of coal is projected to be extracted in 2022-23. The OB will be dumped south of the proposed western pit near the pit and will have to be re-handled to</p>	Year	Calendar Year	Existing South Pit and its extension		Coal (Mte)	OB (Mcum)	Upto Base Yr FY 2022-23	Upto Base Yr FY 2022-23	2.81	16.01	1	2023-24	1.50	11.10	2	2024-25	2.03	11.77	3	2025-26	1.58	5.91	<b>Total</b>		<b>7.92</b>	<b>44.80</b>
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		<p>proposed temporary external dump in the southern part of the block after 5 years.</p> <p>The proposed coal production and OB removal from the eastern and western pit for first 5 years of operation is given below:</p>					
		West Pit		East Pit		Total Coal (Mtc)	Total OB (Mtcum)
	Calendar Year	Coal (Mtc)	OB (Mtcum)	Coal (Mtc)	OB (Mtcum)		
	13 <sup>th</sup> Base Yr FY 2023-23	0.60	4.45			0.60	4.45
	1	2023-24	1.07	6.29	0.98	2.05	10.00
	2	2024-25	2.09	8.92	1.97	4.06	18.00
	3	2025-26	4.01	10.94	3.99	8.00	22.00
	4	2026-27	4.00	11.02	5.00	9.00	35.00
	5	2027-28	3.08	5.44	11.37	14.47	55.57
	Total	14.85	46.53	21.31	38.37	36.00	185.00
		<p>The average lead for OB dumping works out to be around 3.5-4 km. However, in initial 10 years, the lead for external dumps would be around 5-6 Km and lead for internal dumps will be around 3.5-4 km.</p> <p>The average lead for coal would be around 3.5-4 km. However in initial years, the lead would be around 2.5-3 km.</p> <p>The lead estimation is tentative and may be estimated each year in the yearly operation plan.</p>					
		<p><b>MINING SYSTEM PARAMETERS :</b></p> <p>Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.</p>					
		<p><b>Top OB and thick partings:</b></p> <p>Bench height :10-15 m with 20cum electric-hydraulic shovel/backhoe</p> <p>Bench width :Working-40-45m, Non-working- 25m</p> <p>Bench slope :70 deg</p>					



		<p><b>Parting between seams:</b></p> <p>Bench height : as per inter-burden thickness with 10-12 cum electric-hydraulic shovel/ backhoe</p> <p>Bench width : Working- 40-45m, Non-working- 25m</p> <p>Bench slope : 70 deg</p> <p><b>Coal:</b></p> <p>Bench height : Seam height with Surface Miner</p> <p>Bench width : 40-45m</p> <p>Bench slope : 70 deg</p> <p><b>Dump:</b></p> <p>Bench height : 30m</p> <p>Bench width : 30m</p> <p>Bench slope : 37 deg</p> <p><b>WASTE DISPOSAL STRATEGY :</b></p> <p>It is envisaged that initially for 3 years, all the OB generated will be dumped externally from both the eastern and western pit. This temporary external dump is proposed to be located in the southern side of the block. Once sufficient void is created after 3 years of operation, internal dumping will start in eastern pit while in the Western pit, internal dumping can be started only from 8th year of operation once the base seam is reached.</p> <p>The external dumping will continue till 13th year and thereafter from 14th year, this external dump (the OB part) will have to be re-handled back into the quarry void for smooth mine advancement. However, re-handling of 3.73 Mcum/year of Top Soil for spreading over internal dump will start from 10<sup>th</sup> year only.</p>
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		<p>Out of the total OB of 2734.58 Mcum, it is estimated that 533.53 Mcum (~19.5%) will be required to be temporarily dumped externally. This 533.53 Mcum will be re-handled back into the quarry after sufficient space is available for accommodation of waste from 14<sup>th</sup> year and will be re-handled upto 25<sup>th</sup> year. The lead for re-handling would be around 3.5 km. The Strip ratio for the project including re-handling will be 5.17 cum/t.</p> <p>The height of the temporary external dump is proposed to be around 120m above ground level upto an RL of +420m and final height of the internal dump is proposed to be 120m above ground level upto an RL of +420m. This will ensure optimization of the life of the mine to extract maximum mineable coal. However, a slope stability study will be imperative to determine final dump height and final dump slope as per regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020. Slope stability analysis for proposed dumps in the mining plan has been carried out and the factor of safety for dump height upto 120m from OGL was modelled using the cross sections and the material properties collected from the field. The analysis indicates a factor of safety in the range of 1.25-1.50 for various cases.</p> <p>Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 37<sup>o</sup>(equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 30 m. Overall slope of dump works out to be 23<sup>o</sup>- 24<sup>o</sup>. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.</p> <p>The waste disposal schedule is given below:</p>
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MINING PLAN & MINE CLOSURE PLAN FOR TALAIKALLI COAL BLOCK



Sl. No.	Proposed Area (Sq. Met)		Total Area (Sq. Met)		Total Area (Sq. Met)	Total Area (Sq. Met)		Total Area (Sq. Met)	
	Proposed	Existing	Proposed	Existing		Proposed	Existing	Proposed	Existing
1	100	100	100	100	100	100			
2	100	100	100	100	100	100			
3	100	100	100	100	100	100			
4	100	100	100	100	100	100			
5	100	100	100	100	100	100			
6	100	100	100	100	100	100			
7	100	100	100	100	100	100			
8	100	100	100	100	100	100			
9	100	100	100	100	100	100	100	100	
10	100	100	100	100	100	100	100	100	
11	100	100	100	100	100	100	100	100	
12	100	100	100	100	100	100	100	100	
13	100	100	100	100	100	100	100	100	
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99	100	100	100	100	100	100	100	100	
100	100	100	100	100	100	100	100	100	

Schedule for Top soil removal and management is given below:

## MINING PLAN &amp; WNE CLOSURE PLAN FOR TALAIPELLI COAL BLOCK



Year	Top Soil Removal (Mcum)	Top soil disposal (Mcum)			Re-handling of Top Soil (Mcum)
		Temporary External Dump	Internal Dump	Embankment	
Proposed Base Yr FY 2022-23	1.77	1.77			
1	0.94	0.93		0.01	
2	1.03	1.03			
3	1.25	1.25			
4	1.88	1.88			
5	3.38	3.38			
6	4.97	3.27	1.70		
7	3.87	2.17	1.70		
8	3.87	2.17	1.70		
9	3.87	2.17	1.70		
10	3.87	2.17	1.70		3.73
11	4.31	2.61	1.70		3.73
12	5.32		5.32		1.70
13	5.32		5.32		3.73
14	5.32		5.32		4.97
15	1.90		1.90		4.97
16	3.29		3.29		
17	3.76		3.76		
18	3.76		3.76		
19	3.76		3.76		
20	3.76		3.76		
21	2.86		2.86		
22	2.82		2.82		
23	2.82		2.82		
24	2.82		2.82		
25	2.82		2.82		
26	2.66		2.66		
27	1.45		1.45		
28	1.45		1.45		
29	1.45		1.45		
30	0.71		0.71		
31	0.09		0.09		
<b>Total</b>	<b>93.13</b>	<b>34.71</b>	<b>68.35</b>	<b>0.01</b>	<b>34.71</b>
3.1.3	Coal production capacity proposed "Mtpa"	25.00 Mtpa (Peak Rated Capacity)			
3.1.4	Justification for optimization Coal production capacity	Considering the geo-mining condition, cumulative thickness of coal seams (~40m) and strike length of 5 Km, the production capacity of 25 Mty is justified.			
3.1.5	Calendar year from which production will start	2023-24			
3.1.6	Year of achieving rated production	2037-38(15 <sup>th</sup> year of Calendar Programme)			
3.1.7	Coal Production Plan "MT"	Coal production and overburden removal is planned from 1st year, i.e. 2023-24			

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPELLI COAL BLOCK



Year wise production schedule is given below:								
Year	Calendar Year	Proposed Pit		Existing South Pit and Extension		Total		SR
		Coal (Mts)	Adjusted OB (Mcum)	Coal (Mts)	OB	Total Coal	Total OB	
Upto Base Yr FY 2022-23	Upto Base Yr FY 2022-23	0.6	4.43	2.81	16.01	3.41	20.44	6.00
1	2023-24	2.00	10.00	1.50	11.10	3.50	21.10	6.03
2	2024-25	4.00	18.00	2.03	11.77	6.03	29.77	4.94
3	2025-26	6.00	22.00	1.58	5.91	7.58	27.91	3.68
4	2026-27	9.00	35.00			9.00	35.00	3.89
5	2027-28	14.40	55.57			14.40	55.57	3.86
6	2028-29	18.00	100.00			18.00	100.00	5.56
7	2029-30	22.00	110.50			22.00	110.50	5.02
8	2030-31	22.00	110.50			22.00	110.50	5.02
9	2031-32	22.00	110.50			22.00	110.50	5.02
10	2032-33	22.00	110.50			22.00	110.50	5.02
11	2033-34	22.00	110.50			22.00	110.50	5.02
12	2034-35	22.00	102.00			22.00	102.00	4.64
13	2035-36	22.00	102.00			22.00	102.00	4.64
14	2036-37	22.00	102.00			22.00	102.00	4.64
15	2037-38	25.00	102.00			25.00	102.00	4.08
16	2038-39	25.00	102.00			25.00	102.00	4.08
17	2039-40	25.00	102.00			25.00	102.00	4.08
18	2040-41	25.00	102.00			25.00	102.00	4.08
19	2041-42	25.00	102.00			25.00	102.00	4.08
20	2042-43	25.00	102.00			25.00	102.00	4.08
21	2043-44	25.00	100.00			25.00	100.00	4.00
22	2044-45	25.00	100.00			25.00	100.00	4.00
23	2045-46	25.00	100.00			25.00	100.00	4.00
24	2046-47	25.00	100.00			25.00	100.00	4.00
25	2047-48	25.00	100.00			25.00	100.00	4.00
26	2048-49	25.00	100.00			25.00	100.00	4.00
27	2049-50	25.00	100.00			25.00	100.00	4.00
28	2050-51	25.00	100.00			25.00	100.00	4.00
29	2051-52	25.00	100.00			25.00	100.00	4.00
30	2052-53	12.00	50.00			12.00	50.00	4.17
31	2053-54	6.64	24.28			6.64	24.28	3.66
<b>Total</b>		<b>623.64</b>	<b>2689.78</b>	<b>7.92</b>	<b>44.80</b>	<b>631.56</b>	<b>2734.58</b>	<b>4.33</b>

## 3.1.8 Rated Capacity "Mtpa"

- By OC 25.00 Mtpa

- By UG Will be provided at the time of submission of revised mining plan prior to completion of opencast mining. However, a Note on Underground

		Mining has been attached as Annexure VIIF providing a tentative estimate of extractable reserve and capacity												
	- Overall	25.06 Mtpa												
3.1.3	Life of the Mine "Years"													
	- By OC	31 years												
	- By UG	Will be provided at the time of submission of revised mining plan prior to completion of open cast mining. However, a Note on Underground Mining has been attached as Annexure VIIF providing a tentative estimate of extractable reserve and capacity.												
	- Overall	31 years												
3.1.10	Whether the proposed external OB dump site is coal/lignite bearing. If so, whether coal/lignite below waste disposal area is extractable.	As the block area is surrounded by coal bearing blocks on all sides, there is no availability of any land for external dumping outside the block area. Hence the proposed external OB dump is planned on the dip side within the block on coal bearing area. However, the external dump is temporary and will be re-handled back to in pit dump from 14 <sup>th</sup> year and coal will be extracted.												
3.1.11	Whether negative proving for coal / lignite in the proposed site for OB dump/infrastructure has been done.	The proposed external OB dump is temporary and will be re-handled back and coal will be extracted. Infrastructure is planned on the south-west corner of the block and coal below the infrastructure will be mined out by UG method after exhaustion of OC mine.												
3.1.12	Result of any investigation carried out for scientific mining, conservation of minerals and protection of environment; future proposals.	The Hydrogeological study report is in place and enclosed as Annexure-VIIC												
3.1.13	Type of Equipment HCSM proposed	<p>HCSM Configuration is given below</p> <table border="1"> <thead> <tr> <th>Equipment</th> <th>SIZE</th> <th>Nos.</th> </tr> </thead> <tbody> <tr> <td colspan="3"><b>OBR</b></td> </tr> <tr> <td>Hyd Backhoe/Shovel</td> <td>20-22cum</td> <td>15</td> </tr> <tr> <td>Hyd Backhoe/Shovel</td> <td>10-12 cum</td> <td>15</td> </tr> </tbody> </table>	Equipment	SIZE	Nos.	<b>OBR</b>			Hyd Backhoe/Shovel	20-22cum	15	Hyd Backhoe/Shovel	10-12 cum	15
Equipment	SIZE	Nos.												
<b>OBR</b>														
Hyd Backhoe/Shovel	20-22cum	15												
Hyd Backhoe/Shovel	10-12 cum	15												

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



	Rear Dumper	200T	144
	Rear Dumper	100T	177
	RBH Drill	250 mm	23
	Dozer with Ripper	850 HP	4
	Dozer	410HP	24
	<b>COAL</b>		
	Surface Miner	3 Mt/y	9
	FE Loader	5-7 cum	10
	Rear Dumper (Coal Body)	60 T	60
	DOZER(wheel)	450-460hp	10
	<b>COMMON</b>		
	Diesel Hydraulic Backhoe	1.5-2.0 cum	2
	Water Sprinkler	70KL	10
	Mobile Dust Suppression Cannon		10
	Mot. Grader	280HP	8
	Fire Tender		2
	Vibratory Compactor	25T	4
	Diesel Bowser	9KL	4
	Dozers	410 HP	2
	Crane	10Ton	4
	Crane	25Ton	4
	Crane	50Ton	1
	T. Handler		4
	F.E.L	5-6 cum	3
	Fork Lifter		4
	Maintenance Van		2
	<b>RECLAMATION</b>		
	Diesel Hydraulic Backhoe	1.5-2.0 cum	2
	Farm Tractor		4
	Dozer	410HP	2
	Grader	280HP	2
	Tipping Truck	25 T	4

### Chapter-4: Safety Management

S NO	Parameter	Details	
4.1	Safety Management		
	Important Safety aspects		
4.1.1	<p><b>Important safety aspects:</b></p> <p>Major Risks and uncertainties to the project viz. Proximity to river, adjacent working, geo-mining disturbances, slope stability and remedial measures suggested.</p> <p>It should also include proposed overall slope of the quarry and OB dump, dump height, strata control, fire and spontaneous heating, gas monitoring, disaster management, danger from inrush of water etc.</p>	<p>Areas of concern</p> <p>Safety Management Plan</p> <p>Failure of OB/Coal Benches</p> <p>Failure of Dump slopes</p>	<p>Remedial measures</p> <p>For complying with Reg. 104 of CMR 2017, exercise shall be done to identify, assess and record the hazards of health and safety of the persons employed in the mine after consulting the Safety Committee and Internal Safety Organisation (ISO). Based on the above, Safety Management Plan (SMP) shall be formulated for overall management for developing and implementing the safety policy of the company.</p> <p>SMP shall contain, <i>inter alia</i>, plan to implement the policy, principal hazard management, standard operating procedure (SOP), monitor, evaluate and review the plan.</p> <p>Bench height of maximum 15.00 meters matching with the maximum reach of the digging and loading equipment has been proposed. This reduces chances of accidents due to fall of loose materials.</p> <p>In coal surface miner will be used for extraction. This a safe operational environment avoiding blasting with very safe and stable benches.</p> <p>All DGMS guidelines and regulations shall be strictly adhered to.</p> <p>The Internal and external Dumps have been benched at 30 meters height. Overall slope has been proposed to 23-24degrees leaving 30 meters wide berm between two successive benches. This will reduce the chances of OB dump slope failure and subsequent damages. The dumps once stente should be stabilized by bio reclamation.</p> <p>The overall dump height shall be +120 m from the original ground level. A slope stability study as per DGMS guidelines has already been carried out and attached as Annexure.</p>



## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



		All DGMS guidelines and regulations shall be strictly adhered to.
	Flooding of the mine	<p>The pumping capacity has been proposed based on single day maximum rainfall data of past ten years and the mine water discharge.</p> <p>For surface inundation an embankment of around 2.5 km length and 7.0 meters height has been proposed all along the Kelo River and garland drains along the quarry surface boundary.</p> <p>All required precaution against inundation would be taken care of and Standing order for withdrawal of persons in case of apprehended danger shall be framed and implemented.</p>
	Blasting in OB benches	Blasting shall be carried out under the direct supervision of statutory personnel and as per the permissions and regulations of DGMS.
	Fire in coal benches/stock yard	Spontaneous heating of coal will be controlled by continuous and regular movement of coal benches. In case any bench is idle it should be properly dressed and properly cleaned from coal dust and fines at the time of stoppage.
	Accidents due to lack of proper space of movement in Mine.	Workers around shovel, dozer, dumper, drill and cranes must be warned to keep out of blind area so that operator may be able to see them clearly. Audio visual alarms are used for pre warning of persons around this machine. To overcome shortage of space if any, strict discipline will have to be inculcated among workmen and supervisors. At any given point of time, multiple benches will be worked together which will distribute the major producing HEMM at safer distances.
	Disaster Management	The Mine will prepare a DMP (Disaster Management Plan) as per guideline. This plan is to be vetted by DGMS. This is to be prepared and submitted for approval by DGMS just after opening the Mine. It is to be stated that in case of any disaster DGMS is the first organization which is to be first informed. The emergency plan for Disaster management is executed under the guidance of best grade of the industry and the senior officers of the regulator, the Directorate General of Mines Safety, GOI

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



4.22	A commitment from the company Board that the entire mining operation will be carried out as per the statutory provisions given under mines Act 1952, Coal Mine Regulation 2017 and wherever specific permission will be required the company will approach the concerned Authorities	A commitment from the company Board has been provided in Annexure- III
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### Chapter-5: Infrastructure Facilities

Serial Number	Parameter	Details
5.1	Mine Infrastructure required e.g. Equipment maintenance planning workshop, power supply arrangement, water supply	<p>Planning of Project Workshop and store has been done based on a comprehensive maintenance and repair program to achieve the high level of equipment availability, reliability and longer life. Maintenance and repair load of project workshop has been assessed on the basis of annual operating time, inter repair period, life of the equipment/ assemblies/ sub- assemblies, weight and size of the equipment/ assemblies/ sub-assemblies, man-hours required per repair/ maintenance, etc.</p> <p>Facility planning has been done for providing maintenance and repair facilities to all the major equipments deployed in the project, which include, heavy earth moving machineries (such as dumper, dozer, shovel, drill, etc.), light motor vehicles, coal handling plant machineries, mine pumps and power supply equipments. The proposed project workshop and project store will facilitate the maintenance and repair requirement of mining, mechanical, electrical, transport and other auxiliary equipment and storage of spare-parts, sub- assemblies and consumables.</p> <p>For maintenance and repair of equipment, the following facilities has been envisaged:</p> <ul style="list-style-type: none"> <li>a) Project workshop consisting of Excavation &amp; E&amp;M Workshops: For daily maintenance, scheduled maintenance, minor and major repair of equipments are proposed to be carried out.</li> <li>b) Store Complex: For reception, storage &amp; issue of materials, equipment and consumables required for mine operation and maintenance of mining, mechanical and electrical equipment.</li> <li>c) Common Facilities, consisting of welfare building/offices for day to day functioning of the workshop.</li> </ul>

		<p>The Excavation Workshop has been planned at 03 locations considering high mine capacity/ huge fleet of HEMMs and to reduce load of HEMMs, thus saving energy, as:</p> <ul style="list-style-type: none"> <li>a) Main Excavation Workshop – Outside the Mine Quarry: To cater the schedule maintenance, minor &amp; major maintenance of HEMMs, etc.</li> <li>b) Field Excavation Workshop (Eastern side) – along the Eastern side of Mine Quarry</li> <li>c) Field Excavation Workshop (Western side) – along the Western side of Mine Quarry</li> </ul> <p>Field Workshops are provisioned to cater the daily maintenance of HEMMs.</p> <p>One Sub-station each has been considered to cater for the requirements of the Project and colony.</p> <p>Borewells and available Mine water have been envisaged as source of water for the colony &amp; industrial water supply. Separate sewerage system for domestic &amp; industrial sewage has been envisaged for the Project.</p>
5.2	Power Supply & Distribution	<p>Talainalli coal block, having substantial coal reserve, is located in Raigarh district, Chhattisgarh. This block has been allotted to NTPC for necessary development and mining operations consisting of coal mining operation covering open cast mines, coal handling and dispatch arrangement as per requirement. Coal mining operation will require deployment of a number of large coal mining equipment and other auxiliary installations like dewatering pumps, coal handling plant, workshop, residential complex etc.</p> <p>It is estimated that total power demand for Talainalli OCP, for a planned production capacity of 25 MTY mining, will be around 28MVA. Considering the load of HEMM, CHP, Pumping, and other common loads envisaged for the project, two nos. of 2x16 MVA 33/6.6kV substation has been envisaged for fulfilling the power requirement of the project.</p> <p>To cater this load, it is envisaged to draw four nos. of 13kV feeder from existing 132/13kV NTPC substation at Rakeru Village within the block. It is envisaged that each proposed 33/6.6 kV substation to be installed for mining operation will have provision for 2 nos. incoming 33 kV feeders and required nos. of outgoing 6.6 kV feeders as per requirement.</p>

		<p>The transformers for the substation have been selected considering maximum demand of the project at overall power factor of 0.98, and 10% stand by transformation capacity. The transformers of the substation shall be provided with NGR to limit the neutral current as required by statutory provisions. 33 kV VCBs shall be used for primary control of the 33/6.6 kV transformers and incoming 33 kV feeders. Necessary CTs and PTs shall also be provided. Outdoor type 6.6 kV VCBs will be used for secondary control of transformers, control of 6.6 kV outgoing feeders, bus-coupler and capacitor bank control. Necessary protections against over current, short circuit and earth fault for all incoming and outgoing circuit breakers and transformers has also been envisaged. To maintain power factor at 0.98, capacitor bank of suitable capacity with automatic power factor correction relay shall be provided. Necessary provision of automatic fire protection of transformers along with portable fire extinguishers has been envisaged for fire protection in the substations. Provision of fire hydrant system for firefighting of outdoor yard. These substations shall be installed near the quarry at suitable location for supply of power to different equipment of the project. Illumination of the mine (external illumination) shall be done with LED luminaires, fixed on pole, fixed towers and mobile towers. Indoor illumination also will be done with LED fixtures.</p>
5.3	<p>Drainage &amp; pumping Assessment of volume of water for pumping, Pumping capacity and Pump selection</p>	<p>The sources of water accumulation inside the quarry area are from following sources:</p> <ul style="list-style-type: none"> <li>• Rain water falling directly within the excavated area</li> <li>• Inflow of rain water from back filled area</li> <li>• Inflow of rain water from area beyond excavation</li> <li>• Seepage of water from Strata Ground water</li> </ul> <ul style="list-style-type: none"> <li>• The pumping system has been designed to dewater the in-flow of water due to precipitation falling within the active pit limit during the monsoon season to enable the mining activity to continue round the year.</li> <li>• The planning of de-watering of the mine has been done in such a way that as far as possible the working faces and haul roads remain dry. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self-drainage of water to the lowest level of the quarry.</li> <li>• The rain water intake to the opencast mine is non-uniform during the year. The maximum rain water intake will be during the period of about four months i.e., June to September in a</li> </ul>

		<p>year. During dry season, say October to May, seepage from strata is expected to be moderate and the same can be dealt by running a few number of pumps provided for monsoon pumping. During this period repair and overhauling of the pumps will be done by rotation.</p> <ul style="list-style-type: none"> <li>• Pumping capacity has been designed so that the volume of water accumulated in the mine on the day of maximum rainfall can be pumped out within 5 days with 20 hours of working. The assessment has been made for maximum daily precipitation (rainfall) from collected from nearby area which comes to 180 mm and life of the mines of 31 years.</li> </ul> <p><b><u>Pumping capacity and pump selection:</u></b>          Volume of rain water entering to the mine and accumulating in the quarry (make of water) has been assessed on the basis of the following formula:</p> $Q = [(A1-A3) \times h \times n1] + (A2 \times h \times n2) + (A3 \times h \times n3)] \text{ m}^3/\text{day}$ <p>Where, A1 = Mined out area in m<sup>2</sup>          A2 = Area beyond excavation in m<sup>2</sup>          A3 = Internal Dump area in m<sup>2</sup>          h = Maximum precipitation/ rainfall in a day in m</p> <p>The run off co-efficient (n) has been considered as below:</p> <p>For mined out area (n1):                    0.60          For area beyond excavation (n2):        0.10          For internal dumped area (n3) :        0.10</p> <p>Considering 10% seepage from strata the total water accumulation will be:</p> $Q_1 = 1.1 Q;$ <ul style="list-style-type: none"> <li>• Total make of water comes out to be 4,82,967 cum. (Final Year)</li> </ul> <p>Above volume of water will be dewatered in 5 days at the rate of 20 hours pumping per day.          Pumping capacity per hour thus worked out: 4630 Cum/hr</p> <p><b><u>Pump selection:</u></b></p> <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Items</th> <th>QTY.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Main Pump , 810 m<sup>3</sup>/hr. (225 lps), 100 m head, 400 kW</td> <td>2 Nos. (1 working + 1 standby)</td> </tr> </tbody> </table>	Sl. No.	Items	QTY.	1	Main Pump , 810 m <sup>3</sup> /hr. (225 lps), 100 m head, 400 kW	2 Nos. (1 working + 1 standby)
Sl. No.	Items	QTY.						
1	Main Pump , 810 m <sup>3</sup> /hr. (225 lps), 100 m head, 400 kW	2 Nos. (1 working + 1 standby)						

			2	Main Pump , 810 m <sup>3</sup> /hr. (225 lps) 250m head, 800kW	5 Nos. (4 working + 1 standby)
			3	Main Pump , 810 m <sup>3</sup> /hr. (225 lps) 350m head, 1200kW	2 Nos. (2 working)
			4	Pump , 137 m <sup>3</sup> /hr. (38 lps) 60 m head, 37 kW	08 Nos.
			5	Face Pump, 54 m <sup>3</sup> /hr. (15 lps) 50m head, 27.5kW	10 Nos.
			4	Electrical Slurry pump, 101 m <sup>3</sup> /hr. (28 lps) 25m head, 37kW	08 Nos.
			5	Diesel Pumps, 268 m <sup>3</sup> /hr. (60 lps) 170m head	02 Nos.
			6	Pipe strings, bends, armored suction, delivery hoses etc.	LS
5.4	Coal Handling Arrangement:  Brief details of CHP / Mode of dispatch, Coal quality and coal stacking and handling arrangement.	<b>CHP/Mode of Dispatch:</b> <ul style="list-style-type: none"> <li>A full-fledged coal handling plant of 25.0 Mtpa capacity at surface for Talai Falli OCP has been proposed for handling of entire coal.</li> <li>As per requirement suggested by NTPC, 2 streams of conveyor in each side of mine has been provided considering 1 stream as standby.</li> <li>It has been planned to produce coal by blast free technique i.e. through surface miners of (-) 100 mm size. As such further crushing of coal has not been envisaged.</li> <li>For designing CHP, 330 working days in a year and three shifts in a day having 8 effective hours in each shift, the nominal system capacity envisaged at 4000 tph considering other parameters for entire coal handling plant. However, wagon loading will be round the clock.</li> <li>There is a remarkable reduction in coal truck movement at surface outside the mines with the provision of shiftable reclaim feeders at the surface nearby mine mouth.</li> <li>Initially, the blast free coal from the quarry will be transported by 60 to (coal body) dumper and fed into double stream conveyors by the D-1200 TPH Reclaim feeders (2 working and 1 standby) in each installed on surface on both side (Western and Eastern) side in each stream.</li> <li>Coal of (+) 100mm size produced by surface mine in the mine shall be transported by coal trucks/Dumpers and discharged at a suitable location where the shiftable Reclaim feeders are installed. Also two FE loaders/Excavators have been envisaged for channelizing of coal to the reclaim feeder on each side (Western and Eastern). The reclaim feeder shall discharge the</li> </ul>			

		<p>coal into ongoing belt conveyor.</p> <ul style="list-style-type: none"> <li>• Two streams of conveyors of rated capacity 2000 - 2100 tph (Peak 2400-2500 tph) and 1600 mm belt width each has been envisaged for collecting coal from Truck receiving hopper for onward conveying to bunker and subsequently into the proposed 2 nos. of 4000Te silo with RLS System.</li> <li>• Truck receiving hoppers for receiving coal from surface miners on both (Eastern &amp; Western) sides may be considered at later stage during finalization.</li> </ul> <p><b><u>Storage arrangement:</u></b></p> <ul style="list-style-type: none"> <li>• One number of over ground RCC Bunkers of 40,000 Te. Is proposed for storing coal through 2 x 4000 tph tripper conveyor of 2000 mm belt width.</li> </ul> <p><b><u>Handling arrangement:</u></b></p> <ul style="list-style-type: none"> <li>• Coal from bunker will be reclaimed through suitable capacity plough feeders and fed to proposed silo through two nos. of belt conveyors of 4000 tph rated capacity and 2000 mm belt.</li> <li>• The coal will be loaded in to railway wagons through Rapid load out system having pre-weigh hopper envisaged with loading Silo.</li> <li>• The loading conveyors will discharge coal into proposed 2 nos. of 4000 te. Silo's with RLS system.</li> <li>• There is provision of feeding coal from reclaim conveyor to either Silo 1 or Silo 2.</li> <li>• Silo will be located on rail lines. The tentative location of the silo has been provided by NTPC in proposed railway siding for loading of coal into railway wagons.</li> <li>• Each silo shall have facility of wagon loading with the help of 2 nos. RLS with pre-weigh hoppers. However, only one set of RLS with Pre-Weigh hopper of each silo will be operational at a time. Facility of OHE system below the silo is also been considered to facilitate loading the coal through electric loco.</li> <li>• The CHP has been provided with all the necessary facilities like Firefighting system, Dust suppression system, communication systems, belt weighers, magnetic separators, sampling systems, safety switches, necessary control system etc.</li> </ul>
5.5	Coal washing and the proposed handling / disposal of rejects	Not envisaged.



### Chapter-6: Land Requirement

S.N.O	Parameters	Details	
6.1	<b>LAND REQUIREMENT</b>		
6.1.1	Break-up of pre-mining land type (indicative) and source of data		
	<b>Pre-Mining Land Use "ha"</b>		
	<b>Private Land</b>	Agricultural	1181.90
		Township	0
		Grazing	0
		Barren	0
		Water Bodies	2.96
		Road	0
		Community	0
		Others	0
		<b>Sub Total</b>	<b>1184.86</b>
	<b>Govt. Land</b>	Agricultural	0
		Township	70.5
		Grazing	56
		Barren	42.19
		Water Bodies	12.31
		Road	24.54
		Others	0
		<b>Sub Total</b>	<b>205.54</b>
	<b>Forest</b>	Reserve	0
		Protected	543
		Jungle-Jhari	186
		<b>Sub Total</b>	<b>729</b>
	<b>Free-Hold</b>		0
	<b>Total</b>		<b>2119.40</b>
6.1.2	<b>During mining land use details</b>		

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



	Land Use			Land use Post Closure (Ha)						
	Type	Land Use (proposed)	End of Life	Agricultural Land	Plantation	Water body	Public/ company use	Forest land (Returned)	Undisturbed Area	Total
	Excavation area	1829.85								
	Backfilled area		1579.9		1277.02	302.88				1579.9
	Excavated void		259.95			259.95				259.95
	Without Plantation									0
	Top soil dump									0
	External Dump									0
	Safety Zone	29.10	29.10		29.10					29.10
	Road Diversion									0
	Diversion below River/Mele/Canal									0
	Settling Pond									0
	Road and Infrastructure	189.60	189.60		369.60		20.00			189.60
	Rationalization area									0
	Gravel Drain	10.73	10.73		10.73					10.73
	Embankment									0
	Grass belt	17.16	17.16		17.16					17.16
	Water Reservoir near pit									0
	UG Entry									0
	Undisturbed / Mining right for UG	23.96	23.96						23.96	23.96
	Resettlement									0
	Pis head Power Plant									0
	Water harvesting									0
	Agricultural land									0
	<b>Total</b>	<b>2119.40</b>	<b>2119.40</b>	<b>0.00</b>	<b>1512.61</b>	<b>562.83</b>	<b>20.00</b>	<b>0.00</b>	<b>23.96</b>	<b>2119.40</b>
6.1.3	Surface features over the block Area	<p>Forest cover is found in the south eastern part of the block. Small land patches having forest cover are available in central part of the block. Remaining part of the area is mostly cultivated land. Cultivation and collection of forest products are the main occupation of the people of the area.</p> <p>The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area.</p>								
6.1.4	No of Villages / Houses to be shifted	08 Villages								
6.1.5	Population to be affected by the project	2187								
6.1.6	Proposed Rehabilitation Programme	As per approved R&R Policy of Govt of Chhattisgarh and NTPC								
6.2	<b>DETAILS OF LEASE</b>									

**MINING PLAN & MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK**

6.2.1	Status of Lease	Not Applicable for the land acquired under Coal Bearing Areas (Acquisition & Development) Act, 1957  Letter from Ministry of Coal to Govt. of Chattisgarh is attached as Annexure- VIII E
6.2.2	Existing lease Area "Ha"	2119.40 Ha
6.2.3	Period for which Mining Lease has been granted/ is to be renewed/ is to be applied for.	Life of the Mining Plan
6.2.4	Date of expiry of earlier Mining Lease, if any	NA
6.2.5	Weather the lease boundary/ required boundary is same as mentioned in the allotment order	Yes both are Same
6.2.6	Lease Area (applied/ required) as per the mining plan under consideration (Ha)	2119.40 Ha
6.2.7	Weather the applied lease area falls within the allotted block	Within the allotted Block.
6.2.8	Area (Ha) of lease which falls outside the delineated Block boundary/ Existing Mining Lease	Nil
6.2.9	Details of outside area:	
	Weather forms part of any other coal block	NA
	Weather it contains any coal/ lignite reserves	NA
	Purpose for which it is required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others (specify)	NA
6.2.10	Weather some part(s) of allotted block has not been applied for mining lease.	NA
	Total area in Ha of such part(s)	Nil
	Total reserves in such part(s). (Mt)	Nil
	Brief reasoning for leaving such part(s)	NA

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**Chapter-7: Environmental Management**

Serial Number	Parameters	Details
7	<b>ENVIRONMENTAL MANAGEMENT</b>	
7.1	Commitment from the project proponent that the company will comply Environment and Forest condition stipulated in the respective clearances	Attached in Annexure-III

### Chapter 8: Progressive & Final Mine Closure Plan

SNO	Parameter	Details									
8.1	<b>Land Degradation and restoration Schedule</b>										
8.1.1	<b>Tentative Land Degradation and Technical Reclamation (Cumulative Area "Ha")</b>										
	<b>YEAR/STAGE (End of the Mine plus post closure period)</b>	<b>Land Degraded (Ha)</b>				<b>Technically Reclaimed area (Ha)</b>					
		<b>Recreation area for DL</b>	<b>TSDump</b>	<b>Extn. Dump</b>	<b>Intra/Other</b>	<b>Total</b>	<b>Backfilling</b>	<b>TS Dump</b>	<b>Extn. Dump</b>	<b>Intn./CP Area</b>	<b>Total</b>
	<b>Upto Base Year</b>	57.86	10.20	38.70	109.48	217.34	0.00	0.00	0.00	0.00	0.00
	Y1 2011-24	91.63	36.17	188.74	214.03	532.81	0.00	0.00	0.00	0.00	0.00
	Y2 2022-26	745.34	83.95	771.52	214.03	1771.24	0.00	0.00	0.00	17.16	17.16
	Y3 2037-48	296.51	98.08	381.24	214.03	1012.28	0.00	0.00	0.00	17.16	17.16
	Y14 2052-53	838.21	55.00	563.47	214.03	1674.71	115.00	0.00	0.00	17.16	1372.16
	Y15 2057-58	1104.13	0.00	582.81	214.03	1900.97	267.02	0.00	0.00	17.16	2185.16
	Y20 2067-68	1432.36	0.00	370.89	214.03	1877.59	553.02	0.00	0.00	17.16	2447.16
	Y25 2077-78	1722.68	0.00	0.00	214.03	1936.71	779.02	0.00	0.00	17.16	2732.16
	Y30 2087-88	1839.84	0.00	0.00	214.03	2053.88	1044.00	0.00	0.00	17.16	3115.16
	Y31 2093-94	1839.85	0.00	0.00	214.03	2053.88	1100.00	0.00	0.00	17.16	3217.16
	<b>Post Closure</b>										
	Y34 2096-97	1839.85	0.00	0.00	214.03	2053.88	1549.00	0.00	0.00	17.16	3589.16

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAI PALLI COAL BLOCK



## B.1.2 Tentative Biological Reclamation (Cumulative in "Ha")

Stage/Year	Biologically Reclaimed Area					Forest land Returned	Undisturbed/PUW k/Ea-M Use	Total
	Agricultural	Marriaboo	Waterbody	Public/Community Use	Total			
Upto Base Year	0	0	0	0	0.00	0	0	0
Y1 2023-24	0	0	0	0	0.00	0	23.96	23.96
Y2 2025-26	0	0	0	0	0.00	0	23.96	23.96
Y5 2027-28	0	0.00	0	0	0.00	0	23.96	23.96
Y10 2032-33	0	59.00	0	0	59.00	0	23.96	82.96
Y15 2037-38	0	220.00	0	0	220.00	0	23.96	243.96
Y20 2042-43	0	505.00	0	0	505.00	0	23.96	528.96
Y25 2047-48	0	727.00	0	0	727.00	0	23.96	750.96
Y30 2052-53	0	940.00	0	0	940.00	0	23.96	963.96
Y31 2053-54	0	985.00	0	0	985.00	0	23.96	1008.96
<b>Post Closure</b>								
Y34 2056-57	0	1512.61	561.87	70.00	2095.44	0	23.96	2119.40

8.2	Post Closure Water Quality management	<p>The proposed mining area is not dissecting any natural water stream. The storm water and ground water intersected during mining operations will be the source of water accumulation within the mining pit. Accumulated mine pit water during the active mining period will be pumped while post mining operation, there will be accumulated water in the left out voids. An area of about 562.83 ha of land will be converted to waterbody at the end of mine life. This area cannot be backfilled, however will technically reclaimed by converting into water body.</p> <p>In post closure phase, Routine Environmental Monitoring (REM) of the water accumulated shall be fortnightly sampled and analyzed to monitor development of acidity or toxicity in the water at least for 3 years. As post mine period, most of the broken areas will be backfilled and left out water bodies will be much less, development of toxic water is not anticipated. The pH of the accumulated water is thus expected to be within a narrow range near the neutral value.</p> <p>The accumulated water will be utilized for the local community for agriculture and other uses. Regular monitoring of the water quality will be carried out as per the CPCB norms. Once the mine is closed, outside water shall be prevented to enter into the mined out pit which in turn will reduce the TDS and other solvents.</p> <p>The pit water will be utilized for agricultural use, supply as drinking water after treatment and for pisciculture. As such the area falls under arid climatic horizon and this water body will add life to the area by supplying water for agriculture and drinking.</p> <p>Effluent Treatment Plant (ETP) and Sewerage Treatment Plant (STP) should be maintained atleast for 3-5 years. Regular monitoring of the water quality will be carried out as per the CPCB norms.</p> <p>Water quality analysis shall be carried out as per CPCB Water Quality Monitoring 2017 guideline.</p>
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## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



8.3	<b>Post Closure Air Quality management</b>	<p>The post closure activities will be restricted to limited operation only in the following areas:</p> <ol style="list-style-type: none"> <li>1. Dismantling of temporary infrastructures.</li> <li>2. Dismantling of electrical infrastructures.</li> <li>3. Regular maintenance works in the dumping ground.</li> <li>4. Post plantation care.</li> <li>5. Maintenance of the main haul road.</li> <li>6. Cleaning of suture drains and garland drains.</li> </ol> <p>Most of the activities does not generate continuous dust generation, except the dismantling works which will be restricted to the limited zones compared to the whole project area. Water sprinkling will be continued before the vehicle movement.</p> <p>Routine Environmental Monitoring (REM) of the air quality shall be monitored as per latest CPCB guidelines atleast for 3-5 years.</p> <p>Occasionally dust may be generated from the uncovered areas of the dumps. Regular sprinkling arrangements will be done till the areas are stabilised.</p> <p>Quarterly Air quality Monitoring will be done as per NAAQ standard (CPCB guideline 2009)</p>																																																																																																																																																								
8.4	<b>Waste Management (Figures in MM3) (Tentative)</b>	<table border="1"> <thead> <tr> <th rowspan="2">YEAR/STAGE (Life of the Mine plus post closure period)</th> <th rowspan="2">YEAR</th> <th colspan="3">OB Removal (Cumulative)</th> <th colspan="2">External Dump* (Cumulative)</th> <th colspan="2">Internal Backfilling (Cumulative)</th> <th colspan="2">Embankment (Cumulative)</th> </tr> <tr> <th>Top Soil</th> <th>OB</th> <th>TOTAL</th> <th>Top Soil</th> <th>OB</th> <th>Top Soil</th> <th>OB</th> <th>Top Soil</th> <th>OB</th> </tr> </thead> <tbody> <tr> <td>Upto Base Year</td> <td></td> <td>1.72</td> <td>18.72</td> <td>20.44</td> <td>1.72</td> <td>18.72</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y1</td> <td>2023-24</td> <td>7.66</td> <td>38.89</td> <td>46.55</td> <td>2.65</td> <td>38.68</td> <td></td> <td></td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y7</td> <td>2025-26</td> <td>4.95</td> <td>94.29</td> <td>99.23</td> <td>4.94</td> <td>94.07</td> <td></td> <td></td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y5</td> <td>2027-28</td> <td>10.29</td> <td>179.01</td> <td>189.30</td> <td>10.19</td> <td>216.81</td> <td></td> <td>42.57</td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y10</td> <td>2032-33</td> <td>30.46</td> <td>791.14</td> <td>731.60</td> <td>16.42</td> <td>437.96</td> <td>12.23</td> <td>262.96</td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y15</td> <td>2037-38</td> <td>57.28</td> <td>1197.36</td> <td>1254.64</td> <td>14.81</td> <td>464.99</td> <td>52.81</td> <td>737.76</td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y20</td> <td>2042-43</td> <td>71.18</td> <td>1689.12</td> <td>1760.30</td> <td></td> <td>234.84</td> <td>71.17</td> <td>1454.07</td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y25</td> <td>2047-48</td> <td>85.31</td> <td>2174.98</td> <td>2260.30</td> <td></td> <td></td> <td>85.31</td> <td>2174.77</td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y30</td> <td>2052-53</td> <td>93.04</td> <td>2617.26</td> <td>2710.30</td> <td></td> <td></td> <td>93.03</td> <td>2617.05</td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Y34</td> <td>2056-58</td> <td>93.13</td> <td>2641.44</td> <td>2734.57</td> <td></td> <td></td> <td>93.12</td> <td>2641.74</td> <td>0.01</td> <td>0.21</td> </tr> <tr> <td>Post Closure</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y34</td> <td>2056-57</td> <td>93.13</td> <td>2641.44</td> <td>2734.57</td> <td></td> <td></td> <td>93.17</td> <td>2641.74</td> <td>0.01</td> <td>0.21</td> </tr> </tbody> </table> <p>Note: *External Dump will be within the block in the dip side and will be re-handled later</p>	YEAR/STAGE (Life of the Mine plus post closure period)	YEAR	OB Removal (Cumulative)			External Dump* (Cumulative)		Internal Backfilling (Cumulative)		Embankment (Cumulative)		Top Soil	OB	TOTAL	Top Soil	OB	Top Soil	OB	Top Soil	OB	Upto Base Year		1.72	18.72	20.44	1.72	18.72					Y1	2023-24	7.66	38.89	46.55	2.65	38.68			0.01	0.21	Y7	2025-26	4.95	94.29	99.23	4.94	94.07			0.01	0.21	Y5	2027-28	10.29	179.01	189.30	10.19	216.81		42.57	0.01	0.21	Y10	2032-33	30.46	791.14	731.60	16.42	437.96	12.23	262.96	0.01	0.21	Y15	2037-38	57.28	1197.36	1254.64	14.81	464.99	52.81	737.76	0.01	0.21	Y20	2042-43	71.18	1689.12	1760.30		234.84	71.17	1454.07	0.01	0.21	Y25	2047-48	85.31	2174.98	2260.30			85.31	2174.77	0.01	0.21	Y30	2052-53	93.04	2617.26	2710.30			93.03	2617.05	0.01	0.21	Y34	2056-58	93.13	2641.44	2734.57			93.12	2641.74	0.01	0.21	Post Closure											Y34	2056-57	93.13	2641.44	2734.57			93.17	2641.74	0.01	0.21
YEAR/STAGE (Life of the Mine plus post closure period)	YEAR	OB Removal (Cumulative)			External Dump* (Cumulative)		Internal Backfilling (Cumulative)		Embankment (Cumulative)																																																																																																																																																	
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## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK



8.5 Top Soil Management - (Including Action plan for Top Soil management) (Tentative)							
All figures are cumulative and in Mm3							
YEAR/STAGE (Life of the Mine plus post-closure period)	YEAR	Top Soil Removal Plan	Top Soil used				
			Spreading over Rebankment	Spreading over Backfilled area	Spreading over External O&M dump area	Used in Green Soil area	Total Utilised
Upto Mine Year		1.72					
Y1	2023-24	2.66	0.03	0.00	0.00	0.00	0.03
Y3	2025-26	4.95	0.03	0.00	0.00	0.00	0.03
Y5	2027-28	10.20	0.03	0.00	0.00	0.00	0.03
Y10	2032-33	30.66	0.03	12.24	0.00	0.00	12.24
Y15	2037-38	52.84	0.03	52.83	0.00	0.00	52.84
Y20	2042-43	71.38	0.03	71.37	0.00	0.00	71.38
Y25	2047-48	85.32	0.03	85.31	0.00	0.00	85.32
Y30	2052-53	93.04	0.03	93.04	0.00	0.00	93.04
Y31	2053-54	93.13	0.03	93.12	0.00	0.00	93.13
Post Closure							
Y34	2056-57	93.13	0.01	93.12	0.00	0.00	93.13
8.6	Management of Coal Rejects.	Since the project does not envisaged any washery, generation of rejects are not associated.					
8.7	Restoration of Land used for Infrastructure	Survey for 3 monsoon seasons should be done then carry out compaction of the land before any infrastructure to be built over it. All infrastructures will be dismantled excluding the office and Vocational Training center which will be handed over to the state government.					
8.8	Disposal of Mining Machinery	Mining machineries are to be deployed by Contracting agency. They will be taking out the machineries at the end of mine life and will utilize in their other projects. Scrapped machineries will be auctioned to the authorized agencies.					

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPELLI COAL BLOCK



8.9	<b>Safety &amp; Security</b>	<ul style="list-style-type: none"> <li>• Thorough inspection of the mine and OB dump areas for assessing the left over closure jobs of already reclaimed internal dump areas.</li> <li>• Inspection of Infrastructure and water body area for their safe reclamation and abatement of any leftover dangers.</li> <li>• Action required making drainage and any fire areas safe for future period.</li> <li>• Making 2 meter high fencing wall against excavated void are to prevent inadvertent entry as per requirement.</li> <li>• Making safe approach road from surface to left out pit bottom for future uses, as void becomes a water body.</li> <li>• Completing the survey of total reclaimed areas like mined areas, internal dump, mine faces, quarry fencing and other areas to complete and update the Mine plans under Coal mine Regulation</li> </ul>
8.10	<b>Abandonment Cost and Financial Assurance</b>	
8.10.1	<b>Abandonment Cost: Cost of Activities to be taken up for closure of the mine</b>	
<b>Parameters</b>	<b>Details</b>	

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIFALLI COAL BLOCK



Head	Particulars	Unit	Quantity	Rate Rs./unit	Total Rs./Cr.
Pre-closure Costs	Water Quality Measurement	L.S.			1.12
	Air Quality Management	L.S.			1.12
	Water Management				
	Barbed Wire Fencing around the Dump				
	Barbed Wire Fencing around the Dy	m	20000	1000	2.00
	Wing of 1 unit for handling of 10000 Tons				
	Dry Cell Management	Crane	10.00	1000000	10.00
	Technical & Detailed Reclamation of closed pit level @ 100 m deep	ha	25.00	100000	25.00
	Removal of topsoil upto 100 m depth	ha	40.00	100000	4.00
	Removal of topsoil upto 100 m depth	L.S.			10.00
	For 100 m depth of the dump	m	1000	1000	1.00
	Barbed Wire	m	20000	100	2.00
Barbed Wire around the dump	m	2000	100	0.20	
For 100 m depth					
Demolition of Structures & Removal of the Plant	Demolition of Structure	L.S.			1.00
	Removal of Demolition Structure	L.S.			1.00
	Removal of Dump & Plant related Structure	L.S.			1.00
	Demolition of Structure related to handling of plant				
	For 100 m depth of the dump				
	Removal of 100 m depth				
	Removal of 100 m depth	L.S.			1.00
	Demolition of 100 m depth	L.S.			1.00
Water & Sewerage	Barbed Wire Fencing around the Dump				
	Barbed Wire Fencing around the Dy				
	Barbed Wire Fencing with concrete pillars				
	Concrete wall with concrete pillars around the Dy				
	Concrete for 100 m & foundation of concrete wall				
	Removal of Structure				
	Concrete Wall Fencing around the 100 m Dump	m	1000	10000	10.00
	Removal of Wall around the Water Dump				
	Removal of Structure including parking area of 100 m of Water Dump	L.S.			1.00
	For 100 m depth of the dump				
Barbed Wire					
Barbed Wire around the dump					
Barbed Wire					
Barbed Wire around the dump					
Concrete channel from water 100 m Dump					
Technical & Detailed Reclamation of closed pit level @ 100 m Deep	Wing of 1 unit	Crane			
	Dry Cell Management	Crane			
	Oil Refueling for handling				
	Technical - Making 100 m & regression of closed 100 m Dump	L.S.			
	Removal of topsoil upto 100 m depth	L.S.			1.00
	Removal of topsoil upto 100 m depth				
Removal of topsoil upto 100 m depth	ha	10.00	100000	10.00	
Removal of topsoil upto 100 m depth					
Plant Closure Management & Supervision	For 100 m Water Quality Measurement	L.S.			1.00
	For 100 m Air Quality Measurement	L.S.			1.00
	Technical Supervision for 100 m	L.S.			1.00
	Water Measurement	L.S.			1.00
	Removal of topsoil upto 100 m	L.S.			1.00
Others	Removal of topsoil upto 100 m				
	Removal of topsoil upto 100 m				
	Removal of topsoil upto 100 m	L.S.			1.00
	Removal of topsoil upto 100 m				
	Removal of topsoil upto 100 m				
	Removal of topsoil upto 100 m	L.S.			1.00
	Removal of topsoil upto 100 m				
Total Rs. in crores					101.41

## MINING PLAN &amp; MINE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK


**8.10.2 Financial Assurance: Amount to be deposited in Escrow account as a security against the mine activities to be carried out for the closure of the mine**

<b>ESCROW ACCOUNT</b>			
<b>Mine Closure Cost Calculation for Talaipalli OC Project</b>			
Project name		<b>Talaipalli</b>	
Project Area (Ha)		2119.4	
Escrow Amount per Ha. For OC Project as on April, 2019 (lakhs/ Ha)		9	
WPI as on April 2019		121.1	
WPI as on August 2022		153.1	
Escrow Amount per Ha. For OC Project as on August 2022 (lakhs/ Ha)		11.38	
Current value of corpus as on August 2022 (Rs lakhs)		24114.96	
Amount deposited (including interest) till date (Rs lakhs)		1780.00	
Balance Corpus for which provision is to be made (Rs lakhs)		22334.96	
Balance Life of mine (in years)		31	
Annual corpus (Balance corpus / Balance life. in Rs. Lakh)		720.48	
<b>Amount to be deposited in Escrow Account annually, Rs. Lakh</b>			
Year	Opencast	UG	Total
1	720.48	0	720.48
2	756.50	0	756.50
3	794.33	0	794.33
4	834.05	0	834.05
5	875.75	0	875.75
6	919.54	0	919.54
7	965.52	0	965.52
8	1013.80	0	1013.80
9	1064.49	0	1064.49
10	1117.71	0	1117.71

**MINING PLAN & WNE CLOSURE PLAN FOR TALAIPALLI COAL BLOCK**

11	1173.60	0	1173.60
12	1232.28	0	1232.28
13	1293.89	0	1293.89
14	1358.58	0	1358.58
15	1426.51	0	1426.51
16	1497.84	0	1497.84
17	1572.73	0	1572.73
18	1651.37	0	1651.37
19	1733.94	0	1733.94
20	1820.64	0	1820.64
21	1911.67	0	1911.67
22	2007.25	0	2007.25
23	2107.61	0	2107.61
24	2212.98	0	2212.98
25	2323.64	0	2323.64
26	2439.82	0	2439.82
27	2561.81	0	2561.81
28	2689.90	0	2689.90
29	2824.40	0	2824.40
30	2965.62	0	2965.62
31	3113.90	0	3113.90
<b>Total</b>			<b>50982.16</b>
<b>Total Mine closure cost (in Rs Lakhs)</b>			<b>52762.16</b>





एनटीपीसी लिमिटेड  
NTPC Limited

ताताईपल्ली / Talapalli

Ref no.: 06/TI/CMP/COE

Date: 11.08.2023

To,

The Beneficiaries of and use Generating Station (Lars STPS)

(As per list enclosed)

Sub: : Notice for Declaration of Commercial Operation of Talapalli CMP

Ref: Earlier notice Ref no. 06/TI/CMP/COE dated 12.08.2023

Dear Sir/ Madam,

In compliance to Second Amendment of CERC Tariff Regulations 2019 and in reference to our earlier notices, notice is hereby given that Commercial Operation declaration of Talapalli Coal Mining Project is proposed w.e.f. 00:00 hrs. of 01.08.2023.

Yours Sincerely

(Suresh Sandeepadhye)  
Chief General Manager,  
Talapalli Coal Mining Project





**BEFORE THE CENTRAL ELECTRICITY REGULATORY COMMISSION, NEW  
DELHI  
PETITION NO. \_\_\_\_\_/MP/2023**

**IN THE MATTER OF:**

Petition under Regulation 22 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 ("**Tariff Regulations 2019**") read with Regulation 9 (4) of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (Second Amendment) Regulations, 2021 ("**Second Amendment 2021**") seeking condonation of delay of 22.5 months in declaring Commercial Operation Date of Talaipalli Coal Mine and approval of input price of coal supplied from Talaipalli Coal Mine to end use generating station i.e., Lara STPS for the period from Commercial Operation Date i.e., 01.10.2023 to 31.03.2024.

**AND IN THE MATTER OF:**

NTPC Limited ...Petitioner

Versus

Madhya Pradesh Power Management Company Limited & Ors. ...Respondents

**VOLUME-III  
[1163-1788]**

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<b>47.</b>	<b>ANNEXURE P/43 (COLLY.)</b> A true copy of the Letter dated 26.09.2023 and approved Mine Plan issued by MoC to the Petitioner.	<b>1163-1715</b>
<b>48.</b>	<b>ANNEXURE P/44</b> A true copy of the Relevant extracts of LoA dated 16.10.2023 issued by Petitioner to M/s VPR Mining Infrastructure.	<b>1716-1717</b>
<b>49.</b>	<b>ANNEXURE P/45 (COLLY.)</b> True copies of the relevant extracts of Service Purchase Orders and LOAs.	<b>1718-1727</b>
<b>50.</b>	<b>ANNEXURE P/46 (COLLY.)</b> A true copy of relevant extracts of Project Agreement.	<b>1728-1731</b>

51. **ANNEXURE P/47**  
A true copy of the Office Memorandum dated 1732-1770  
29.05.2020.
52. Vakalatnama along with Power of Attorney. 1771-1779
53. Fee Acknowledgement/Form-1. 1780-1782
54. Proof of Service. 1783-1788

**FILED BY**



**SKV LAW OFFICES**

Advocates for the Petitioner

B-50, Defence Colony, New Delhi-110024

Phone: 011-47099999

Email: [lawyers@skvlawoffices.com](mailto:lawyers@skvlawoffices.com)

Place: New Delhi

Date: 24.11.2023

Application No.  
 F:\apps\ACT\001134\F\000300002  
 Coal Controller Organization  
 A subordinate organization of  
 Ministry of Coal, Government of India.

Shakti Bhawan, New Delhi  
 2005-18-28

To  
 NTPC LIMITED  
 Address  
 NTPC LIMITED State-Chhattisgarh District-Rajnandgaon  
 Email: rajnandgaon@ntpc.co.in  
 Contact: 960008027  
 Fax:

Subject: Approval of Mining Plan and Mine Closure Plan (for Abandonment) for Colliery of M/s NTPC LIMITED.

RE:

You are directed to refer to your application for approval of Mining Plan and Mine Closure Plan for Colliery located in MAND-RANGARH Coal Field Submitted through application number APP00200 of Single Window Portal of Ministry of Coal for approval of the Central Government under Rule 30E of MCR 1980 for a total capacity of 25Mtpa Peak capacity 37 5000 Mtpa, Lease area 2110.40ha and Project area 2119.40. It has been considered and approval of the Central Government there on is hereby conveyed under Section 3(2)(c) of the Mines & Minerals (Development & Regulation) Act, 1957 subject to the following conditions:


1. The project proponent should ensure implementation of all observations made by internal committee during actual operation.
2. Project Proponent shall take all necessary precautions regarding safety of mine workings and persons employed thereon.
3. Mining lease of this block shall not encroach into any other adjacent coal block.
4. The year of abandonment for carrying out the closure activities envisaged in the Mine closure plan is indicative. The actual cost for carrying out the activities at the time of final closure may be higher. The actual cost of abandonment will have to be borne by the project proponent for carrying out the closure activities.
5. The approval of the Mining Plan (including Mine Closure Plan) is without prejudice to the requirement of approvals from competent prescribed authority under the relevant rules/regulations etc.
6. Approval of Mining plan is technical in nature, which is granted with a view to facilitating further developmental activities by the allottee. This approval will have no effect on the penalty provisions of the agreement in case of non-compliance of Mine plan.
7. Monitoring of vibrations for development of mine will be as per efficiency parameters in CBMPA/CMDPA and appropriation of PQD will be done in case of falsification in compliance with the provisions of CBMPA/CMDPA.
8. Evacuation route/ roads/ water bodies/other surface features/infrastructure outside the Geological Block/Project Area shall not be part of the Mining Plan (in line with para 1.5 of OM, P.No. 54011/2002/13-CPA dated 29.05.2002 of MoC for guidelines for Preparation, Formulation, Submission, Processing, Scrutiny, Approval and Review of Mining Plan for coal and lignite blocks).
9. Name of manufacturer, make of equipment/CMM, model name suggesting the name of the manufacturer, if mentioned anywhere in the mining plan, has not been considered for approval.
10. RR shall be done according to existing laws. If it has been mentioned anywhere in the mining plan, it has not been considered for approval.
11. (a) The mining of lower seams have been proposed to be extracted by underground method due to space constraint for OB accommodation within the block. Attempts shall be made to identify land outside the block for surface

*Subir*

accommodation so as to maximize reserves extraction from operational mining. (i) Extractable reserve calculation in the south-west and south of the basin, shall be done using suitable technology to extract the latent coal. A revised mining plan incorporating the above shall be submitted as soon as possible but not later than 3 years from the date of approval of the mining plan.

You are requested to download the copy of the mining plan and mine closure plan duly signed by the competent authority for beneficial actions and submissions at your end.

Yours Faithfully,



(Anil Mahawar)

Deputy Director,

Coal Control Organisation (A subordinate organization of Ministry of Coal)

Copy to:

1. Under Secretary, NA section, MoC

2. Under Secretary, NA section, MoC

Approved

**Mine Plan and Mine Closure Plan**  
(First Modification/Revision)

**For**

**Talaipalli**

MAND-RAIGARH Coal Field  
(Under Rule 22E of MCR 1960)  
Raigarh  
Chhattisgarh

Project area 2119.40 ha

**Rated Capacity 25 MTPA**  
**Peak Capacity -37.5000MTPA**

Prepared By

**Central Mine Planning and Design Institute**

Contact No. - 8987788956  
Email ID - rc.dutta@coalindia.in

APPLICANT

**NTPC LIMITED**

NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003

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## CHECKLIST

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Chapter-2	Exploration, Geology, Seam Sequence, Coal Quality and Reserve	
Chapter-3	Mining	
Chapter-4	Safety Management	
Chapter-5	Infrastructure Facilities proposed and their Location	
Chapter-6	Land Requirement	
Chapter-7	Environment Management	
Chapter-8	Progressive & Final Mine Closure Plan	
Annexure	Copy of allotment order /Vesting order.	
Annexure	<p>Certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA) if the project area is confined within the vested/allotted block boundary/existing mining lease and</p> <p>Where the project area extends beyond the block boundary, a certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA) should be supported with a certificate of State Government mines and Geology department must be attached, which should specify</p> <p>(a) consent of the state government for grant of lease beyond the vested geological boundary/existing mining lease</p> <p>(b) non-existence of Coal/ Lignite in the area beyond the vested/allotted geological block boundary/existing mining lease to rule out the issue of encroachment and use of coal bearing area (beyond the vested/allotted block boundary/existing mining lease) in the mining plan</p>	
Annexure	Approval of the Company Board	
Annexure	Copy of earlier approval of mining plan	
Annexure	Plan / chart showing schedule of implementation of Mine closure activities (progressive and final closure) with duration of important activities.	
Annexure	Expert-Review Report carried out by an Accredited Mining Plan Preparing Agency (MPPA)	
Annexure	Other document (if any)	
Plates	Location plan	
Plates	Plan certified by Qualified person/ Accredited Mining Plan preparing agency (MPPA) if the project area is confined within the vested/allotted block boundary/existing mining lease and where the project area extends beyond the block boundary, a Plan certified by Qualified person/ Accredited Mining Plan preparing agency (MPPA) should be supported with a plan with cardinal co-ordinates duly certified by the Mines and Geology Department of the concerned State Government Plan in support of Annexure - II	
Plates	Printed copy of the KML file superimposed in the recent (not older than one year from the base date) dated satellite image duly certified by Accredited Agency should also be attached. Note: The soft copy of the KML file shall also be part of the Soft copy of the mining Plan.	
Plates	Cadastral plan showing approved block boundary via-A-via proposed/existing mining lease & Mine boundary superimposed over it in distinct color, showing land use and infrastructure etc.	
Plates	Geological plan showing all the boreholes drilled and proposed to be drilled showing allotted block boundary and required lease area.	
Plates	Representative Graphic Litholog	
Plates	Surface Plan showing drainage system, Contour, preferably at 3m interval, location of BH (borehole)	
Plates	Conceptual plan showing infrastructure facilities including colony, boundary of mining area, mine entries, roads including road diversion alignment etc.	

Plates	Tentative land use plan showing land type (Govt., forest and tenancy land) with its data source.	✓
Plates	Floor contour plan and seam folio plan, iso-grade plan.	✓
Plates	Cross-section showing coal/firnite seam(s).	✓
Plates	Plan showing existing and proposed surface layout(s).	✓
Plates	Plan showing total coal thickness and overburden thickness and stripping ratio (in case of opencast (OC) Mines)	✓
Plates	Final stage quarry plan showing haul road alignment (in case of OC Mines)	✓
Plates	Plan showing mode and location of entries and surface layouts (in case of underground (UG) Mines)	✗
Plates	Layout of the panel for each system (like Longwall, Continuous Miner, Bord & Pillar, road header etc.) should be given (in case of UG Mines)	✗
Plates	Layout of pillar extraction (in case of UG Mines)	✗
Plates	Support system (in case of UG Mines)	✗
Plates	Haulage and transport system (in case of UG Mines)	✗
Plates	Post mining land use plan	✓
Plates	Progressive mine closure plan/ stage plans	✓
Plates	Reclamation plan	✓

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## Chapter-1: Project Information

### 1.1 Introduction

S No	Parameters	Details
1.1.1	Name of the Coal/Lignite Block	Talaipalli
1.1.2	Name of the Coalfield/ Lignite Field	MAND-RAIGARH Coal Field
1.1.3	Base date of Mining Plan/ Mine Closure Plan	01/04/2023
1.1.4	Linked End Use Plant	LARA STPP
1.1.5	Distance of End Use Plant from the pit head of the project in km	70
1.1.6	Mode of Coal Transport	BY RAIL

### 1.2 Location, Topography & Communication

S No	Parameters	Details
1.2.1	Location of coal deposit	District - Raigarh, State - Chhattisgarh
	State	Chhattisgarh
	District	Raigarh
1.2.2	Communication	Road from Raigarh town via Chorghora to Ambikapur (SH) at 25 Km. Raigarh Rail station on Howrah Bombay main railway line is 55 Km from the block. Nearest Airport is Jhansuguda at a distance of 100 Km
1.2.3	Availability of power supply & water etc	Water from Kelo River, and Permanent Power is available from 132 KV / 33 KV NTPC Substation at Raikani village within block
1.2.4	Prominent physiographic features, drainage pattern, natural water courses, rainfall data, highest flood level	Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south. HFL for the Kelo river is 219 m. The monsoon period extends from mid-June to September with an average annual mean rainfall of 1820 mm
1.2.5	Important surface features within the project area and major diversion or shifting involved	No such important surface features within the project. There is no involvement of major diversion or shifting

### 1.3 Details of the Allotment Agreement

S No	Parameters	Details
1.3.1	Name of the Allottee	NTPC LIMITED
1.3.2	Details of allotment/leasing Order	103/31/2015/NA
1.3.2(B)	Allocation/Vesting Order Date	2015-09-08
1.3.3	Name and address of the Applicant	NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003
1.3.4	Name of the previous Allottee of the Block	NTPC LIMITED
1.3.5	Starting date of the Mine as per CMDPA/CBOPA	01/05/2019
1.3.6	Rated capacity as per CMDPA/CBOPA	18.00
1.3.7	Production Schedule as per opening permission (meeting provisions of CMDPA if any)	AS PER CMDPA
1.3.8	End Use of Coal/ Lignite as per allotment order if any	LARA STPP
1.3.9	Cardinal points coordinates of the Block Boundary	Cardinal Points files data shown below

### Cardinal Points co-ordinates of the Block boundary :

ANNEXURE VIII		
CARDINAL POINTS OF TALAPALLI COAL BLOCK		
POINT NO	LONGITUDE (WGS84)	LATITUDE (WGS84)
P-0	83° 29' 42.381" E	22° 14' 43.085" N
P-1	83° 29' 45.262" E	22° 14' 41.094" N
P-2	83° 29' 48.143" E	22° 14' 39.103" N
P-3	83° 29' 51.024" E	22° 14' 37.111" N
P-4	83° 29' 53.905" E	22° 14' 35.120" N
P-5	83° 29' 56.786" E	22° 14' 33.129" N
P-6	83° 29' 59.667" E	22° 14' 31.137" N
P-7	83° 30' 2.548" E	22° 14' 29.146" N
P-8	83° 30' 5.429" E	22° 14' 27.154" N
P-9	83° 30' 8.309" E	22° 14' 25.163" N
P-10	83° 30' 11.190" E	22° 14' 23.172" N
P-11	83° 30' 14.071" E	22° 14' 21.180" N
P-12	83° 30' 16.952" E	22° 14' 19.189" N
P-13	83° 30' 19.833" E	22° 14' 17.197" N
P-14	83° 30' 22.714" E	22° 14' 15.206" N
P-15	83° 30' 25.595" E	22° 14' 13.214" N
P-16	83° 30' 28.476" E	22° 14' 11.223" N
P-17	83° 30' 31.357" E	22° 14' 9.231" N
P-18	83° 30' 34.238" E	22° 14' 7.240" N
P-19	83° 30' 37.119" E	22° 14' 5.248" N
P-20	83° 30' 40.000" E	22° 14' 3.257" N
P-21	83° 29' 58.067" E	22° 14' 11.345" N
P-22	83° 29' 58.194" E	22° 14' 17.368" N
P-23	83° 29' 57.459" E	22° 14' 17.198" N
P-24	83° 29' 58.726" E	22° 14' 16.809" N
P-25	83° 29' 58.201" E	22° 14' 16.252" N
P-26	83° 29' 56.552" E	22° 14' 15.385" N
P-27	83° 29' 54.948" E	22° 14' 14.299" N
P-28	83° 29' 54.351" E	22° 14' 12.722" N
P-29	83° 29' 54.054" E	22° 14' 11.568" N
P-30	83° 29' 53.962" E	22° 14' 9.562" N
P-31	83° 29' 53.278" E	22° 14' 8.813" N
P-32	83° 29' 52.773" E	22° 14' 7.856" N
P-33	83° 29' 52.008" E	22° 14' 6.932" N
P-34	83° 29' 51.411" E	22° 14' 6.388" N
P-35	83° 29' 50.968" E	22° 14' 6.180" N
P-36	83° 29' 50.524" E	22° 14' 6.140" N
P-37	83° 29' 49.951" E	22° 14' 6.203" N
P-38	83° 29' 49.303" E	22° 14' 6.382" N
P-39	83° 29' 48.581" E	22° 14' 6.646" N
P-40	83° 29' 47.775" E	22° 14' 7.039" N
P-41	83° 29' 47.015" E	22° 14' 7.674" N
P-42	83° 29' 46.074" E	22° 14' 8.478" N
P-43	83° 29' 43.827" E	22° 14' 10.684" N
P-44	83° 29' 42.565" E	22° 14' 10.543" N
P-45	83° 29' 41.314" E	22° 14' 10.840" N
P-46	83° 29' 39.108" E	22° 14' 10.894" N
P-47	83° 29' 37.410" E	22° 14' 11.000" N
P-48	83° 29' 36.301" E	22° 14' 10.770" N
P-49	83° 29' 34.771" E	22° 14' 10.304" N
P-50	83° 29' 33.657" E	22° 14' 9.973" N
P-51	83° 29' 32.985" E	22° 14' 9.570" N
P-52	83° 29' 32.155" E	22° 14' 9.012" N
P-53	83° 29' 31.146" E	22° 14' 8.003" N
P-54	83° 29' 30.001" E	22° 14' 6.617" N
P-55	83° 29' 28.913" E	22° 14' 4.444" N
P-56	83° 29' 27.772" E	22° 14' 1.898" N
P-57	83° 29' 27.418" E	22° 14' 0.799" N
P-58	83° 29' 27.358" E	22° 14' 0.074" N
P-59	83° 29' 27.604" E	22° 13' 59.091" N
P-60	83° 29' 27.883" E	22° 13' 58.348" N
P-61	83° 29' 28.538" E	22° 13' 57.253" N
P-62	83° 29' 28.929" E	22° 13' 56.753" N
P-63	83° 29' 29.000" E	22° 13' 56.531" N
P-64	83° 29' 28.918" E	22° 13' 56.082" N
P-65	83° 29' 28.725" E	22° 13' 55.652" N

ANNEXURE-VIIC		
P-60	83° 29' 28.408" E	22° 13' 55.067" N
P-61	83° 29' 27.843" E	22° 13' 54.268" N
P-68	83° 29' 27.315" E	22° 13' 53.427" N
P-69	83° 29' 26.957" E	22° 13' 52.652" N
P-70	83° 29' 26.574" E	22° 13' 51.321" N
P-71	83° 29' 26.300" E	22° 13' 50.368" N
P-72	83° 29' 26.594" E	22° 13' 49.643" N
P-73	83° 29' 27.248" E	22° 13' 48.896" N
P-74	83° 29' 28.209" E	22° 13' 48.008" N
P-75	83° 29' 28.416" E	22° 13' 46.834" N
P-76	83° 29' 22.623" E	22° 13' 43.860" N
P-77	83° 29' 19.830" E	22° 13' 41.786" N
P-78	83° 29' 17.038" E	22° 13' 39.712" N
P-79	83° 29' 14.245" E	22° 13' 37.638" N
P-80	83° 29' 11.453" E	22° 13' 35.564" N
P-81	83° 29' 8.660" E	22° 13' 33.490" N
P-82	83° 29' 5.867" E	22° 13' 31.416" N
P-83	83° 29' 3.075" E	22° 13' 29.342" N
P-84	83° 29' 0.282" E	22° 13' 27.267" N
P-85	83° 28' 57.490" E	22° 13' 25.193" N
P-86	83° 28' 54.698" E	22° 13' 23.119" N
P-87	83° 28' 51.905" E	22° 13' 21.045" N
P-88	83° 28' 49.113" E	22° 13' 21.638" N
P-89	83° 28' 44.980" E	22° 13' 22.627" N
P-90	83° 28' 41.518" E	22° 13' 23.718" N
P-91	83° 28' 38.056" E	22° 13' 24.808" N
P-92	83° 28' 34.593" E	22° 13' 25.499" N
P-93	83° 28' 31.131" E	22° 13' 26.390" N
P-94	83° 28' 27.668" E	22° 13' 27.281" N
P-95	83° 28' 24.206" E	22° 13' 28.172" N
P-96	83° 28' 20.744" E	22° 13' 29.063" N
P-97	83° 28' 17.281" E	22° 13' 29.953" N
P-98	83° 28' 13.819" E	22° 13' 30.844" N
P-99	83° 28' 10.356" E	22° 13' 31.735" N
P-100	83° 28' 6.894" E	22° 13' 32.626" N
P-101	83° 28' 3.431" E	22° 13' 33.516" N
P-102	83° 27' 59.968" E	22° 13' 34.407" N
P-103	83° 27' 56.506" E	22° 13' 35.297" N
P-104	83° 27' 53.044" E	22° 13' 36.188" N
P-105	83° 27' 49.581" E	22° 13' 37.079" N
P-106	83° 27' 46.119" E	22° 13' 37.969" N
P-107	83° 27' 42.656" E	22° 13' 38.860" N
P-108	83° 27' 39.193" E	22° 13' 39.750" N
P-109	83° 27' 35.731" E	22° 13' 39.718" N
P-110	83° 27' 32.268" E	22° 13' 39.686" N
P-111	83° 27' 28.805" E	22° 13' 39.654" N
P-112	83° 27' 24.911" E	22° 13' 39.622" N
P-113	83° 27' 21.341" E	22° 13' 39.594" N
P-114	83° 27' 17.771" E	22° 13' 39.562" N
P-115	83° 27' 14.200" E	22° 13' 39.531" N
P-116	83° 27' 10.630" E	22° 13' 39.499" N
P-117	83° 27' 7.059" E	22° 13' 39.468" N
P-118	83° 27' 3.489" E	22° 13' 39.436" N
P-119	83° 26' 59.918" E	22° 13' 39.405" N
P-120	83° 26' 56.348" E	22° 13' 39.373" N
P-121	83° 26' 52.777" E	22° 13' 39.342" N
P-122	83° 26' 49.207" E	22° 13' 39.310" N
P-123	83° 26' 45.636" E	22° 13' 39.279" N
P-124	83° 26' 42.066" E	22° 13' 39.247" N
P-125	83° 26' 38.495" E	22° 13' 39.215" N
P-126	83° 26' 34.925" E	22° 13' 39.184" N
P-127	83° 26' 31.354" E	22° 13' 39.152" N
P-128	83° 26' 27.784" E	22° 13' 39.120" N
P-129	83° 26' 24.213" E	22° 13' 39.089" N
P-130	83° 26' 20.643" E	22° 13' 39.057" N
P-131	83° 26' 17.072" E	22° 13' 39.025" N
P-132	83° 26' 13.502" E	22° 13' 38.993" N
P-133	83° 26' 9.931" E	22° 13' 38.962" N

ANNEXURE VIII		
P-134	83° 29' 8.361" E	22° 13' 36.937" N
P-135	83° 29' 2.790" E	22° 13' 38.898" N
P-136	83° 29' 59.320" E	22° 13' 38.896" N
P-137	83° 29' 35.641" E	22° 13' 38.634" N
P-138	83° 29' 52.079" E	22° 13' 38.802" N
P-139	83° 29' 48.508" E	22° 13' 38.770" N
P-140	83° 29' 44.938" E	22° 13' 38.738" N
P-141	83° 29' 41.368" E	22° 13' 38.706" N
P-142	83° 29' 41.345" E	22° 13' 42.254" N
P-143	83° 29' 41.323" E	22° 13' 45.801" N
P-144	83° 29' 41.301" E	22° 13' 49.348" N
P-145	83° 29' 41.278" E	22° 13' 52.896" N
P-146	83° 29' 41.256" E	22° 13' 56.443" N
P-147	83° 29' 41.234" E	22° 13' 59.991" N
P-148	83° 29' 41.211" E	22° 14' 3.539" N
P-149	83° 29' 41.189" E	22° 14' 7.087" N
P-150	83° 29' 41.167" E	22° 14' 10.635" N
P-151	83° 29' 44.729" E	22° 14' 10.670" N
P-152	83° 29' 48.292" E	22° 14' 10.707" N
P-153	83° 29' 51.854" E	22° 14' 10.744" N
P-154	83° 29' 55.416" E	22° 14' 10.808" N
P-155	83° 29' 58.979" E	22° 14' 10.852" N
P-156	83° 29' 2.541" E	22° 14' 10.895" N
P-157	83° 29' 6.104" E	22° 14' 10.939" N
P-158	83° 29' 9.666" E	22° 14' 10.983" N
P-159	83° 29' 13.228" E	22° 14' 11.026" N
P-160	83° 29' 16.791" E	22° 14' 11.070" N
P-161	83° 29' 20.353" E	22° 14' 11.114" N
P-162	83° 29' 20.331" E	22° 14' 14.419" N
P-163	83° 29' 20.310" E	22° 14' 17.724" N
P-164	83° 29' 20.288" E	22° 14' 21.029" N
P-165	83° 29' 20.268" E	22° 14' 24.335" N
P-166	83° 29' 20.244" E	22° 14' 27.640" N
P-167	83° 29' 20.222" E	22° 14' 30.945" N
P-168	83° 29' 20.201" E	22° 14' 34.251" N
P-169	83° 29' 20.179" E	22° 14' 37.556" N
P-170	83° 29' 20.157" E	22° 14' 40.861" N
P-171	83° 29' 20.136" E	22° 14' 44.167" N
P-172	83° 29' 20.113" E	22° 14' 47.472" N
P-173	83° 29' 20.092" E	22° 14' 50.777" N
P-174	83° 29' 20.070" E	22° 14' 54.082" N
P-175	83° 29' 20.048" E	22° 14' 57.388" N
P-176	83° 29' 20.026" E	22° 15' 0.693" N
P-177	83° 29' 20.004" E	22° 15' 3.998" N
P-178	83° 29' 19.983" E	22° 15' 7.304" N
P-179	83° 29' 19.961" E	22° 15' 10.609" N
P-180	83° 29' 19.938" E	22° 15' 13.914" N
P-181	83° 29' 19.917" E	22° 15' 17.220" N
P-182	83° 29' 19.895" E	22° 15' 20.525" N
P-183	83° 29' 19.874" E	22° 15' 23.830" N
P-184	83° 29' 19.852" E	22° 15' 27.135" N
P-185	83° 29' 19.830" E	22° 15' 30.441" N
P-186	83° 29' 19.808" E	22° 15' 33.746" N
P-187	83° 29' 19.786" E	22° 15' 37.051" N
P-188	83° 29' 19.765" E	22° 15' 40.357" N
P-189	83° 29' 19.743" E	22° 15' 43.662" N
P-190	83° 29' 19.721" E	22° 15' 46.967" N
P-191	83° 29' 19.699" E	22° 15' 50.273" N
P-192	83° 29' 19.677" E	22° 15' 53.578" N
P-193	83° 29' 22.402" E	22° 15' 56.882" N
P-194	83° 29' 25.126" E	22° 15' 58.585" N
P-195	83° 29' 27.850" E	22° 15' 1.089" N
P-196	83° 29' 30.575" E	22° 15' 3.593" N
P-197	83° 29' 33.299" E	22° 15' 6.098" N
P-198	83° 29' 36.023" E	22° 15' 8.602" N
P-199	83° 29' 38.748" E	22° 15' 11.107" N
P-200	83° 29' 42.004" E	22° 15' 13.611" N
T-101	83° 29' 45.261" E	22° 15' 16.116" N

ANNEXURE VIII		
P-202	83° 26' 48.517" E	22° 16' 6.885" N
P-203	83° 26' 51.774" E	22° 16' 5.453" N
P-204	83° 26' 55.030" E	22° 16' 4.020" N
P-205	83° 26' 58.287" E	22° 16' 2.587" N
P-206	83° 27' 1.543" E	22° 16' 1.214" N
P-207	83° 27' 4.800" E	22° 15' 59.802" N
P-208	83° 27' 8.056" E	22° 15' 58.369" N
P-209	83° 27' 8.064" E	22° 15' 54.395" N
P-210	83° 27' 8.072" E	22° 15' 50.422" N
P-211	83° 27' 8.080" E	22° 15' 46.448" N
P-212	83° 27' 8.088" E	22° 15' 42.475" N
P-213	83° 27' 11.411" E	22° 15' 41.273" N
P-214	83° 27' 14.734" E	22° 15' 40.130" N
P-215	83° 27' 18.058" E	22° 15' 38.988" N
P-216	83° 27' 21.381" E	22° 15' 37.845" N
P-217	83° 27' 24.704" E	22° 15' 36.702" N
P-218	83° 27' 28.027" E	22° 15' 35.560" N
P-219	83° 27' 31.351" E	22° 15' 34.417" N
P-220	83° 27' 34.674" E	22° 15' 33.274" N
P-221	83° 27' 37.997" E	22° 15' 32.132" N
P-222	83° 27' 41.320" E	22° 15' 30.989" N
P-223	83° 27' 44.643" E	22° 15' 29.846" N
P-224	83° 27' 47.966" E	22° 15' 28.703" N
P-225	83° 27' 51.289" E	22° 15' 27.561" N
P-226	83° 27' 54.613" E	22° 15' 26.418" N
P-227	83° 27' 57.936" E	22° 15' 25.275" N
P-228	83° 28' 1.259" E	22° 15' 24.132" N
P-229	83° 28' 4.582" E	22° 15' 22.989" N
P-230	83° 28' 7.905" E	22° 15' 21.846" N
P-231	83° 28' 11.228" E	22° 15' 20.703" N
P-232	83° 28' 14.551" E	22° 15' 19.560" N
P-233	83° 28' 17.874" E	22° 15' 18.417" N
P-234	83° 28' 21.197" E	22° 15' 17.274" N
P-235	83° 28' 24.520" E	22° 15' 16.131" N
P-236	83° 28' 27.843" E	22° 15' 14.988" N
P-237	83° 28' 31.166" E	22° 15' 13.845" N
P-238	83° 28' 34.489" E	22° 15' 12.702" N
P-239	83° 28' 37.811" E	22° 15' 11.559" N
P-240	83° 28' 41.134" E	22° 15' 10.416" N
P-241	83° 28' 44.457" E	22° 15' 9.273" N
P-242	83° 28' 47.780" E	22° 15' 8.130" N
P-243	83° 28' 51.103" E	22° 15' 6.987" N
P-244	83° 28' 54.426" E	22° 15' 5.844" N
P-245	83° 28' 57.749" E	22° 15' 4.701" N
P-246	83° 28' 61.072" E	22° 15' 3.558" N
P-247	83° 28' 64.395" E	22° 15' 2.415" N
P-248	83° 28' 67.718" E	22° 15' 1.272" N
P-249	83° 28' 71.041" E	22° 15' 0.129" N
P-250	83° 28' 74.364" E	22° 15' 8.980" N
P-251	83° 28' 77.687" E	22° 15' 7.837" N
P-252	83° 28' 81.010" E	22° 15' 6.694" N
P-253	83° 28' 84.333" E	22° 15' 5.551" N
P-254	83° 28' 87.656" E	22° 14' 59.015" N
P-255	83° 28' 90.979" E	22° 14' 57.872" N
P-256	83° 28' 94.302" E	22° 14' 56.729" N
P-257	83° 28' 97.625" E	22° 14' 55.586" N
P-258	83° 28' 100.948" E	22° 14' 54.443" N
P-259	83° 28' 104.271" E	22° 14' 53.300" N
P-260	83° 28' 107.594" E	22° 14' 52.157" N
P-261	83° 28' 110.917" E	22° 14' 51.014" N
P-262	83° 28' 114.240" E	22° 14' 49.871" N
NOTE: Boundary points are software generated from geotransformed block boundary of Talacali coal block.		

## 1.4 Details of the Previous Approval of Mining Plan:



S No	Parameters	Details	
1.4.1	Date of approval	31/03/2010	
	Copy of earlier approval of mining plan Upload document	Annexure 4: Document shown in annexure section.	
1.4.2	Conditions, if any	S.No	Conditions
		1	The mining company shall take all necessary precaution regarding safety of mine workings, persons, deployed therein.
		2	Mining lease to be acquired shall not encroach into any other coal block.
		3	The approval of the mining plan is without prejudice to the requirement of approvals.
1.4.3	Scheduled year of start of production	2012-13	
1.4.4	Proposed year of achieving the targeted production	2016	
1.4.5	Date of actual commencement of mining operations, if operations already started	15/10/2019	
1.4.6	Likely date of mining operations, if operations not yet started & reasons for non-commencement of operations	Operational	
1.4.7	Planned production and actual levels achieved in last 3 years (Coal in Mtp, OB in MM3, SR in MM3)	Year	Planned Coal 'Mtp' OB MM3 SR MM3 Actual Coal 'Mtp' OB MM3 SR MM3
			UG OC UG OC UG OC
		2018-20	1.500 7.650 3.100 0.000 0.180 2.070 10.890
		2020-21	0.000 4.000 19.040 4.760 0.000 0.810 3.710 4.560
		2021-22	0.000 8.000 34.000 4.250 0.000 0.410 2.450 5.980
		2022-23	0.000 13.000 55.250 4.250 0.000 2.000 12.210 6.110
1.4.8	Statutory obligations vis-à-vis compliance status in a tabular form:	S.No	Clearance Type (Mining Plan, Mining Lease, Environment, Forest, CTO etc.)
			Conditions
			Compliance Status
		1	ENVIRONMENTAL CLEARANCE ATTACHED AS ANNEXURE VIIA COMPLIED
		2	FOREST CLEARANCE ATTACHED AS ANNEXURE VIIB COMPLIED
		3	CONSENT TO OPERATE ATTACHED AS ANNEXURE VIIB COMPLIED
		4	ENVIRONMENTAL CLEARANCE ATTACHED AS ANNEXURE VIIA COMPLIED
		5	FOREST CLEARANCE ATTACHED AS ANNEXURE VIIB COMPLIED
		6	CONSENT TO OPERATE ATTACHED AS ANNEXURE VIIB COMPLIED
1.4.9	Reasons for difference between the planned and actual production levels	MDO contract ran into legal dispute and subsequently contract was terminated on 4th July 2019. However, mining operation was started on a small patch in Oct 2019 contractually in the area beyond the disputed MDO contract by appointing an agency.	

#### 1.5 PARAMETERS OF APPROVED MINING PLAN VIS-À-VIS PROPOSED MINING PLAN

S.No	Block Area	Approved Mining Plan	Proposed Mining Plan
1.5.1	Geological Block Area HA	2113	2113.4000
1.5.2	Geological Block Area Projected HA	2113	2113.40
1.5.3	Lease area HA	2113	2113.4000
1.5.4	Project area HA	2113	2113.4000
1.5.5	Life of the Project Yrs	54	31
1.5.6	Minimum and Maximum Depth of working	70-404	30 -340
1.5.7	Geological Block Area yet to be projected 'Ha'	0.00	0.00
1.5.8	Production Target MTP	18	25.0000
1.5.9	Seams Available As per GR	X1A, X1B, XTOP, XBOT, IXL2, IX L1, IX, VII, VI, VITOP, VIMD, VIBOT, VTOP, VMID, VBOT, VTOP, VMID, VIBOT, VTOP, VMID, VIBOT, III L, III B L3, II L2, II L1, II, I L, I	X-1A, X-1B, X-TOP, X-BOT, IX-L2, IX-L1, IX, VII, VI, VI-TOP, VI-MID, VI-BOT, V-TOP, V-MID, V-BOT, IV-TOP, IV-MID, IV-L, IV-BOT, III L, III B L3, II L2, II L1, II, I L, I

1.5.10	Seams not considered for Mining with Reasons	S. No	Seams	Reason
		1	III L	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
		2	III	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
		3	II L3	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
		4	II L2	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable
		5	II L1	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable

			6 II	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable.
			7 II L	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable.
			8 I	In this proposed Mining Plan Seams from X-LA upto IV-BOT has been considered for opencast mining due to lack of dumping space. Seam III L to Seam II L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable.
1.5.11	Gross Geological Reserve Mte	1400.57	1407.94	
1.5.12	Net Geological Reserve Mte	1290.57	1297.1450	
1.5.13	Booked Reserve Mte	385.25	408.7378	
1.5.14	Minable Reserve Mte	905.65	664.7999	
1.5.15	Extractable Reserve Mte	881.25	631.5897	
1.5.16	% of Extractors recovery	68.32%	49.8410%	
1.5.17	Reserve Depleted (at the base date) Reserves Mte	3.41	3.4100	
1.5.18	Balance Extractable Reserve Mte	857.84	628.1800	
1.5.19	Average Grade	F	4214.0000	
1.5.20	OB in MM3	3777.07	3714.1300	
1.5.21	GR M3/ha	4.48	4.3208	
1.5.22	Mining Technology	OC Shovel Dumper and Surface Miner UG Continuous Miner and Shuttle Car	OC Shovel Dumper and Surface Miner UG to be planned later	
1.5.23	Coal Beneficiation envisaged			
1.5.24	Handling of Rejects	NOT APPLICABLE	NOT APPLICABLE	
1.5.25		Land use pattern "Ha"		
1	Excavation Area	2079.56	1839.8500	
2	Top Soil Dump		0.0000	
3	External Dump		0.0000	
4	Safety Zone	33.44	29.1000	
5	Other Use		19.7300	
6	Infrastructure area		189.6000	
7	Green Belt		17.1600	
8	Undisturbed Area		23.9500	
	Total	2113.0000	2119.4000	

1.5.26	Reasons for revision	<p>M/s TEMPL was appointed as MCO on 26.08.2020 by NTPC for development and operation of Talapali Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL claimed that as per their calculations 404.5 MT of coal can be extracted at a stripping ratio of 4.30 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.00 to 5.25 Cum/t. Along with this, the issue of accommodation of excess OB in the designated dump area including temporary external dump and unfeasibility of 100 backfilling by re-handling of temporary external dump as per approved mining plan was raised by M/s TEMPL. Subsequently, M/s TEMPL chose to rescind the contract 04.05.21 and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Subsequent to few hearings and submissions made by both the Parties, NTPC and TEMPL jointly approached CMDPIIL for technical opinion. CMDPIIL suggested for modification of Mining plan is necessary for start of mining operations. Meanwhile, NTPC terminated the contract on 08.03.22. For floating of fresh NIT, as per CMDPIIL's suggestion, modification of Mining plan is necessary.</p>
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APPROVED

## Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality and Reserve

### 2.1 Details of the block

S.No	Parameters	Details	
2.1.1	Particulars of adjacent blocks: North, South, East, West	North	Unexplored
		East	Peema
		South	Unexplored and Dipside of Barod-Bjari Block
		West	Chintapani Extension Block and Dipside of Barod-Bjari Block
2.1.2	Location of the Block	Talaipalli Coal Block is located in the eastern part of Mand-Raigarh coalfield, District Raigarh, State Chhattisgarh, latitude 22° 13' 20" N to 22° 16' 12" N Longitude 83° 25' 40" E to 83° 30' 16" E Talaipalli block is covered by Survey of India top sheet No. 64N7 NE (RF-150000)	
	State	Chhattisgarh	
	District	Raigarh	
2.1.3	Area of the Block 'Ha'	2119.40	
2.1.4	Area of the geological block projected in 'Ha' (Area of the geological block considered for liquidation of coal reserve)	2119.40	
2.1.5	Balance area yet to be projected 'Ha'	0	
2.1.6	Lively Reserve in the area yet to be projected 'Mte'	193.81	
2.1.7	Cardinal Point Co-ordinates of the non-coal/lignite bearing area/existing mining lease outside the allotted Geological Coal/Lignite block	The Geological Block area and the Project area are same Project area doesn't contain any area outside the block boundary	
	(Duly certified in line with para 1.9 of the Guideline, if fresh minning lease required)	Cardinal Points files data shown below	
2.1.8	Certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA) if the project area is confined within the vested/allotted block boundary/existing mining lease and Cardinal Points Co-ordinates of the Proposed area outside the non-coal/lignite bearing area outside the allotted Geological Coal/Lignite block	Annexure 2A Annexure 2B The Project area, Lease area and geological block area in Ha shall also be envisaged	Document shown in annexure section. Document shown in annexure section. The Geological Block area, lease area and the Project area are same i.e. 2119.40 Ha. Project area doesn't contain any area outside the block boundary.
2.1.9	KML file of the Proposed lease area, Project Area and geological Block	File attached in Plates section below.	
2.1.10	Whether the proposed project area is confined within the allotted block boundary/existing mining lease, if not, the reason for deviation from allotted block boundary, may be given	Yes. The proposed project area is confined within the allotted block boundary	
2.1.11	If the project area extends outside the allotted block boundary/existing mining lease, confirmation about non-occurrence of coal/lignite in the area under reference needs to be furnished	NA	
2.1.12(1)	Year of Starting	2018	
2.1.12(2)	Type of the Project	OPERATING	

(Duly certified in line with para 1.9 of the Guideline, if fresh minning lease required) :

Document not found

S No	Parameters	Details																																					
2.2.1	Regional geological set up of the area, local geology, structure, stratigraphic sequence, characteristics of the litho-logical units (coal seams/partings/overburden).	<p>Mand-Raigarh Coalfield lies in the drainage basin of Mahanadi. It represents a part of the south-eastern periphery of a vast caudron of sedimentary terrain, known as Son-Mahanadi Gondwana Master Basin. Mand-Raigarh Coalfield along with Ib-Hingiri coalfield towards south-east and Korba-Hasdo towards west and north-west constitute the large NW-SE trending asymmetrical synformal master basin.</p> <p>The extensive occurrences of Barakar and Supra-Barakar rocks amidst isolated Talchr outcrop spanned between latitudes N21° 45' to 22° 42' and longitudes E83° 01' to 83° 44', constitutes Mand-Raigarh Coalfield. It is situated between Ib-River Coalfield in the southeast and Korba Coalfield in the northwest with more or less similar stratigraphic and tectonic setting. The coal measures in the Mand-Raigarh basin are exposed in three well defined patches due to erosion of the overlying Kamthi rocks along the drainage of the prominent rivers.</p> <p>The Mand-Raigarh Coalfield is an asymmetrical basin with an approximately NW-SE axis. It is a part of Ib-Mand-Korba master basin lying within the Mahanadi graben. It displays a typical half-graben configuration, with the southern boundary marked by a major NW-SE zone of faulting coinciding with the trend of the Mahanadi graben and the northern boundary not faulted over the major part. The beds dip at low angle 50 – 70 towards south-west. In the southern limb, the strike is approximately NW-SE with minor variations and the beds dip towards north-east.</p> <p>The General Stratigraphic sequence is furnished below:</p> <table border="1"> <thead> <tr> <th>Age</th> <th>Formation</th> <th>Thickness (m)</th> <th>Lithology</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Recent to subrecent</td> <td></td> <td></td> <td>Alluvial soil pebbly to bouldery bed with silty clay band, laterite etc.</td> </tr> <tr> <td>Cretaceous to Eocene</td> <td>Deccan Traps</td> <td></td> <td>Basalt flows &amp; dolerite dykes</td> </tr> <tr> <td>Lower to Middle Triassic</td> <td>Kamthi</td> <td>2851</td> <td>Poorly sorted, frequently ferruginous, coarse to very coarse grained, locally graded to pebbly mega cross bedded sandstone containing brownish grey to buff coloured clay clasts. 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2.2.2	Local geology, Structure, Stratigraphic sequence, Characteristics of the litho-logical units (coal seams/partings/overburden).																																						

Taleipalli Block is located in the eastern part of Mand-Raigarh Coalfield. Major part of Taleipalli block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession is given below:

Formation	Thickness (m)	Lithology
Recent	0.50 - 18.00	Soil, alluvium
Barren Measures	18.80 - 143.00	Shale, fine to medium grained sandstone and intercalation of shale and sandstone carbonaceous shale and thin coal beds Fine, medium and coarse grained feldspathic grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams Khakee greenish shales & sandstone occasional pebbly
Barakars	30.00 - 596.00	
Takri	1.00 - 54.30	
Basement		Metamorphics

The general strike of the bed is NW-SE in the major part of the block which swings to almost east - west in the north-western and western part of the block. The dip of beds varies from 4 to 8 towards South-west.

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data with throw varying from 0-150m. Out of 12, three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. Barren Measure Formation is preserved in a limited area in the north-western part of the block. Remaining area is structurally free except two relatively minor faults.

The sequence of Coal seams is given below:

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.2	1.08			0.50-0.90
	Parting			5.41	11.5	8.0-6.5
2	X LB	0.3	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.4	1.8			1.00-1.75
	Parting			0.1	3	1.0-2.0
4	X Bot	1.8	8.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX L1	0.36	1.88			1.2-2.0
	Parting			5.65	11.87	8.0-6.0
7	IX	0.95	8.88			3.5-6.0
	Parting			8.3	18.15	9.0-12.0
8	VIII	2.85	6.64			4.0-6.5
	Parting			17.68	42.01	23.0-25.0
9	VII	0.1	3.9			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.58	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-6.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.46	1.76			0.50-1.0
	Parting			2.8	23.45	14.0-21.0
13	V Top	0.5	3.08			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.3	6.4			0.50-2.0
	Parting			15.78	14	17.0-23.0
	IV Top	0.54	5.78			2.5-3.0

	Parting			5.3	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.98			0.50-2.0
	Parting			0.7	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			6.05	21.54	14.0-17.0
20	III L	0.1	3.25			0.50-1.5
	Parting			24.57	44.05	33.5-38.0
21	II	0.65	5.97			2.0-5.5
	Parting			31.1	55.85	33.0-61.0
22	II L3	0.5	1.05			-0.00
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			-0.00
	Parting			5	65.59	55
24	II L1	0.05	1.54			-0.00
	Parting			1.27	20.59	3.0-14.0
25	I	0.13	5.10			1.5-2.5
	Parting			0.37	3.85	0.50-2.0
26	I L	0.05	3.45			-0.00
	Parting			Around 35.0 m		
27	I	0.22	0.55		-	27

2.2.3 Geological Block Area "Ha" 2119.40

2.2.4 Status of Exploration of the block

Detail exploration in the block was carried out since 2006-09. A total of 117 number of boreholes were drilled by GSI & MECL which were considered for preparation of the Geological Report. Total meterage considered for preparation of Geological Report is 46289.30 m.

2.2.5 Area covered by "detailed" exploration within the block (sq. km) 21.154

2.2.6 Whether entire area has been covered by a detailed exploration Yes The entire proposed lease area has been explored

2.2.7 No. of boreholes drilled within the block 117

2.2.8 Whether any further exploration/study is required or suggested and time frame in which it is to be completed No

2.2.9 Year wise future programme of exploration NA

2.2.10 Overall borehole density within the block (no. / sq. km) approx 5.52

2.2.11 No of Seams available as per GR (Geological Report) X-LA, X-LB, X-TOP, X-BOT, IX-L2, IX-L1, IX-VIII, VII, VI-TOP, VI-MID, VI-BOT, V-TOP, V-MID, V-BOT, IV-TOP, IV-MID, IV-L, IV-BOT, III-L, III-L3, II-L2, II-L1, II-L1

2.2.12 Seams not considered for Mining with Reserve In this proposed Mining Plan, Seams from X-LA upto IV-BOT has been considered for opencast mining. Further below seams cannot be mined by OC method due to lack of dumping space. Seams III-L to Seams II-L will be considered for UG mining after exhaustion of OC mine. Seam I is not workable.

2.2.13 Dip of the Seam The general strike is NW-SE with south-westerly dip of 4-8 deg

#### 2.2.14 Seam wise thickness, depth and reserve

Seam	Thick-ness Rang-e 'm'	Depth Rang-e 'm'	Net Geol-ogical Res-erve 'Mte'	Block Reserve Below 'Mte'				Mn Res-erve 'Mte'	Min-ing Loss-es	Ext Res-erve 'Mte'			As on base date 'Mte'							Reas-on (For seam s not consid-ered for min-ing)			
				High-wal/ Baste-r	Nara-River/Road	Barr-er	Un-econ-omic			Total Block ad-	UG	OC	UG	OC	High-wal	Decision of Reserve			Balance Reserve				
																UG	OC	High-wal	UG		OC	High-wal	Total
X-LA	0.20-1.05	21.40-165.78	3.537		3.4333	3.4333	0.1037	0.0052	0.0985				0.00	0.10		0.1							
Parting	5.41-11.90					0.0000							0.00	0.00									
X-LB	0.30-1.25	14.52-177.58	4.6500	0.0537	0.0539	4.4053	0.2771	0.0138	0.2532				0.00	0.25		0.25							
Parting	3.37-14.85					0.0000							0.00	0.00									



X-TOP	0.40-1.60	10.9 7-187 19	14.1 260	1.62 41	0.74 55	4.75 36	7.12 32	7.00 26	0.35 01	6.65 27	0.05 99	0.00	6.59	6.59
Parting	0.70-3.00						0.00 00					0.00	0.00	
X-BOT	1.60-8.10	12.2 8-152 93	80.4 090	8.91 34	10.0 448	5.83 03	24.7 865	55.8 205	2.78 10	52.8 364	0.66 42	0.00	52.1 8	52.1 8
Parting	2.30-20.15						0.00 00					0.00	0.00	
IX-L2	1.20-2.55	10.7 8-225 31	28.9 590	3.34 96	3.73 16	2.25 29	9.34 04	19.8 185	0.98 09	18.8 376	0.26 14	0.00	18.3 8	18.3 8
Parting	13.5-21.84						0.00 00					0.00	0.00	
IX-L1	0.36-1.65	10.7 8-225 31	29.2 930	4.47 73	3.40 69	1.97 21	9.55 73	19.7 357	0.98 08	18.7 489	0.25 35	0.00	18.5 0	18.5
Parting	5.65-11.87						0.00 00					0.00	0.00	
IX	0.95-8.65	11.8 7-238 02	102 3310	14.4 822	10.2 044	5.48 23	30.1 489	72.1 921	3.80 91	68.5 730	1.00 42	0.00	67.5 7	67.5 7
Parting	6.30-16.15						0.00 00					0.00	0.00	
VIII	2.06-8.64	7.95 255 47	128 2510	20.8 172	12.4 546	9.15 94	41.8 412	86.6 098	4.33 05	82.2 793	1.14 67	0.00	81.1 3	81.1 3
Parting	17.6-42.01						0.00 00					0.00	0.00	
VII	0.10-3.90	58.2 0-270 06	15.8 490	5.04 14	5.14 84	2.11 33	12.3 031	3.54 59	0.17 73	3.38 86		0.00	3.37	3.37
Parting	1.08-17.44						0.00 00					0.00	0.00	
VI-TOP	0.37-3.42	12.0 8-312 32	34.2 940	5.75 60	4.34 45	4.81 67	14.7 173	19.5 767	0.97 88	18.5 978		0.00	18.6 0	18.6
Parting	0.56-3.25						0.00 00					0.00	0.00	
VI-MID	3.06-10.01	9.96 321 49	180 9160	23.8 405	15.2 906	15.5 950	64.7 261	116 1899	5.80 95	110 3604		0.00	110 38	110 38
Parting	0.85-5.98						0.00 00					0.00	0.00	
VI-BOT	0.48-1.75	12.4 3-328 50	10.9 360	1.37 03	0.14 60	5.09 24	6.60 87	4.32 73	0.21 64	4.11 06		0.00	4.11	4.11
Parting	3.80-23.45						0.00 00					0.00	0.00	
V-TOP	0.50-3.08	12.4 4-347 15	17.0 110	4.48 88	2.48 42	2.81 38	8.58 68	7.42 41	0.37 12	7.05 29		0.00	7.05	7.05
Parting	9.06-18.94						0.00 00					0.00	0.00	
V-MID	0.15-3.73	10.5 7-360 80	35.1 570	9.31 93	2.88 41	5.58 84	17.5 918	18.5 951	0.82 83	17.8 369		0.00	17.8 4	17.8 4
Parting	4.55-15.85						0.00 00					0.00	0.00	

V-BOT	0.30-5.40	22.96-377.60	42.2010	8.9908	2.7183	6.6342	18.2833	23.9177	1.1959	22.7218	0.00	22.72	22.72	
Parting	15.18-30.14						0.0000				0.00	0.00		
IV-TOP	0.54-5.78	10.87-405.18	93.8220	25.1158	2.2913	10.5820	37.9892	55.8326	2.7916	53.0411	0.00	53.04	53.04	
Parting	5.30-20.13						0.0000				0.00	0.00		
IV-MID	0.98-7.24	19.55-425.07	145.4770	35.7954	12.6738	10.8022	59.0714	86.4055	4.3203	82.0852	0.00	82.08	82.08	
Parting	0.75-8.95						0.0000				0.00	0.00		
IV-L	0.23-4.99	25.28-400.11	31.1310	5.6820	0.4445	5.2906	11.3275	19.8034	0.9902	18.8132	0.00	18.81	18.81	
Parting	0.70-4.55						0.0000				0.00	0.00		
IV-BOT	0.55-5.87	28.39-402.73	73.9880	17.8628	4.3560	3.9081	25.9267	48.0613	3.4013	45.6583	0.00	45.66	45.66	
Parting	6.05-21.54						0.0000				0.00	0.00		
III-L	0.10-3.25	42.78-421.12	33.043				0.0000				0.00	0.00		In the proceed Minin o Plan Seams from X-LA upto IV-BOT has been done one o for open cast mine

APPROVED

















Basic assumptions and considerations for reserve estimations are listed below. MineX Package has been utilized for resource estimation.

- i. The isochores, isograde and the floor contours, Iso-OB, iso depth lines have been generated by MineX Software.
- ii. The open cast reserves have been estimated on the basis of 1-100 thickness for the seams from seam XLA to IV Bottom, where all the carbonaceous bands and obvious bands individually or collectively upto 1m. thickness have been included in the seam & >1m bands have been excluded.
- iii. The reserves have been estimated on 1-30 thickness for the seams from III L to II L as underground reserve.
  - iv) Reserves are not estimated for BCS & IP seam thicknesses.
- v) The opencast reserves are estimated for 1 m and above seam thickness & at 1 m thickness interval. For underground reserves estimation minimum workable thickness has been considered as 0.50m, 0.90, 1.2, 1.50 m thickness and onward at 0.50 m thickness interval. The highly disturbed zone between fault F8, F9, F4, F7 and F5 area, the reserve have been estimated in indicated category for all the seams.
- vi) Iso-overburden & iso-quarry lines are generated through model upto the floor of seam-IV Bottom. The iso-overburden lines are compared with combined coal thickness to generated C, OB lines, sub sector wise.
- vii) A 50 m barrier zone is left for Kalo River and its tributary as nala.
- viii) All volumes of coal are estimated by MineX Software Model and reserves are estimated as:  
 Gross Reserves = Area X Thickness X Sp. Gravity of Coal
- ix) A 10% deduction has been made from the gross proved reserves to arrive at the net-in-situ proved reserves available in the block for open cast potential and underground area where as 100% gross reserves are considered for indicated category.

2.2.16	Average GCV 'KCal/kg'	
	4214 Kcal/kg	
2.2.17	Gross Geological Reserve of the block 'Mte'	1407.94
2.2.18	Net Geological Reserve of the block 'Mte'	1287.1450
2.2.19	Minable Reserve of the block 'Mte'	664.7999
2.2.20	Blocked Reserve 'Mte'	408.7378
2.2.21	Corresponding extractable reserve of the block 'Mte'	631.0597
2.2.22	Percentage of Extraction	49.841
2.2.23	Reserve already depleted (Base date of Mining Plan)	3.41
2.2.24	Balance Reserve (as on Base Date)	628.1497

### Chapter-3: Mining

#### 3.1 Mining Method

S No	Parameters	Details
3.1.1	Existing method of mining if the mine is under operation	OPENCAST MINING
3.1.2	Proposed method of mining with justification on suitability of method of mining	

APPROVED

**PROPOSED METHOD OF MINING**

Considering the geo-mining characteristics of the block, dumping space constraints and for **conservation of resource**, it is proposed to extract the coal reserves upto Seam IV BOT using open cast mining Method because of following reasons –

- Occurrence of multiple seam with a significant number having low thickness between 0.5m-1.5m. Also, some seams are thick and are above 5m in thickness. Coal loss in such seam conditions can be minimized by opencast mining method.
- The existence of very low cover for entry to bottom-most seam considered (Seam-IV BOT) in the eastern part of the block makes opencast mining an obvious choice.

The deposit has therefore been proposed for mining by opencast method up to the Seam IV BOT Floor due to constraint of space for dumping. Seam below IV BOT shall be considered for UG mining after exhaustion of OC mine.

**CHOICE OF TECHNOLOGY**

The operational factors include

- Multi-Seam operation involving 19-seams horizons.
- Effective seam thickness varying from 1.00 to 9.00 m with majority of seams having less effective thickness varying from 1.00 to 2.50m.
- Mild seam gradient.
- OB with varying parting thickness.

Based on the above factors surface miner has been considered for extraction of coal as surface miner eliminates blasting in coal.

As removal of overburden with varying parting thickness requires flexible operation, shovel-dumper combination with conventional system of mining (i.e. inclined sicing) has been considered for removal of overburden.

For a rated capacity of 25.0 Mtpa, it is proposed to deploy 10-12 cum Hydraulic Shovel/backhoe and 20-22 Cum Hydraulic shovel/backhoe with 100T and 200T Rear Dumper respectively for OB. For Coal, Surface Miner with Front End Loader and ROT Dumper shall be deployed.

**PIT FORMULATION STRATEGY:**

The mine boundary for the pit has been delineated taking into consideration block boundary, surface features, strip ratio and **external dump space required for continuity of mining**. Considering the above, the pit is formulated with maximum possible external OB dump on the dip side within the block to be re-handled later and internal dumping in the de-coaled area. **Pit optimization has been done considering constraint on space availability for dumping of waste.**

The pit boundary has been fixed leaving safety barrier, conveyor corridor along the eastern, southern and western boundary. Also, the infrastructural facilities (MOR, Sios, workshop etc) is proposed to be located in the south-west corner of the block.

The proposed Pit has been formulated considering Seam IV as base seam. Seam IV has been taken as the base seam for the pit since going upto Seam III, which is only 4-4.5m thick and is 50-60m below seam IV increases the CB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. So, Opencast mining for the Talapali coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal.

Considering the above quarry surface within the block has been delineated as follow:

North	East	South	West
50m from Block boundary, foothill of the Turga Hill in NW and leaving area for UG infrastructure in north near BH MNRT-02.	50m from edge of Kelo river and 50m from Block boundary	50m from block boundary	50m from Block boundary and leaving area for infrastructure in south-west

**RATED CAPACITY:**

Revised Mining Plan for Talapali Coal Block has been prepared for a rated/peak capacity of 25.0 Mtpa of Coal from Opencast mine. This output is considered based on thickness of multiple coal seams (19 No. of Coal Horizons for OCP) and strike length of ~5 Km.

**BASIC PROJECT AND MINE PARAMETERS:**

The basic project parameters is given below

Sr. No.	Parameters	Unit	Value	
1	Maximum depth	m	540	
2	Usual strike length	along the Mine Floor	m	4800
		along the Mine Surface	m	5200
4	Usual dip rise length	on the Mine Floor	m	2600
		on the Mine Surface	m	3200
6	Area:	On the Mine Floor	ha	1301.10
		On the Mine	ha	1826.85

Surface		
---------	--	--

**SEQUENCE OF MINING:**

The block has NW-SE strike of around 5 km. Opencast mining for the Talapali coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal and effective dump management. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping and infrastructure.

To ensure availability of adequate quantity of coal and early reaching of target capacity, a two-entry scenario has been envisaged, one on the north eastern side and the other on the north-western side. Seam IV will be accessed from both the side which will form the base of the quarry. Then working front of both the quarry will advance towards south and towards each other eventually merging into a single quarry with full strike length after about 9-10 years.

In the initial years, simultaneous working of mechanized opencast mine and the projected belowground mine may pose operational problems due to massive production from the opencast unit. As such, it is considered prudent to start underground mine work after exhaustion of opencast workings.

OB will be transported through flank roads to internal OB dumps and temporary external OB dumps in dip side. Coal is proposed to be transported through ramps and flank roads. Coal from both pit in initial years and also after merger of the pit will be transported to mobile coal handling arrangement at the surface in both eastern and western side and thereafter to Coal dispatch center by surface conveyors.

The mining operation in the block is continuing in the southern part of the block since October 2019 through outsourcing means upto seam VIII. This south pit is projected to extract 2.81 Mt of coal by the end of FY 2022-23. This pit will extend for another 3 years after FY 2022-23. The projected coal production and OB removal from this south pit and its extension is given below.

Year	Calendar Year	Existing South Pit and its extension	
		Coal (Mte)	OB (Mcum)
Upto Base Yr FY 2022-23	Upto Base Yr FY 2022-23	2.81	16.01
1	2023-24	1.50	11.10
2	2024-25	2.03	11.77
3	2025-26	1.58	5.91
<b>Total</b>		<b>7.92</b>	<b>44.80</b>

Moreover, the work for mining operation through outsourcing means in the north-western side has already been awarded for 5 years upto Seam VIII. The pit will be opened in the north west side as per the proposed mine entry and the mine will produce about 14.69 Mt of coal with 46.53 Mcum of OB removal in the 5 years out of which 0.60 Mt of coal is projected to be extracted in 2022-23. The OB will be dumped south of the proposed western pit near the pit and will have to be re-handled to proposed temporary external dump in the southern part of the block after 5 years.

The proposed coal production and OB removal from the eastern and western pit for first 5 years of operation is given below:

Year	Calendar Year	West Pit		East Pit		Total Coal (Mt)	Total OB (Mcum)
		Coal (Mt)	OB (Mcum)	Coal (Mt)	OB (Mcum)		
Upto Base Yr FY 2022-23		0.60	4.43			0.60	4.43
1	2023-24	1.02	6.59	0.98	5.71	2.00	10.00
2	2024-25	2.09	9.60	1.97	6.50	4.06	16.00
3	2025-26	4.01	10.94	1.98	11.08	6.00	22.00
4	2026-27	4.00	11.02	5.00	23.58	9.00	35.00
5	2027-28	3.09	5.44	11.37	50.13	14.46	56.57
<b>Total</b>		<b>14.69</b>	<b>46.53</b>	<b>21.31</b>	<b>98.37</b>	<b>36.00</b>	<b>145.00</b>

The average lead for OB dumping works out to be around 3.5-4 km. However, in initial 10 years, the lead for external dumps would be around 5-6 Km and lead for internal dumps will be around 3.5-4 km.

The average lead for coal would be around 3.5-4 km. However in initial years, the lead would be around 2.5-3 km.

The lead estimation is tentative and may be estimated each year in the yearly operation plan.

**MINING SYSTEM PARAMETERS :**

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.

**Top OB and thick partings:**

Bench height : 10-15 m with 20cum electric-hydraulic shovel/backhoe

Bench width : Working-40-45m, Non-working- 25m

Bench slope : 70 deg

**Parting between seams:**

Bench height : as per inter-burden thickness with 10-12 cum electric-hydraulic shovel/backhoe

Bench width : Working- 40-45m, Non-working- 25m

Bench slope : 70 deg

**Coal:**

Bench height : Seam height with Surface Miner

Bench width : 40-45m

slope : 70 deg

Dump:  
 Bench height 30m  
 Bench width 30m  
 Bench slope 37 deg

#### WASTE DISPOSAL STRATEGY :

It is envisaged that initially for 3 years, all the OB generated will be dumped externally from both the eastern and western pit. This temporary external dump is proposed to be located in the southern side of the block. Once sufficient void is created after 3 years of operation, internal dumping will start in eastern pit while in the Western pit, internal dumping can be started only from 8th year of operation once the base seam is reached.

The external dumping will continue till 13th year and thereafter from 14th year, this external dump (the OB part) will have to be re-handled back into the quarry void for smooth mine advancement. However, re-handling of 3.73 Mcum/year of Top Soil for spreading over internal dump will start from 10th year only.

Out of the total OB of 2734.58 Mcum, it is estimated that 533.53 Mcum (~19.5%) will be required to be temporarily dumped externally. This 533.53 Mcum will be re-handled back into the quarry after sufficient space is available for accommodation of waste from 14th year and will be re-handled upto 25th year. The lead for re-handling would be around 3.5 km. The Strip ratio for the project including re-handling will be 3.17 cum/t.

The height of the temporary external dump is proposed to be around 120m above ground level upto an RL of +400m and final height of the internal dump is proposed to be 120m above ground level upto an RL of +400m. This will ensure optimization of the life of the mine to extract maximum mineable coal. Slope stability study will be imperative to determine final dump height and final dump slope as per regulation no. 109, CMR 2017, and DGM's Circular no. 3, 2020. Slope stability analysis for proposed dumps in the mining plan has been carried out and the factor of safety for dump height upto 120m from DGL was modelled using the cross sections and the material properties collected from the field. The analysis indicates a factor of safety in the range of 1.25-1.50 for various cases.

Overall slope of dump works out to be 23-24.

The waste disposal schedule is given below:

Year	Temporary External Dump (Mcum)		Internal Dump (Mcum)		Emba volume rt	Total OB (Mcum)		Rehandling to Internal Dump (Mcum)	
	Progressive	Cumulative	Progressive	Cumulative		Progressive	Cumulative	Progressive	Cumulative
Upto Base Yr FY 2022-23	20.44	20.44				20.44	20.44		
1	30.88	41.32	0.00	0.00	0.22	21.10	41.55		
2	29.77	71.10	0.00	0.00		29.77	71.32		
3	27.91	99.01	0.00	0.00		27.91	99.23		
4	22.25	121.24	12.77	12.77		35.00	134.23		
5	25.77	147.01	29.80	42.57		35.37	169.60		
6	38.80	205.81	41.26	83.77		100.00	288.80		
7	63.58	269.38	48.02	130.60		110.50	400.30		
8	63.58	332.96	48.02	177.62		110.50	510.80		
9	63.58	396.54	48.02	224.54		110.50	621.30		
10	63.58	460.12	48.02	271.48		110.50	731.80	3.73	3.73
11	24.46	484.59	66.01	337.47		110.50	842.30	3.73	7.47
12	24.46	509.07	77.54	435.01		102.00	944.30	3.73	11.20
13	24.46	533.53	77.54	512.55		102.00	1046.30	3.73	14.93
14			102.00	614.55		102.00	1148.30	16.43	31.36
15			102.00	716.55		102.00	1250.30	37.18	68.54
16			102.00	818.55		102.00	1352.30	42.90	110.54
17			102.00	920.55		102.00	1454.30	47.02	157.66
18			102.00	1022.55		102.00	1556.30	47.02	204.67
19			102.00	1124.55		102.00	1658.30	47.02	251.68
20			102.00	1226.55		102.00	1760.30	47.02	298.70
21			102.00	1328.55		102.00	1862.30	47.02	345.72
22			102.00	1426.55		102.00	1960.30	47.02	392.73
23			102.00	1528.55		102.00	2060.30	47.02	439.75
24			102.00	1628.55		102.00	2160.30	47.02	486.76
25			102.00	1728.55		102.00	2260.30	46.77	533.53
26			100.00	1828.55		100.00	2360.30		
27			100.00	1928.55		100.00	2460.30		
28			100.00	2028.55		100.00	2560.30		
29			100.00	2128.55		100.00	2660.30		
30			60.00	2178.55		50.00	2710.30		
Tot			24.38	2200.83		24.38	2734.58		

Total	633.83	2280.83	0.23	2734.98	633.51
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3.1.3	Coal production capacity proposed MTPA	25.0000
3.1.4	Justification for optimization Coal production capacity	
Considering the geo-mining condition, cumulative thickness of coal seams (~40m) and strike length of 5 Km, the production capacity of 25 Mtpa is justified.		
3.1.5	Calendar year from which the production will start.	2023-24
3.1.6	Year of Achieving rated production	2037-38

### 3.1.7 Tentative Coal production Plan MT

Year		Coal Production Schedule			OB MM3	ER
Year of Operation	Calendar Year	UG	OC	Total		
1	2023-24	0.00	3.50	3.5000	21.10	8.0286
2	2024-25	0.00	6.03	6.0300	29.77	4.6370
3	2025-26	0.00	7.58	7.5800	27.91	3.6821
4	2026-27	0.00	9.00	9.0000	35.00	3.6889
5	2027-28	0.00	14.40	14.4000	55.57	3.6580
6	2028-29	0.00	18.00	18.0000	100.00	3.5536
7	2029-30	0.00	22.00	22.0000	110.50	3.0227
8	2030-31	0.00	22.00	22.0000	110.50	3.0227
9	2031-32	0.00	22.00	22.0000	110.50	3.0227
10	2032-33	0.00	22.00	22.0000	110.50	3.0227
11	2033-34	0.00	22.00	22.0000	110.50	3.0227
12	2034-35	0.00	22.00	22.0000	102.00	4.6364
13	2035-36	0.00	22.00	22.0000	102.00	4.6364
14	2036-37	0.00	22.00	22.0000	102.00	4.6364
15	2037-38	0.00	25.00	25.0000	102.00	4.0800
16	2038-39	0.00	25.00	25.0000	102.00	4.0800
17	2039-40	0.00	25.00	25.0000	102.00	4.0800
18	2040-41	0.00	25.00	25.0000	102.00	4.0800
19	2041-42	0.00	25.00	25.0000	102.00	4.0800
20	2042-43	0.00	25.00	25.0000	102.00	4.0800
21	2043-44	0.00	25.00	25.0000	100.00	4.0000
22	2044-45	0.00	25.00	25.0000	100.00	4.0000
23	2045-46	0.00	25.00	25.0000	100.00	4.0000
24	2046-47	0.00	25.00	25.0000	100.00	4.0000
25	2047-48	0.00	25.00	25.0000	100.00	4.0000
26	2048-49	0.00	25.00	25.0000	100.00	4.0000
27	2049-50	0.00	25.00	25.0000	100.00	4.0000
28	2050-51	0.00	25.00	25.0000	100.00	4.0000
29	2051-52	0.00	25.00	25.0000	100.00	4.0000
30	2052-53	0.00	12.00	12.0000	50.00	4.1667
31	2053-54	0.00	6.6397	6.6397	24.28	3.6588

Note: Calendar Plan/Production Plan for the entire life of the mine.

3.1.8	Rated Capacity Mtpa	By OC : 25.00 By UG : 0.00 Overall : 25.0000
3.1.9	Life of the mine: Years	By OC : 31 By UG : 0 Overall : 31
3.1.10	Whether the proposed external OB dump site is coal/lignite bearing. If so, whether coal/lignite below waste disposal area is extractable.	As the block area is surrounded by coal bearing blocks on all sides, there is no availability of any land for external dumping outside the block area. Hence the proposed external OB dump is planned on the dip side within the block on coal bearing area. However, the external dump is temporary and will be re-handled back to in-pit dump from 14th year and coal will be extracted.

3.1.11	Whether the proposed external OB dump site is coal/lignite bearing if so, whether coal/lignite below waste disposal area is extractable	The proposed external OB dump is temporary and will be re-handled back and coal will be extracted. Infrastructure is planned on the south-west corner of the block and coal below the infrastructure will be mined out by UG method after exhaustion of OC mine.				
3.1.12	Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment, future proposals	The Hydrogeological study report is and Slope stability report is enclosed as Annexeure-VIIB and Annexeure-VIIC respectively.				
3.1.13	Type of Equipment/ HEMM proposed	S.No	Type of Equipment	Capacity	Unit	Population
		1	Hyd Backhoe or Shovel	20	Cubic Meter	15
		2	Hyd Backhoe or Shovel	10	Cubic Meter	15
		3	Surface Miner	2	SM	9
		4	FE Loader	6	Cubic Meter	14
		5	Rear Dumper	200	ton	144
		6	Rear Dumper	100	ton	177
		7	Rear Dumper Coal Body	60	ton	60
		8	Drill	250	mm	23
		9	Dozer with Ripper	850	Horsepower (HP)	4
		10	Crawler Dozer	410	Horsepower (HP)	28
		11	Wheel Dozer	450	Horsepower (HP)	10
		12	Diesel hydraulic backhoe	2	Cubic Meter	4
		13	Water Sprinkler	70	KL	10
		14	Mobile Dust suppression cannon	10	no	10
		15	Motor Grader	280	Horsepower (HP)	8
		16	Fire Tender	2	no	2
		17	Vibratory Compactor	25	ton	4
		18	Diesel Bowser	8	KL	4
		19	Crane	10	ton	4
		20	Crane	25	ton	4
		21	Crane	30	ton	1
		22	Tyre Handler	4	mm	4
		23	Fork Lift	4	no	4
		24	Maintenance Van	2	no	2
		25	Farm Tractor	4	no	4
		26	Tipping Truck	25	ton	4
3.1.14	Upload Require Document	OC : NA UG : NA				



## Chapter-4: Safety Management

### 4.1 Safety Management

S.No	Parameters	Details
4.1.1	Major Risks and uncertainties to the project viz. Proximity to river, adjacent working, geo-mining disturbances, slope stability and remedial measures suggested. It should also include proposed overall slope of the quarry and OB dump, dump height, strata control, fire and spontaneous heating, gas monitoring, disaster management, danger from inrush of water etc.	

APPROVED

Areas of concern	Remedial measures
Safety Management Plan	For complying with <b>Reg. 104</b> of CMR 2017, exercise shall be done to identify, assess and record the hazards of health and safety of the persons employed in the mine after consulting the Safety Committee and Internal Safety Organisation (ISO). Based on the above, Safety Management Plan (SMP) shall be formulated for overall management for developing and implementing the safety policy of the company. SMP shall contain, inter alia, plan to implement the policy, principal hazard management, standard operating procedure (SOP), monitor, evaluate and review the plan.
Failure of OB/Coal Benches	Bench height of maximum 15.00 meters matching with the maximum reach of the digging and loading equipment has been proposed. This reduces chances of accidents due to fall of loose materials. In coal surface miner will be used for extraction. This a safe operational environment avoiding blasting with very safe and stable benches. All DGMS guidelines and regulations shall be strictly adhered to.
Failure of Dump slopes	The internal and external Dumps have been benched at 30 meters height. Overall slope has been proposed to 23-24degrees leaving 30 meters wide berm between two successive benches. This will reduce the chances of OB dump slope failure and subsequent damages. The dumps once sterile should be stabilized by bio reclamation. The overall dump height shall be +120 m from the original ground level. A slope stability study as per DGMS guidelines has already been carried out and attached as Annexure. All DGMS guidelines and regulations shall be strictly adhered to.
Flooding of the mine	The pumping capacity has been proposed based on single day maximum rainfall data of past ten years and the mine water discharge. For surface inundation an embankment of around 2.5 km length and 7.0 meters height has been proposed all along the Keib River and garland drains along the quarry surface boundary. All required precaution against inundation would be taken care of and Standing order for withdrawal of persons in case of apprehended danger shall be framed and implemented.
Blasting in OB benches	Blasting shall be carried out under the direct supervision of statutory personnel and as per the permissions and regulations of DGMS.
Fire in coal benches/stockyard	Spontaneous heating of coal will be controlled by continuous and regular movement of coal benches. In case any bench is idle it should be properly dressed and properly cleaned from coal dust and fines at the time of stoppage.
Accidents due to lack of proper space of movement in Mine	Workers around shovel, dozer, dumper, drill and cranes must be warned to keep out of blind area so that operator may be able to see them clearly. Audio visual alarms are used for pre warning of persons around this machine. To overcome shortage of space if any, strict discipline will have to be inculcated among workmen and supervisors. At any given point of time, multiple benches will be worked together, which will distribute the major producing HEMM at safer distances.
Disaster Management	The Mine will prepare a DMP(Disaster Management Plan) as per guideline. This plan is to be vetted by DGMS. This is to be prepared and submitted for approval by DGMS just after opening the Mine. It is to be stated that in case of any disaster DGMS is the first organization which is to be first informed. The emergency plan for Disaster management is executed under the guidance of best grade of the industry and the senior officers of the regulator, the Directorate General of Mines Safety, GOI.

4.1.2

A Commitment from the Company Board that entire mining operation will be carried out as per the Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017 and wherever specific permission will be required the company will approach the concerned authorities.

Attached as Annexure-III

## Chapter-5: Infrastructure Facilities proposed and their Location

### 5. Infrastructure Facilities

S.No	Parameters	Details		
		S.No.	Infrastructure to be retain to be public use	Infrastructure to be dismantled/reclaimed
5.1	Mine infrastructure required	1	Substation required for public use	Coal Handling Plant
		2	Overhead Electrical Transmission Lines	All buildings and their sewer system other than those required for public use
		3	Water tanks and water pipelines	All structural sheds including workshop, store
		4	Roads constructed to serve the mine facilities	All surface haul roads and other roads except the roads to be used for society
		5	Any buildings required for public use	All power lines, telephone lines, poles, cables and conductors, including Sub-Station transformers, etc. not required for public use
5.2	Power supply & illumination	<p>Talaipalli coal block, having substantial coal reserve, is located in Raigarh district, Chhattisgarh. This block has been allotted to NTPC for necessary development and mining operations consisting of coal mining operation covering opencast mines, coal handling and dispatch arrangement as per requirement. Coal mining operation will require deployment of a number of large coal mining equipment and other auxiliary installations like dewatering pumps, coal handling plant, workshop, residential complex etc.</p> <p>It is estimated that total power demand for Talaipalli OCP, for a planned production capacity of 25 MTY mining, will be around 28MVA. Considering the load of HEMM, CHP, Pumping, and other common loads envisaged for the project, two nos. of 2X16 MVA 33/6.6 kV substation has been envisaged for fulfilling the power requirement of the project.</p> <p>To cater this load, it is envisaged to draw four nos of 33kV feeder from existing 132/33kV NTPC substation at Rakera Village within the block. It is envisaged that each proposed 33/6.6 kV substation to be installed for mining operation will have provision for 2 nos. incoming 33 kV feeders and required nos. of outgoing 6.6 kV feeders as per requirement.</p> <p>The transformers for the substation have been selected considering maximum demand of the project at overall power factor of 0.98, and 100 % stand-by transformation capacity. The transformers of the substation shall be provided with NGR to limit the neutral current as required by statutory provisions. 33 kV VCBs shall be used for primary control of the 33/6.6 kV transformers and incoming 33 kV feeders. Necessary CTs and PTs shall also be provided. Outdoor type 6.6 kV VCBs will be used for secondary control of transformers, control of 6.6 kV outgoing feeders, bus-coupler and capacitor bank control. Necessary protections against over current, short circuit and earth fault for all incoming and outgoing circuit breakers and transformers has also been envisaged. To maintain power factor at 0.98, capacitor bank of suitable capacity with automatic power factor correction relay shall be provided. Necessary provision of automatic fire protection of transformers along with portable fire extinguishers has been envisaged for fire protection in the substations. Provision of fire hydrant system for firefighting of outdoor yard. These substations shall be installed near the quarry at suitable location for supply of power to different equipment of the project.</p> <p>Illumination of the mine (external illumination) shall be done with LED luminaries, fixed on pole, fixed towers and mobile towers. Indoor illumination also will be done with LED fixtures.</p>		
5.3	Drainage & Pumping: Assessment of Volume of Water for Pumping, Pumping Capacity and Pump Selection			

The sources of water accumulation inside the quarry area are from following sources:

- Rain water falling directly within the excavated area
- Inflow of rain water from back filled area
- Inflow of rain water from area beyond excavation
- Seepage of water from Strata Ground water
- The pumping system has been designed to dewater the in-flow of water due to precipitation falling within the active pit limit during the monsoon season to enable the mining activity to continue round the year.
- The planning of de-watering of the mine has been done in such a way that as far as possible the working faces and haul roads remain dry. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self-drainage of water to the lowest level of the quarry.
- The rain water intake to the opencast mine is non-uniform during the year. The maximum rain water intake will be during the period of about four months i.e., June to September in a year. During dry season, say October to May, seepage from strata is expected to be moderate and the same can be dealt by running a few number of pumps provided for monsoon pumping. During this period repair and overhauling of the pumps will be done by rotation.
- Pumping capacity has been designed so that the volume of water accumulated in the mine on the day of maximum rainfall can be pumped out within 5 days with 20 hours of working. The assessment has been made for maximum daily precipitation (rainfall) from collected from nearby area which comes to 160 mm and life of the mines of 31 years.

#### Pumping capacity and pump selection:

Volume of rain water entering to the mine and accumulating in the quarry (make of water) has been assessed on the basis of the following formula:

$$Q = [(A1-A3) \times h \times n1] + (A2 \times h \times n2) + (A3 \times h \times n3) \text{ m}^3/\text{day}$$

Where: A1 = Mined out area in m<sup>2</sup>

A2 = Area beyond excavation in m<sup>2</sup>

A3 = Internal Dump area in m<sup>2</sup>

h = Maximum precipitation/ rainfall in a day in m

The run off co-efficient (n) has been considered as below

For mined out area (n1): 0.80

For area beyond excavation (n2): 0.10

For internal dumped area (n3): 0.10

Considering 10% seepage from strata the total water accumulation will be:

$$Q1 = 1.1 Q$$

- Total make of water comes out to be **4,52,967 cum**. (Final Year)

Above volume of water will be dewatered in 5-days at the rate of 20 hours pumping per day

Pumping capacity per hour thus worked out: **4630 Cum/hr**

#### Pump selection:

	Items	QTY.
1	Main Pump, 810 m <sup>3</sup> /hr (225 lps), 100 m head, 400 kW	2 Nos. (1 working + 1 standby)
2	Main Pump, 810 m <sup>3</sup> /hr (225 lps), 250m head, 800 kW	3 Nos. (4 working + 1 standby)
3	Main Pump, 810 m <sup>3</sup> /hr (225 lps), 350m head, 1200 kW	2 Nos. (2 working)
4	Pump, 137 m <sup>3</sup> /hr (38 lps), 60 m head, 37 kW	06 Nos.
5	Face Pump, 54 m <sup>3</sup> /hr (15 lps), 50m head, 22.5 kW	10 Nos.
4	Electrical Slurry pump, 101 m <sup>3</sup> /hr (28 lps), 29m head, 37 kW	08 Nos.
	Diesel Pumps, 288 m <sup>3</sup> /hr (80 lps), 170m head	03 Nos.
	Pipe fittings, bends, armoured suction, delivery hoses etc.	LS

5.4	Coal Handling Arrangement: Brief detail of the CHP/ Mode of Dispatch, Coal quality and Coal stacking and handling arrangement	<p>CHP/Mode of Dispatch: A full-fledged coal handling plant of 25.0 Mtpa capacity at surface for Tarapalli OCP has been proposed for handling of entire coal. As per requirement suggested by NTPC, 2 streams of conveyor in each side of mine has been provided considering 1 stream as standby. It has been planned to produce coal by blast free technique i.e. through surface miners of (-) 100 mm size. As such further crushing of coal has not been envisaged. For designing CHP, 330 working days in a year and three shifts in a day having 8 effective hours in each shift, suitable nominal system capacity has been envisaged considering other parameters for entire coal handling plant. However, wagon loading will be round the clock. Possibility of In-pit crushing conveying system was also explored, but due to space constraint for internal and external dumping and other mining parameters, in-pit crushing conveying system were not found feasible. Suitable receiving arrangement through Reclaim feeder/Chain feeder/Truck receiving station has been proposed for receiving of coal in the mine pit. It may be finalized at later stage according to mine condition and space availability in the mine quarry. These receiving arrangement for coal have been proposed inside the mine quarry to minimize the truck/dumper movements. The receiving pit/ station may be shifted as per the mine advancement and requirement during mine operation. Two streams of identical conveyors of suitable capacity and required belt width has been envisaged for collecting coal from truck receiving hopper for onward conveying. Coal from bunker has been proposed to feed 2 nos. of suitable capacity silo with RLS System. Storage arrangement: One number of over ground RCC Bunkers, is proposed for storing coal through tripper conveyor of required belt width. Handling arrangement: Coal from bunker will be reclaimed through suitable capacity plough feeders and fed to proposed silo through two nos. of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having pre-weigh hopper envisaged with loading Silo. The loading conveyors will discharge coal into proposed 2 nos. of Silos with RLS system. There is provision of feeding coal from reclaim conveyor to either Silo 1 or Silo 2. Silo will be located on rail line. The tentative location of the silo has been provided by NTPC in proposed railway siding for loading of coal into railway wagons. Each silo shall facility of wagon loading with the help of 2 nos. RLS with pre-weigh hoppers. However, only one set of RLS with Pre-weigh hopper of each silo will be operational at a time. Facility of GHE system below the silo is also been considered to facilitate loading the coal through electric loco. The CHP has been provided with all the necessary facilities like Firefighting system, Dust suppression system, communication systems, belt weighers, magnetic separators, sampling systems, safety switches, necessary control system etc. The proposed Silos location has been provided by NTPC, on the railway siding under construction by NTPC. Necessary sound and dust proof arrangement for conveyors passing through administration building shall be envisaged.</p>
5.5	Coal washing and the proposed handling/ disposal of rejects	Not Envisaged

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## Chapter-6: Land Requirement

### 6.1 Land requirement

S.No	Parameters	Details		
6.1.1	Total Land requirement for the mine in 'Ha'. Indicative source of data			
Total Land Requirement- 2119.40 Ha. Source of data is Cadastral Plan				
Break up of pre-mining land type (indicative) and source of data				
S.No	Land Type	Existing/pre-Mining Use	Area	
1	Forest Land	Jungle-Jhari	360.81	
2	Private Land	Agriculture	1197.94	
3	Private Land	Water Bodies	2.96	
4	Government Land	Township	43.12	
5	Government Land	Grazing	59.86	
6	Government Land	Barren	47.13	
7	Government Land	Water Bodies	21.96	
8	Government Land	Road & others	36.33	
9	Forest Land	Protected	149.29	

### 6.1.2 During mining Land use details

Type	Land use (Proposed)	Land Use (End of Life)	Land Use (Post Closure)						
			Agricultural land	Plantation	Water Body	Public/Company Use	Forest Land (Returned)	Undisturbed	Total
Excavation Area	1638.85								
Backfilled Area		1579.90		1277.02	302.88				1579.9000
Excavated Void		259.86			259.96				259.9600
Without Plantation									
Top Soil Dump									
External Dump									
Safety Zone	29.10	29.10		29.10					29.1000
Haul Road between quarries									
Road diversion									
Diversion Or Below River Or Nala Or Canal									
Settling Pond									
Road And Infrastructure Area	189.60	189.60		189.60		20.00			189.6000
Rationalization Area									
Garland Drains	19.73	19.73		19.73					19.7300
Embankment									
Green Belt	17.16	17.16		17.16					17.1600
Water Reservoir Near Pit									
UG Entry									

Undisturbed OR Mining Right For UG	23.96	23.96						23.96	23.9600
Resettlement									
Pit Head Power Plant									
Water Harvesting									

S.No	Parameters	Details
6.1.3	Surface features over the block area	Forest cover is found in the south eastern part of the block. Small land patches having forest cover are available in central part of the block. Remaining part of the area is mostly cultivated land. Cultivation and collection of forest products are the main occupation of the people of the area. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area.
6.1.4	No. of villages/Houses to be shifted	8 Villages
6.1.5	Population to be affected by the project	2187 PAFs
6.1.6	Proposed Rehabilitation programme	As per approved RR Policy of Govt. of Chhattisgarh and NTPC

## 6.2 DETAILS OF LEASE

S.No	Parameters	Details
6.2.1	Status of Lease	Not Applicable for the land acquired under Coal Bearing Areas (Acquisition & Development) Act, 1957. Letter from Ministry of Coal to Govt. of Chhattisgarh is attached as Annexure-VIII.
6.2.2	Existing Lease Area (Ha)	2119.40
6.2.3	Period for which Mining Lease has been granted/is to be renewed/ is to be applied for.	Life of the Mine (31 years)
6.2.4	Date of expiry of earlier Mining Lease, if any	Not Applicable
6.2.5	Whether the lease boundary/ required boundary is same as mentioned in the allotment order.	Yes
6.2.6	Lease Area (applied/ required) as per the Mining Plan under consideration (Ha)	2119.40
6.2.7	Whether the applied lease area falls within the allotted block.	Yes
6.2.8	Area (Ha) of lease which falls outside the delineated Block Boundary/Existing Mining Lease	Nil
6.2.8	Area (Ha) of lease which falls outside the delineated Block Boundary/Existing Mining Lease	Nil
6.2.9	Details of outside area	Not Applicable
	Whether forms part of any other coal block	NA
	Whether it contains any coal/gnife reserves	NA
	Purpose for which it is required, e.g. roads/ DB dumps/ service buildings/ colony/ safety zone/ others (specify).	NA
6.2.10	Whether some part(s) of the allotted block has not been applied for mining lease	Not Applicable
	Total area in Ha of such part(s)	Nil
	Total reserves in such part(s) (Mt)	Nil
	Brief reasoning for leaving such part(s)	NA

## Chapter-7: Environment Mangement

### 7. Environment Mangement

S No	Parameters	Details
7.1	Commitment from the project proponent that the company will comply Environment and Forest Condition stipulated in the respective clearances	Attached as Annexure-III

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### Chapter-8: Progressive & Final Mine Closure Plan

#### B.1.1 Land Degradation and restoration Schedule

Tentative Land Degradation and Technical Reclamation (Cumulative Area Ha)									
Year/Stage		Land Degraded				Technically Reclaimed Area			
(Life of the mine plus post closure period)		Excise	Dump (Fxn + Top Soil)	Intraothers	Total	Backfill	Dump (Fxn + Top Soil)	Others	Total
Up to Base year	2023	53.85	42.00	109.48	53.8500				
Y-1	2023-24	83.65	274.93	255.59	574.1700				
Y-3	2025-26	323.19	336.89	255.59	918.6800			17.16	17.1600
Y-5	2027-28	356.51	441.74	255.59	1053.8400			17.16	17.1600
Y-10	2032-33	838.21	622.47	255.59	1716.2700	115.00		17.16	132.1600
Y-15	2037-38	1104.13	582.81	255.59	1942.5300	267.00		17.16	284.1600
Y-20	2042-43	1442.36	320.60	255.59	2018.7500	553.00		17.16	570.1600
Y-25	2047-48	1722.68		255.59	1978.2700	779.00		17.16	796.1600
Y-30	2052-53	1839.85		255.59	2095.4400	1044.00		17.16	1061.1600
Y-31	2053-54	1839.85		255.59	2095.4400	1100.00		17.16	1117.1600
<b>Final Closure</b>									
Y-34	2056-57	1839.85		255.59	2095.44	1579.90		515.54	2095.44

#### B.1.2 Tentative Biological Reclamation (Cumulative in 'Ha')

Year/Stage		Biologically Reclaimed Area					Forest land (Return)	Un Disturbed/ To be left for Public/room Use	Total
(Life of the mine plus post closure period)		Agriculture	Plantation	Water Body	Public/ Company Use	Total			
Up to Base year	2023								
Y-1	2023-24						23.96	23.9600	
Y-3	2025-26						23.96	23.9600	
Y-5	2027-28						23.96	23.9600	
Y-10	2032-33		59.00			59.0000	23.96	82.9600	
Y-15	2037-38		220.00			220.0000	23.96	243.9600	
Y-20	2042-43		508.00			508.0000	23.96	525.9600	
Y-25	2047-48		727.00			727.0000	23.96	750.9600	
Y-30	2052-53		940.00			940.0000	23.96	963.9600	
Y-31	2053-54		985.00			985.0000	23.96	1008.9600	
<b>Final Closure</b>									
Y-34	2056-57		1512.81	562.83	20.00	2095.44	23.96	2119.40	

S.No	Parameters	Details
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B.2	<b>Post Closure Water Quality management</b>  (Existing water bodies available in the lease hold area. Measures to be taken for protection of the same including control of erosion, sedimentation, siltation, water.	The proposed mining area is not dissecting any natural water stream. The storm water and ground water intersected during mining operations will be the source of water accumulation within the mining pit. Accumulated mine pit water during the active mining period will be pumped while post mining operation, there will be accumulated water in the left out voids. An area of about 962.83 ha of land will be converted to waterbody at the end of mine life. This area cannot be backfilled, however will technically reclaimed by converting into water body in post closure phase. Routine Environmental Monitoring (REM) of the water accumulated shall be fortnightly sampled and analyzed to monitor development of acidity or toxicity in the water at least for 3 years. As post mine period, most of the broken areas will be backfilled and left out water bodies will be much less, development of toxic water is not anticipated. The pH of the accumulated water is thus expected to be within a narrow range near the neutral value. The accumulated water will be utilized for the local community for agriculture and other uses. Regular monitoring of the water quality will be carried out as per the CPCB norms. Once the mine is closed, outside water shall be prevented to enter into the mined out pit which in turn will reduce the TDS and other solvents. The pit water will be utilized for agricultural use, supply as drinking water after treatment and for pisciculture. As such the area falls under arid climatic horizon and this water body will add life to the area by supplying water for agriculture and drinking. Effluent Treatment Plant (ETP) and Sewerage Treatment Plant (STP) should be maintained atleast for 3-5 years. Regular monitoring of the water quality will be carried out as per the CPCB norms. Water quality analysis shall be carried out as per CPCB Water Quality Monitoring 2017 guideline.
B.3	<b>Post Closure Air Quality management</b>	The post closure activities will be restricted to limited operation only in the following areas: 1. Dismantling of temporary infrastructures 2. Dismantling of electrical infrastructures 3. Regular maintenance works in the dumping ground 4. Post plantation care 5. Maintenance of the main haul road 6. Cleaning of subse drains and garland drains. Most of the activities does not generate continuous dust generation, except the dismantling works which will be restricted to the limited zones compared to the whole project area. Water sprinkling will be continued before the vehicle movement. Routine Environmental Monitoring (REM) of the air quality shall be monitored as per latest CPCB guidelines atleast for 3-5 years. Occasionally dust may be generated from the uncovered areas of the dumps. Regular sprinkling arrangements will be done till the areas are stabilised. Quarterly Air quality Monitoring will be done as per NAAQ standard (CPCB) guideline (2008).

#### B.4 Waste Management (Figures in MMt) (Tentative)

Year/Stage (Life of the mine plus post closure period)	OB Removal (Cumulative)			External Dump (Cumulative)		Internal Backfilling (Cumulative)		Enticement (Cumulative)	
	Top Soil	OB	Total	Top Soil	OB	Top Soil	OB	Top Soil	OB
Up to Base year 2023	1.72	18.72	20.44	1.72	18.72				
Y-1 2023-24	2.65	38.89	41.55	2.65	38.88			0.01	0.21
Y-3 2025-26	4.95	94.29	99.23	4.94	94.07			0.01	0.21
Y-5 2027-28	10.20	179.60	189.80	10.19	136.81		42.57	0.01	0.21
Y-10 2032-33	30.66	701.14	731.80	18.42	437.96	12.23	262.96	0.01	0.21
Y-15 2037-38	52.84	1197.46	1250.30		464.99	52.83	732.26	0.01	0.21
Y-20 2042-43	71.18	1689.12	1760.30		234.83	71.17	1454.09	0.01	0.21
Y-25 2047-48	85.32	2174.98	2260.30			85.31	2174.77	0.01	0.21
Y-30 2052-53	93.04	2517.26	2710.30			93.03	2517.05	0.01	0.21
Y-31 2053-54	93.13	2541.45	2734.58			93.12	2541.24	0.01	0.21
<b>Post Closure</b>									
Y-34 2056-57	93.13	2541.45	2734.58			93.12	2541.24	0.01	0.21

#### B.5 Top Soil Management – (including Action plan for Top Soil management) (Tentative)

Year/Stage (Life of the mine plus post closure period)	Top Soil Removal Plan	Top Soil Used				
		Spreading Over Enticement	Spreading Over Backfill area	Spreading Over External OB Dump area	Used in Green Belt area	Total Utilized
Up to Base year 2023	1.72					
Y-1 2023-24	2.65	0.01				0.01
Y-3 2025-26	4.95	0.01				0.01
Y-5 2027-28	10.20	0.01				0.01
Y-10 2032-33	30.66	0.01	12.23			12.24
Y-15 2037-38	52.84	0.01	52.83			52.84
Y-20 2042-43	71.18	0.01	71.17			71.18
Y-25 2047-48	85.32	0.01	85.31			85.32
Y-30 2052-53	93.04	0.01	93.03			93.04
Y-31 2053-54	93.13	0.01	93.12			93.13
<b>Post Closure</b>						
Y-34 2056-57	93.13	0.01	93.12			93.13

S No	Parameters	Details
8.6	Management of Coal Rejects	Since the project does not envisaged any washery, generation of rejects are not associated
8.7	Restoration of Land used for Infrastructure	Survey for 3 monsoon seasons should be done then carry out compaction of the land before any infrastructure to be built over it. All infrastructures will be dismantled excluding the office and Vocational Training center which will be handed over to the state government.
8.8	Disposal of Mining Machinery	Mining machineries are to be deployed by Contracting agency. They will be taking out the machineries at the end of mine life and will utilize in their other projects. Scrapped machineries will be auctioned to the authorized agencies.
8.9	Safety & Security	Thorough inspection of the mine and OB dump areas for assessing the left over closure jobs of already reclaimed internal dump areas inspection of infrastructure and water body area for their safe reclamation and abatement of any leftover dangers Action required making drainage and any fire areas safe for future period Making 2 meter high fencing wall against excavated void are to prevent inadvertent entry as per requirement Making safe approach road from surface to left out pit bottom for future uses, as void becomes a water body Completing the survey of total reclaimed areas like mined areas, internal dump, mine faces, quarry fencing and other areas to complete and update the Mine plans under Coal mine Regulation.

#### 8.10 Abandonment Cost and Financial Assurance:

##### 8.10.1 Abandonment Cost. Cost of Activities to be taken up for closure of the mine

Head	Activities	Unit	Quantity	Rate RS/Unit	Amount RS Cr	
Progressive Closure	Water quality management	Ls			3.10	
	Air quality management	Ls			3.10	
	Waste Management	M CUM				
	Barbed wire fencing around dump	m				
	Barbed wire fencing around the pit	m	20000	1000	2.00	
	Filling of Void - Rebanding of Croft dump	MM3				
	Top Soil Management	MM3	93.13	4000000	372.52	
	Technical And Biological Reclamation of Mined out of land and OB Dump	Ha	2118.4	20000	42.38	
	Plantation over virgin area including green belt	Ha	45.26	5000	0.23	
	Manpower Cost and Supervision	LS				10.00
	Total wall around the dump	m	8000	6500	5.20	
	Garland drain	m	20000	325	0.65	
	Garland drain around the dump	m	5000	325	0.16	
	Any other Activity					
	Any other Activity - 2					
Dismantling of infrastructures & Disposal/ rehabilitation of mining Machinery	Dismantling of workshop	Ls			3.00	
	Rehabilitation of the dismantled facilities	Ls			2.00	
	Dismantling of pump and pipe/ other facilities	Ls			5.00	
	Dismantling of stowing bunker, provisioning of pumps for borewell pumping arrangement					
	Dismantling of UG equipment					
	Rearranging water pipeline to dump top park/Agriculture land	Ls			2.00	
	Dismantling of power lines	LS			2.00	
	Any other Activity					
	Any other Activity - 2					
Safety and Security	Barbed wire fencing around dump					
	Barbed wire fencing around the pit	m				
	Barbed wire fencing with Masonary piler					
	Concrete wall with Masonary pilers around the pit	m				
	Securing all shaft and installation of borewell pump					

	Securing of incline				
	Concrete wall fencing around the water body	M	5000	50000	30.00
	Boundary wall around the water body				
	Stabilisation (viz benching, pitching etc) of side walls of the water body	LS			5.00
	Toe wall around the dump				
	Garland Drain				
	Garland Drain around the dump				
	Drainage channel from main OB dump				
	Any other Activity				
Technical and Biological Reclamation of mined out of land and OB Dump	Filling of Void	Ha			
	Top soil management	MM3			
	OB Rehandling for backfilling	MM3			
	Terracing, blanketing with soil and vegetation of External OB Dump	Ha			
	Peripheral road, gates, view point, cemented steps on bank	LS			1.00
	Expenditure on development of Agriculture land				
	Landscaping and Plantation	LS	1512.61	100000	15.13
	Any other Activity				
Post Closure management and supervision	Power Cost	LS			1.50
	Post mining water quality management	LS			0.50
	Post mining air quality management	LS			0.50
	Subsidence monitoring for 5 years	LS			
	Waste management	LS			
	Manpower Cost and supervision	LS			
	Manpower Cost and supervision				3.00
Others	Entrepreneurship development/vocational/skill development training for sustainable income of affected people)				3.80
	Golden Handshake/Retrenchment benefits to 100 employees of OC				5.00
	Golden Handshake/Retrenchment benefits to 200 employees of UG				
	One-time financial grant to societies/ institutional organisations which is dependant upon the project				5.00
	Provide jobs in other mines of company				
	Continuation of other services like running of school etc.				
	Any other Activity				
	<b>Total</b>				<b>523.80</b>

8.10.2 Financial Assurance : Amount to be deposited in Escrow account as a security against the mine activities to be carried out for the closure of the mine

WPI as on	Apr-13	121.10
WPI as on base date	NOVEMBER 2022	152.1
Escalation rate of Closure cost		1.25%
	UG	OC
Cost %a, Crafts	0.015	0.09

Closure Cost 'Rs. Cr/Ha'	0.019	0.113
Project Area 'Ha'	0	2119.40
Amount to be deposited into Escrow Account 'Rs. in Crs'	0	239.492
Amount already deposited into Escrow Account 'Rs. in Crs'	0	17.80
Net Amount to be deposited into Escrow Account 'Rs. in Crs'	0	221.692
Rate of compounding of Annual Closure Cost		5.00%
Balance Life of the project 'in Yrs'	9	31
Annual Closure Cost 'Rs. in Crs'	0	7.151
Amount to be deposited into Escrow Account after compounding @ of 5% 'Rs. in Crs'		506.010

Amount to be deposited into Escrow

Year	OC	Year	UG	Total
1	7.151	1	0	7.151
2	7.509	2	0	7.509
3	7.884	3	0	7.884
4	8.278	4	0	8.278
5	8.692	5	0	8.692
6	9.127	6	0	9.127
7	9.583	7	0	9.583
8	10.062	8	0	10.062
9	10.565	9	0	10.565
10	11.094			11.094
11	11.648			11.648
12	12.231			12.231
13	12.842			12.842
14	13.484			13.484
15	14.158			14.158
16	14.865			14.865
17	15.61			15.61
18	16.39			16.39
19	17.21			17.21
20	18.07			18.07
21	18.974			18.974
22	19.922			19.922
23	20.919			20.919
24	21.964			21.964
25	23.063			23.063
26	24.216			24.216
27	25.427			25.427
28	26.698			26.698
29	28.033			28.033
30	29.434			29.434
31	30.906			30.906
Total	506.010		0.000	506.010

# Annexures

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## Annexure 1A1

Allotment Order for Talaspalli Coal Mine

**Government of India**  
**Ministry of Coal**  
**Office of the Nominated Authority**

World Trade Tower, New Delhi

Office of the nominated authority constituted under section 6 of the Coal Mines (Special Provisions) Act, 2015.

**Allotment order under clause (a) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13**

**In re:** Talaspalli Coal Mine (the "mine") particulars of which is specified in Annexure 1

**Order no.:** 103/1/2015/NA

**Date:** September 08, 2015

**In favor of:** NTPC Limited incorporated in India under the Companies Act, 1956 with corporate identity number L40101DL1975COR07966, whose registered office is at NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi - 110003, India (the "Allottee").

**For utilization in:** End Use Plant situated at Dist. Raigarh, Chhattisgarh, as more particularly described below (the "End Use Plant")

S. No.	Name of Specified End Use Plant	Address	Configuration	Capacity
1	Lata SIPP	Dist. Raigarh, Chhattisgarh	5 x 800 MW	4000 MW

\*MW stands for Mega Watt

WHEREAS, the nominated authority has, in accordance with the provisions of the Coal Mines (Special Provisions) Act, 2015 (the "Act") and the Coal Mines (Special Provisions) Rules, 2014 (the "rules") conducted the allotment of the mine;

AND WHEREAS the allottee is eligible to receive this allotment order with respect to the mine as described in this allotment order, including, inter-alia -

(a) the coal bearing land acquired by the prior allottee and the lands, in or adjacent to the coal mines used for coal mining operations acquired by the prior allottee; and

(b) any existing mine infrastructure as defined in clause (j) of sub-section (1) of section 3 of the Act.



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AND WHEREAS the allottee was also the prior allottee of such Schedule I coal mine;

AND WHEREAS, the allottee has deposited the additional levy payable under sub-section (7) of section 5 of the Act on or prior to the due date specified under rule 18 of the rules;

AND WHEREAS the allottee has furnished a performance bank guarantee dated April 28, 2015 for an amount equal to INR 4,12,58,88,000 (Indian Rupees Four Hundred Twelve Crore Fifty Eight Lakh and eighty Eight Thousand) issued by State Bank of India in accordance with the allotment document read with sub-section (6) and sub-section (12) of section 8 of the Act and sub-rule (8) rule 13 of the rules;

AND WHEREAS the allottee has entered into an Allotment Agreement dated March 20, 2015 (as amended) with the nominated authority in accordance with the provisions of sub-rule (7) of rule 13.

NOW, THE NOMINATED AUTHORITY DOES ORDER:

1. On and from September 08, 2015 ("allotment date") and in accordance with sub-section (4) of section 8 read with sub-section (12) section 8 of the Act, with respect to the mine, the following shall stand fully and absolutely transferred and vested in the allottee, namely:-

- (a) all the rights, title, interest and liabilities as were available to the prior allottee;
- (b) entitlement to a mining lease to be granted by the State Government with the terms and conditions of the Allotment Agreement forming a part of it on making an application;
- (c) all statutory licenses, permits, permissions, approvals or consents as per rules, required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 2**;
- (d) entitlement to any statutory license, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the Central Government, to the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 3**;
- (e) entitlement to any statutory license, permit, permission, approval or consent required to undertake coal mining operations in the mine, if already issued by the State Government, to the prior allottee on making an application on the same terms and conditions as were applicable to the prior allottee, as listed in the **Annexure 4**;
- (f) rights appertaining to the approved mining plan of the prior allottee;
- (g) in the event the secured creditor elects to continue the facility arrangements and security interest, the Allottee shall continue the credit or banking facilities or other lending arrangements to which the prior allottee was a party in terms of clause (a) of sub-section (1) of section 12 of the Act.





2. The Allottee may seek any change in the terms and conditions attached to such licence, permit, permission, approval or consent by making an application in accordance with applicable laws.
3. This Allotment order is liable to be cancelled in accordance with the provisions of sub-rule (6) of rule 13.

  
(By the nominated authority)

## ANNEXURE

## Annexure 1: Particulars of the mine

## Part A - Description of the mine

Name of Coal Mine	Talajpalli
Latitude	22°13'33" N to 22°16'18" N
Longitude	83°27'49" E to 83°30'22" E
Coalfield	Mand Ragathi
Villages	Talajpalli, Bichimra, Nagarampa, Kudumaha, Halkera, Chotiguda, Ajiguth & Sahigudi
Taluk/Taluka	Gireyada
District	Ragathi
State	Chhattisgarh



## Part B - Description of Land in relation to the mine

Type of Land: Freehold Land for Mining as per Mining Lease

S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
1	Raikara	18/1	02-Feb-15	1.767
2	Raikara	18/2	02-Feb-15	0.202
3	Raikara	20/1	02-Feb-15	0.680
4	Raikara	20/3	02-Feb-15	0.202
5	Raikara	20/5	02-Feb-15	0.405
6	Raikara	22/1	02-Feb-15	0.400
7	Raikara	22/2	02-Feb-15	0.089
8	Raikara	28/1	02-Feb-15	0.440
9	Raikara	29/1	02-Feb-15	0.107
10	Raikara	31	02-Feb-15	0.324
11	Raikara	32/1	02-Feb-15	1.582
12	Raikara	33/1	02-Feb-15	0.612
13	Raikara	36/1	02-Feb-15	0.447
14	Raikara	36/2	02-Feb-15	0.447
15	Raikara	36/3	02-Feb-15	0.447
16	Raikara	36/4	02-Feb-15	0.448
17	Raikara	38	02-Feb-15	0.255
18	Raikara	39/1	02-Feb-15	0.077
19	Raikara	39/2	02-Feb-15	0.557
20	Raikara	40/1	02-Feb-15	0.255
21	Raikara	40/2	02-Feb-15	0.162
22	Raikara	40/4	02-Feb-15	0.324
23	Raikara	40/5	02-Feb-15	0.384
24	Raikara	40/6	02-Feb-15	0.278
25	Raikara	40/7	02-Feb-15	0.237
26	Raikara	40/8	02-Feb-15	0.237
27	Raikara	41/1	02-Feb-15	0.543
28	Raikara	41/2	02-Feb-15	0.543
29	Raikara	41/3	02-Feb-15	0.332
30	Raikara	41/4	02-Feb-15	0.134
31	Raikara	42	02-Feb-15	0.248
32	Raikara	43	02-Feb-15	0.154
33	Raikara	45/2	02-Feb-15	0.182
34	Raikara	45/3	02-Feb-15	0.364
35	Raikara	45/4	02-Feb-15	0.364
36	Raikara	45/5	02-Feb-15	0.405
37	Raikara	45/7	02-Feb-15	0.028
38	Raikara	45/8	02-Feb-15	0.010
39	Raikara	45/9	02-Feb-15	0.040
40	Raikara	45/10	02-Feb-15	0.996
41	Raikara	45/11	02-Feb-15	0.303
42	Raikara	46	02-Feb-15	0.781
43	Raikara	47	02-Feb-15	0.967



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
44	Raikara	49/2	02-Feb-15	0.412
45	Raikara	50	02-Feb-15	0.425
46	Raikara	52	02-Feb-15	0.218
47	Raikara	53/2	02-Feb-15	0.304
48	Raikara	54/2	02-Feb-15	0.611
49	Raikara	55/1	02-Feb-15	0.971
50	Raikara	56/2	02-Feb-15	0.198
51	Raikara	57	02-Feb-15	0.207
52	Raikara	58	02-Feb-15	0.121
53	Raikara	60	02-Feb-15	0.300
54	Raikara	63	02-Feb-15	1.655
55	Raikara	64/1	02-Feb-15	0.480
56	Raikara	64/2	02-Feb-15	0.171
57	Raikara	65/1	02-Feb-15	0.382
58	Raikara	67/1	02-Feb-15	2.624
59	Raikara	67/2	02-Feb-15	0.575
60	Raikara	68	02-Feb-15	0.279
61	Raikara	69/1	02-Feb-15	0.387
62	Raikara	69/2	02-Feb-15	0.202
63	Raikara	70/4	02-Feb-15	0.382
64	Raikara	71/4	02-Feb-15	0.870
65	Raikara	74/2	02-Feb-15	0.032
66	Raikara	74/3	02-Feb-15	0.073
67	Raikara	74/4	02-Feb-15	0.057
68	Raikara	75/1	02-Feb-15	0.265
69	Raikara	79	02-Feb-15	0.200
70	Raikara	80/1	02-Feb-15	0.166
71	Raikara	80/2	02-Feb-15	0.178
72	Raikara	80/4	02-Feb-15	0.040
73	Raikara	80/5	02-Feb-15	0.089
74	Raikara	81/1	02-Feb-15	0.222
75	Raikara	81/6	02-Feb-15	0.085
76	Raikara	81/7	02-Feb-15	0.154
77	Raikara	82/1	02-Feb-15	0.348
78	Raikara	82/2	02-Feb-15	0.179
79	Raikara	82/5	02-Feb-15	0.065
80	Raikara	83/9	02-Feb-15	0.186
81	Raikara	85	02-Feb-15	0.530
82	Raikara	86/1	02-Feb-15	0.097
83	Raikara	86/2	02-Feb-15	0.490
84	Raikara	87	02-Feb-15	0.201
85	Raikara	91/4	02-Feb-15	0.480
86	Raikara	92	02-Feb-15	0.263
87	Raikara	93	02-Feb-15	0.182
88	Raikara	94/2	02-Feb-15	0.277
89	Raikara	94/3	02-Feb-15	0.417



S.No	Village	Khata No.	Date of Registration	Area (Hectares)
90	Raikara	944	02-Feb-15	0.304
91	Raikara	945	02-Feb-15	0.526
92	Raikara	951	02-Feb-15	0.330
93	Raikara	952	02-Feb-15	0.330
94	Raikara	96	02-Feb-15	0.486
95	Raikara	97	02-Feb-15	0.299
96	Raikara	98	02-Feb-15	0.219
97	Raikara	102	02-Feb-15	0.644
98	Raikara	103/1	02-Feb-15	0.298
99	Raikara	103/2	02-Feb-15	0.242
100	Raikara	107/2	02-Feb-15	0.374
101	Raikara	107/4	02-Feb-15	0.282
102	Raikara	108/1	02-Feb-15	0.273
103	Raikara	108/2	02-Feb-15	0.263
104	Raikara	108/3	02-Feb-15	0.334
105	Raikara	108/4	02-Feb-15	0.520
106	Raikara	108/5	02-Feb-15	0.340
107	Raikara	108/6	02-Feb-15	0.210
108	Raikara	110	02-Feb-15	0.376
109	Raikara	111	02-Feb-15	0.368
110	Raikara	112/2	02-Feb-15	0.217
111	Raikara	114	02-Feb-15	0.717
112	Raikara	117	02-Feb-15	0.134
113	Raikara	118/1	02-Feb-15	0.158
114	Raikara	118/2	02-Feb-15	0.117
115	Raikara	119	02-Feb-15	1.143
116	Raikara	121/2	02-Feb-15	0.076
117	Raikara	122/1	02-Feb-15	0.119
118	Raikara	122/2	02-Feb-15	0.089
119	Raikara	122/4	02-Feb-15	0.138
120	Raikara	122/5	02-Feb-15	0.053
121	Raikara	122/6	02-Feb-15	0.069
122	Raikara	123/1	02-Feb-15	0.311
123	Raikara	123	02-Feb-15	0.138
124	Raikara	129/1	02-Feb-15	0.728
125	Raikara	130/1	02-Feb-15	0.101
126	Raikara	130/2	02-Feb-15	0.271
127	Raikara	130/3	02-Feb-15	0.417
128	Raikara	133	02-Feb-15	0.405
129	Raikara	137/2	02-Feb-15	0.089
130	Raikara	140	02-Feb-15	0.190
131	Raikara	142	02-Feb-15	0.401
132	Raikara	143	02-Feb-15	0.401
133	Raikara	145	02-Feb-15	0.729
134	Raikara	148/1	02-Feb-15	1.028
135	Raikara	148/2	02-Feb-15	0.641



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
136	Raikara	148/1	02-Feb-15	0.093
137	Raikara	150/1	02-Feb-15	0.655
138	Raikara	150/2	02-Feb-15	0.162
139	Raikara	152	02-Feb-15	0.312
140	Raikara	154	02-Feb-15	0.304
141	Raikara	156/1	02-Feb-15	0.265
142	Raikara	156/2	02-Feb-15	0.266
143	Raikara	156/3	02-Feb-15	0.206
144	Raikara	156/4	02-Feb-15	0.110
145	Raikara	156/5	02-Feb-15	0.121
146	Raikara	157/1	02-Feb-15	0.068
147	Raikara	157/2	02-Feb-15	1.019
148	Raikara	161	02-Feb-15	0.084
149	Raikara	163/2	02-Feb-15	0.011
150	Raikara	166	02-Feb-15	0.259
151	Raikara	168/1	02-Feb-15	1.783
152	Raikara	169	02-Feb-15	1.226
153	Raikara	170/3	02-Feb-15	0.862
154	Raikara	171/1	02-Feb-15	0.527
155	Raikara	171/2	02-Feb-15	2.324
156	Raikara	171/3	02-Feb-15	0.717
157	Raikara	171/4	02-Feb-15	0.384
158	Raikara	171/5	02-Feb-15	0.793
159	Raikara	171/6	02-Feb-15	0.174
160	Raikara	171/7	02-Feb-15	0.071
161	Raikara	171/8	02-Feb-15	0.518
162	Raikara	171/10	02-Feb-15	0.364
163	Raikara	171/11	02-Feb-15	0.264
164	Raikara	171/12	02-Feb-15	0.888
165	Raikara	171/13	02-Feb-15	0.405
166	Raikara	171/14	02-Feb-15	0.101
167	Raikara	172/1	02-Feb-15	0.068
168	Raikara	172/2	02-Feb-15	0.202
169	Raikara	172/3	02-Feb-15	0.068
170	Raikara	172/4	02-Feb-15	0.069
171	Raikara	173	02-Feb-15	2.784
172	Raikara	173/1	02-Feb-15	0.330
173	Raikara	173/1	02-Feb-15	0.417
174	Raikara	173/2	02-Feb-15	0.423
175	Raikara	178/1	02-Feb-15	1.214
176	Raikara	178/2	02-Feb-15	0.809
177	Raikara	178/3	02-Feb-15	1.064
178	Raikara	178/5	02-Feb-15	1.214
179	Raikara	179/1	02-Feb-15	0.202
180	Raikara	179/2	02-Feb-15	1.793
181	Raikara	179/3	02-Feb-15	1.794



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
182	Raikara	1794	02-Feb-15	1.794
183	Raikara	1795	02-Feb-15	1.794
184	Raikara	1797	02-Feb-15	0.800
185	Raikara	181/1	02-Feb-15	0.364
186	Raikara	181/2	02-Feb-15	0.243
187	Raikara	183	02-Feb-15	1.214
188	Raikara	184/3	02-Feb-15	0.385
189	Raikara	184-4	02-Feb-15	0.405
190	Raikara	190	02-Feb-15	0.995
191	Raikara	193/2	02-Feb-15	0.378
192	Raikara	193/3	02-Feb-15	0.120
193	Raikara	195	02-Feb-15	1.055
194	Raikara	196	02-Feb-15	1.048
195	Raikara	197/2	02-Feb-15	0.526
196	Raikara	198/1	02-Feb-15	0.629
197	Raikara	198/2	02-Feb-15	0.629
198	Raikara	198/3	02-Feb-15	0.629
199	Raikara	198/4	02-Feb-15	0.629
200	Raikara	199	02-Feb-15	0.397
201	Raikara	201	02-Feb-15	0.393
202	Raikara	204/2	02-Feb-15	0.110
203	Raikara	205	02-Feb-15	0.134
204	Raikara	206/1	02-Feb-15	0.325
205	Raikara	206/3	02-Feb-15	0.294
206	Raikara	207	02-Feb-15	0.806
207	Raikara	208/1	02-Feb-15	0.295
208	Raikara	208/2	02-Feb-15	0.339
209	Raikara	208/3	02-Feb-15	0.372
210	Raikara	208/5	02-Feb-15	0.267
211	Raikara	209/2	02-Feb-15	0.807
212	Raikara	211	02-Feb-15	0.768
213	Raikara	212/4	02-Feb-15	1.500
214	Raikara	213	02-Feb-15	0.729
215	Raikara	214/2	02-Feb-15	0.959
216	Raikara	215/1	02-Feb-15	0.134
217	Raikara	215/2	02-Feb-15	0.134
218	Raikara	215/5	02-Feb-15	0.134
219	Raikara	215/7	02-Feb-15	0.271
220	Raikara	217/2	02-Feb-15	0.607
221	Raikara	217/3	02-Feb-15	0.724
222	Raikara	218	02-Feb-15	0.947
223	Raikara	220/2	02-Feb-15	1.418
224	Raikara	224	02-Feb-15	1.542
225	Raikara	225/1	02-Feb-15	1.590
226	Raikara	225/2	02-Feb-15	1.598
227	Raikara	228/1	02-Feb-15	0.270



S.No	Village	Khata No.	Date of Registration	Area (Hectares)
228	Raikarn	2331	02-Feb-15	1.048
229	Raikarn	2332	02-Feb-15	0.162
230	Raikarn	236	02-Feb-15	0.484
231	Raikarn	237	02-Feb-15	0.405
232	Raikarn	2391	02-Feb-15	0.182
233	Raikarn	2392	02-Feb-15	0.211
234	Raikarn	2393	02-Feb-15	0.449
235	Raikarn	2402	02-Feb-15	0.587
236	Raikarn	2404	02-Feb-15	0.364
237	Raikarn	2411	02-Feb-15	0.317
238	Raikarn	2413	02-Feb-15	0.178
239	Raikarn	2416	02-Feb-15	0.061
240	Raikarn	2422	02-Feb-15	1.610
241	Raikarn	244	02-Feb-15	0.113
242	Raikarn	245	02-Feb-15	0.099
243	Raikarn	2473	02-Feb-15	0.098
244	Raikarn	2481	02-Feb-15	0.469
245	Raikarn	2483	02-Feb-15	0.133
246	Raikarn	2484	02-Feb-15	0.133
247	Raikarn	251	02-Feb-15	0.190
248	Raikarn	2522	02-Feb-15	0.802
249	Raikarn	253	02-Feb-15	0.878
250	Raikarn	2542	02-Feb-15	1.436
251	Raikarn	2544	02-Feb-15	0.377
252	Raikarn	2545	02-Feb-15	0.377
253	Raikarn	255	02-Feb-15	0.709
254	Raikarn	256	02-Feb-15	1.302
255	Raikarn	258	02-Feb-15	0.947
256	Raikarn	261	02-Feb-15	0.154
257	Raikarn	264	02-Feb-15	1.052
258	Raikarn	265	02-Feb-15	1.775
259	Raikarn	266	02-Feb-15	0.551
260	Raikarn	2671	02-Feb-15	1.998
261	Raikarn	2672	02-Feb-15	2.347
262	Raikarn	268	02-Feb-15	0.802
263	Raikarn	2703	02-Feb-15	0.141
264	Raikarn	2705	02-Feb-15	0.405
265	Raikarn	272	02-Feb-15	0.560
266	Raikarn	2731	02-Feb-15	0.154
267	Raikarn	2733	02-Feb-15	0.194
268	Raikarn	2744	02-Feb-15	0.061
269	Raikarn	277	02-Feb-15	0.202
270	Raikarn	280	02-Feb-15	0.845
271	Raikarn	2811	02-Feb-15	0.504
272	Raikarn	2812	02-Feb-15	0.286
273	Raikarn	2822	02-Feb-15	0.206



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S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
274	Raikarn	2824	02-Feb-15	0.182
275	Raikarn	2826	02-Feb-15	0.065
276	Raikarn	2831	02-Feb-15	0.368
277	Raikarn	2842	02-Feb-15	0.299
278	Raikarn	2843	02-Feb-15	0.283
279	Raikarn	2844	02-Feb-15	0.283
280	Raikarn	2845	02-Feb-15	0.283
281	Raikarn	285	02-Feb-15	0.297
282	Raikarn	286	02-Feb-15	1.212
283	Raikarn	2871	02-Feb-15	0.476
284	Raikarn	2881	02-Feb-15	0.085
285	Raikarn	2882	02-Feb-15	0.303
286	Raikarn	2892	02-Feb-15	0.277
287	Raikarn	2911	02-Feb-15	0.077
288	Raikarn	294	02-Feb-15	0.555
289	Raikarn	2952	02-Feb-15	0.459
290	Raikarn	2971	02-Feb-15	0.081
291	Raikarn	2981	02-Feb-15	0.218
292	Raikarn	3002	02-Feb-15	0.101
293	Raikarn	3022	02-Feb-15	0.243
294	Raikarn	3033	02-Feb-15	0.053
295	Raikarn	3036	02-Feb-15	0.053
296	Raikarn	3037	02-Feb-15	0.053
297	Raikarn	3043	02-Feb-15	0.338
298	Raikarn	308	02-Feb-15	0.591
299	Raikarn	3101	02-Feb-15	0.164
300	Raikarn	3102	02-Feb-15	0.176
301	Raikarn	3141	02-Feb-15	0.101
302	Raikarn	3142	02-Feb-15	0.084
303	Raikarn	315	02-Feb-15	0.202
304	Raikarn	316	02-Feb-15	0.166
305	Raikarn	318	02-Feb-15	0.559
306	Raikarn	3103	02-Feb-15	0.093
307	Raikarn	3183	02-Feb-15	0.329
308	Raikarn	3184	02-Feb-15	0.161
309	Raikarn	3185	02-Feb-15	0.141
310	Raikarn	3186	02-Feb-15	0.182
311	Raikarn	3187	02-Feb-15	0.020
312	Raikarn	3188	02-Feb-15	0.101
313	Raikarn	320	02-Feb-15	0.162
314	Raikarn	321	02-Feb-15	0.142
315	Raikarn	324	02-Feb-15	0.081
316	Raikarn	325	02-Feb-15	0.162
317	Raikarn	326	02-Feb-15	0.607
318	Raikarn	3272	02-Feb-15	0.418
319	Raikarn	3273	02-Feb-15	1.673



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
320	Raikara	3275	02-Feb-15	0.946
321	Raikara	3287	02-Feb-15	0.825
322	Raikara	3287	02-Feb-15	0.417
323	Raikara	3284	02-Feb-15	0.409
324	Raikara	329	02-Feb-15	0.190
325	Raikara	331	02-Feb-15	0.563
326	Raikara	3352	02-Feb-15	0.809
327	Raikara	3353	02-Feb-15	0.202
328	Raikara	334	02-Feb-15	0.255
329	Raikara	3351	02-Feb-15	0.534
330	Raikara	3352	02-Feb-15	0.283
331	Raikara	3371	02-Feb-15	0.029
332	Raikara	3391	02-Feb-15	0.372
333	Raikara	33910	02-Feb-15	0.210
334	Raikara	340	02-Feb-15	0.567
335	Raikara	341	02-Feb-15	1.198
336	Raikara	3423	02-Feb-15	1.214
337	Rajara	3423	02-Feb-15	1.416
338	Rajara	3425	02-Feb-15	1.436
339	Raikara	3426	02-Feb-15	1.410
340	Raikara	34210	02-Feb-15	1.035
341	Raikara	34211	02-Feb-15	1.072
342	Raikara	3467	02-Feb-15	1.675
343	Raikara	3465	02-Feb-15	0.202
344	Raikara	3466	02-Feb-15	0.445
345	Raikara	3546	02-Feb-15	0.749
346	Raikara	3547	02-Feb-15	0.182
347	Raikara	3642	02-Feb-15	0.890
348	Raikara	3643	02-Feb-15	0.807
349	Raikara	3753	02-Feb-15	0.809
350	Raikara	3841	02-Feb-15	0.134
351	Raikara	3952	02-Feb-15	0.858
352	Raikara	396	02-Feb-15	0.202
353	Raikara	3981	02-Feb-15	0.170
354	Kanwar	3982	02-Feb-15	0.212
355	Raikara	3983	02-Feb-15	0.562
356	Raikara	3984	02-Feb-15	0.441
357	Raikara	3986	02-Feb-15	0.260
358	Raikara	4001	02-Feb-15	0.405
359	Raikara	4004	02-Feb-15	0.243
360	Raikara	406	02-Feb-15	0.073
361	Raikara	405	02-Feb-15	0.595
362	Raikara	4071	02-Feb-15	0.301
363	Raikara	4062	02-Feb-15	0.227
364	Raikara	4074	02-Feb-15	0.178
365	Raikara	499	02-Feb-15	0.405



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
366	Raikam	501	02-Feb-15	0.821
367	Raikam	505/1	02-Feb-15	0.116
368	Raikam	505/2	02-Feb-15	0.364
369	Raikam	505/3	02-Feb-15	0.405
370	Raikam	505/4	02-Feb-15	0.248
371	Raikam	505/11	02-Feb-15	0.243
372	Raikam	505/12	02-Feb-15	0.408
373	Raikam	505/13	02-Feb-15	0.202
374	Raikam	505/14	02-Feb-15	1.057
375	Raikam	506/1	02-Feb-15	0.061
376	Raikam	506/4	02-Feb-15	0.162
377	Raikam	513/18	02-Feb-15	0.636
378	Raikam	515/19	02-Feb-15	0.069
379	Raikam	515/20	02-Feb-15	0.016
380	Raikam	538/2	02-Feb-15	0.841
381	Raikam	538/3	02-Feb-15	1.652
382	Raikam	539/2	02-Feb-15	0.059
383	Raikam	540	02-Feb-15	0.251
384	Raikam	542/1	02-Feb-15	0.061
385	Raikam	450/2	02-Feb-15	0.710
386	Raikam	450/3	02-Feb-15	0.531
387	Talaspalli	2/12	02-Feb-15	0.080
388	Talaspalli	2/13	02-Feb-15	0.080
389	Talaspalli	6	02-Feb-15	1.088
390	Talaspalli	8/1	02-Feb-15	0.583
391	Talaspalli	8/4	02-Feb-15	0.160
392	Talaspalli	11/2	02-Feb-15	0.260
393	Talaspalli	11/3	02-Feb-15	0.405
394	Talaspalli	22/1	02-Feb-15	0.406
395	Talaspalli	22/2	02-Feb-15	0.425
396	Talaspalli	24/1	02-Feb-15	0.222
397	Talaspalli	26/2	02-Feb-15	0.226
398	Talaspalli	26/3	02-Feb-15	0.226
399	Talaspalli	26/4	02-Feb-15	0.089
400	Talaspalli	26/5	02-Feb-15	0.089
401	Talaspalli	26/8	02-Feb-15	0.960
402	Talaspalli	26/10	02-Feb-15	0.154
403	Talaspalli	26/11	02-Feb-15	0.202
404	Talaspalli	26/12	02-Feb-15	0.202
405	Talaspalli	26/13	02-Feb-15	0.060
406	Talaspalli	26/14	02-Feb-15	0.251
407	Talaspalli	26/15	02-Feb-15	0.160
408	Talaspalli	26/16	02-Feb-15	0.170
409	Talaspalli	26/17	02-Feb-15	0.251
410	Talaspalli	26/20	02-Feb-15	0.089
411	Talaspalli	26/21	02-Feb-15	0.089



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
412	Talaspalli	26/22	02-Feb-15	0.794
413	Talaspalli	26/23	02-Feb-15	0.081
414	Talaspalli	26/25	02-Feb-15	0.105
415	Talaspalli	26/26	02-Feb-15	0.085
416	Talaspalli	26/28	02-Feb-15	0.162
417	Talaspalli	26/31	02-Feb-15	0.174
418	Talaspalli	26/33	02-Feb-15	0.097
419	Talaspalli	26/35	02-Feb-15	0.428
420	Talaspalli	26/37	02-Feb-15	0.089
421	Talaspalli	26/38	02-Feb-15	0.069
422	Talaspalli	26/40	02-Feb-15	0.182
423	Talaspalli	26/41	02-Feb-15	0.182
424	Talaspalli	26/41	02-Feb-15	0.150
425	Talaspalli	26/41	02-Feb-15	0.150
426	Talaspalli	26/44	02-Feb-15	0.065
427	Talaspalli	26/45	02-Feb-15	0.081
428	Talaspalli	26/47	02-Feb-15	0.172
429	Talaspalli	26/48	02-Feb-15	0.677
430	Talaspalli	26/49	02-Feb-15	0.129
431	Talaspalli	26/50	02-Feb-15	0.051
432	Talaspalli	26/51	02-Feb-15	1.174
433	Talaspalli	26/52	02-Feb-15	0.142
434	Talaspalli	26/54	02-Feb-15	0.182
435	Talaspalli	26/55	02-Feb-15	0.182
436	Talaspalli	26/56	02-Feb-15	0.210
437	Talaspalli	26/57	02-Feb-15	0.182
438	Talaspalli	26/59	02-Feb-15	0.406
439	Talaspalli	26/60	02-Feb-15	0.784
440	Talaspalli	26/61	02-Feb-15	0.480
441	Talaspalli	26/63	02-Feb-15	0.150
442	Talaspalli	26/64	02-Feb-15	0.210
443	Talaspalli	29/7	02-Feb-15	0.616
444	Talaspalli	29/13	02-Feb-15	0.405
445	Talaspalli	30/1	02-Feb-15	0.357
446	Talaspalli	30/2	02-Feb-15	0.357
447	Talaspalli	30/3	02-Feb-15	0.258
448	Talaspalli	31/3	02-Feb-15	0.182
449	Talaspalli	32/1	02-Feb-15	0.068
450	Talaspalli	32/4	02-Feb-15	0.068
451	Talaspalli	32/5	02-Feb-15	0.060
452	Talaspalli	33/7	02-Feb-15	0.202
453	Talaspalli	39	02-Feb-15	0.590
454	Talaspalli	40/1	02-Feb-15	1.663
455	Talaspalli	40/4	02-Feb-15	1.019
456	Talaspalli	40/5	02-Feb-15	1.244
457	Talaspalli	40/6	02-Feb-15	0.243



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
438	Talaspalli	43/1	02-Feb-15	0.423
439	Talaspalli	43/2	02-Feb-15	0.182
440	Talaspalli	44	02-Feb-15	2.161
441	Talaspalli	43	02-Feb-15	1.238
442	Talaspalli	46	02-Feb-15	0.279
443	Talaspalli	46/2	02-Feb-15	0.302
444	Talaspalli	51/1	02-Feb-15	2.081
445	Talaspalli	31/2	02-Feb-15	1.134
446	Talaspalli	54	02-Feb-15	0.995
447	Talaspalli	36	02-Feb-15	0.433
448	Talaspalli	38/2	02-Feb-15	0.129
449	Talaspalli	39	02-Feb-15	0.202
470	Talaspalli	61/3	02-Feb-15	1.026
471	Talaspalli	65/2	02-Feb-15	0.081
472	Talaspalli	65/4	02-Feb-15	0.071
473	Talaspalli	65/6	02-Feb-15	0.071
474	Talaspalli	66/2	02-Feb-15	0.413
475	Talaspalli	72/1	02-Feb-15	0.559
476	Talaspalli	75/2	02-Feb-15	0.308
477	Talaspalli	75/3	02-Feb-15	0.102
478	Talaspalli	75/2	02-Feb-15	0.283
479	Talaspalli	76/1	02-Feb-15	0.243
480	Talaspalli	76/3	02-Feb-15	0.301
481	Talaspalli	82	02-Feb-15	0.061
482	Talaspalli	84	02-Feb-15	1.028
483	Talaspalli	86/2	02-Feb-15	0.809
484	Talaspalli	87/2	02-Feb-15	0.401
485	Talaspalli	87/3	02-Feb-15	0.312
486	Talaspalli	87/4	02-Feb-15	1.574
487	Talaspalli	87/7	02-Feb-15	0.380
488	Talaspalli	87/8	02-Feb-15	0.308
489	Talaspalli	87/10	02-Feb-15	0.882
490	Talaspalli	87/11	02-Feb-15	0.551
491	Talaspalli	87/12	02-Feb-15	0.214
492	Talaspalli	87/13	02-Feb-15	1.238
493	Talaspalli	87/14	02-Feb-15	0.166
494	Talaspalli	87/18	02-Feb-15	0.312
495	Talaspalli	87/20	02-Feb-15	0.170
496	Talaspalli	92/1	02-Feb-15	0.263
497	Talaspalli	92/2	02-Feb-15	0.298
498	Talaspalli	92/3	02-Feb-15	0.258
499	Talaspalli	92/4	02-Feb-15	0.259
500	Talaspalli	92/8	02-Feb-15	0.174
501	Talaspalli	92/9	02-Feb-15	0.061
502	Talaspalli	92/10	02-Feb-15	0.142
503	Talaspalli	92/12	02-Feb-15	0.142



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
506	Talapalli	95/13	02-Feb-15	0.465
505	Talapalli	97/1	02-Feb-15	0.182
506	Talapalli	97/4	02-Feb-15	0.481
507	Talapalli	97/5	02-Feb-15	0.297
508	Talapalli	100	02-Feb-15	0.405
509	Talapalli	101/3	02-Feb-15	0.109
510	Talapalli	101/2	02-Feb-15	0.190
511	Talapalli	101/4	02-Feb-15	0.241
512	Talapalli	101/7	02-Feb-15	0.210
513	Talapalli	101/8	02-Feb-15	0.121
514	Talapalli	101/9	02-Feb-15	0.129
515	Talapalli	101/10	02-Feb-15	0.210
516	Talapalli	101/11	02-Feb-15	0.268
517	Talapalli	101/12	02-Feb-15	0.280
518	Talapalli	101/14	02-Feb-15	0.083
519	Talapalli	101/15	02-Feb-15	0.111
520	Talapalli	101/17	02-Feb-15	0.081
521	Talapalli	101/18	02-Feb-15	0.111
522	Talapalli	101/20	02-Feb-15	0.049
523	Talapalli	101/22	02-Feb-15	0.052
524	Talapalli	114/1	02-Feb-15	0.208
525	Talapalli	116	02-Feb-15	3.000
526	Talapalli	119/1	02-Feb-15	0.138
527	Talapalli	119/4	02-Feb-15	0.566
528	Talapalli	121/2	02-Feb-15	0.138
529	Talapalli	121/3	02-Feb-15	0.066
530	Talapalli	121/4	02-Feb-15	0.048
531	Talapalli	121/6	02-Feb-15	0.280
532	Talapalli	121/8	02-Feb-15	0.080
533	Talapalli	121/12	02-Feb-15	0.052
534	Talapalli	124	02-Feb-15	1.461
535	Talapalli	126/3	02-Feb-15	0.251
536	Talapalli	126/8	02-Feb-15	0.077
537	Talapalli	126/7	02-Feb-15	0.291
538	Talapalli	126/9	02-Feb-15	0.077
539	Talapalli	126/11	02-Feb-15	0.174
540	Talapalli	130/2	02-Feb-15	0.165
541	Talapalli	130/3	02-Feb-15	0.145
542	Talapalli	130/4	02-Feb-15	0.138
543	Talapalli	130/5	02-Feb-15	0.082
544	Talapalli	130/6	02-Feb-15	0.162
545	Talapalli	130/8	02-Feb-15	0.097
546	Talapalli	130/9	02-Feb-15	0.105
547	Talapalli	130/11	02-Feb-15	0.182
548	Talapalli	130/12	02-Feb-15	0.243
549	Talapalli	130/13	02-Feb-15	0.200



S.No.	Village	Khata No.	Date of Registration	Area (Hectares)
550	Talaspalli	130/18	02-Feb-15	0.847
551	Talaspalli	131/1	02-Feb-15	0.093
552	Talaspalli	131/2	02-Feb-15	0.093
553	Talaspalli	131/4	02-Feb-15	0.030
554	Talaspalli	131/6	02-Feb-15	0.061
	<b>Total</b>			<b>241.465</b>

Note: Land Rights vested on NTPC Limited by virtue of Section 11 notification under CRA Act.

Type of Land: Leasehold Land for Mining as per Mining Lease.

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	266.79



**Part C – Description of Mine Infrastructure in relation to the mine :****C1- Mine Infrastructure: Immovable Assets**

S. No.	Head of Assets	Description (Nature of Assets)
1	CWD - Railway Siding	Railway Siding (Being Amount paid as Social Charges)
2	Other Buildings	Office At Talabani Adm

**C2- Mine Infrastructure: Land for Compensatory Afforestation**

Type of Land: Freshfield Land for Compensatory Afforestation

Nil

Type of Land: Leasehold Land for Compensatory Afforestation

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-

**C3- Mine Infrastructure: Resettlement and Rehabilitation Land**

Type of Land: Resettlement and Rehabilitation Freshfield Land

Nil

Type of Land: Resettlement and Rehabilitation Leasehold Land

Nature	Area (Hectares)
Government Land	-
Private Land	-
Forest Land	-





**Annexure 2: Particulars of statutory licenses, permits, permissions, approvals or consents issued by the Central Government which are being transferred along with this Allotment Order.**

S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Approval of Mining Plan and Mine Closure Plan Mining Plan (February, 2010)	Ministry of Coal	No.13016/29/2003-CA-I (Vol III)	21.03.2010



S. No	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Opening of Escrow Account	Ministry of Coal – CCO		03.04.2014
2.	Environment Clearance	Ministry of Environment and Forests	No. J-11015/379/2009-IA.II(M)	02.01.2013
3.	Forest Clearance – a) Stage 1	Ministry of Environment and Forests	F. No.B-18/2013-FC	05.11.2012
	b) Stage 2		F. No.B-18/2013-FC	28/29.01.2014



Annexure 4: Particulars of statutory licenses, permits, permissions, approvals or consents issued by the State Government to be obtained in application by the Allotee.

S. No.	Statutory Clearance	Ministry/ Agency	Letter No.	Date
1.	Consent to establish	Chattisgarh Environment Conservation Board	No 646/TS/CECB/201 3	06.01.2013



## Annexure 2A

ANNEXURE-VIIC		
CARDINAL POINTS OF TALAPALLI COAL BLOCK		
POINT NO	LONGITUDE (WGS84)	LATITUDE (WGS84)
P-0	83° 29' 42.381" E	22° 14' 43.085" N
P-1	83° 29' 45.262" E	22° 14' 41.094" N
P-2	83° 29' 48.143" E	22° 14' 39.103" N
P-3	83° 29' 51.024" E	22° 14' 37.111" N
P-4	83° 29' 53.905" E	22° 14' 35.120" N
P-5	83° 29' 56.786" E	22° 14' 33.129" N
P-6	83° 29' 59.667" E	22° 14' 31.137" N
P-7	83° 30' 2.548" E	22° 14' 29.146" N
P-8	83° 30' 5.429" E	22° 14' 27.154" N
P-9	83° 30' 8.310" E	22° 14' 25.163" N
P-10	83° 30' 11.190" E	22° 14' 23.172" N
P-11	83° 30' 14.071" E	22° 14' 21.180" N
P-12	83° 30' 16.952" E	22° 14' 19.189" N
P-13	83° 30' 19.833" E	22° 14' 17.197" N
P-14	83° 30' 22.714" E	22° 14' 15.206" N
P-15	83° 30' 25.595" E	22° 14' 13.214" N
P-16	83° 30' 28.476" E	22° 14' 11.223" N
P-17	83° 30' 31.357" E	22° 14' 9.231" N
P-18	83° 30' 34.238" E	22° 14' 7.240" N
P-19	83° 30' 37.119" E	22° 14' 5.248" N
P-20	83° 30' 40.000" E	22° 14' 3.257" N
P-21	83° 29' 59.067" E	22° 14' 17.346" N
P-22	83° 29' 58.194" E	22° 14' 17.369" N
P-23	83° 29' 57.321" E	22° 14' 17.392" N
P-24	83° 29' 56.448" E	22° 14' 16.809" N
P-25	83° 29' 55.575" E	22° 14' 16.226" N
P-26	83° 29' 54.702" E	22° 14' 15.385" N
P-27	83° 29' 53.829" E	22° 14' 14.299" N
P-28	83° 29' 52.956" E	22° 14' 12.722" N
P-29	83° 29' 52.083" E	22° 14' 11.589" N
P-30	83° 29' 51.210" E	22° 14' 9.962" N
P-31	83° 29' 50.337" E	22° 14' 8.813" N
P-32	83° 29' 52.773" E	22° 14' 7.856" N
P-33	83° 29' 52.009" E	22° 14' 6.932" N
P-34	83° 29' 51.411" E	22° 14' 6.368" N
P-35	83° 29' 50.968" E	22° 14' 6.180" N
P-36	83° 29' 50.524" E	22° 14' 6.145" N
P-37	83° 29' 49.951" E	22° 14' 6.203" N
P-38	83° 29' 49.303" E	22° 14' 6.382" N
P-39	83° 29' 48.581" E	22° 14' 6.646" N
P-40	83° 29' 47.775" E	22° 14' 7.039" N
P-41	83° 29' 47.015" E	22° 14' 7.674" N
P-42	83° 29' 46.074" E	22° 14' 8.478" N
P-43	83° 29' 43.827" E	22° 14' 10.084" N
P-44	83° 29' 42.565" E	22° 14' 10.543" N
P-45	83° 29' 41.374" E	22° 14' 10.960" N
P-46	83° 29' 39.109" E	22° 14' 10.894" N
P-47	83° 29' 37.410" E	22° 14' 11.000" N
P-48	83° 29' 36.301" E	22° 14' 10.770" N
P-49	83° 29' 34.771" E	22° 14' 10.324" N
P-50	83° 29' 33.857" E	22° 14' 9.873" N
P-51	83° 29' 32.985" E	22° 14' 9.570" N
P-52	83° 29' 32.155" E	22° 14' 9.012" N
P-53	83° 29' 31.148" E	22° 14' 8.063" N
P-54	83° 29' 30.001" E	22° 14' 6.617" N
P-55	83° 29' 28.813" E	22° 14' 4.444" N
P-56	83° 29' 27.772" E	22° 14' 1.806" N
P-57	83° 29' 27.418" E	22° 14' 0.799" N
P-58	83° 29' 27.356" E	22° 14' 0.074" N
P-59	83° 29' 27.804" E	22° 13' 59.031" N
P-60	83° 29' 27.883" E	22° 13' 58.348" N
	83° 29' 28.538" E	22° 13' 57.253" N

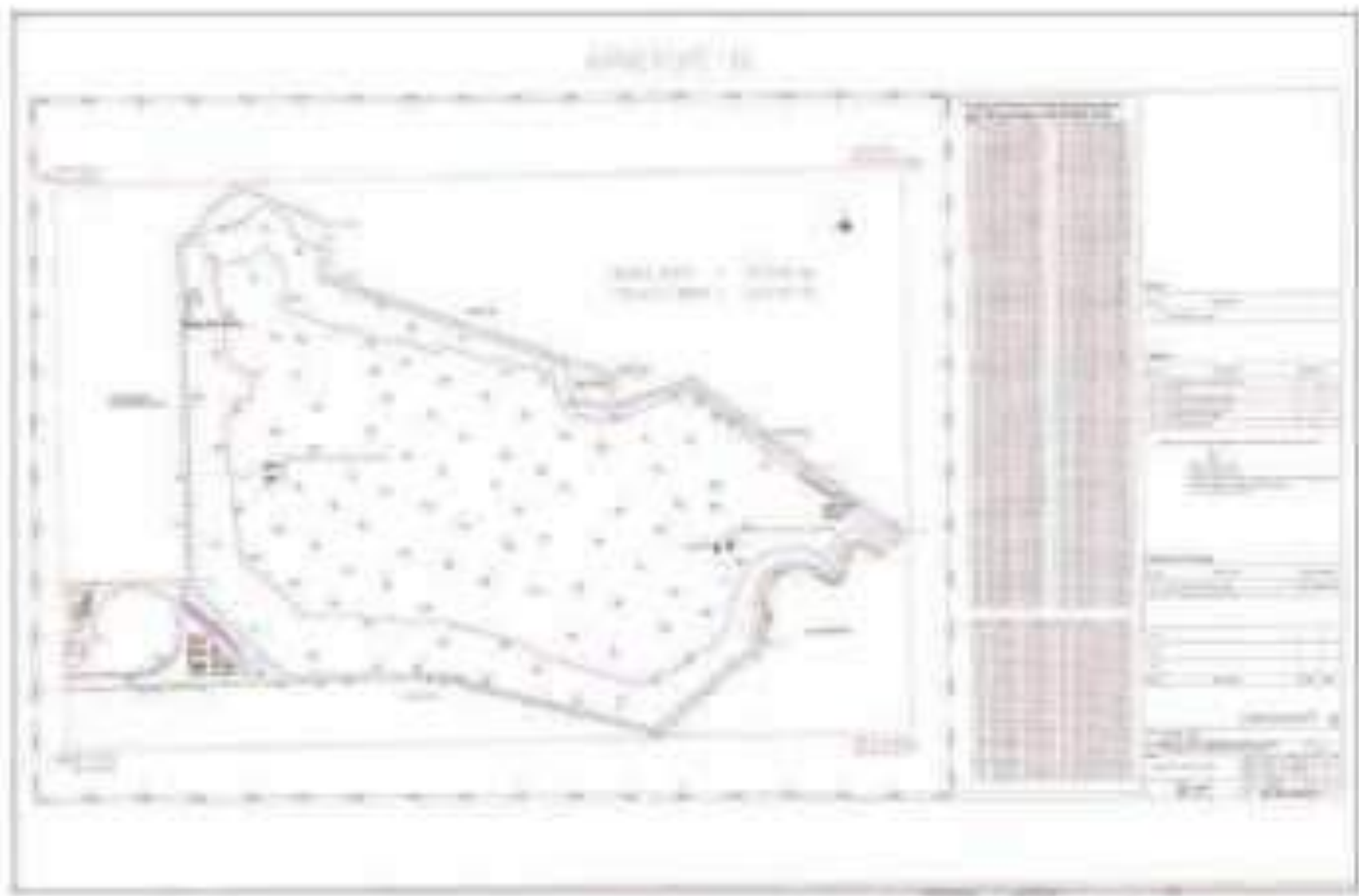
ANNEXURE VIII		
P-52	83° 29' 28.928" E	22° 13' 55.753" N
P-53	83° 29' 29.000" E	22° 13' 55.531" N
P-54	83° 29' 28.818" E	22° 13' 55.082" N
P-55	83° 29' 28.725" E	22° 13' 55.552" N
P-56	83° 29' 28.408" E	22° 13' 55.083" N
P-57	83° 29' 27.843" E	22° 13' 54.268" N
P-58	83° 29' 27.315" E	22° 13' 53.427" N
P-59	83° 29' 26.957" E	22° 13' 52.652" N
P-70	83° 29' 25.574" E	22° 13' 51.321" N
P-71	83° 29' 25.390" E	22° 13' 50.358" N
P-72	83° 29' 25.594" E	22° 13' 49.543" N
P-73	83° 29' 27.240" E	22° 13' 48.895" N
P-74	83° 29' 26.208" E	22° 13' 48.008" N
P-75	83° 29' 25.416" E	22° 13' 45.934" N
P-76	83° 29' 22.623" E	22° 13' 43.850" N
P-77	83° 29' 19.830" E	22° 13' 41.766" N
P-78	83° 29' 17.038" E	22° 13' 39.712" N
P-79	83° 29' 14.245" E	22° 13' 37.638" N
P-80	83° 29' 11.453" E	22° 13' 35.564" N
P-81	83° 29' 8.660" E	22° 13' 33.490" N
P-82	83° 29' 5.867" E	22° 13' 31.416" N
P-83	83° 29' 3.075" E	22° 13' 29.342" N
P-84	83° 29' 0.282" E	22° 13' 27.267" N
P-85	83° 28' 57.490" E	22° 13' 25.193" N
P-86	83° 28' 54.698" E	22° 13' 23.119" N
P-87	83° 28' 51.906" E	22° 13' 21.045" N
P-88	83° 28' 48.443" E	22° 13' 21.935" N
P-89	83° 28' 44.980" E	22° 13' 22.627" N
P-90	83° 28' 41.518" E	22° 13' 23.218" N
P-91	83° 28' 38.056" E	22° 13' 24.809" N
P-92	83° 28' 34.593" E	22° 13' 25.400" N
P-93	83° 28' 31.131" E	22° 13' 26.390" N
P-94	83° 28' 27.668" E	22° 13' 27.281" N
P-95	83° 28' 24.206" E	22° 13' 28.172" N
P-96	83° 28' 20.744" E	22° 13' 29.063" N
P-97	83° 28' 17.281" E	22° 13' 29.953" N
P-98	83° 28' 13.819" E	22° 13' 30.844" N
P-99	83° 28' 10.356" E	22° 13' 31.735" N
P-100	83° 28' 6.894" E	22° 13' 32.625" N
P-101	83° 28' 3.431" E	22° 13' 33.516" N
P-102	83° 27' 59.969" E	22° 13' 34.407" N
P-103	83° 27' 56.506" E	22° 13' 35.297" N
P-104	83° 27' 53.044" E	22° 13' 36.188" N
P-105	83° 27' 49.581" E	22° 13' 37.079" N
P-106	83° 27' 46.119" E	22° 13' 37.969" N
P-107	83° 27' 42.656" E	22° 13' 38.860" N
P-108	83° 27' 39.193" E	22° 13' 39.750" N
P-109	83° 27' 35.731" E	22° 13' 39.718" N
P-110	83° 27' 32.268" E	22° 13' 39.888" N
P-111	83° 27' 28.806" E	22° 13' 39.656" N
P-112	83° 27' 24.911" E	22° 13' 39.525" N
P-113	83° 27' 21.341" E	22° 13' 39.594" N
P-114	83° 27' 17.771" E	22° 13' 39.502" N
P-115	83° 27' 14.200" E	22° 13' 39.531" N
P-116	83° 27' 10.630" E	22° 13' 39.499" N
P-117	83° 27' 7.059" E	22° 13' 39.468" N
P-118	83° 27' 3.489" E	22° 13' 39.436" N
P-119	83° 26' 59.918" E	22° 13' 39.405" N
P-120	83° 26' 56.348" E	22° 13' 39.373" N
P-121	83° 26' 52.777" E	22° 13' 39.342" N
P-122	83° 26' 49.207" E	22° 13' 39.310" N
P-123	83° 26' 45.636" E	22° 13' 39.279" N
P-124	83° 26' 42.066" E	22° 13' 39.247" N
P-125	83° 26' 38.495" E	22° 13' 39.215" N
P-126	83° 26' 34.925" E	22° 13' 39.184" N
P-127	83° 26' 31.354" E	22° 13' 39.152" N
P-128	83° 26' 27.784" E	22° 13' 39.120" N
P-129	83° 26' 24.213" E	22° 13' 39.089" N

ANNEXURE VIII		
P-130	83° 29' 20.643" E	22° 13' 39.057" N
P-131	83° 29' 17.072" E	22° 13' 39.028" N
P-132	83° 29' 13.502" E	22° 13' 38.993" N
P-133	83° 29' 9.931" E	22° 13' 38.952" N
P-134	83° 29' 6.361" E	22° 13' 38.930" N
P-135	83° 29' 2.790" E	22° 13' 38.898" N
P-136	83° 29' 9.220" E	22° 13' 38.866" N
P-137	83° 29' 55.649" E	22° 13' 38.834" N
P-138	83° 29' 92.079" E	22° 13' 38.802" N
P-139	83° 29' 48.508" E	22° 13' 38.770" N
P-140	83° 29' 44.938" E	22° 13' 38.738" N
P-141	83° 29' 41.368" E	22° 13' 38.706" N
P-142	83° 29' 41.345" E	22° 13' 42.254" N
P-143	83° 29' 41.323" E	22° 13' 45.801" N
P-144	83° 29' 41.301" E	22° 13' 49.348" N
P-145	83° 29' 41.278" E	22° 13' 52.896" N
P-146	83° 29' 41.256" E	22° 13' 56.443" N
P-147	83° 29' 41.234" E	22° 13' 59.991" N
P-148	83° 29' 41.211" E	22° 14' 3.538" N
P-149	83° 29' 41.189" E	22° 14' 7.085" N
P-150	83° 29' 41.167" E	22° 14' 10.633" N
P-151	83° 29' 44.739" E	22° 14' 10.678" N
P-152	83° 29' 48.290" E	22° 14' 10.720" N
P-153	83° 29' 51.854" E	22° 14' 10.764" N
P-154	83° 29' 55.418" E	22° 14' 10.808" N
P-155	83° 29' 58.979" E	22° 14' 10.852" N
P-156	83° 29' 2.041" E	22° 14' 10.895" N
P-157	83° 29' 6.104" E	22° 14' 10.939" N
P-158	83° 29' 9.896" E	22° 14' 10.983" N
P-159	83° 29' 13.228" E	22° 14' 11.026" N
P-160	83° 29' 16.791" E	22° 14' 11.070" N
P-161	83° 29' 20.353" E	22° 14' 11.114" N
P-162	83° 29' 20.331" E	22° 14' 14.419" N
P-163	83° 29' 20.310" E	22° 14' 17.724" N
P-164	83° 29' 20.288" E	22° 14' 21.029" N
P-165	83° 29' 20.266" E	22° 14' 24.335" N
P-166	83° 29' 20.244" E	22° 14' 27.640" N
P-167	83° 29' 20.222" E	22° 14' 30.945" N
P-168	83° 29' 20.201" E	22° 14' 34.251" N
P-169	83° 29' 20.179" E	22° 14' 37.556" N
P-170	83° 29' 20.157" E	22° 14' 40.861" N
P-171	83° 29' 20.135" E	22° 14' 44.167" N
P-172	83° 29' 20.113" E	22° 14' 47.472" N
P-173	83° 29' 20.092" E	22° 14' 50.777" N
P-174	83° 29' 20.070" E	22° 14' 54.082" N
P-175	83° 29' 20.048" E	22° 14' 57.388" N
P-176	83° 29' 20.026" E	22° 15' 0.693" N
P-177	83° 29' 20.004" E	22° 15' 3.998" N
P-178	83° 29' 19.983" E	22° 15' 7.304" N
P-179	83° 29' 19.961" E	22° 15' 10.609" N
P-180	83° 29' 19.939" E	22° 15' 13.914" N
P-181	83° 29' 19.917" E	22° 15' 17.220" N
P-182	83° 29' 19.895" E	22° 15' 20.525" N
P-183	83° 29' 19.874" E	22° 15' 23.830" N
P-184	83° 29' 19.852" E	22° 15' 27.135" N
P-185	83° 29' 19.830" E	22° 15' 30.441" N
P-186	83° 29' 19.808" E	22° 15' 33.746" N
P-187	83° 29' 19.786" E	22° 15' 37.051" N
P-188	83° 29' 19.765" E	22° 15' 40.357" N
P-189	83° 29' 19.743" E	22° 15' 43.662" N
P-190	83° 29' 19.721" E	22° 15' 46.967" N
P-191	83° 29' 19.699" E	22° 15' 50.272" N
P-192	83° 29' 19.677" E	22° 15' 53.578" N
P-193	83° 29' 22.402" E	22° 15' 56.883" N
P-194	83° 29' 25.128" E	22° 15' 58.589" N
P-195	83° 29' 27.850" E	22° 16' 1.089" N
P-196	83° 29' 30.575" E	22° 16' 3.583" N
P-197	83° 29' 33.298" E	22° 16' 6.080" N

ANNEXURE VIII		
P-199	83° 26' 36.023" E	22° 16' 8.600" N
P-199	83° 26' 38.748" E	22° 16' 11.103" N
P-200	83° 26' 42.004" E	22° 16' 9.881" N
P-201	83° 26' 45.261" E	22° 16' 8.278" N
P-202	83° 26' 48.517" E	22° 16' 6.885" N
P-203	83° 26' 51.774" E	22° 16' 5.453" N
P-204	83° 26' 55.030" E	22° 16' 4.040" N
P-205	83° 26' 58.287" E	22° 16' 2.627" N
P-206	83° 27' 1.543" E	22° 16' 1.214" N
P-207	83° 27' 4.800" E	22° 15' 59.802" N
P-208	83° 27' 8.056" E	22° 15' 58.389" N
P-209	83° 27' 8.064" E	22° 15' 54.266" N
P-210	83° 27' 8.072" E	22° 15' 50.402" N
P-211	83° 27' 8.080" E	22° 15' 46.409" N
P-212	83° 27' 8.088" E	22° 15' 42.416" N
P-213	83° 27' 11.411" E	22° 15' 41.273" N
P-214	83° 27' 14.734" E	22° 15' 40.130" N
P-215	83° 27' 18.058" E	22° 15' 38.988" N
P-216	83° 27' 21.381" E	22° 15' 37.845" N
P-217	83° 27' 24.704" E	22° 15' 36.702" N
P-218	83° 27' 28.027" E	22° 15' 35.560" N
P-219	83° 27' 31.351" E	22° 15' 34.417" N
P-220	83° 27' 34.674" E	22° 15' 33.274" N
P-221	83° 27' 37.997" E	22° 15' 32.132" N
P-222	83° 27' 41.320" E	22° 15' 30.989" N
P-223	83° 27' 44.643" E	22° 15' 29.846" N
P-224	83° 27' 47.966" E	22° 15' 28.703" N
P-225	83° 27' 51.289" E	22° 15' 27.561" N
P-226	83° 27' 54.613" E	22° 15' 26.418" N
P-227	83° 27' 57.936" E	22° 15' 25.275" N
P-228	83° 28' 1.259" E	22° 15' 24.132" N
P-229	83° 28' 4.582" E	22° 15' 22.989" N
P-230	83° 28' 7.905" E	22° 15' 21.846" N
P-231	83° 28' 11.228" E	22° 15' 20.703" N
P-232	83° 28' 14.551" E	22° 15' 19.560" N
P-233	83° 28' 17.874" E	22° 15' 18.417" N
P-234	83° 28' 21.197" E	22° 15' 17.274" N
P-235	83° 28' 24.520" E	22° 15' 16.131" N
P-236	83° 28' 27.843" E	22° 15' 14.988" N
P-237	83° 28' 31.166" E	22° 15' 13.845" N
P-238	83° 28' 34.489" E	22° 15' 12.702" N
P-239	83° 28' 37.811" E	22° 15' 11.559" N
P-240	83° 28' 41.134" E	22° 15' 10.416" N
P-241	83° 28' 44.457" E	22° 15' 9.273" N
P-242	83° 28' 47.780" E	22° 15' 8.130" N
P-243	83° 28' 51.103" E	22° 15' 6.987" N
P-244	83° 28' 54.426" E	22° 15' 5.844" N
P-245	83° 28' 57.749" E	22° 15' 4.701" N
P-246	83° 29' 01.072" E	22° 15' 3.558" N
P-247	83° 29' 04.395" E	22° 15' 2.415" N
P-248	83° 29' 07.718" E	22° 15' 1.272" N
P-249	83° 29' 11.041" E	22° 15' 0.129" N
P-250	83° 29' 14.364" E	22° 14' 58.986" N
P-251	83° 29' 17.687" E	22° 14' 57.843" N
P-252	83° 29' 21.010" E	22° 14' 56.700" N
P-253	83° 29' 24.333" E	22° 14' 55.557" N
P-254	83° 29' 27.656" E	22° 14' 54.414" N
P-255	83° 29' 30.979" E	22° 14' 53.271" N
P-256	83° 29' 34.302" E	22° 14' 52.128" N
P-257	83° 29' 37.625" E	22° 14' 50.985" N
P-258	83° 29' 40.948" E	22° 14' 49.842" N
P-259	83° 29' 44.271" E	22° 14' 48.699" N
P-260	83° 29' 47.594" E	22° 14' 47.556" N
P-261	83° 29' 50.917" E	22° 14' 46.413" N
P-262	83° 29' 54.240" E	22° 14' 45.270" N

NOTE: Boundary points are software generated from georeferenced block boundary of Talipali coal block.

Annexure 2B



APPROVE





एनटीपीसी लिमिटेड  
NTPC Limited

Annexure 3A1

**Subject:** Approval of Mining Plan and overburdening as per Annexure II of the Ministry of Coal guidelines dated 28/05/2016 with respect to Talabali coal mine situated in NTPC Ltd. in Late Stage Thermal Power Station.

NTPC Board authorized Regional Executive Director (RED) Coal Mining to approve the Mining Plan/Overburdening Plans, associated documents pertaining to these plans for the Coal Mining Projects and are submitted herewith for Talabali to be submitted to Ministry of Coal in the capacity referred to hereunder with enclosures of self-acting permits. (Annexure A)

As Regional Executive Director Coal Mining, I am submitting the following:

1. Consensus of all concerned in preparation of Mining Plan.
2. Certified Soil, Earth, Mine Planning and Design Studies with EOPR Certificate No. NMPCT/MP/2019/0010 issued on 26/11/2019 has been verified (Annexure B).
3. Acceptance of the Mining Plan with recommendations for approval.
4. Undertaking that the mine will be developed as per the approval of the mining plan from Ministry of Coal and all other approvals, as required will be obtained from relevant authorities.
5. Undertaking that all mining operations will be carried out as per the regulatory provisions given under Mines Act 1952, Coal Mine Regulation 2017, EP Act 1986 and FC Act 1992 and a separate safety provision will be adopted for carrying out approved the concerned activities.
6. Revised schedule for implementation:
  1. Undertaking that the preparation & rehabilitation work shall be carried out in accordance with the approved Mine Closure Plan and any modification thereto which may be made in the Mine Closure Plan to Ministry of Coal, New Delhi & State.
  2. Undertaking that the remediation measures proposed in the Mine Closure plan including reclamation and rehabilitation works will be carried out in accordance with the approved Mine Closure plan and final mine closure plan and undertake to submit a yearly report before the end of every year to the Coal Controller setting forth the status of progressive and rehabilitation works carried out as envisaged in the approved Mine Closure plan (Programme and Plan Sheet).
  3. Undertaking that they will obtain a mine closure certificate from Coal Controller in the affected the progressive, reclamation and rehabilitation works carried out in accordance with the approved Mine Closure plan/ Mine Closure plan and will monitor the restoration level to the Mine Government approved.

Regional Executive Director Coal Mining

एनटीपीसी लिमिटेड, नए दिल्ली, भारत  
NTPC Limited, New Delhi, India  
www.nptcltd.com

UNRECORDED

EXTRACTS FROM THE MINUTES OF 417<sup>th</sup> MEETING OF THE BOARD OF DIRECTORS HELD ON WEDNESDAY, 29<sup>th</sup> FEBRUARY 2015

Item No.417.2.13 Approval of Mining Plan & Mine Closure Plans of Coal Mining Projects of NTPC and nomination of "Owner" as per the Mines Act 1952 for Pakri-Barwadih and all other coal mining blocks allocated / to be re-allocated / to be formally allocated to NTPC

XX	XX	XX	XX	XX	XX
XX	XX	XX	XX	XX	XX

The Board, after discussions, passed the following resolution:

Resolved that Regional Executive Director (Coal Mining) be and is hereby authorized to approve the Mining Plans/Mine Closure Plans, associated documents pertaining to these plans for Coal Mining Projects and any subsequent revision/update thereof, to be submitted to Ministry of Coal or any statutory authority in connection with development of coal mine projects.

Further resolved that Shri Sherao Anand, Regional Executive Director (Coal Mining) be nominated as "Owner" as per the Mines Act, 1952 for Pakri-Barwadih and for all other coal mining blocks already allocated / to be re-allocated / to be formally allocated to NTPC.

----

CERTIFIED TRUE COPY

*[Signature]*  
 M. S. MOHANTA, DIRECTOR  
 General Manager, Coal Mining Division  
 National Thermal Power Corporation  
 100, Connaught Place, New Delhi-110028

**QUALITY COUNCIL OF INDIA**  
2007 Government of India

**NABET National Accreditation Board for Education and Training**  
100, Park Road, Sector 10, Gurgaon, Haryana - 122001

**CERTIFICATE OF ACCREDITATION**

**Center for (CC-NABET) Mining**  
**for Promoting Exploration & Mining Plan Preparation Agency**

**Central Mine Planning and Design Institute**  
Address: Sector 10, Gurgaon, Haryana

<b>SCOPE/COVERAGE</b>	<b>Department/Department - Mining Institute, Government of India, Ministry of Coal, 100, Park Road, Gurgaon</b>
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This Certificate is issued upon the condition that the institution shall continue to conform to the standards of the Council of Quality Assurance, Ministry of Education, Government of India.

The institution shall be eligible to use the logo of the Council of Quality Assurance, Ministry of Education, Government of India, for promotional purposes.

  
Director

  
QR Code

  
Chairman

PREPARED BY

## Annexure 4

Annexure-IV

DD

130160332803-CA-I (Vol. III)  
Government of India,  
Ministry of Coal

New Delhi, the dated 31<sup>st</sup> March, 2014

To

Dr. General Manager (PE&PD),  
1<sup>st</sup> Floor, Engineering Office Complex,  
Sector-24, Noida-201301  
(U.P.)

**Subject:** Approval of Mining Plan (February, 2010) in respect of Talajpalli Coal Block in Masal Raigrah, in the State of Chhattisgarh for captive mining of coal by MA. NTPC Ltd.

Sir,

I am directed to refer to your letter No.CGPEN/3114/MP/12 dated 10.11.2009 submitting the said Mining Plan (February, 2010) for Talajpalli coal block in Masal Raigrah in the State of Chhattisgarh, for captive mining of coal by MA. National Thermal Power Corporation Ltd, to be read alongwith allocation Company's letter dated 05/02/2010 and to say that the mining plan has been considered in this Ministry and the approval of the competent authority is hereby conveyed under Section 5 (2) (b) of the Mines & Minerals (Development & Regulation) Act, 1957 subject to the following conditions:-

- (i) The mining company shall take all necessary precautions regarding safety of mine workings, persons, deployed therein.
- (ii) Mining lease to be acquired shall not encroach into any other coal block.
- (iii) The approval of mining plan is without prejudice to the requirement of approvals from competent/prescribed authority under the relevant mine regulations, etc.

2. Two copies of the approved Mining Plan duly signed by the competent authority are returned herewith with request that a copy of the approved mining plan be submitted

Annexure-IV contd.

to the concerned State Government; for necessary action and also a photocopy of the approved Mining Plan may be sent to the Coal Controller for monitoring the block.

Enclosure.

Yours faithfully,

(V. S. Rao)

Under Secretary to the Government of India

Copy:-

1. Under Secretary, CPAM Section, Ministry of Coal, for information and record.
2. The Coal Controller, 1-Council House Street, Kolkata.

Annexure-5

Annexure V

Sl. No.	Activity	Start Date	End Date	Duration	Remarks
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APPROVED



## Annexure 6



**bharatkosh.gov.in**  
Government of India Receipt Portal

**RECEIPT**

Transaction Ref.No. 1512220009288 Dated: Dec 15 2022 12:03PM

Received from M/S. NTPC LIMITED with Transaction Ref.No:  
1512220009288

Dated Dec 15 2022 12:03PM the sum of INR 550100 (Five Lakhs Fifty  
Thousand One Hundred Only) through Internet based Online payment in the  
account of

Coal and Lignite, Application Processing fee- Mining Plan of NTPC Talaspalli.

**Disclaimer:- This is a system generated electronic receipt, hence no physical signature  
is required for the purpose of authentication.**

Printed On: 15-12-2022 12:7:21

Courtesy :- Controller General of Accounts

APPROVED

# Annexure 7

## TO WHOM IT MAY CONCERN

The Mining Plan & Mine Closure Plan of Talaspali Coal Mine formulated by Mining Plan Preparing Agency-Central Mine Planning and Design Institute, QCI Number- NABET/APA-MPPAIA/010 which was sent for expert review to Mining Plan Preparing Agency-MECON Limited, QCI Number- NABET/APA-MPPAIA/015.

The Mining Plan & Mine Closure Plan of Talaspali Coal Mine has been review from Technical and administrative angle and has found to be prepared in line with the guideline for formulation, processing, scrutiny and approval of Mining Plan and Mine Closure Plan circulated vide OM dated 29th May 2020. The subject mining plan is found to be in order and is recommended for consideration of the Approving Authority for approval.

Digital Signature

MECON Limited

Vivekananda Path, P.O.Doranda, Ranchi, Jharkhand, Pin 834002

NABET/APA-MPPAIA/015

821739581

APPROVED



## Additional Annexure-8

Annexure VIII

No. 11615/2702009-1A(I)(M)  
Government of India  
Ministry of Environment & Forests

Paryavaran Bhawan,  
C.O.D Complex, Lodi Road New  
New Delhi - 110001  
Dated: 02 January, 2013

To

The General Manager,  
M/s NTPC,  
Engineering complex,  
A-8A, Sector-24,  
NOIDA - 201301.

**Sub:** Talaspalli Coalmine (OC at 18 MTPA capacity and UC at 0.72 MTPA capacity of a total project area of 2349.35 ha) of M/s NTPC located in villages Talaspalli, Bichhosen, Niyamangan, Kadumaha, Raikera, Chotigaha, Ajigarh, & Sahaspali, Tehsil Chhatgaha, district Raigarh, Chhattisgarh - Environmental Clearance - req.

Re

This is with reference to letter No. CC/ISE/701/2009/GEN dated 25.09.2009 along with application for Terms of Reference (TOR) for a new Talaspalli Opencast-cum-Underground Coalmine and the Ministry's letter dated 13.11.2009 granting the TOR and your letter No. CC/ISE/701/2009/GEN dated 30.03.2011 for environmental clearance and subsequent letters dated 20.09.2011, 21.10.2011, and 22.02.2012 on the aforesaid subject. The Ministry of Environment & Forests has considered the application. It is noted that the proposal is for opening a new Talaspalli Opencast-cum-Underground Coalmine project of 18.72 MTPA production capacity in a total project area of 2349.35 ha located in Tehsil Chhatgaha in district Raigarh, Chhattisgarh. The mine is captive to the company's Late Super Thermal Power Project (4000MW) located at a distance of 60km. There are no National Parks, WL, Sanctuaries, Biosphere Reserves within the 10 km study area. There are 2 blocks of Reserve Forest (RF) Sikon, Rai, Talgi East, Talgi West, Deodhargi forest within 10 Km radius of study area. A number of endangered species such as elephant, bear and leopard are reported in the study area. The total project area of 2349.35 ha includes ML of an area of 2113 ha and an area of 238.35 ha of land outside the ML, which is required for colony, R&R colony and MGR. The MGR route passes through an elephant migratory corridor. Of the total project area, 1320.99 ha is private land, 261.97 ha is Govt. land, 766.393 ha is forestland. Forestry clearance has been obtained vide letter of the FC Division no. 8-18/2012-FC dated 5<sup>th</sup> November, 2012. The break-up of land use for the project is given below:

S.No.	Particular	Private	Govt.	Forest	Total
1.	Mine lease area	1200.99	202.00	710.10	2113
2.	Colony	8.717	18.25	-	26.967
3.	R&R Colony	-	19.22	-	19.22
4.	MGR corridor	113.77	18.53	56.253	188.553
	<b>Total</b>	<b>1320.987</b>	<b>261.97</b>	<b>766.393</b>	<b>2349.35</b>

1.2 River Kalo flows 60m along the eastern boundary of the ML and Pajhar falls at 3.5 km. A number of fast order/second order streams originate from the ML. Kara nala is a seasonal nala originating from the northern side of the block and passes through the block and joins River Kalo. It is proposed to divert Kara nala flowing through the ML into a Channel (diversion canal) which would be constructed along the northern side of the block and ultimately join River Kalo. A detailed Area Drainage Study comprising run off characterization, flood frequency analysis, etc has been carried out. Based on

1

In the study, the diversion channel has been designed taking into consideration the realignment of the channel with the River to its original path. The Channel Diversion Plan has been submitted to the Flood & Irrigation Dept., Govt. of Chhattisgarh.

1.3 Of the total ML area, 2079.34 ha is for the mine, 26 ha is for infrastructure and an embankment proposed along River Keo and 7.66 ha is for green belt. It is proposed to leave a 60m wide floodland between River Keo and quarry area undisturbed due to safety reasons as a study carried out has indicated that the exposure of coal seam left out after mining is prone to catching fire. Grade of coal is E-G with ash content upto 52%. Mining technology for OC mining would be shovel-dumper and Board & Pillar and Continuous Miner for UG mine. There are 21 coal horizons and it would be usual to work the top seams by UG mining. The lower 4 seams are planned by OC mining. UG mining would commence 20 years after commencement of OC mining. The parting between OC and UG mining is about 33m-51 m. Ultimate working depth is 404m bgl. The total estimated OB generation from the mine is 3777.87 Mtpa, of which 264.32 Mtpa of OB would be stored in external OB dump of 446 ha in northern side of 80m from ground level. During the initial years, 264.32 Mtpa of OB would be temporarily accommodated in temporary external dumps of 60m-90m height in coal bearing area of 446 ha within the mine lease, which would be re-handled during the 5<sup>th</sup> year of mine operation when backfilling begins and continues upto 20<sup>th</sup> year and concurrent backfilling would implemented beyond 20<sup>th</sup> year and upto 52<sup>nd</sup> year of mine operations. As a result, land acquisition of 446 ha of land for external OB dump is not required. At the post mining stage, there would be no permanent external dump outside the coal block. In addition, 80 ha of an isolated patch of backfilled area raised to a height of 60m would be re-handled back into the mine void and the height of the internal dump would be match with nearby topography/ground level. Of the total ML area of 2079.34 ha, 1848.38 ha would be simultaneously backfilled and reclaimed with plantation and the balance 230.96 ha would be left as a void and final void depth of 60m by backfilling into the final pit void.

1.4 The total estimated water requirement of the project is 2390 m<sup>3</sup>/d, of which 750m<sup>3</sup>/d is for domestic use and 1640 m<sup>3</sup>/d is for the mine operation. A detailed hydrological study of the area has been carried out and the falls under "Safe Category" as far as ground water development is concerned. Water table is in the range of 6.10-7.20m bgl (pre-monsoon) and 2.9-12.3 m bgl (post-monsoon). Confined aquifer is at the depth of 200m. Water harvesting measures and monitoring of ground water and surface water would be implemented.

1.5 A Conservation Plan for endangered wildlife of the area was drawn and submitted to the State Government. The Wild life conservation plan includes provision for the safe passage/corridor for the elephants, creation of underpass along elevated MGR, with passageway for free movement of herds of elephants, relaxing speeds of train in elephant passages, development of plantation of fodder, habitat restoration. A budgetary provision of Rs 5 crores has been made for wild life conservation. The Plan for afforestation has been submitted to Chhattisgarh State Forest Department as part of the diversion proposal of 1532 acre land in Dhamrajanji ghat and Raigarh at the cost of Rs 13.75 crores. An estimated 56, 727 TPD of coal would be transported through an MGR system of 180.54 ha of land upto Kotariya Railway Siding to the linked Laxmi Super Thermal Power Station at a distance of 60km. The MGR would pass through an elephant migratory corridor. It is proposed to create underpass along MGR for the safe passage of elephants as overhead multiple tubed conveyors covering such a long distance is not techno-economically feasible. However, adequate number of over/under passes would be constructed along the MGR route, voided/reported/inhabited by elephants in the area in consultation with PCCF (WLS) and at least 5 under/over passes shall be created particularly along the 7km stretch of the 20km MGR route, which forms a part of the elephant migratory corridor. In the rest of the route wherever required, similar under/overpasses shall be created. A detailed study has been initiated.

1.6 The project involves R&R of 1395 PAFs, which includes 615 land and homestead lines and 960 land loans. R&R Plan has been prepared after a detailed survey was carried out and after 10 VDAC meetings and Gram Sabha and meetings with DC, for a total cost of Rs 677 crores, of which rehabilitation plan is for Rs 214 crores. CSR plan has been prepared for Rs 48 crores. Since the project falls in a notified tribal area, a Plan for Tribal Development for Rs 5 crores has been prepared. Capital cost for EMP is Rs 1018.80 lakhs with an annual recurring budget of Rs 5.66T of coal. Public Hearing was held on 18-12-2016. Life of the OC mine is 52 years and UG mine is 30 years. Total capital cost of the project is Rs 6900 crores.

1.7 The Ministry of Environment & Forest hereby awards environmental clearance for the above mentioned Talajpali Coalmine (OC at 18 MTPA capacity and UG at 8.72 MTPA capacity of a total project area of 2348.35 ha) of M/s National Thermal Power Corporation

to be used

(NTPC) Ltd, located in Tehsil Gharghoda, district Raigarh, Chhattisgarh under the Environmental Impact Assessment Notification, 2006 and subsequent amendments thereto and Circulars there under subject to the compliance of the terms and conditions mentioned below:

#### A. Specific Conditions

- i. The maximum production capacity shall not exceed 18 MTPA for open-pit mining and 0.72 MTPA for underground mining.
- ii. The Plan for diversion of Karna Nala shall be modified to include a major stream flowing through the ME, towards the north side. The diversion channel shall be designed taking into consideration the realignment of the channel to join with River Kain to its original path. Approval of the Flood & Irrigation Department, Govt. Of Chhattisgarh shall be obtained for plan for diversion of Karna Nala and the stream. The proposed embankment along the diverted channel shall be established with plantation using a mix of native species. Stone pitching shall be done towards forest area.
- iii. Top soil of an estimated 25.32 Mm<sup>3</sup> generated during initial 4 years shall be stacked properly within the mined-out area with proper slope at marked sites and shall be used judiciously for reclamation and development of green belt within a year of its generation.
- iv. During the initial 4 years of open-pit mining, an estimated 264.32 Mm<sup>3</sup> of OB generated to be accommodated in temporary external dumps of 60m height in a coal bearing area of 440 ha within the mine lease, shall be re-handled during the 5<sup>th</sup> year of mine operation when backfilling begins. In addition, 81 ha of an isolated patch of ext. OB dump shall also be re-handled back into the mine void. At the post mining stage, there shall be no permanent external dump outside the coal block.
- v. Reclamation of areas after re-handling of temporary external OB dumps and backfilled decanted voids and habitat restoration of the mined out area shall be carried out by developing a 3-4m native forest ecosystem using native species found in the pre-mining forest ecosystem. A nursery of native species found in pre-mining eco-system shall be developed for reclamation and for habitat restoration. Afforestation plan shall also include reintroduction of species on which the tribes are dependent for minor forest produce for their livelihoods.
- vi. Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilized for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly.
- vii. Gullied drains (size, gradient and length) and sump capacity shall be designed keeping 30% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also be provided for adequate retention period to allow proper settling of silt material.
- viii. Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.
- ix. No groundwater shall be used for the mine operations except for drinking purpose and during the initial years of mine operation. Any additional water requirement envisaged for mine operations shall be obtained from mine pit water, by recycling to the maximum extent and from rainwater harvesting measures.
- x. Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new piezometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality including TDS and TSS in May and in monsoon. Data thus collected shall be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.
- xi. A Plan for recharging and monitoring of ground water in the impact zone and implemented in consultation with the State Ground Water Board, which includes creation of ponds and wells in impact zone and check dams in River Kain, Paper Hall in consultation with concerned Government Dept. A suitable scheme for supply of drinking water to 8 surrounding villages shall also be prepared in consultation with State Government, particularly where village wells go dry in the impact zone.
- xii. ETP shall also be provided for workshop, and CMP. Effluent shall be treated to conform to effluent

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prescribed standards, particularly for pH and TSS in case of discharge into any watercourse within or outside the lease.

- vii. An STP shall be provided for the township/colony to treat the domestic effluents to prescribed standards and for their reuse in project activities and in development of green belt in the colony.
- viii. Industrial wastewater (workshop and washwater) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (F) dated 19<sup>th</sup> May 1993 and 31<sup>st</sup> December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed for treatment of workshop effluents.
- ix. No fly ash from the linked TPPs shall be used in backfilling of the mined void without undertaking an environmental feasibility study and without prior approval of this Ministry under EIA Notification, 2006.
- x. Controlled blasting shall be practiced only during daytime with use of delay electric detonators. Drills shall be wet operated. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.
- xi. Crushers at the CHP shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc. Hoppers of the coal crushing unit shall be fitted with high efficiency bag filters and mist spray water sprinkling system shall be installed and operated effectively at all times of operation to check fugitive emissions from crushing operations, transfer points, stockyards.
- xii. All approach roads shall be black topped and swept regularly with mechanical sweepers and internal roads and major haul roads shall be black topped or concreted and provided with mobile and fixed type sprinklers. A 3-lin avenue plantation using local species shall be developed along the main roads, and approach roads to the mine. In addition, green belt shall be developed using local species all along the periphery of the site, along the areas such as crushing unit, and stockyards, which shall be properly maintained. Water sprinkling arrangements shall be established and functional during transfer and loading of coal.
- xiii. A Conservation Plan for the endangered faunal species reported in the study area and for the medicinal plants found in and around the project area shall be implemented in consultation with the State Forest and Wildlife Departments. An in-situ conservatory of species found in the pre-mining original ecosystem and rare and endangered plant species including medicinal plants species found in the study area during pre-mining phase shall be established and species reintroduced during mine reclamation and habitat restoration. The Conservation Plan shall include conservation of areas within the project boundary to be left undisturbed as free passageways for the wildlife to reach the forests in the study area. The Conservation Plan shall also include activities of mine reclamation and wildlife habitat restoration of mined out areas within the core area and project area using native species representative of the forest ecosystem during the pre-mining phase. Separate funds of Rs. 5 crore as capital costs shall be earmarked for implementation of the various activities under the Conservation Plan. The status of the Conservation Plan including expenditure (capital and revenue) shall be reported once a year as part of the monitoring report to this Ministry and to the MCEP Regional Office, Bhopal. The proponent shall also participate in the Regional Wildlife Conservation Plan (RWLCP) for the study area prepared by the State Wildlife Dept. and in addition to the above funds shall also contribute financially for implementation of the RWLCP. Habitat development/conservation measures along the migratory route/habitats of elephants found/visiting the area shall form a part of the Regional Action Plan.
- xiv. The proponent shall ensure that the 70 km stretch of MGR which includes a part of the elephant migratory corridor provides safe passageway for the elephants, the number and locations of which shall be finalized after a detailed study in consultation with the State Forest and Wildlife Departments, Govt. of Chhattisgarh and inputs from Dr. Ramjan Sakarwat, Professor and Chairman, Centre for Ecological Sciences, Indian Institute of Science, Bangalore. Adequate number of over/under passes shall be constructed along the MGR route, visited/reported/observed by elephants in the area in consultation with PCCP (WL), and atleast 5 under/over passes shall be created particularly along the 7km stretch of the Niler MGR route, which forms a part of the elephant migratory corridor. In the rest of the route wherever required, similar under/overpasses shall be created. The WL Plan shall include measures for awareness for conservation of wildlife, training to the drivers of MGR for use of siren, horn, fire crackers to move animals away from railway tracks, avoiding use of MGR during time of maximum animal movement.

- xxx. An Environment Cell/Panel of experts consisting of WI, expert, ecologist, sociologist and hydrology shall be created to oversee the implementation of the WI, Conservation Plan and Plan for Rehabilitation-restoration. No such species shall be used in reclamation and restoration of the mine.
- xxxi. Area brought under afforestation shall be not less than 1878.34 ha which includes, backfilled area (1842.38 ha) which includes area reclaimed after re-handling of temporary external CD dumps and topsoil dump, embankment (13 ha) along ML boundary, infrastructure area (3 ha) along road, grass belt (7.56ha), and is undertaken area/safety area and is colony outside the ML by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.
- xxxii. A Progressive Mine Closure Plan shall be implemented by reclamation of 1842.38 ha of the total quarry area of 2079.34 ha by backfilling and reclamation and by afforestation, to create a diversity forest ecosystem, by planting native species in consultation with the local DFO/Agriculture Department/relevant institution. The density of the trees shall be around 2500 plants per ha. The balance 236.96 ha void left as a water body of a min. depth of 60m which shall be gently sloped and the upper benches stabilized with grass and plantation.
- xxxiii. R&R Plan prepared for the 8 villages in the core zone - Talipalli, Bichanara, Baganpur, Kucharnaha, Raskara, Chhatiguda, Ajgarh and Sahelpali with 637 land and homestead users and 940 land users shall be implemented within an agreed time-frame of 3-5 years and shall be not less than the norms laid down/approved by the State Government and shall not be inferior than that in the National R&R Policy and shall be completed within the agreed time-frame. R&R shall include specific income generation schemes and setting up of SHGs and cooperatives, and activities and assistance under the Tribal development Plan for the tribals being displaced and provision of assistance for the under-privileged sections. The provision also includes a Corpus Fund for the maintenance of the Resettlement site. The status of the implementation of the R&R Plan along with financial status of the activities undertaken shall be uploaded on the company website and updated at least once in 4 year.
- xxxiv. The Project cost shall include a Tribal Development Plan for a minimum cost of Rs 10 crores. The activities for Tribal Development under CSR and R&R shall be dovetailed with the District Tribal Welfare Plan being prepared annually by the State Government which should be used to prepare and diversify the activities. Training/capacity development and skill development shall form an integral part of CSR and R&R Action Plan, wherein project affected youth are given training in it is for enhancing their skill for direct/indirect employment. A colony for outsourcee permanent shall be provided. The R&R Action Plan shall also provide for assistance to vulnerable persons of the society as per R&R Policy of Govt. of Chhattisgarh. A female social scientist shall also be included for implementation of R&R and CSR.
- xxxv. The proponent shall implement activities undertaken under CSR for neighboring villages in the study area for the life of the project. The activities shall include establishing/strengthening of schools, roads, drainage and sanitation, community halls, drinking water in the villages and skill development of the local communities. The CSR Plan shall also include Tribal Welfare activities for the tribals and their skill development for alternate livelihood and addressing issues such as availability of minor forest produce for the tribal/local communities. The details of the activities and expenditure made thereon in each of the villages taken up under CSR shall be displayed on the company's website and updated at least once in six months. The socio-economic development of the villages shall be monitored over the life of the project using indices such as the UNDP Human Development Index.
- xxxvi. For monitoring land use pattern and for post mining land use, a time series of satellite maps, based on satellite imagery (on a scale of 1:5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhopal.
- xxxvii. A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests for approval 3 years in advance of final mine closure for approval. The Plan shall include habitat restoration of the project area consisting of a diversity forest ecosystem, using a mix of native species found in the pre-mining ecosystem in the study area.
- xxxviii. The approved Mining Plan shall be modified to integrate Specific Conditions Nos. (iv), (vi) and (XIII) and approval obtained prior to start of mining operations.

2/1/2022

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### B. General Conditions

- i. No change in technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.
- ii. No change in the calendar plan including quantum of mineral coal and waste being produced shall be made.
- iii. Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for monitoring  $PM_{10}$ ,  $PM_{2.5}$ ,  $SO_2$  and  $NO_2$ . Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, in the particulate matter etc. shall be carried out at least once in six months.
- iv. Data on ambient air quality ( $PM_{10}$ ,  $PM_{2.5}$ ,  $SO_2$  and  $NO_2$ ) and heavy metals such as Hg, As, Ni, Cr, etc) and other monitoring data shall be regularly submitted to the Ministry including its Regional Office at Bhopal and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognized under the EP Rules, 1986 shall be furnished as part of the compliance report.
- v. Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HSDM, etc shall be provided with ear plugs/muffs.
- vi. Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, and treated so as to conform to the standards including for heavy metals before discharge prescribed under GSR 422 (S) dated 19<sup>th</sup> May 1993 and 31<sup>st</sup> December 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.
- vii. Vehicular emissions shall be kept under control and regularly monitored.
- viii. Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognized under EP Rules, 1986.
- ix. Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.  
Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contraindications due to exposure to dust and to take corrective measures, if needed.
- x. A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.
- xi. The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to the Ministry and its Regional Office at Bhopal.
- xii. The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution control Board and may also be seen at the website of the ministry of Environment & Forests at <http://mef.nic.in>
- xiii. A copy of the environmental clearance letter shall be tasked to concerned Panchayat/Zila Parishad, Municipal Corporation or Urban Local Body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on the company's website.
- xiv. A copy of the clearance letter shall be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Centre and Collector's Office/Talukdar's Office for 30 days.

BT/10/2011



- vi. The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated EC conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in the public domain. The monitoring data of environmental quality parameters (air, water, noise and soil) and critical pollutants such as PM10, PM2.5, SO2 and NOx (arbiters and stack if any) and critical ecological parameters shall also be displayed at the entrance of the project premises and along with in company office and on the company's website.
- vii. The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the MOEF, the respective Zonal offices of CPCB and the SPCB.
- viii. The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the officer(s) of the Regional Office by furnishing the requisite data/information/monitoring reports.
- ix. The environmental statement for each financial year ending 31<sup>st</sup> March in Form-V is specified to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Office of the MOEF by e-mail.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

5. The above conditions will be enforced *inter-alia* under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

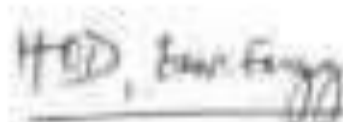
  
(Dr. Manoj Kumar)  
Director

Copy to:

1. Secretary, Ministry of Coal, New Delhi.
2. DG (F) and Special Secretary, Ministry of Environment and Forests, New Delhi.
3. Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur.
4. Principal Chief Conservator of Forests and C/WLW, Govt. of Chhattisgarh, Raipur.
5. Chief Conservator of Forests, Regional office (SE), Ministry of Environment & Forests, E-2240 Anap Colony, Bhopal - 462016.
6. Chairman, Chhattisgarh State Environment Conservation Board, 1-Tilak Nagar, Shiv Mandir Chowk, Main Road, Avant Vihar, RAIPUR-Chhattisgarh - 492001.
7. Chairman, Central Pollution Control Board, CHD-com-Office Complex, East Arjun Nagar, New Delhi - 110012.
8. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Canton Road Barracks, A-2, W-3 Kirti Khandi Marg, New Delhi.
9. District Collector, Raipur, Government of Chhattisgarh.
10. Monitoring File 11. Guard File 12. Record File.

  
(Dr. Manoj Kumar)  
Director

cc: HED, East Figg

 : For info to the Ministry

  
3/70

Government of India  
Ministry of Environment, Forest & Climate Change

Indira Paryashan Bhawan  
Aligarj Road,  
Jor Bagh, New Delhi

No. J-11015/279/2009-IA-0(M) PL. 11e

Dated: 28<sup>th</sup> October, 2015

To,  
The Managing Director,  
M/s NTPC Limited,  
NTPC Bhawan, Scope Complex,  
7, Institutional Area, Lodhi Road,  
New Delhi - 110003  
Email: [perfoms@npsc.co.in](mailto:perfoms@npsc.co.in)

*REJ (EM)*  
*28/10/15*  
*PA*

**Sub:** Revalidation/transfer of Environmental Clearance of Talaspali Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2348.35 ha) in villages Talaspali, Bichinara, Nayarampur, Kodumoha, Raikera, Chotiguda, Ajligarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgarh) – reg.

The Ministry of Environment, Forest and Climate Change (MoEFCC), in accordance with the Environmental Impact Assessment (EIA) Notification, 2003 and subsequent amendment thereto had accorded Environmental Clearance (EC) for Talaspali Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2348.35 ha) in villages Talaspali, Bichinara, Nayarampur, Kodumoha, Raikera, Chotiguda, Ajligarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgarh) to M/s National Thermal Power Corporation Limited subject to compliance of terms and conditions stipulated therein vide letter No. J-11015/279/2009-IA.0 (M) dated 3<sup>rd</sup> January, 2013.

WHEREAS the Hon'ble Supreme Court of India vide judgment dated 23<sup>rd</sup> August, 2014 read with the order dated 24<sup>th</sup> September, 2014 has cancelled the allocation of 204 coal blocks and issued directions with regard to such coal blocks wherein the Central Government in pursuance of the said directions has to take immediate action to implement the said order.

Revalidation/transfer, Talaspali, NTPC & NTPC



Secretary	
Ministry Director	
Secretary (E)	
Secretary (M)	
Secretary (P)	
Secretary (F)	
Secretary (S)	
Secretary (G)	
Secretary (I)	
Secretary (J)	
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WHEREAS in pursuance of the judgment and order of the Hon'ble Supreme Court, the nominated authority has, in accordance with provisions of the Coal Mines (Special Provisions) Second Ordinance, 2014 and the Coal Mines (Special Provisions) Rules, 2014 conducted the auction of the mines.

WHEREAS Ministry of Coal (MOC) vide letter No. 1301438/2015-CA-III dated 18<sup>th</sup> September, 2015 has informed that, their Ministry has allotted 3 Coal Mines through allotment routes to 3 different allottees. MOC has requested this Ministry to facilitate transfer of the Environment Clearance and Forest Clearance of these blocks to the successful allottees.

WHEREAS Ministry of Coal vide Allotment Order under clause (c) of sub-rule (2) of rule 7 and sub-rule (1) of rule 13 and Order No. 103/31/2015/NA dated 8<sup>th</sup> September, 2015 has allotted the Talajpalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2349.35 ha) in villages Talajpalli, Dichinara, Nayarampur, Kudumoha, Raikera, Chotiguda, Ajjgarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgarh) to M/s National Thermal Power Corporation Limited as the successful allottee.

WHEREAS vide Gazette Notification S.O. 811 (E) Notification dated 23.03.2015, MOEFCC has made amendments to paragraph 11 in the Gazette Notification S.O. 1533 (E) dated 14<sup>th</sup> September, 2006. Vide the said amendment; where an allocation of coal block is cancelled in any legal proceeding; or by the Government in accordance with law, the environmental clearance granted in respect of such coal block may be transferred, subject to the same validity period as was initially granted, to any legal person to whom such block is subsequently allocated, and in such case, obtaining of 'no objection' from either the holder of environment clearance or from the regulatory authority concerned shall not be necessary and no reference shall be made to the Expert Appraisal Committee or the State Level Expert Appraisal Committee concerned.

WHEREAS in light of the MOC Allotment Order No. 103/31/2015/NA dated 8<sup>th</sup> September, 2015, transfer of EC may not be warranted as the Successful Allottee M/s National Thermal Power Corporation Limited is already in possession of EC letter No. J-11015/279/2005-(A-II) (W) dated 2<sup>nd</sup> January, 2013.

However, the said EC may be considered for revocation in favour of M/s National Thermal Power Corporation Limited for Talajpalli Coalmine (OC at 18 MTPA capacity and UG at 0.72 MTPA capacity ) in a project area of 2349.35 ha) in villages Talajpalli, Dichinara, Nayarampur, Kudumoha, Raikera, Chotiguda, Ajjgarh, & Salehpali, Tehsil Gharghoda, District Raigarh (Chhattisgarh) subject to the following conditions:

- (i) Any change in scope of work will attract the provisions of the Environment (Protection) Act, 1986 and Environmental Impact Assessment Notification, 2006 in conjunction with the subsequent amendments / circulars.
- (ii) All conditions stipulated in the EC letter No.J-11915/279/2009-IA.II (M) dated 2<sup>nd</sup> January, 2012 shall remain unchanged.
- (iii) The allottee shall be liable, if any, for any act of violation of the EP Act, 1986 / EIA Notification 2006/subsequent amendments and circulars which it has inherited during the revocation/transfer.
- (iv) Allottee shall be liable for compliance of all court directions, if any.

  
(P. R. Sakhare)  
Scientist C

Copy to :

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. The Chief Conservator of Forests, Regional office (E2), Ministry of Environment & Forests, E-2/240 Area Colony, Bhopal - 462016.
3. The Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur.
4. The Member Secretary, Chhattisgarh State Environment Conservation Board, 1- Tilak Nagar, Shiv Mandir Chowk, Main Road, Avanti Vihar, Raipur - Chhattisgarh - 492001.
5. The Member Secretary, Central Pollution Control Board, CBD-cem-Office Complex, East Arjun Nagar, Delhi - 110 032.
6. The Member Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Benarshi, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
7. The Advisor, Coal India Limited, SCOPE Minar, Corridor-1, 4<sup>th</sup> Floor, Vikas Marg, Laxmi Nagar, New Delhi.
8. The District Collector, Raipur, Government of Chhattisgarh.
9. Monitoring File 10. Guard File 11. Record File 12. Notice Board

  
(P. R. Sakhare)  
Scientist C



J-11015/279/2009-IA.II (M)  
 Government of India  
 Ministry of Environment, Forest & Climate Change  
 Impact Assessment Division  
 \*\*\*

Indira Paryavaran Bhavan,  
 Vayu Wing, 3<sup>rd</sup> Floor, Allganj,  
 Jor Bagh Road, New Delhi-110 003

Dated: 6<sup>th</sup> November, 2019

To,  
 Dr. Vijay Kumar- General Manager (Environment)  
 M/s National Thermal Corporation Ltd  
 Engineering Office Complex,  
 Sector 24, **Noida** - 201301 (UP),

Email: [environment.ntpc@gmail.com](mailto:environment.ntpc@gmail.com)

**Sub: Talaipalli Coal Mining Project (OC at 18 MTPA capacity and UG at 0.72 MTPA Capacity) of M/s National Thermal Power Corporation Limited in mine lease area of 2349.35 ha, located in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajjigarh and Salehpalli, in Tehsil Gharghoda, District Raigarh (Chhattisgarh)- Amendment in Environmental Clearance-reg.**

Sir,  
 This refers to your online proposal No. IA/CG/CMIN/114462/2019 dated 14<sup>th</sup> August, 2019, on the above mentioned subject.

2. The Ministry of Environment, Forest and Climate Change has granted environmental clearance on 2<sup>nd</sup> January, 2013 in favour of M/s National Thermal Power Corporation Limited for Talaipalli Coal Mining Project (OC at 18 MTPA capacity and UG at 0.72 MTPA Capacity) in mine lease area of 2349.35 ha located in villages Talaipalli, Bichinara, Nayarampur, Kudurmoha, Raikera, Chotiguda, Ajjigarh and Salehpalli, in Tehsil Gharghoda, District Raigarh (Chhattisgarh).

3. Subsequent to deallocation by Hon'ble Supreme Court of India judgment dated 25<sup>th</sup> August, 2014 read with order dated 24<sup>th</sup> September, 2014 and reallocation to M/s National Thermal Power Corporation Limited as the successful allottee by Ministry of Coal vide MOC Allotment Order No. 103/31/2015/NA dated 8<sup>th</sup> September, 2015, the EC was revalidated vide Ministry's letter dated 28<sup>th</sup> October, 2015.

4. The amendment in environmental clearance has been sought with respect to supply of coal from Talaipalli Coal Mine Project to Lara STPP over a distance of 68.4 km as interim arrangement for a period of 24 months i.e. from January,

2020 to December, 2021 or till the commissioning of MGR, whichever is earlier. The amendment has been sought in the said EC with the General condition No. B(i) and B(ii) stipulated therein, as below:

B(i) No changes in technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests  
 B(ii) No change in calendar plan including quantum of mineral coal and waste being produced shall be made.

5. The proposal was considered by the Expert Appraisal Committee (EAC) in the Ministry for Thermal & Coal Mining Sector in its meeting held on 3-4 October, 2019. The EAC, after deliberations, has recommended for grant of permission for transportation of 2,575 TPD of coal by road with 20 Tonne Tippers/ Dumpers (258 Tippers to and fro per day) from Talaipali CMP to Lara STPP over a distance of 68.4 km as an interim arrangement for a period of 24 months i.e. from January, 2020 to December, 2021 or till the commissioning of MGR, whichever is earlier; and to start coal production from South Pit with a production capacity of 0.94 MTPA for two years subject to following conditions.

- (i) Adequate dust suppression measures shall be taken along the transportation route.
- (ii) The PP shall expedite the commissioning of MGR as early as possible
- (iii) No transportation of coal by road is allowed after commencement of the MGR.
- (iv) All the mitigation measures proposed in Traffic Impact Assessment study shall be complied.

6. Based on recommendations of the EAC, Ministry of Environment, Forest and Climate Change hereby accords approval for amendment in the environmental clearance dated 2<sup>nd</sup> January, 2013 and subsequent revalidation of EC dated 28<sup>th</sup> October, 2015, for the above said project, as recommended by the EAC and stated in para 5 above.

7. All other terms and conditions stipulated in the environmental clearance dated 2<sup>nd</sup> January, 2013 and subsequent revalidation of EC dated 28<sup>th</sup> October, 2015, shall remain unchanged.

  
 (Dr. R.B. Lal)  
 Additional Director / Scientist 'E'

**Copy to:-**

1. The Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. The Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Anara Colony, Bhopal - 462016.

3. The Secretary, Department of Environment & Forests, Government of Chhattisgarh, Secretariat, Raipur
4. The Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi
5. The Member Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, Delhi -110 032
6. The Member Secretary, Chhattisgarh State Environment Conservation Board, 1- Tilak Nagar, Shiv MandirChawk, Main Road, Avanti Vihar, Raipur - Chhattisgarh - 492001.
7. The District Collector, Raigarh, Government of Chhattisgarh
8. Monitoring File 10. Guard File 11. Record File 12. Notice Board.

(Dr. R.B. Lal)  
Additional Director / Scientist 'E'

## Additional Annexure-9

Annexure VIII-B

F. No. 3-18/2013 - FC  
 Government of India  
 Ministry of Environment & Forests  
 (FC Division)

Prayogesh Sharma,  
 CDD Complex, Lodi Road,  
 New Delhi - 110028  
 Date: 28<sup>th</sup> January, 2014

To  
 The Principal Secretary (Forests),  
 Government of Chhattisgarh,  
 Raipur

Sub: Diversion of 766.292 ha of forest land for Talajpali Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raipur and Dharanjaijpur Forest Divisions, Chhattisgarh regarding.

Re: I am directed to refer to the Govt. of Chhattisgarh letter no. F. 3-33/2011/192 dated 13<sup>th</sup> March, 2012 on above mentioned subject seeking prior approval of the Central Government under Section 2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted under section 7 of the said Act, 'in-principle' approval was granted vide this Ministry's letter of cover number dated 5.08.2012 subject to fulfillment of certain conditions prescribed therein. The State Government has provided compliance report in respect of the conditions stipulated in the 'in-principle' approval and has requested the Central Government to grant final approval.

In this connection, I am directed to say that on the basis of the compliance report furnished by the State Government, vide letter no. (Din Pradhan/D/Khas)/135.22/1768 dated 1.10.2013 and 24.12.2013 final approval of the Central Government is hereby granted under section 2 of the Forest (Conservation) Act, 1980 for diversion of 766.292 ha of forest land for Talajpali Coal Mining Project and construction of Railway Line, in favour of National Thermal Power Corporation (NTPC) in Raipur and Dharanjaijpur Forest Divisions, Chhattisgarh subject to fulfillment of the following conditions:

- (i) Legal status of the diverted forest land shall remain unaltered.
- (ii) Compensatory afforestation over the degraded forest land, unless it relates to the forest land being diverted shall be raised and maintained by the State Forest Department from the lands already notified from the User Agency.
- (iii) The User Agency shall pay the additional amount of NPV, if so determined, as per the final decision of the Hon'ble Supreme Court of India.
- (iv) The period of diversion of the said forest land under this approval shall be for a period co-terminus with the period of the mining lease proposed to be granted under the Mines and Minerals (Development & Regulation) Act, 1957, or Rules framed there under, subject to a maximum period of 30 years.

## Annexure VIII-B contd.

- (v) User agency either itself or through the State Forest Department shall undertake gap filling and soil and moisture conservation activities to protect and improve the degraded open lands (having gross density less than 0.05, if any, located in the area within 100 m from water points of the mining lease)
- (vi) The user agency shall undertake mining in a planned manner after mining the area for restoration of the mined over area. The restoration/reclamation plan as per the approved mining plan shall be executed by the User Agency from the very first year and an annual report on implementation thereof shall be submitted to the Nodal Officer, Forest (Conservation) Act, 1980, in the concerned State Government and the concerned Regional Office of the Ministry. If it is found from the annual report that the activities indicated in the restoration/reclamation plan are not being executed by the User Agency, the Nodal Officer or the Chief Conservator of Forests (Central) may direct that the mining activities shall remain suspended till such time, such restoration activities are satisfactorily executed.
- (vii) The User Agency either itself or through the State Forest Department shall undertake fencing, protection and afforestation of the safety zone area (1.5 meter strip all along the outer boundary of the mining lease or mining cluster, as applicable, and such other areas as specified in the approved mining plan) in accordance with undertaking given by the user agency.
- (viii) The State Forest Department shall undertake afforestation on degraded forest land, one and half time in extent to the area used for safety zone from the forest already notified from the user agency.
- (ix) The boundary of safety zone shall be demarcated on ground at the project cost, by erecting four feet high reinforced concrete concrete pillars, each provided with an aerial marker, cement and back filling and distance from pillar to pillar.
- (x) In case of under-ground mines, area on surface shall be fenced and afforested from the funds to be provided by the user agency.
- (xi) The user agency shall ensure that at least part of its site and soil otherwise shall be used for rock filling.
- (xii) The user agency shall have a social welfare department to help track of socio-economic conditions of all the project affected people.
- (xiii) The user agency shall undertake compensatory greening in the surrounding villages.
- (xiv) The user Agency shall implement the R & R Plan as per the R & R Policy of State Government in consonance with National R&R Policy, Government of India India. The implementation of the project work and implementation. The said R & R Plan will be monitored by the State Government/Regional Office of MHP along with initiatives for monitoring and reporting observable milestones.




## Annexure VI-B contd.

- (vii) The user agency shall undertake de-silting of the village tanks and other water bodies located within five km from the mine lease boundary as or to the extent the impact of silting of such water bodies, wherever required.
- (viii) Following activities shall be undertaken by the User Agency as per the Plan of Rs. 120.22 lakhs and undertaking allocated by them to implement this Plan:
- (a) Appropriate vegetative measures to maintain soil erosion and slaking of slopes.
  - (b) Planting of adequate drought hardy plant species and covering of waste in the appropriate area within the mining lease to avoid soil erosion.
  - (c) Construction of check dams, retention wall walls along the contour to avoid sliding down of the excavated materials.
  - (d) Stabilize the overburden dumps by appropriate grading/terracing as or to ensure that the angle of repose at any given place is less than 25° and
  - (e) Strict adherence to the prescribed top soil management.
- (ix) No labour camp shall be established on the forest land.
- (x) The User Agency shall provide fully protected drinking water to the labourers and the staff working at the site as or to avoid any damage and pressure on the nearby forest areas.
- (xi) The boundary of the diverted forest land, mining lease and safety zone, as applicable, shall be demarcated on ground at the project site, by erecting four feet high reinforced concrete concrete pillars, each marked with its serial number, forward and back bearing and distance from pillar to pillar.
- (xii) The forest plan of the proposal shall not be changed without the prior approval of the Central Government.
- (xiii) The forest land shall not be used for any purpose other than that specified in the proposal.
- (xiv) The forest land proposed to be diverted shall neither in circumstances be transferred to any other agency, department or person without prior approval of the Central Government.
- (xv) No change to the Data and Base of the adjoining area shall be allowed.
- (xvi) Any tree felling shall be done only where it is unavoidable and that too under strict supervision of the State Forest Department.
- (xvii) The user agency shall submit the annual self compliance report in respect of the above conditions to the State Government and to the concerned Regional Office of the Ministry separately.

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## Annexure VIII-B contd.

- (iii) Any other condition that the concerned Regional Office of this Ministry may impose, from time to time, in the interest of conservation, protection and development of forests & wildlife and
- (iv) All other conditions stipulated in the Map/ approved for which the user agency has submitted undertakings shall be complied with.
- (v) The User Agency and the State Government shall ensure compliance to provisions of the all Acts, Rules, Regulations and Notifications, for the time being in force, as applicable to the project.

Yours faithfully

(Prasanna Kumar)

Sr. Assistant Inspector General of Forests

Copy to be sent to:

1. The Principal Chief Conservator of Forests, Govt. of Chhattisgarh, Raipur.
2. The Asst. PCCF (Control) Regional Office Raipur, MP.
3. The Forest Officer (PCCF), On the PCCF, Govt. of Chhattisgarh, Raipur.
4. The User Agency (NTPC Limited, Talabari) Coal Mining Project, Lathaga Road, Gherghoda, District Raipur - 491 111, Chhattisgarh.
5. Monitoring Cell
6. Forest File.

(Prasanna Kumar)

Sr. Assistant Inspector General of Forests



Annexure VIII-B contd.

- 1. The design of the proposed shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 2. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 3. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
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- 12. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
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- 14. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 15. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 16. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 17. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 18. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 19. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.
- 20. The design of the shaft will be done in such a way that it is safe and sound and will be able to withstand the maximum stress to which it will be subjected during its life.

*Handwritten signature*  
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Annexure VI-B contd.

- (1) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (2) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (3) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (4) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
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- (12) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
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- (15) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (16) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (17) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (18) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (19) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.
- (20) The mine shall be operated in accordance with the provisions of the Act and the rules made thereunder.

  
 Director General, Coal India Ltd.

Page No.

- 1. The Director General, Coal India Ltd., New Delhi, India.
- 2. The Joint Director, Coal India Ltd., New Delhi, India.
- 3. The Joint Director, Coal India Ltd., New Delhi, India.
- 4. The Joint Director, Coal India Ltd., New Delhi, India.
- 5. The Joint Director, Coal India Ltd., New Delhi, India.
- 6. The Joint Director, Coal India Ltd., New Delhi, India.

  
 Director General, Coal India Ltd.

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## Additional Annexure-10

## ANNEXURE-VIIC

## CARDINAL POINTS OF TALAIKALLI COAL BLOCK

POINT NO	LONGITUDE (WGS84)	LATITUDE (WGS84)
P-0	83° 29' 42.381" E	22° 14' 43.085" N
P-1	83° 29' 45.263" E	22° 14' 43.084" N
P-2	83° 29' 48.143" E	22° 14' 39.103" N
P-3	83° 29' 51.024" E	22° 14' 37.111" N
P-4	83° 29' 53.905" E	22° 14' 35.120" N
P-5	83° 29' 56.786" E	22° 14' 33.129" N
P-6	83° 29' 59.667" E	22° 14' 31.137" N
P-7	83° 30' 2.548" E	22° 14' 29.146" N
P-8	83° 30' 5.429" E	22° 14' 27.154" N
P-9	83° 30' 8.309" E	22° 14' 25.163" N
P-10	83° 30' 11.190" E	22° 14' 23.172" N
P-11	83° 30' 14.071" E	22° 14' 21.180" N
P-12	83° 30' 16.954" E	22° 14' 19.188" N
P-13	83° 30' 19.834" E	22° 14' 17.196" N
P-14	83° 30' 22.715" E	22° 14' 15.204" N
P-15	83° 30' 25.596" E	22° 14' 13.212" N
P-16	83° 30' 28.476" E	22° 14' 11.220" N
P-17	83° 30' 31.357" E	22° 14' 09.228" N
P-18	83° 30' 34.237" E	22° 14' 07.236" N
P-19	83° 30' 37.118" E	22° 14' 05.244" N
P-20	83° 30' 40.000" E	22° 14' 03.252" N
P-21	83° 29' 58.867" E	22° 14' 17.346" N
P-22	83° 29' 58.194" E	22° 14' 17.363" N
P-23	83° 29' 57.459" E	22° 14' 17.199" N
P-24	83° 29' 56.720" E	22° 14' 16.809" N
P-25	83° 29' 56.201" E	22° 14' 16.252" N
P-26	83° 29' 55.352" E	22° 14' 15.580" N
P-27	83° 29' 54.940" E	22° 14' 14.399" N
P-28	83° 29' 54.351" E	22° 14' 12.722" N
P-29	83° 29' 54.054" E	22° 14' 11.569" N
P-30	83° 29' 53.362" E	22° 14' 9.562" N
P-31	83° 29' 53.270" E	22° 14' 8.813" N
P-32	83° 29' 52.773" E	22° 14' 7.856" N
P-33	83° 29' 52.809" E	22° 14' 6.912" N
P-34	83° 29' 51.411" E	22° 14' 6.388" N
P-35	83° 29' 50.969" E	22° 14' 6.180" N
P-36	83° 29' 50.528" E	22° 14' 6.145" N
P-37	83° 29' 49.951" E	22° 14' 6.203" N
P-38	83° 29' 49.303" E	22° 14' 6.362" N
P-39	83° 29' 48.581" E	22° 14' 6.646" N
P-40	83° 29' 47.775" E	22° 14' 7.030" N
P-41	83° 29' 47.015" E	22° 14' 7.674" N
P-42	83° 29' 46.074" E	22° 14' 8.470" N
P-43	83° 29' 45.827" E	22° 14' 10.084" N
P-44	83° 29' 45.365" E	22° 14' 10.543" N
P-45	83° 29' 44.376" E	22° 14' 10.840" N

P-40	83° 29' 39.103" E	22° 14' 10.994" N
P-41	83° 29' 37.410" E	22° 14' 11.000" N
P-42	83° 29' 36.301" E	22° 14' 10.770" N
P-43	83° 29' 34.771" E	22° 14' 10.524" N
P-44	83° 29' 33.857" E	22° 14' 0.373" N
P-45	83° 29' 32.985" E	22° 14' 9.570" N
P-46	83° 29' 32.150" E	22° 14' 9.012" N
P-47	83° 29' 31.146" E	22° 14' 8.053" N
P-48	83° 29' 30.001" E	22° 14' 8.612" N
P-49	83° 29' 28.913" E	22° 14' 4.440" N
P-50	83° 29' 27.772" E	22° 14' 1.036" N
P-51	83° 29' 27.410" E	22° 14' 0.799" N
P-52	83° 29' 27.356" E	22° 14' 0.074" N
P-53	83° 29' 27.404" E	22° 13' 59.033" N
P-54	83° 29' 27.803" E	22° 13' 58.348" N
P-55	83° 29' 28.503" E	22° 13' 57.253" N
P-56	83° 29' 28.920" E	22° 13' 56.763" N
P-57	83° 29' 29.000" E	22° 13' 56.511" N
P-58	83° 29' 28.018" E	22° 13' 56.092" N
P-59	83° 29' 28.720" E	22° 13' 55.652" N
P-60	83° 29' 28.409" E	22° 13' 55.083" N
P-61	83° 29' 27.843" E	22° 13' 54.368" N
P-62	83° 29' 27.313" E	22° 13' 53.427" N
P-63	83° 29' 26.957" E	22° 13' 52.653" N
P-64	83° 29' 26.570" E	22° 13' 52.321" N
P-65	83° 29' 26.283" E	22° 13' 50.364" N
P-66	83° 29' 26.594" E	22° 13' 49.643" N
P-67	83° 29' 27.289" E	22° 13' 48.886" N
P-68	83° 29' 28.209" E	22° 13' 48.008" N
P-69	83° 29' 28.410" E	22° 13' 45.934" N
P-70	83° 29' 22.823" E	22° 13' 43.860" N
P-71	83° 29' 19.832" E	22° 13' 41.786" N
P-72	83° 29' 17.030" E	22° 13' 39.712" N
P-73	83° 29' 14.247" E	22° 13' 37.638" N
P-74	83° 29' 11.453" E	22° 13' 35.564" N
P-75	83° 29' 8.660" E	22° 13' 33.490" N
P-76	83° 29' 5.867" E	22° 13' 31.416" N
P-77	83° 29' 3.075" E	22° 13' 29.342" N
P-78	83° 29' 0.282" E	22° 13' 27.267" N
P-79	83° 28' 57.480" E	22° 13' 25.193" N
P-80	83° 28' 54.688" E	22° 13' 23.119" N
P-81	83° 28' 51.895" E	22° 13' 21.045" N
P-82	83° 28' 48.943" E	22° 13' 21.938" N
P-83	83° 28' 44.980" E	22° 13' 22.827" N
P-84	83° 28' 41.510" E	22° 13' 23.718" N
P-85	83° 28' 38.050" E	22° 13' 24.609" N
P-86	83° 28' 34.595" E	22° 13' 25.499" N
P-87	83° 28' 31.131" E	22° 13' 26.390" N
P-88	83° 28' 27.668" E	22° 13' 27.281" N
P-89	83° 28' 24.200" E	22° 13' 28.172" N

P-96	83° 28' 20.744" E	22° 13' 29.053" N
P-97	83° 28' 17.381" E	22° 13' 29.053" N
P-98	83° 28' 13.819" E	22° 13' 30.844" N
P-99	83° 28' 10.356" E	22° 13' 31.735" N
P-100	83° 28' 6.894" E	22° 13' 32.625" N
P-101	83° 28' 3.431" E	22° 13' 33.516" N
P-102	83° 27' 59.969" E	22° 13' 34.407" N
P-103	83° 27' 56.506" E	22° 13' 35.297" N
P-104	83° 27' 53.044" E	22° 13' 36.188" N
P-105	83° 27' 49.581" E	22° 13' 37.079" N
P-106	83° 27' 46.119" E	22° 13' 37.969" N
P-107	83° 27' 42.656" E	22° 13' 38.860" N
P-108	83° 27' 39.193" E	22° 13' 39.750" N
P-109	83° 27' 35.731" E	22° 13' 40.641" N
P-110	83° 27' 32.268" E	22° 13' 41.532" N
P-111	83° 27' 28.805" E	22° 13' 42.423" N
P-112	83° 27' 25.343" E	22° 13' 43.314" N
P-113	83° 27' 21.881" E	22° 13' 44.205" N
P-114	83° 27' 18.418" E	22° 13' 45.096" N
P-115	83° 27' 14.955" E	22° 13' 45.987" N
P-116	83° 27' 11.493" E	22° 13' 46.878" N
P-117	83° 27' 8.031" E	22° 13' 47.769" N
P-118	83° 27' 4.568" E	22° 13' 48.660" N
P-119	83° 26' 59.918" E	22° 13' 49.551" N
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P-122	83° 26' 49.231" E	22° 13' 52.224" N
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P-126	83° 26' 34.981" E	22° 13' 55.788" N
P-127	83° 26' 31.418" E	22° 13' 56.679" N
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P-129	83° 26' 24.293" E	22° 13' 58.461" N
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P-211	83° 27' 8.080" E	22° 15' 46.208" N
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P-213	83° 27' 11.411" E	22° 15' 41.273" N
P-214	83° 27' 14.734" E	22° 15' 40.130" N
P-215	83° 27' 18.058" E	22° 15' 38.988" N
P-216	83° 27' 21.381" E	22° 15' 37.845" N
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P-223	83° 27' 44.643" E	22° 15' 29.846" N
P-224	83° 27' 47.966" E	22° 15' 28.703" N
P-225	83° 27' 51.289" E	22° 15' 27.560" N
P-226	83° 27' 54.613" E	22° 15' 26.418" N
P-227	83° 27' 57.936" E	22° 15' 25.275" N
P-228	83° 28' 1.259" E	22° 15' 24.132" N
P-229	83° 28' 4.582" E	22° 15' 22.989" N
P-230	83° 28' 7.905" E	22° 15' 21.846" N
P-231	83° 28' 11.228" E	22° 15' 20.703" N
P-232	83° 28' 14.551" E	22° 15' 19.560" N
P-233	83° 28' 17.874" E	22° 15' 18.417" N
P-234	83° 28' 21.197" E	22° 15' 17.274" N
P-235	83° 28' 24.520" E	22° 15' 16.132" N
P-236	83° 28' 27.843" E	22° 15' 14.989" N
P-237	83° 28' 31.166" E	22° 15' 13.846" N
P-238	83° 28' 34.489" E	22° 15' 12.703" N
P-239	83° 28' 37.811" E	22° 15' 11.560" N
P-240	83° 28' 41.134" E	22° 15' 10.418" N
P-241	83° 28' 44.457" E	22° 15' 9.275" N
P-242	83° 28' 47.780" E	22° 15' 8.132" N
P-243	83° 28' 43.281" E	22° 15' 2.752" N
P-244	83° 28' 46.605" E	22° 15' 3.782" N
P-245	83° 28' 50.009" E	22° 15' 4.821" N

P-246	83° 28' 54.375" E	22° 15' 5.855" N
P-247	83° 28' 57.890" E	22° 15' 6.894" N
P-248	83° 29' 1.405" E	22° 15' 7.932" N
P-249	83° 29' 4.920" E	22° 15' 8.971" N
P-250	83° 29' 7.837" E	22° 15' 9.980" N
P-251	83° 29' 10.689" E	22° 15' 4.969" N
P-252	83° 29' 13.570" E	22° 15' 2.990" N
P-253	83° 29' 16.451" E	22° 15' 1.000" N
P-254	83° 29' 19.332" E	22° 14' 59.015" N
P-255	83° 29' 22.213" E	22° 14' 57.024" N
P-256	83° 29' 25.095" E	22° 14' 55.033" N
P-257	83° 29' 27.976" E	22° 14' 53.042" N
P-258	83° 29' 30.857" E	22° 14' 51.050" N
P-259	83° 29' 33.738" E	22° 14' 49.059" N
P-260	83° 29' 36.619" E	22° 14' 47.068" N
P-261	83° 29' 39.500" E	22° 14' 45.077" N
P-262	83° 29' 42.381" E	22° 14' 43.085" N

NOTE: Boundary points are software generated from georeferenced block boundary of Talsipilli coal block

APPROVED

## Additional Annexure-11

Annexure VIII

Hydrogeology of Area in & around 10 km. radius of Talaipalli  
Coal Mining Project of National Thermal Power Corporation  
Limited

At- Village Talaipalli, Block-Gharghoda, District- Raigarh,  
Chhattisgarh State

Prepared by  
Earth & Environment,  
Plot No. 652, Ekamra villa,  
IRC Village, Nayapalli, Bhubaneswar-751015

**Hydrogeology of Area in & around 10 km. radius of Talaipalli  
Coal Mining Project of National Thermal Power Corporation  
Limited**

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## CHAPTER-I

### INTRODUCTION

#### 1.1 GENERAL:

National Thermal Power Corporation (NTPC) Ltd. is the leading power generating listed company in the country under Ministry of Power, Govt of India, engaged in generation of Power with existing installed capacity of 43,128 MW (including 5,974 MW through JVs) comprising of 38 NTPC Stations (17 Coal based stations, 7 combined cycle gas/liquid fuel based stations, 7 joint Venture stations (5 coal based and one gas based) and 7 renewable energy projects. NTPC is the largest power generating major in the country. It has also diversified into hydro-power, coal mining, power equipment manufacturing, oil & gas exploration, power trading and distribution. With an increasing presence in the power value chain, NTPC is well on its way to become an integrated power major.

The existing power plants of NTPC are accorded long term coal linkages from CIL and Singareni Collieries Co. Ltd (SCCL). To meet the short term shortages, NTPC is also importing coal. Considering the gap in demand and existing linkages for coal, NTPC has decided to diversify into coal mining through backward integration and has been allotted coal mining blocks.

Talaspali coal mining block in the state of Chhattisgarh is one such block allotted to NTPC by Ministry of Coal (MoC) vide letter No. 13016/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000 MW Larsa Integrated Power Project to come up about 60 kms away from the coal block in Chhattisgarh State.

As per the directive of Ministry of Coal, NTPC Ltd. submitted a mining plan in Feb 2010 for Talaspali Coal Block in Mand, Raigarh in the state of Chhattisgarh. The Ministry of Coal vide their letter No. 13016/29/2003-CA-1 (Vol II), dated 31st March, 2010 has approved the mining capacity by Open Cast – 18.0 MTPA and 0.72 MTPA from Underground operations.

Environmental Clearance was accorded by the Ministry of Environment and Forest vide letter No.J-11015/279/2009-I A 1 (M) dt 02.01.2013 for the proposed Talaspali Coal Mine

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At Village Talaspali, Block-Gharghoda, Raigarh District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s. NTPC Ltd

Project (OpenCast at 18MTPA Capacity & Under Ground at 0.72 MTPA Capacity of a total project area of 2349.35ha.)

The entire coal produced from this block will be transported by Merry Go Round (MGR) rail system for a total length of approximately 80 km between the mine and the power plant.

**1.2 BRIEF PROJECT PROFILE:**

This coal block has Talpa Pahar in the north, Proposed Palma Coal Block (South Eastern Coalfields Ltd.) in the east, Silt Pahar in the south and proposed Chingatapari Coal Block (South Eastern Coalfields Ltd.) in the West. Talaspali block is about 35 km away from Raigarh and is close to Tehsil Headquarters at Gharghoda situated on Raigarh-Anaikapur State Highway. The nearest railway station is Raigarh lying on the Mumbai-Howrah main line of SE railways.

Kalo River is flowing through the south-eastern part of the present area, and constitutes the main drainage system.

This coal block has coal seams/splits from SLA to SL (26 split seams/splits) with gross geological reserves of 1400.58 Mt of power grade coal of varying grades. Dip of seams is varying between 4° to 8°. Opencast coal mining has been proposed up to the basal seam III and the balance are considered for by below ground method of mining. Since opencast mining ensures much higher percentage of extraction of coal reserves, the proposed strategy is considered best from the point of view of coal conservation. The Opencast Mine will have maximum depth of 404 m. Below ground mining development is proposed to commence after about 20 yrs of start of opencast mining. Coal requirement for Linked Power Station has been indicated as about 18 MTPA, which is projected to be achieved in the Opencast Mine in the 5<sup>th</sup> year of coal production. The proposed opencast mine will have a life of 52 years, including the build-up period of the Project.

The total O.C mineable coal reserves have been estimated as 843.58 Mt at the corresponding OS of 5777.07 Mn<sup>3</sup> at an average SR of 4.48 m<sup>3</sup>/t.

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At Village Talaspali, Block-Gharghoda, Raigarh District, Chhattisgarh State

### Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s.NTPC Ltd

The capacity of underground mine to be worked through a pair of vertical shafts is assessed at 0.72 MTPA at 100% rated capacity or 0.50 MTPA at 80% level. The life of below-ground mine will be 30 years including development period.

NTPC intends to mine the entire property in a scientific manner with due regard to the conditions laid out by Ministry of Environment & Forest and with full emphasis on Environmental conservation and safety.

#### 1.3 LOCATION OF THE PROJECT:

Talaspali coal block mine lease area of 2113 ha is bounded by latitude 22° 13' 35" to 22° 16' 06" N and longitude 83° 25' 48" to 83° 30' 22" E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaspali block is covered by Survey of India topo sheet No. 54N/7 5N08 (RP 1:50000). The location map is shown in figure no.1.1.

#### 1.4 MINING METHODS

To ensure availability of adequate quantity of coal, it has been planned to commence mechanized mining operations by having two independent opencast mines at eastern & western extremities. Both the quarries would advance towards southwards as also towards each other to finally merge into one entity after about 20 years of mine operation. Internal dump will start once sufficient void space gets available from 5<sup>th</sup> year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will be placed as external dump within the mine property.

At-Village Talaspali, Block-Gherghoda, Raigarh District, Chhattisgarh State





Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s NTPC Ltd.



At-Village Talaspali, Block-Gharbhada, Raigarh District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s. NTPC Ltd.

After the Opencast mine is exhausted, underground mining will commence. It will be serviced by two vertical shafts. The coal production target is fixed at 0.60 Million Tonnes per annum from the Underground Mine and the expected life of the mine will be 34 years including construction period of 4 years. 'B' Seam, which will be the main seam for UG mining with patches in other seams in the packet of UG mining seams, has general thickness of 0.50m to 2.50m. Two Continuous Miner districts will provide the production.

The mine parameters for opencast mine are given at Table No. 1.1

**Table 1.1: Opencast Mine Main Parameters**

Sl. No.	Parameters	Unit	Value
1	Maximum depth	m	404
2	Maximum strike length		
	along the Mine Floor	Km	6.02
	along the Mine Surface	Km	6.69
3	Minimum strike length		
	along the Mine Floor	Km	0.75
	along the Mine Surface	Km	1.37
4	Maximum dip rise length:		
	on the Mine Floor	Km	4.12
	on the Mine Surface	Km	4.76
5	Minimum dip rise length:		
	on the Mine Floor	Km	2.60
	on the Mine Surface	Km	3.06
6	Area		
	On the Mine Floor	ha	2027.79
	On the Mine Surface	ha	2079.34

### 1.5 WATER REQUIREMENT

The total water requirement for domestic and various industrial purpose for initial 5 years of mining operations is estimated to be 2300 m<sup>3</sup>/day. Out of this about 692 m<sup>3</sup>/day is expected to be recovered and reused and thus the net water requirement will be about 1608 m<sup>3</sup>/day with the following break up:

At Villages Talaspali, Bock-Gharbhoda, Raigarh District, Chhattisgarh State

Table 1.2: Break-up of Water Requirement

All values in m<sup>3</sup>/dayEstimated Water Requirement for Initial Five Years of Mining Operation (m<sup>3</sup>/day)

Sl. No	Purpose	Source of Water	Total Water Requirement	Recycled Quantity	Use of recycled Water	Balance / Actual Water Requirement
<b>A DOMESTIC</b>						
1	Mines	Bore well	150	120	Dust suppression Green Belt Development etc.	30
2	Colony	Bore well/ground water	600	540	Dust suppression Green Belt Development etc.	60
<b>B INDUSTRIAL</b>						
1	Vehicle wash	Sump Water	40	30	Vehicle wash	10
2	Dust suppression & Green belt development	Sump Water	1600	0	Dust suppression Green Belt Development etc.	1600
<b>Total</b>			<b>2390</b>	<b>690</b>		<b>1698</b>

Note: Recovery / Waste water generation of 80% from Mines, 90% from colony and 90 % from vehicle wash is considered

Part of Bore well water shall be used for Industrial Purpose subject to adequacy of surface water availability.

**SOURCE OF WATER**

The principal source of water for the project is the pit de-watering water. Ground water is required for initial period during mining development and construction of infrastructure. Since the mining activities will intersect water table, mining quarry needs to be de-watered for safe mining. Based on the hydrological investigation, it is estimated that about 120 m<sup>3</sup>/day of water will have to be pumped out of the mine at the end of 1<sup>st</sup> year of mining and 1320 m<sup>3</sup>/day will be available at the end of 2<sup>nd</sup> year. Pit de-watering water will be used for dust suppression, fire fighting, vehicle washing, green belt creation, etc. and also for drinking and domestic uses after treatment if necessary. During the initial stage, pit de-watering water is not sufficient for the requirement. So requirement will be met from ground water source through bore wells. Use of ground water will be stopped once pit de-watering water is sufficient for the total requirement.

The water balance diagram is given in Figure no.1.3 shown below:

At Village Talaspali, Block-Ghaghoda, Raigarh District, Chhattisgarh State



## CHAPTER-2

### OBJECTIVE OF HYDROGEOLOGICAL SURVEY

#### 2.1 Objectives

The detail hydrogeological investigation of the buffer zone has been undertaken with the following objectives.

- (i) To decipher the present hydrogeological scenario of the study area.
- (ii) To decipher the aquifer geometry in the area
- (iii) To evaluate the status of the ground water storage
- (iv) To assess the hydraulic characteristics of the aquifer present in the area.
- (v) To evaluate the status of ground water resource and its utilization and ground water budget
- (vi) To assess the hydro-chemical characteristics of ground water present in the area.
- (vii) To quantify the volume of de-watering from the mining pit

#### 2.2 Methodology of Investigation

The geology of the area and subsurface conditions have been interpreted based on the exploratory data collected from different agencies, like Geological Survey of India, Central Ground Water Board, Govt. of India. Intensive well inventory of the area have been undertaken to establish the groundwater flow regimes. The hydrogeological properties of the aquifer existing in the study area have been evaluated through conducting aquifer performance test on representative wells. The pumping test conducted includes constant rate of pumping and observation of water level change at regular interval of time. The test data has been analyzed using standard computer aided techniques. The ground water resource has been calculated as per the norms of GEC, IIT of Ministry of Water Resources, Govt. of India. Climate data of the area has been taken from the IMD.

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At Village Talaspali, Block-Ghaghoda, Raigarh District, Chhattisgarh State

### 2.3 Study Area & its Profile

The area under present study has been taken as a circular area of 10km. radius keeping Talaspali Coal Mining Project at the center here called as buffer zone. The study area falls under the Survey of India Topo-sheets no. 84 N7.8,11 & 12. It is bounded by 22°02'17.98" to 22°22' 05.434" N. Latitudes and 83°22' 10.51" to 83° 33' 49.02" E. Longitudes. The index map of the study area is shown in fig.no.2.1 The total study area is 314sq.km.

The study area belongs to north-eastern part of Raigarh district in Chhattisgarh state. The study area falls in Gherghoda, Lafunge and Tamnar blocks of Raigarh district. The maximum area of the buffer zone lies in the Gherghoda block. The block-wise area of the study area is shown in table no.2.1.

The area is characterized by denudational hill ranges in the north with intervening valleys, plateaus in the south, rivers, nallas, reserved forest and water bodies. The surface elevation varies from 600m to 300m above M.S.L. The general surface gradient is from north to south. The major reserved forests in the area are Tolpe west Reserved Forest, Slat RF, Rampur RF and Deodongi RF. The area is drained by river Kalo and its tributaries and other small streams. The river Kalo flows in the eastern part in north to south direction.

The area is underlain by rocks of the Gondwana Super Group and granite gneiss.

The study area is approachable by road from Gherghoda, the block head quarter. There exist a l net work of roads in the study area.

The area is sparsely populated with few isolated hamlets. The main hamlets are Rabara, Bhatumunda, Bapamura, Maupara, Hrishar, Pema, Manasachhar, Gondpara, Katharpari, Oiyagon, Chhinkhol, Bhakura, Phulkanda, Kurunghel, Lita and Mustoli etc.

Table 2.1: Block-wise area of the study Area

Sl.No.	Block	Area (in sq.km)
1	Gherghoda	180.23
2	Lafunge	122.4
3	Tamnar	31.37
	Total	314.0

At-Village Talaspali, Block-Gherghoda, Raigarh District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talipalli Coal Mining Project of M/s.NTPC Ltd

**Landuse Pattern**

The total buffer zone area of all the rural villages as per the 2001 census data works out to 30233 Ha with the following classification:

	Area in Ha	in %
Forest land	3682.0	12.16
Irrigated land	534.0	1.77
Un-irrigated land	16017.0	52.97
Cultivable waste Land	5825.0	19.26
Land not available for cultivation	4074.0	13.48
<b>Total</b>	<b>30233.0</b>	<b>100.00</b>

From the above it is seen that village Forest and un-irrigated land constitutes about 65.15% of the total buffer zone area.





As Village Taluqa, Block-1, Barpeta, Jagati District, Chhattisgarh State.

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## CHAPTER-3

### CLIMATE

The study area experiences a tropical climate with a hot and dry summer and pleasant winter intervened by south-west monsoon season. The summer season extends from March to middle of June followed by rainy season from mid-June to mid-October. The winter season extends from November till the end of February.

#### 3.2 Temperature

The temperature in the study area starts rising from March to May, which is the hottest month of the year with mean daily maximum temperature 45°C. However in 2005 June was the hottest month with a maximum temperature of 48°C. With the advent of monsoon, temperature starts reducing and the winter season starts from November. December is the coldest month of the year with mean daily maximum temperature of about 27°C and the temperature coming down to a minimum of about 8°C.

#### 3.3 Humidity and Wind

Humidity of the air is generally high during south-west monsoon period and low during winter months. The relative humidity varies from 26% to 64% throughout the year. The mean monthly potential evapo-transpiration value ranges from 4mm in December to 470mm in May.

Wind is generally light to moderate. Wind velocity increases during summer and south-west monsoon months. The mean annual wind speed is 3.3km/hr.

#### 3.4 Rainfall

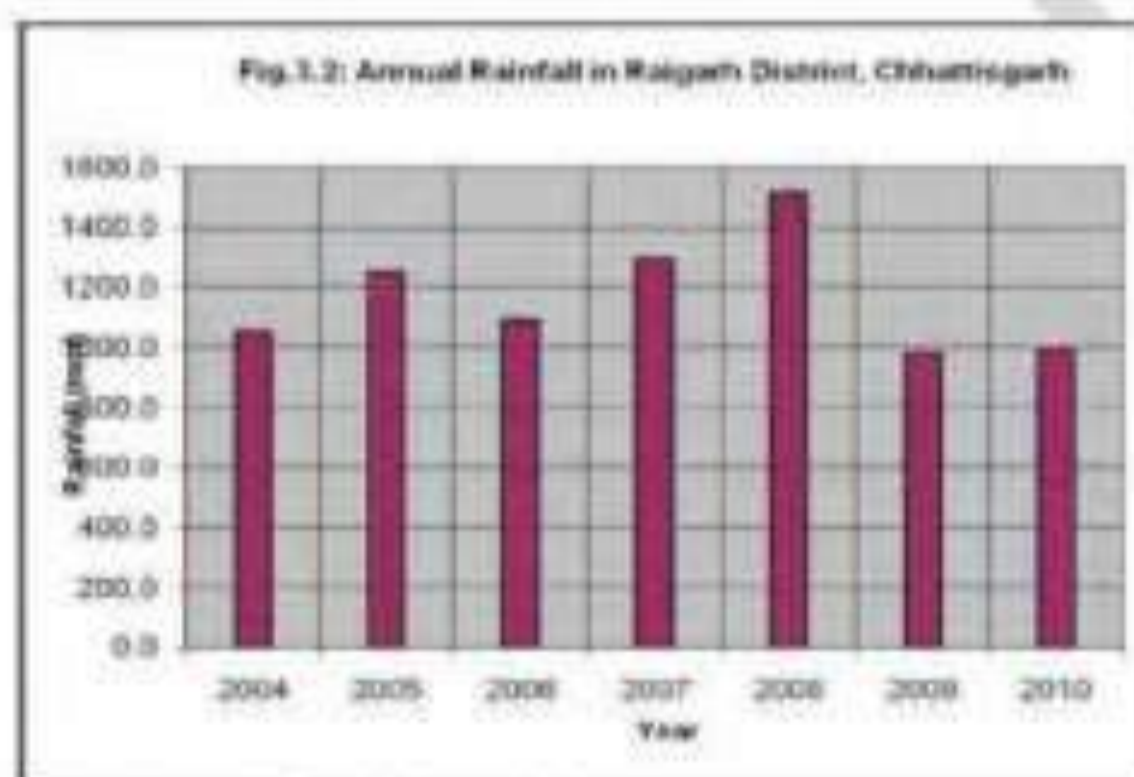
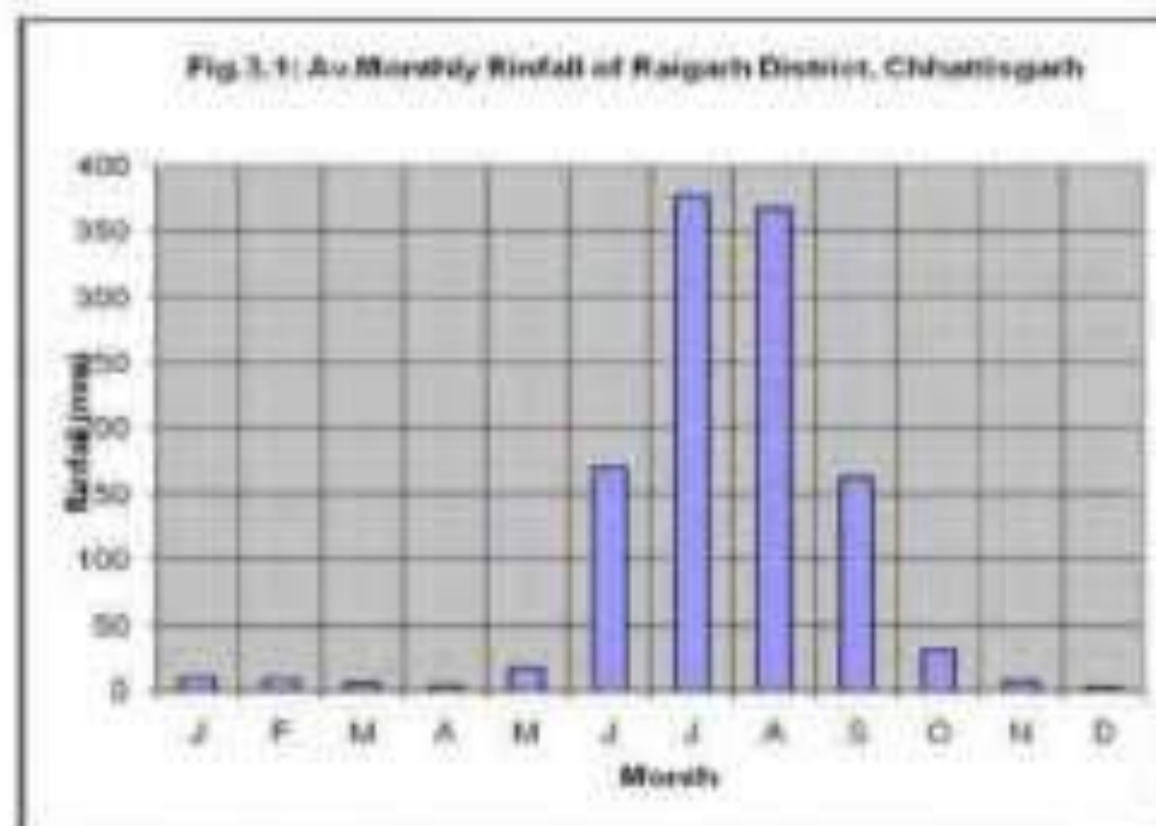
The south-west monsoon is the principal source of precipitation in the study area. The average annual rainfall of the study area is 1165 mm (2004-2010). About 92% of the total rainfall is received during the period from June to September. July and August are the wettest months of the year.

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s.NTPC Ltd

**Table.3.1: Monthly Rainfall in Raigarh District, Chhattisgarh**

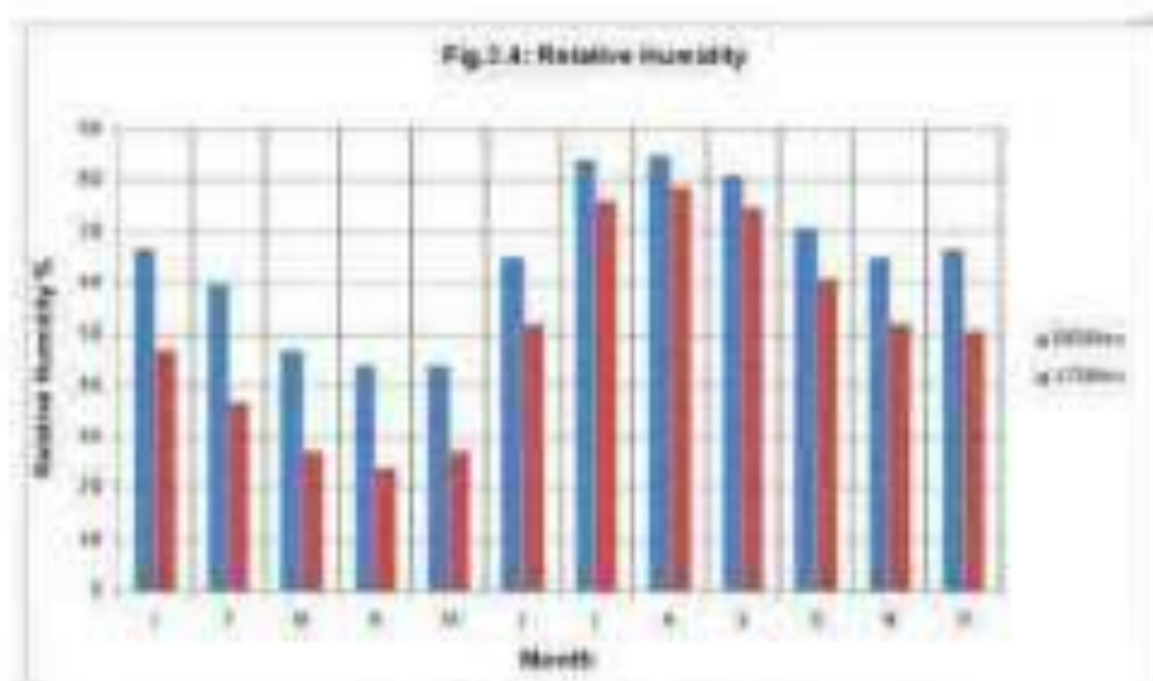
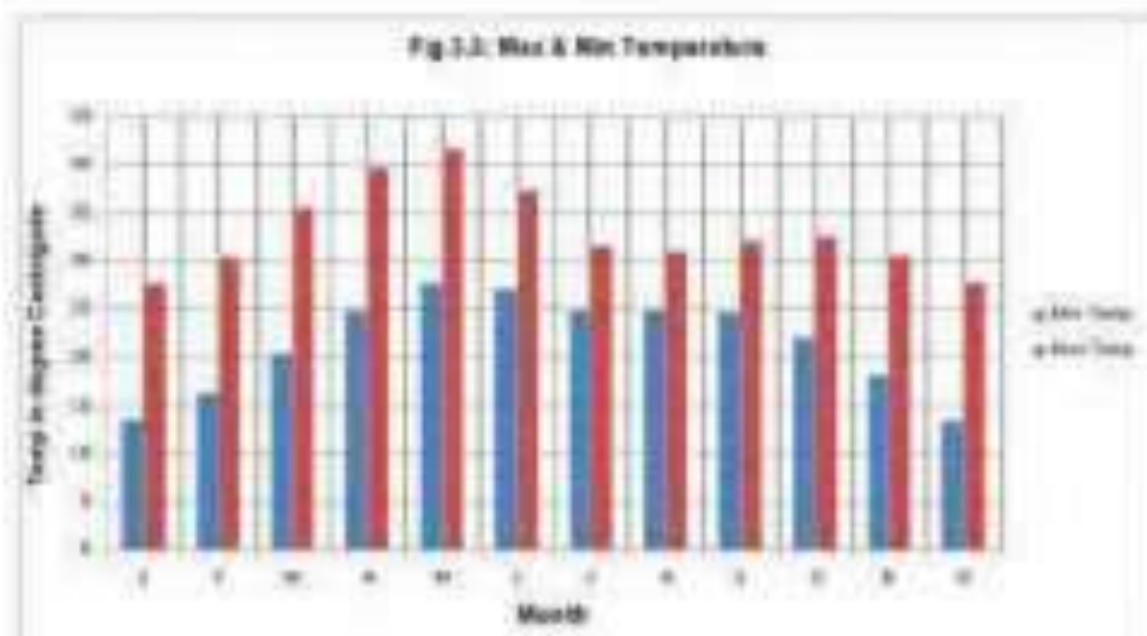
Month/ Year	J	F	M	A	M	J	J	A	S	O	N	D	TOTAL
2004	18.8	0	0	0	0	358.5	289.2	474.8	81.8	36.8	0	0	1049.8
2005	37.5	8.2	0	0	0	277.1	427.6	310.4	121.6	54.4	0	0	1240.8
2006	0	0	0	0	91.2	117.8	308.2	400.8	110.2	26.5	5.3	0	1069.1
2007	0	35.2	17.2	0	29.6	233.1	342.3	318.2	239.5	40.1	36.6	0	1291.8
2008	22.4	21.3	27.8	31.8	2.3	258.7	288.1	586.9	261.9	9.8	0	0	1913.9
2009	0	0	0	0	0	15.3	850.4	154.8	82.2	25.5	0	0	978.2
2010	0	0	0	0	0	117.1	318.5	251.4	251.2	21.3	7.3	20.5	968.3
Ave	11.2	9.2	8.4	4.8	17.8	189.2	378.8	386.7	182.8	31.4	7.8	2.8	1168.4

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.	Avg.
Avg. min. Temperature °C	13.59	15.31	20.37	24.89	27.88	27.15	25.13	25.13	24.70	22.13	18.17	13.45	21.65
Avg. max. temperature °C	27.87	30.32	35.89	39.71	41.89	37.81	31.88	31.15	32.88	32.54	30.57	27.84	33.84
Monthly avg. relative humidity %													
8.30 hrs	87	80	47	44	44	85	84	85	81	71	85	87	85
17.30 hrs	47	37	27	24	27	52	76	79	75	61	52	51	51



At-Village Talaspali, Block-Ghorghoda, Raigarh District, Chhattisgarh State

## Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s. NTPC Ltd.



At-Village Talaspali, Block-Gherghoda, Raigarh District, Chhattisgarh State

## CHAPTER-4

### HYDRO-GEOMORPHOLOGY

Geomorphic features control the occurrence and movement of ground water. Satellite remote sensing is being widely used for assessment of natural resources due to its synoptic coverage. A hydro-geomorphological map of 10km radius buffer zone of the project has been prepared through interpretation of remote sensing data along with field ground checking. The map shows presence of the following hydro-geomorphic units.

#### Denudational Hill

This is formed due to differential erosion and weathering so that a more resistant formation or intrusion stands as mountains or hills. More than two-third of the study area is covered with denudational hills. Entire northern part and south-central part is covered with the hills. Denudational hills with moderately-high slope facilitate surface run off and scope for ground water recharge in these area is poor.

#### Plateau/Pediplain

These are high land with flat surface. Entire south of the study area is covered with plateau/pediplain. Surface runoff is moderate and scope for ground water recharging is good.

#### Valley Fill

These constitute colluvial deposits of varying lithology. These are in fact broad depressions between mountains normally filled with colluvial deposits. Ground water potential of this unit is very good.

#### Mesa

These structural features occurs with few patches in south. Gondwana sandstone constitute the features. They have steep slope and hence surface runoff is high. Scope for ground water recharging is meager.

#### Flood Plain

Flood plain occurs all along the river Kosi. It is good source of ground water.

#### **River**

Kalo is the major river flowing in a north to south direction. The river along with its tributaries is a good source of ground water recharging.

#### **Water Body**

The area is dotted with numerous village ponds and a reservoirs. These are good sources of ground water recharging.

The geomorphic units are shown in fig no 4.1.

#### **DRAINAGE**

The drainage pattern of the area is controlled by underlying geological formation and structural features such as surface elevation, strike, folds, faults and lineaments. Kalo river is the main drainage in the area. The Kalo nadi flows in the north to south direction in eastern part of the study area. Tedpara, Jahanara nala, Mantala nala and Khandhova nala are other streams flow in the study area.

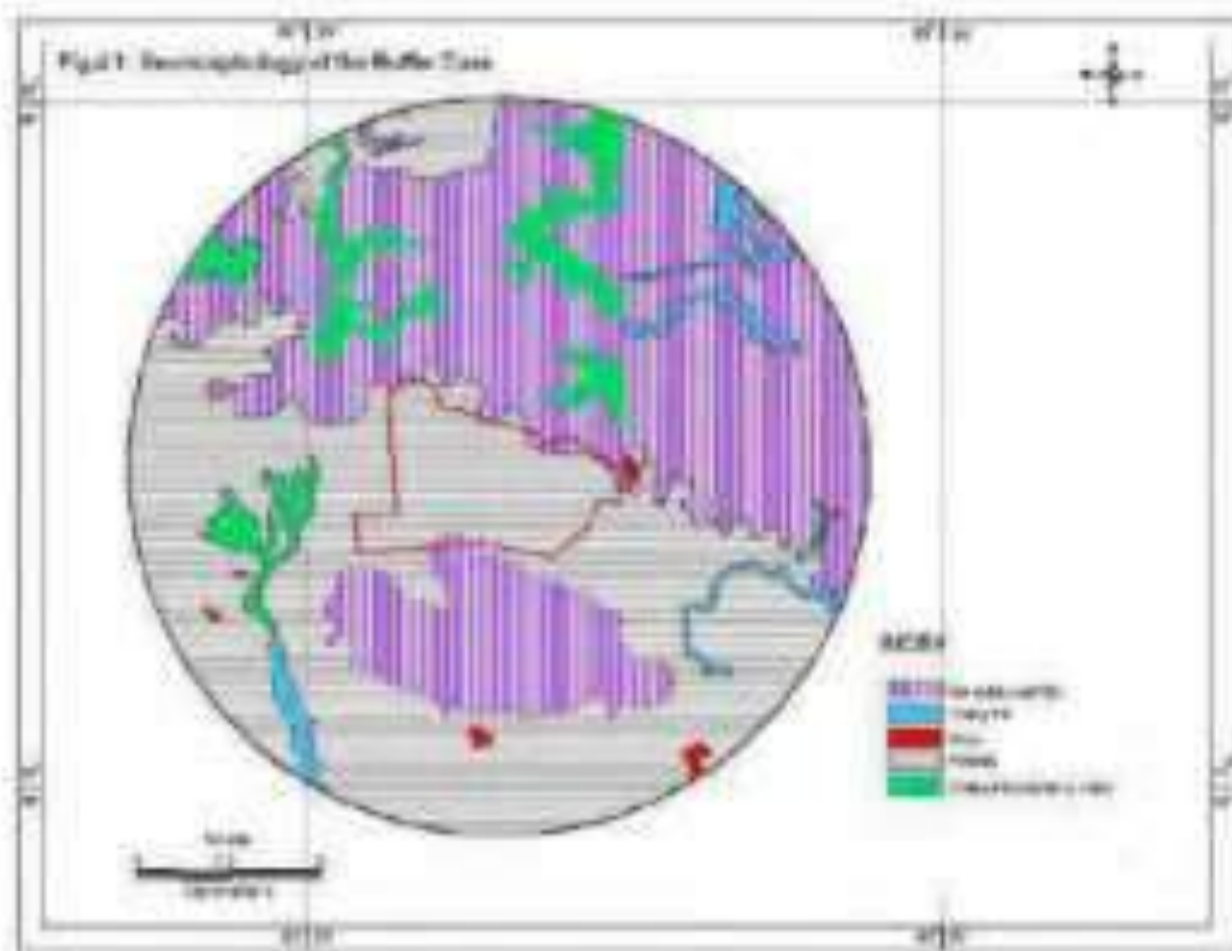
The drainage lines exhibits in the buffer area are in subdendritic to subparallel pattern.

Though the streams and rivers in the area are controlled by the lithology and structure, slope plays an important role in controlling the direction of flow. The drainage density varies throughout the area with high diversity in the hilly region and low drainage density in the plains. Some of the streams are perennial in nature. But the lower order channels are ephemeral.

The drainage in the area is shown in fig no 4.2

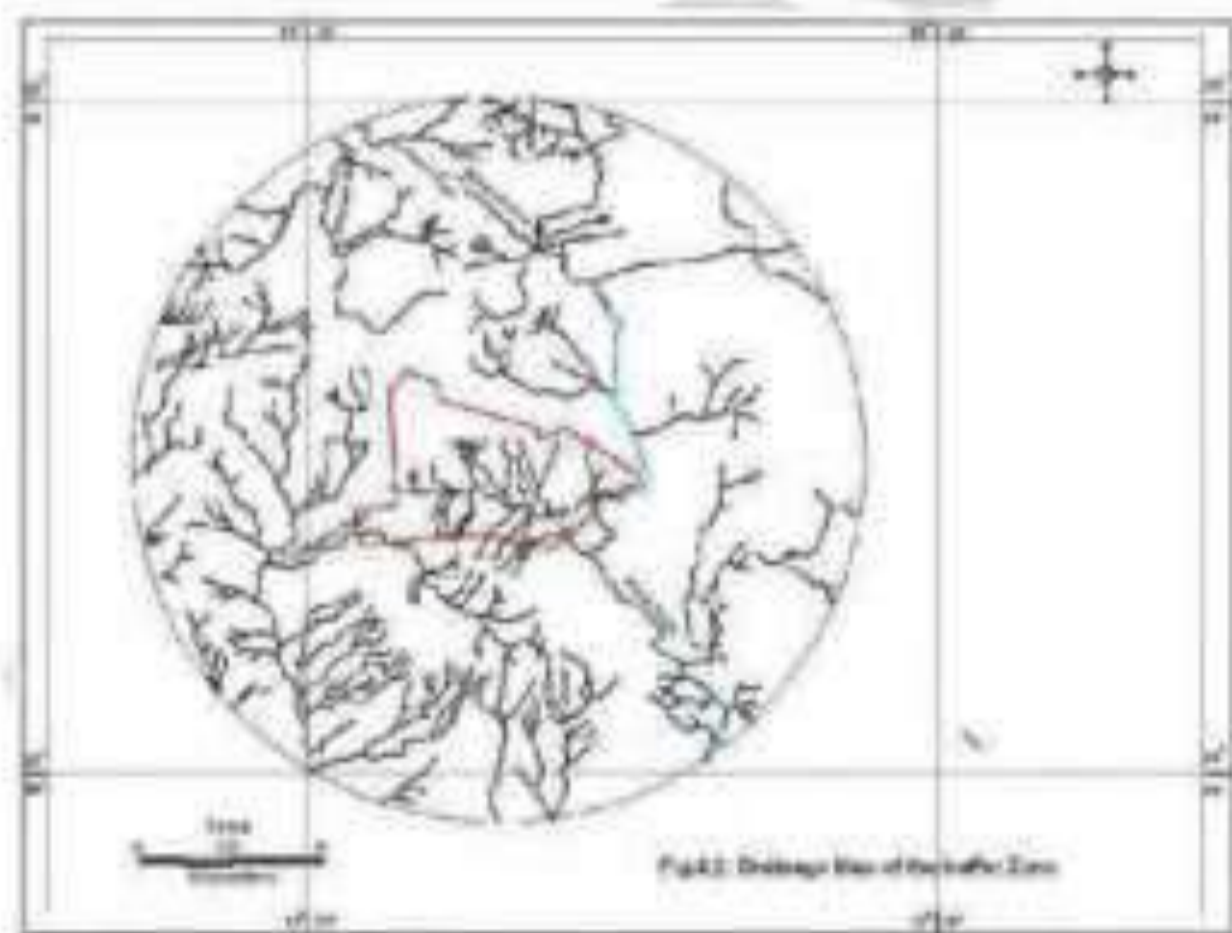


Hydrogeology of 10km Buffer Zone of Talwandi Coal Mining Project of M/s NTPC Ltd



As Village Talwandi, Block-Bhoginda, Rajpura District, Chhatisgarh State

Hydrogeology of 10km Buffer Zone of Talwandi Coal Mining Project of M/s NTPC Ltd



As Village Talwandi, Block-Bhoginda, Rajpura District, Chhatisgarh State



## CHAPTER-5

### GEOLOGY

The buffer zone is covered with semi-consolidated formation of Gondwana Super Group underlain by crystalline rocks of Chhotanagpur Gneissic Complex. The generalized stratigraphic succession of the area is given below.

**Table 5.1: Regional Stratigraphic Succession**

Age	Group	Formation	Lithology
Quaternary	Recent to Subrecent		Alluvium-Clay, silt
Permian	Gondwana Super Group	Kamthi	Ferruginous sandstone, Clay, shale grit
		Bargur	Sandstone, siltstone, shale with coal and fire clay
Proterozoic	Chhotanagpur Gneissic Complex		Granite gneiss, migmatites, composite gneiss

#### Chhotanagpur Gneissic Complex:

Gneissic complex occupies north-eastern part of the area. It is generally coarse and porphyritic and contains quartz, microcline, orthoclase, oligoclase, biotite, a little apatite and occasionally green hornblende. Tourmaline is frequently seen but abundant in the pegmatite phase.

#### Gondwana Super Group

##### Bargur

It consists of white to lean coloured sandstones and grits with occasional conglomerates and beds of shale. It consists of much carbonaceous matter in the form of streaks, lentils and seams of coal. In several cases the coal seams are associated with beds of fire clay.

##### Kamthi

It comprises of red and grey argillaceous sandstones and conglomerates with interstratified shales. The beds contain patches and nodules of ferruginous material.

##### Alluvium

The unconsolidated formation of Quaternary age comprising alluvium, clay, silt, etc. in several isolated patches and near major river courses.

The geology map of the study area is shown in fig no 5.1.

### Geology of Talapalli Block

Talapalli Block is located in the eastern part of Mand-Raigarh Coalfield. The geology of the block is in conformity with the regional set up. Major part of Talapalli block is covered by the rocks of Barakar formations. Baran measure occurs in the southern part of the block. However a small patch of Damru Measure is also noticed in the north western part of the block. The geological succession evolved on the basis of exploration data generated in the block is given in the Table 5.2

Table No.5.2: Geological Succession in Talapalli Block

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Silt, alluvium
Baran Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakara	30 – 296	Fine, medium and coarse grained feldspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talcher	1.00 – 54.30	Khawes, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

### DESCRIPTION OF FORMATION

**Metamorphics:** Precambrian metamorphic rock constitute the basement of the basin. These are composed of quartzite, mica-schist, granite gneiss and at places intruded by pegmatite or vein quartz. The metamorphics have been intersected in 7 boreholes (MNRT-53, 62, RT-6, 9, 12, 13 & 14). The thickness of metamorphics in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-6).

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s. NTPC Ltd

**Talcher Formation :** The rocks of Talcher formation are not exposed within the block boundary. It is encountered in boreholes RT-5,6,9,10,12,13 &14. The thickness of Talcher as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10). Talcher formation consists of greyish white to greenish grey sandstone and shale, occasionally khaki in colour. At places it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite.

**Barakar Formation :** The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 30 – 505 m. Barakar formation constitute fine to coarse grained, white to grey feldspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27 coal seams have been encountered in this formation besides a few local seams / bands.

**Barren Measure Formation :** This formation has occupied the southern part of the block. Besides a small patch of barren measure is preserved in the northern part of the block due to opposite dip of faults formation of graben. This formation is intersected in 15 boreholes with thickness varying from 18.80 m (MNRT-27) to 143.00 m (MNRT-24). Barren Measure Formation is represented by predominantly grey shale with minor sandstone and intercalation of sandstone and shale.

**Igneous Intrusives :** The block is free from any igneous intrusives.

**Soil & Alluvium :** Major part of the block is covered by a layer of soil and alluvium. The weathering has affected all the strata below soil to a varying extent. The thickness of soil ranges from 0.50m (MNRT-7, 8) to 18 m (MNRT-5). The depth of weathered zone varies from 6.00 m (MNRT-34) to 27.30 m (MNRT-5).

**Structure of the Block**

The Talaspali block is mostly covered with soil. Hence the structural interpretation is mainly based on the sub-surface data obtained during the course of exploratory drilling. The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4° to 5° towards Southwest.

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s.NTPC Ltd

A total of 12 numbers of faults have been deciphered from the subsurface data out of which faults F1-F1, F4-F4 and F5-F5 are major faults. Most of the faults are restricted to the northern part of the block. Remaining area is structurally free except two relatively minor faults. All the faults as interpreted based on intersections in boreholes, is detailed at Table 5.3

**Table- 5.3- Details of Faults**

Fault No.	Location	Trend	Nature of fault	Throw	Remarks
F1-F1	Northern part passing near BH No. MNRT-24, 27, 32 & 35	East/West to ENE, NE-SW dipping northerly	Dip fault	20m. - 85m	Throw of fault increases towards west due to abutment of fault F3, F2 and F5
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 - 10m.	
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.	The throw of fault increases towards MNRT -43 due to the abutment of fault F3 with fault F4
F4-F4	Northern part near BH MNRT-31,24, 43 & 52	East/West dipping northerly	Dip fault	30-150m	The throw of fault increases due to abutment of fault F3, F5, F7, F8 & F9
F5-F5	Northern western part through BH, MNRT-52	East/West	Strike fault	35 m	
F6-F6	Northern part passing through MNRT-31	WNW-ESE dipping westerly	Oblique fault	15 - 25 m.	
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20 m.	

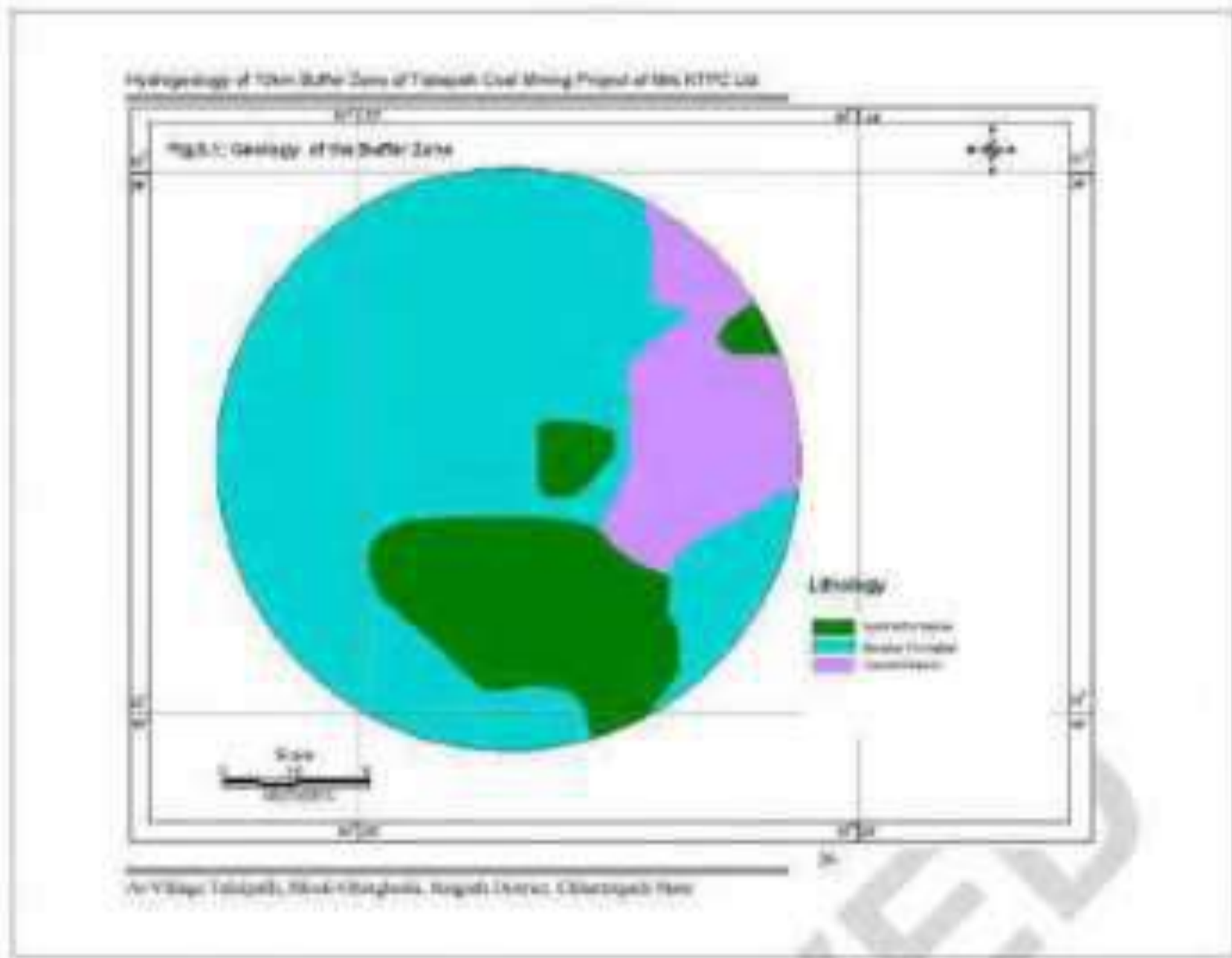
Hydrogeology of 10km Buffer Zone of Talaspalli Coal Mining Project of M/s. NTPC Ltd.

F8-F8	Northern part passing through MRRT-11 & 5	NW-SE	Oblique fault	50-100 m.	The cumulative throw of fault FT,FB & F8 resulted in the reduction of 100m of strata in MRRT-5
F8-F9	Northern part passing through MRRT-10, RT-4 & MRRT-11	East – West or curvilinear	Strike/ Oblique fault	25m	
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0-10 m.	
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m.	
F12-F12	Southern part	NW-SE	Oblique	25 m.	

#### COAL SEAMS

Detailed exploration in Talaspalli Block has revealed the presence of coal bearing horizons belonging to Barakar Formations. These carbonaceous horizons could be distinctly demarcated as upper, middle and lower columns of Barakar formation. Altogether 28 workable coal seams are developed in the block. Besides these workable seams there are few non workable persistent bands occurring throughout the block. All the 28 seams are mainly composed of coal, shaly coal, carbonaceous shale and shale. The coal is dull in appearance high in moisture and is of non-caking type. The seams are not affected by any igneous intrusive.

Seam XIA is the top most seam in the block, developed persistently in the southern part of the block over a limited area. Seam X has split into 4 major sections as X-LA, X-LB, X-Top and X Bottom. X Bottom seam underlies the X Top seam and is the thickest coal seam among X group of seam. Similarly seam IX has 3 sections, IX-L2, IX-L1 & IX seam-VI has 3 sections, VI Top, VI Middle and VI Bottom, seam V has 3 splits as V Top, V Middle, V Bottom. Seam IV has 4 sections, IV Top, IV Middle, IV L & IV Bottom. Seam III has two splits as seam III L and seam III. Whereas seam II has 5 splits, sections as II L3, II L2, II L1, II and II L. Seam-I is poorly developed in the block and do not attain workable thickness.



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## CHAPTER-6

### AQUIFER SYSTEM

The study area is covered with rocks of Proterozoic to Permian age with some small isolated pockets of Recent to Sub-recent alluvium. Based on the nature, the rocks are broadly grouped into 3 major aquifer systems i.e.

- (i) **Hard Rock Aquifer System**  
Comprising crystalline metamorphics of Chhotanagpur Gneissic Complex
- (ii) **Soft Rocks:** Comprising semi-consolidated crystalline rocks belonging to Gondwana Super Group
- (iii) **Soft Rocks:** younger alluvium.

#### Aquifer Properties

**Hard Rock:** It comprises of crystalline metamorphics of Chhotanagpur Gneissic Complex. These are mainly composed of quartz mica schists and quartz with granite gneiss intruded by granite and dolerite. These rocks are devoid of primary porosity. Ground water occurs in secondary porosity in top weathered zone and in fractures in deeper zone. The top weathered mantle and shallow fractures mainly constitute the shallow aquifers. The thickness of weathered mantle varies from 5 to 20m tog. The shallow fracture zone extend down to depth of 60m tog. Ground water occurs under phreatic conditions. The shallow aquifers are being tapped through dug wells, dug cum borewells and shallow tubewells. Ground water occurs under confined to semi-confined conditions in deep fractures. Usually 3 to 4 sets of fractures are encountered upto depth of 100 to 150m. These aquifers are being tapped through tubewells.

**Soft Rocks-Semi-Consolidated** : Gondwana Group of rocks constitute semi-consolidated aquifer systems. Barakar and Karfi formations constitute the Super Group. Ferruginous sandstone and clay form the Karfi formation. Sandstone, shale and coal form the Barakar formation. Sandstone is subarkose in composition, fine to coarse grained, poor to moderately sorted. The shale are generally black and carbonaceous. The rocks possess both primary & secondary porosity. Ground water in these formation occurs in phreatic, semi-confined & confined conditions. The top

27

At-Village Talaspali, Block-Gharghoda, Raigarh District, Chhattisgarh State

#### Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s. NTPC Ltd

weathered zone followed by fractured zone provide sufficient water to wells. In Barakar formation fractured aquifer down to depth of 400m persists. The deeper fractured aquifers are more productive than shallow aquifers. Tubewells tapping aquifers beyond 200m produces good discharge.

The Transmissivity and storativity of Barakar formations range between 3 to 143 m<sup>2</sup>/day and  $1.72 \times 10^{-2}$  to  $7.66 \times 10^{-2}$  respectively.

#### **Soft Rocks Alluvium**

The alluvium in pockets are good potential aquifers in shallow zones and are developed through filter point wells.



**PUMPING TEST**

Aquifer characteristics are necessary in order to assess the ground water potential of the area. It is essential to know aquifer parameters such as yield, transmissivity and storativity etc. For this purpose two aquifer performance tests was conducted. Drawdown during recuperation was measured at intervals. Residual Drawdown (RDD) and time were plotted on a semi-log paper and analyzed by applying Theis's Recovery formula mentioned below-

$$\text{Transmissivity (T)} = (2.30X Q) / (4 \times \Delta S)$$

Where Q is the yield of well in m<sup>3</sup>/day recorded during pumping

ΔS is the drawdown for one log cycle

These data along with respective analysis and plotting of data on semi-log graph sheet are shown in fig.no 6.1. Basic data of APT is given below.

**AQUIFER PERFORMANCE TEST-1**

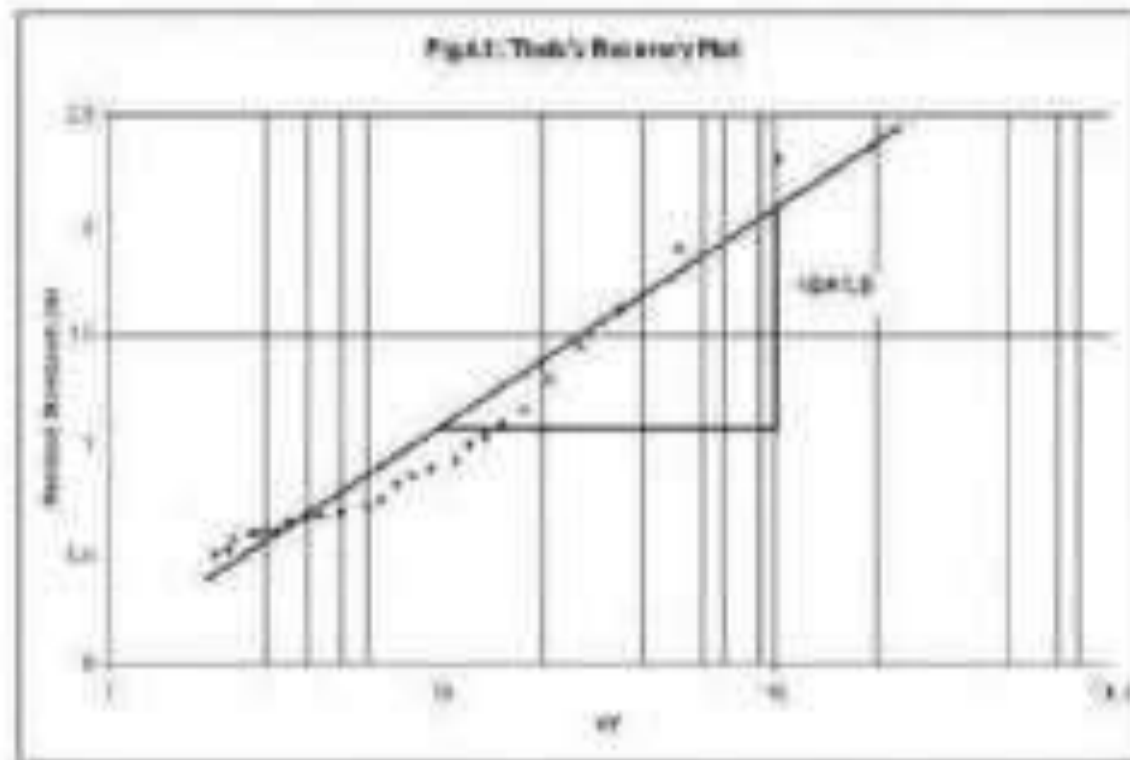
Aquifer performance test was conducted in a well in Bichhnera village. The details are as below:

Formation	: Barakar Sandstone
Water level	: 3.8 m bgl (below ground level)
MP (Measuring Point)	: 0.85m
Duration of pumping	: 100min
Discharge	: 2.1 lps
Δs	: 1.0 m

$$\begin{aligned} \text{Transmissivity} &= (2.30X Q) / (4 \times \Delta S) \text{ m}^2/\text{day} \\ &= (2.3 \times 181.5) / (4 \times 1.428 \times 1.0) \\ &= 33.25 \end{aligned}$$

Table K.1: Pumping Test Data of Well at Bichhimara

Time (minute) since pumping		ST	Depth to Water Level (m bwp)	Residual Drawdown (m)
Started (T)	Stopped (T)			
101	1	101	6.85	2.3
102	2	91	6.54	1.89
103	3	84.3	6.27	1.62
104	4	76	6.1	1.45
105	5	71	5.95	1.3
106	6	67.7	5.81	1.16
107	7	65.3	5.74	1.09
108	8	63.5	5.68	1.04
109	9	62.1	5.65	1
110	10	61	5.58	0.95
112	12	6.3	5.54	0.89
114	14	6.1	5.51	0.86
116	16	7.3	5.47	0.82
118	18	6.6	5.4	0.78
120	20	6	5.37	0.75
125	25	5	5.34	0.69
130	30	4.3	5.33	0.68
135	35	3.6	5.32	0.67
140	40	3.5	5.3	0.65
145	45	3.2	5.28	0.61
150	50	3	5.26	0.6
155	55	2.6	5.25	0.6
160	60	2.7	5.24	0.59
170	70	2.4	5.22	0.57
180	80	2.3	5.17	0.52
190	90	2.1	5.15	0.5



## CHAPTER-7

### WATER LEVEL REGIME

A total 20 nos. of observation wells were established in the study area. The water level of the wells were monitored during the pre & post-monsoon 2013. The location and details of the wells are given in the table no.7.1 & fig 7.1.

#### Pre-Monsoon, 2013 Depth to Water Level.

The pre-monsoon depth to water level varies in the range between 5.4m bgl and 13.87m bgl. Maximum water level was observed at Lauthansura which was 13.87m bgl. The depth to water level contour map was prepared and shown in fig. 7.2. The map depicts that water level in major part of the area lies between 7 and 9m BGL. Water level is deep in the north & north western part of the area which is in between 11 and 14m and shallow in the south and south-east part which lies between 5.5 to 9m BGL.

#### Post-Monsoon, 2013 Depth to Water Level

The post-monsoon depth to water level varies in the range between 3.8m bgl and 8.3m bgl. Maximum water level was observed at Rakera which was 8.3m bgl. The depth to water level contour map was prepared and shown in fig.7.3. The map depicts that water level is shallow in the south-eastern part of the area and is deep in the north-west part of the area.

#### Water Level Fluctuation (Pre to Post-monsoon)

All the observation wells show rise in water level during post monsoon period. The rise in water level is in the range of 1.2m to 7.0m. Maximum rise in water level was observed at Chintapani which was 7m. Fluctuation contour map was prepared and shown in fig.no.7.4. The map depicts that north-west part of the study area show maximum rise in water level is the range between 4 to 7m.

#### Water Table Elevation

Water table elevation map has been prepared and shown in fig no.7.5. The map depicts that water table elevation varies from 450m to 200m amsl during post-monsoon 2013. Water table is at higher elevation in the north and gradually decline in the south. Ground water flow direction is from north to south.

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s.NTPC Ltd.

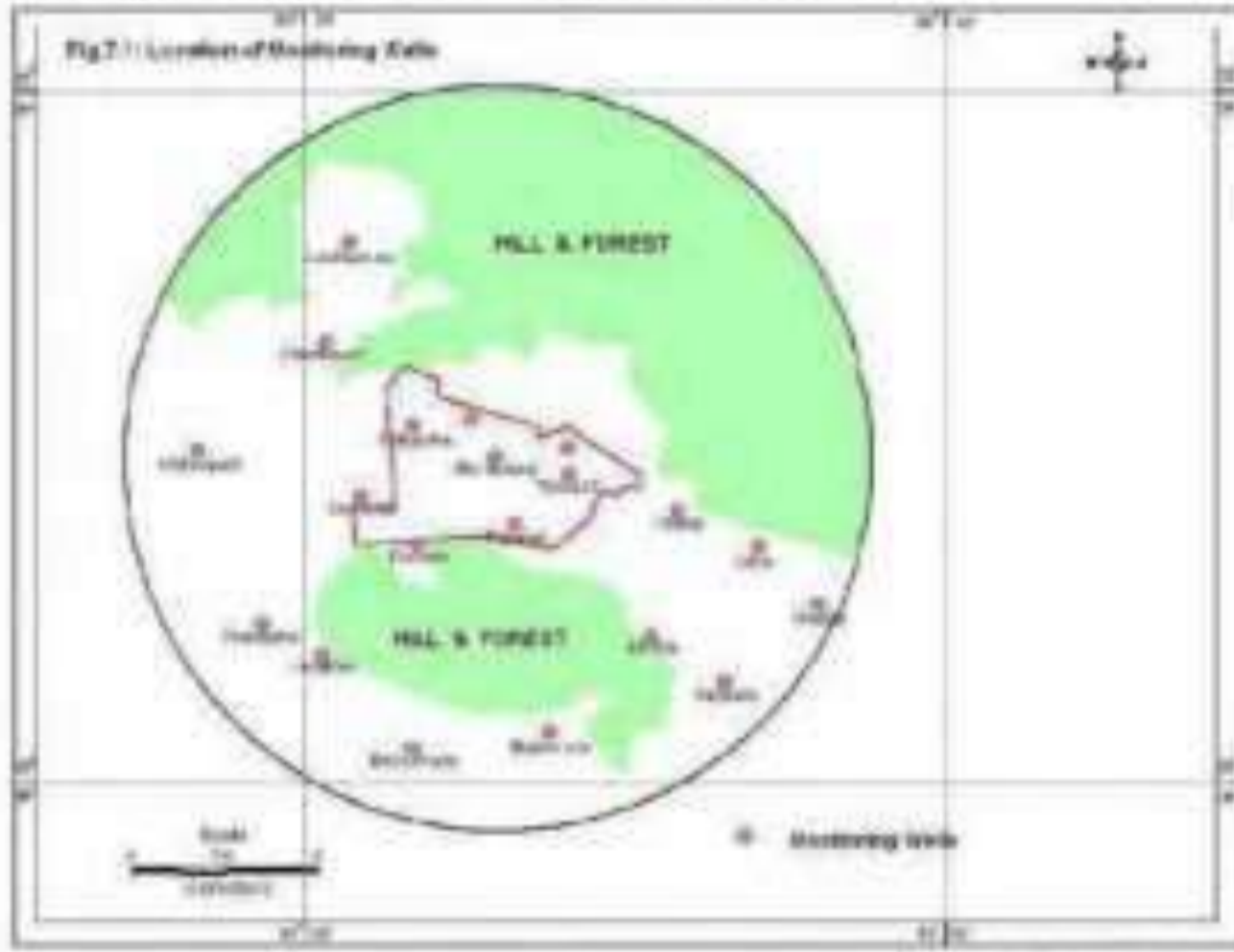
**Table No.7.1: Water Level Data of Monitoring Stations**

Sl. No	Well Location	Longitude	Latitude	Water Level,Pre-Monsoon,2013 (m.bgl)	Water Level,Post-Monsoon,2013 (m.bgl)	Water Level Fluctuation in m.
1	Safepali	85.431	22.736	11.6	6.4	5.2
2	Chitpuri	85.4453	22.753	8.5	5.54	2.96
3	Rakara	85.4457	22.2044	13.1	6.3	3.8
4	Bichinara	85.488	22.2458	11.5	5.7	5.8
5	Ajgari	85.4596	22.2543	5.4	4.2	1.2
6	Rangpur	85.471	22.228	8.8	3.8	3
7	Kutha Meura	85.49447	22.2473	8.3	6.2	3.1
8	Katharua	85.3884	22.2493	12.28	7.89	4.47
9	Chandipani	85.4215	22.27284	11.42	6.38	7.04
10	Latharua	85.428	22.237	13.67	7.21	6.69
11	Nandara	85.40518	22.20807	7.9	4.02	2.98
12	Bhulanada	85.4447	22.175	5.6	3.91	1.69
13	Bagamura	85.48	22.178	6.3	4.31	1.99
14	Muzari	85.5298	22.191	8.78	4.17	2.61
15	Khara	85.5088	22.205	7.32	3.07	3.65
16	Hudari	85.51	22.238	6.54	5.33	3.21
17	Utha	85.5345	22.2238	6.8	5.51	3.09
18	Palna	85.5128	22.2328	8.26	4.87	4.39
19	Talaspali	85.48527	22.24395	9.63	5.67	3.96
20	Karawa	85.42882	22.19781	7.58	5.23	3.06

13

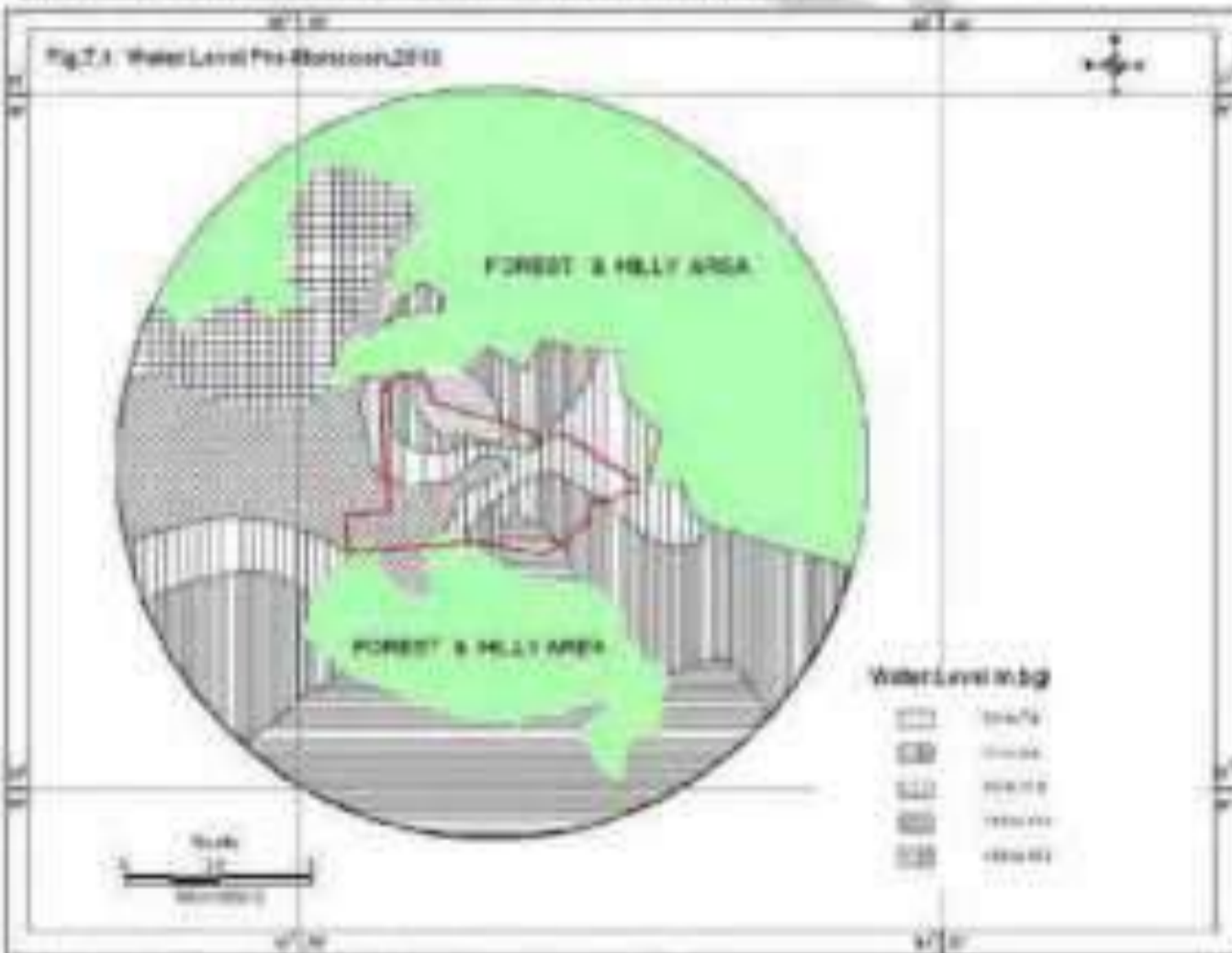
At-Village Talaspali, Block-Ghorghoda, Bagarh District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Tawakal Coal Mining Project of M/s NTPC Ltd



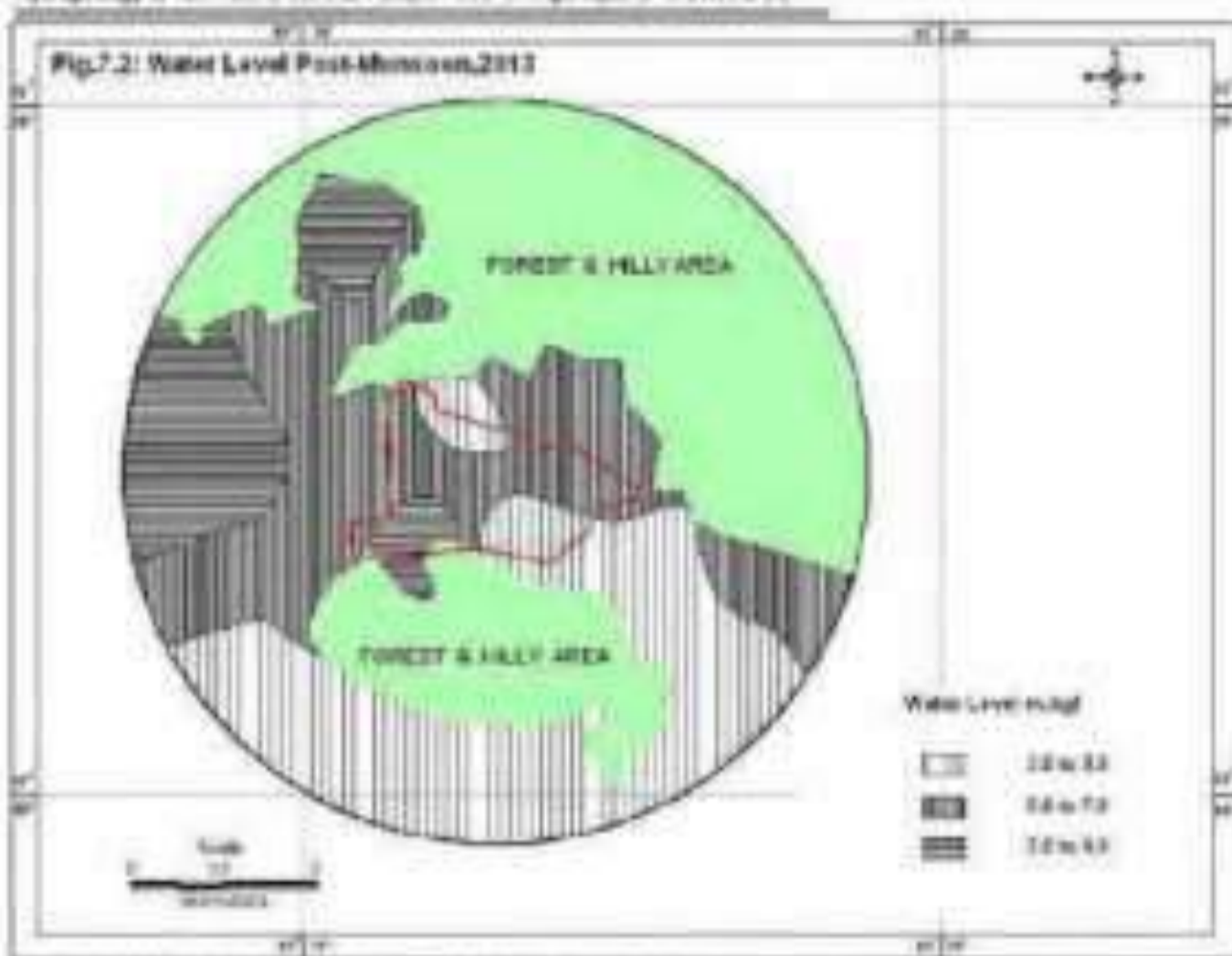
At Village Talapali, Block-10, Range, Nagpur District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Tawakal Coal Mining Project of M/s NTPC Ltd



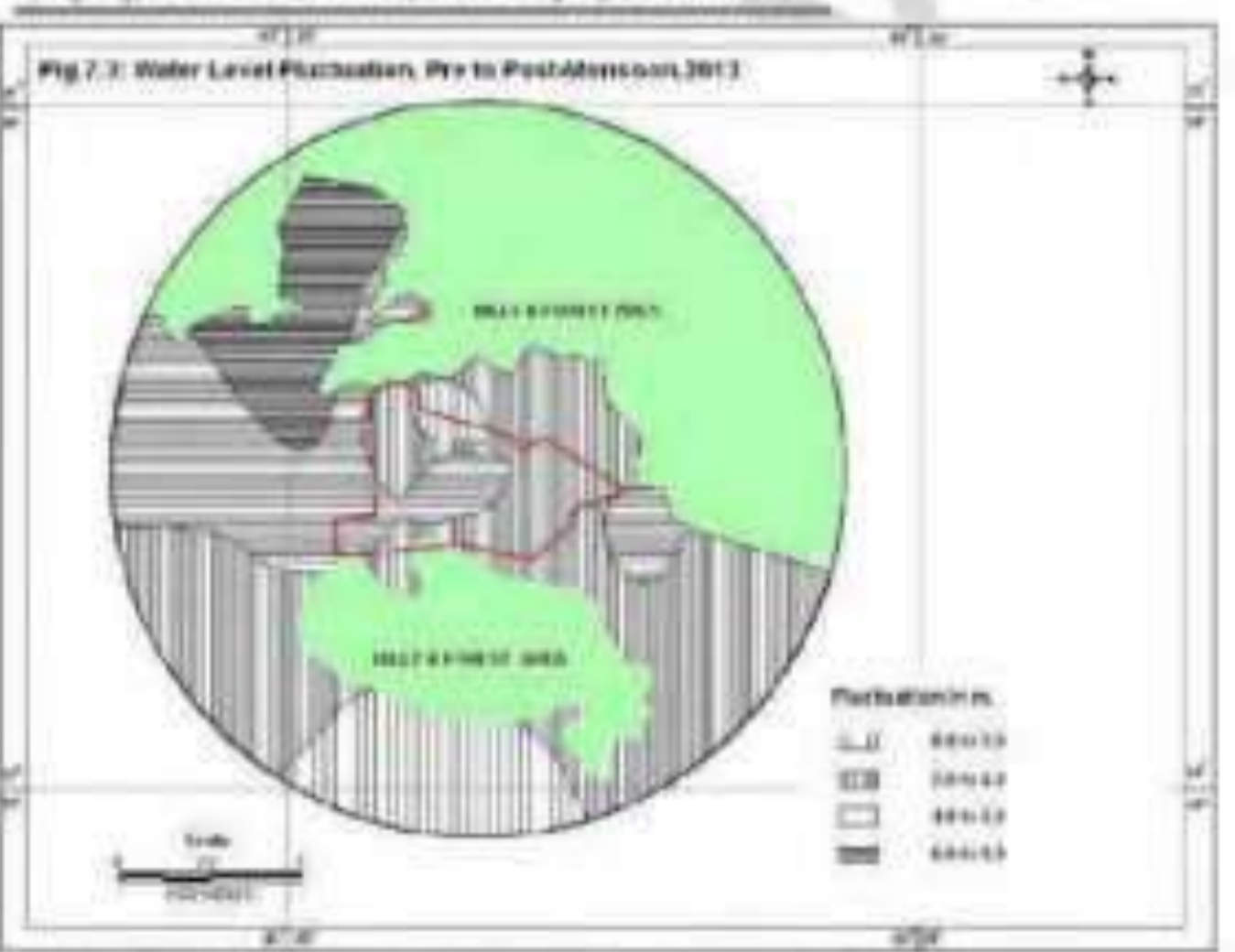
At Village Talapali, Block-10, Range, Nagpur District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s NTPC Ltd



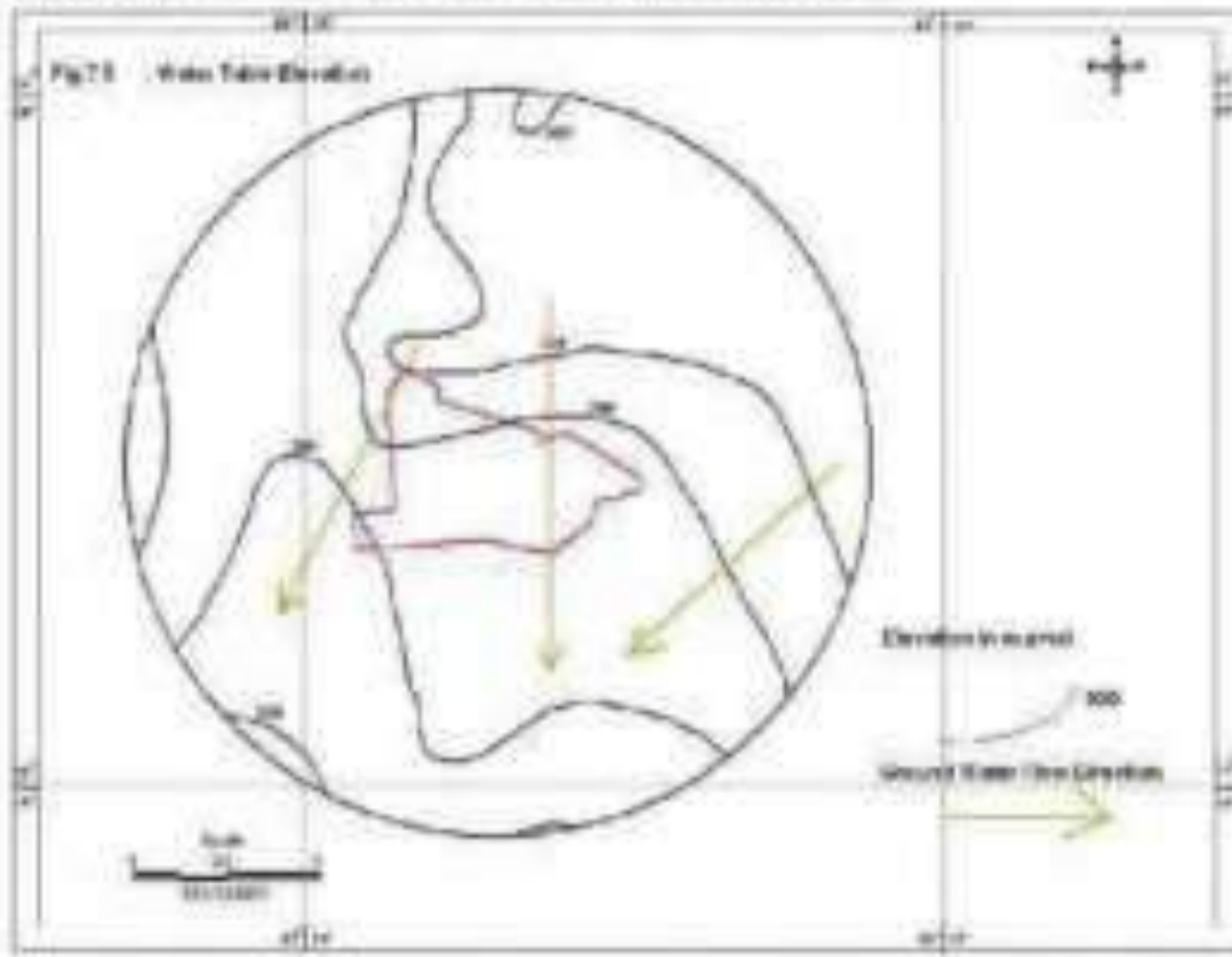
An Village Talaspali, Block-Ranghola, Raigarh District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s NTPC Ltd



An Village Talaspali, Block-Ranghola, Raigarh District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Tamsui Coal Mining Project of MTA KPTPC Ltd



At Village Tamsui, Hsueh-shengshan, Hsuquli District, Chiayi County, Taiwan

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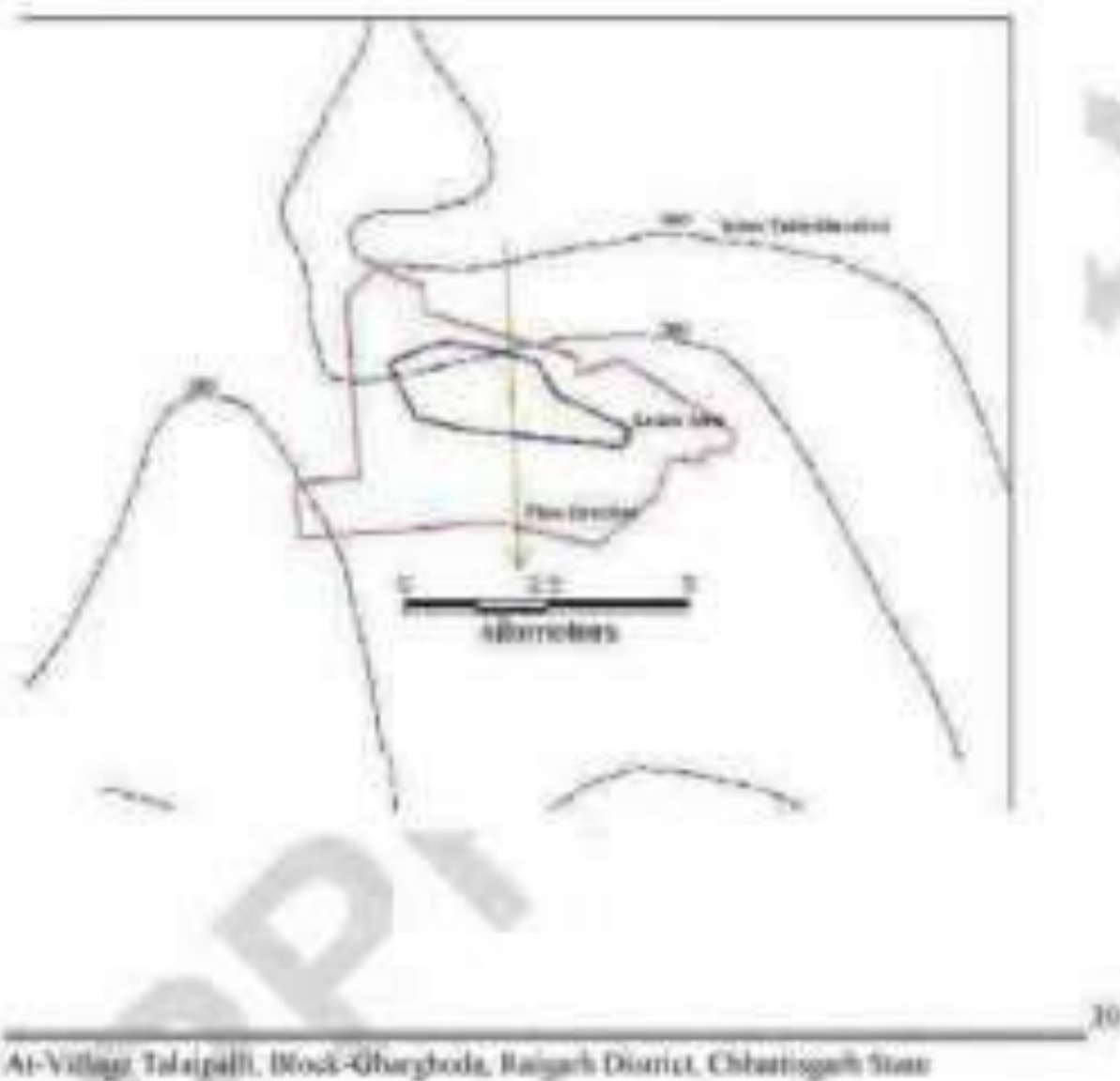
## CHAPTER-8

### MINE DRAINAGE

#### De-watering in Open Cast Mines of Talaspali Coal Mining Project

The Talaspali Coal Mining Project spreads over an area of 2113 hectares of land. The surface elevation of mining lease area varies between 340m amsl and 250m amsl. Water Table elevation (based on the water level data of dug wells tapping phreatic aquifer & measured during post-monsoon, 2013) surrounding the Mines varies in between 325 and 280m amsl. The ground water flow direction is from north to south. The elevation map is shown in fig 8.1.

Fig 8.1: Water Table Elevation, Post-Monsoon, 2013 Surrounding Mines (m amsl)



### Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s. NTPC Ltd

The pit bottom at the end of the 1<sup>st</sup> year will be at 300mamsl. Hence mining activities will intersect water table during the first year of mining. The table below shows the year wise mining development.

The groundwater level must be pulled down to create dry conditions in the mining area so that the generally low strength aquifer sequence material can be safely excavated. Mine dewatering is usually undertaken for a variety of geo-technical (material strength considerations), mining and safety reasons and:

Table E.1: Year Wise Development Of Various Stages Of Mining

Year	Top RL of Pit (m.amsl)	Bottom RL of Pit (m.amsl)	Depth of Pit in m.	Pit length in m.	Pit width in m.
Year-1	345	300	45	1200	214
Year-2	345	250	95	1457	618
Year-3	345	225	120	1457	1025
Year-4	345	175	170	1457	1260
Year-5	345	150	195	1457	1408
Conceptual Period	345	0	345	6303	287

The main objective is to find out the total volume of ground water which needs to be pumped out from the Pits for safe mining operations.

#### Ground water intersection

The groundwater inflow to a mining excavation is mainly a consequence of the interaction of groundwater system, hydrogeological characteristics of the rock mass and the mining geometry. The water inflow regime is determined by the incision of one or more aquifers by the mining reaction and the relative hydrogeological characteristics of the various aquifers.

The groundwater inflow in the vicinity of mining excavation can be estimated by using Darcy's equation for laminar flow through porous media.

$$Q = T \cdot i \cdot w$$

Where Q is the flow in m<sup>3</sup>/day

T is the transmissivity in m<sup>2</sup>/day

i is the hydraulic gradient

w is the width of the aquifer exposed

### Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s.NTPC Ltd

Transmissivity of the aquifer has been evaluated from the pumping test carried out and the transmissivity value is 33.25m<sup>2</sup>/day. The hydraulic gradient has been evaluated from the water table elevation map of the area and the gradient is 0.0055. The width of aquifer perpendicular to the flow direction is varying with the progress of mining of coal. The width of mining pit is perpendicular to the ground water flow direction. Hence in this case the width of coal block is the width of aquifer exposed. The table no 9.1 shows the progressive width of coal pit with progress of mining.

Putting all these values in the equation, the approximate volume of ground water ingress to the pit has been evaluated which needs to be pumped out from the pit for safe mining. The table no 9.2 shows the volume of ground water to be available for de-watering.

**Table no.9.2: Approximate volume of mining de-watering water**

Year of mining	Transmissivity (m <sup>2</sup> /day)	Hydraulic Gradient (i)	Length(m)	Width (m)	Q (m <sup>3</sup> /day) from mining length faces	Q (m <sup>3</sup> /day) from mining width faces	Total Q m <sup>3</sup> /day
(1)	(2)	(3)	(4)	(5)	(6) 2325x2/100x of faces	(7) 3325x2/100x of faces	(8)
1	33.25	0.0055	1260	214	800	136	936
2			1457	618	925	360	1318
3			1457	1026	925	551	1570
4			1457	1260	925	600	1728
5			1457	1428	925	694	1819

The table 9.2 shows that 936 m<sup>3</sup>/day of pit water will be available at the end of first year of mining and 1320 m<sup>3</sup>/day will be available at the end of 2<sup>nd</sup> year. The quantity will increase with time with the progress of mining in increase of pit width. The evaluated volume of pit water is approximate. Once mining activity starts the volume will be re-evaluated periodically taking other methods.

#### USE OF PIT DE-WATERED WATER

The pumped out pit water will be put to gainful uses. Mines requires water mainly for dust suppression, green belt development and for drinking and domestic uses for colony, drinking for mining site and uses in site office. Pit water will be used for dust

#### Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s.NTPC Ltd

suppression and green belt development and will also be used for domestic and drinking purposes after treatment. Use of pit de-watering water is shown in water balance diagram in fig.no.1.3. Excess pit water will be recharged to ground water system at suitable locations.

#### **GROUND WATER REGIME MONITORING**

In order to find out the impact of mine de-watering, on the regional ground water regime monitoring of ground water will be carried out at regular interval. A well net work of observation wells will be established surrounding the quarry. For phreatic aquifer, water level will be measured through established dug wells. For deeper aquifer, Sncoc. of piezometers will be established in the area. The location of the piezometers is shown in fig.no.8.2.

Hydrogeology of 10km Buffer Zone of Talaspah Coal Mining Project of M/s. NTPC Ltd



As Village Talaspah, Block-Baghmati, Nagpur District, Chhattisgarh State

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## CHAPTER-9

### GROUND WATER QUALITY

In order to assess the chemical quality of ground water in the buffer zone, six (6) nos. of water samples were collected and analysed. The table 9.1 shows the quality of ground water in the area. Five water samples from streams were also collected and analysed. The result is shown in fig.9.3.

A perusal of the table no.9.1 indicates, the distribution of various constituents vary greatly in the area. Concentrations of the above parameters are well within the permissible limits as per the BIS standards.

pH of ground water samples varies from 8.52 to 8.26 indicating slightly acidic nature of the water. The maximum permissible limit for pH as prescribed by BIS (1991) in drinking water supply is 8.50 to 8.50. The ground water has pH values within prescribed limits and suitable for drinking purposes.

The results of chemical analysis of ground water samples indicate that there is less variation in conductivity in the area. The EC value of ground water varies between 154 and 470 micro-mhos/cm at 25°C. The range of electrical conductivity values shows that the ground water of the area is fresh.

The major sources of chloride in ground water are from seawater, evaporite deposits and seepage from sewage and industrial effluents containing common salt. The chloride concentration in ground water varies from 8.2 to 39.5 mg/l indicating the quality of water within this aquifer is potable.

The main sources of nitrate in ground water are industrial wastes, sewage and animal wastes and agricultural sources. The nitrate concentration in shallow ground water has been recorded from 0.57 to 16.4mg/l. The nitrate concentration in ground water in the area is well within the permissible limit of 100mg/l as prescribed by BIS, 1991.

The fluoride concentration in the area lies between 0.21 to 1.24mg/l. The fluoride concentration is within the permissible limit as prescribed by BIS, 1991.

The ground water samples of the area show that water is fit for drinking as well as for domestic purposes.

Hydrogeology of 10km Buffer Zone of Talwandi Coal Mining Project of M/s NTPC Ltd

**Table 6.1 Chemical Quality of Ground Water**

S.No	Parameters	Chakguda	Sahaspal	NayaKampur	Harapal	Aggarh	Panna	Units in 1000L
<b>A-General &amp; Physical</b>								
1	Temperature	26	26	26.2	26	26	26	
2	Color/Turbidity (NTU)	10	10	10	10	10	10	25
3	Turbidity (NTU)	11	11	11	11	11	11	10
4	Total Hardness (CaCO <sub>3</sub> )	366	365	470	360	465	367	
5	Calcium	Aggravate	Aggravate	Aggravate	Aggravate	Aggravate	Aggravate	Aggravate
6	Mg	3.72	3.25	7.27	3.52	6.25	3.96	134.5
<b>B-CHEMICAL-ORGANIC</b>								
7	Total Dissolved Solids	36	132	262	276	279	219	2000
8	Total Hardness (CaCO <sub>3</sub> )	4	122	198	175	182.9	198	500
9	Calcium hardness	36	41.3	71.3	52.4	74	54.28	
10	Magnesium hardness	36	41	44.4	44	108	117.7	
11	Residual	15	4.38	11.7	15.8	26	12.4	100
12	Carbon	14	31	31	25	20.4	22.5	200
13	Total Alkalinity	38.2	7.5	25	25	187	117	500
14	Chloride	12.2	2.1	26.5	11.3	11.1	25	1000
15	Sulfate	7.14	4.52	17.1	12	7	26.2	400
16	Fluoride	0.21	0.041	0.09	0.08	0.24	0.26	1.5
17	Iron	0.4	0.17	0.02	0.7	1.25	0.3	45
18	Manganese	0.5	0.22	0.18	0.40	0.38	0.17	1.0
19	Copper	0.5	0.5	0.5	0.5	0.5	0.5	1.0
20	Total Iron	0.05	0.02	0.02	0.02	0.05	0.07	1
21	Residual Chlorine	0.5	0.5	0.5	0.5	0.5	0.5	1.0

At Village Talwandi, Block Kharagpur, Rajpuri District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talwandi Coal Mining Project of M/s NTPC Ltd

22	Temperature	26	27	27	26	26	26	
23	Dissolved Oxygen	4.80	4.24	4.75	4.75	4.45	4.75	100
24	Total Suspended Solids	0.5	25	38	48	54	82	100
25	Sulfate	0.5	0.5	0.5	0.5	0.5	0.5	100
26	Chloride	0.5	0.5	0.5	0.5	0.5	0.5	100
27	Phosphate	1.32	1.1	1.8	0.4	0.4	0.97	100
28	Sodium	4.072	1.1	1.4	21.281	8.8	11.88	100
29	Potassium	1.1	0.5	0.3	11.507	0.5	25.1	100
30	Residual Nitrate	1.88	0.1	0.3	1.98	14.4	30.1	100
31	Oil & Grease	5	0.5	0.5	0.5	0.5	4	100
32	Residual Chlorine	0.5	0.5	0.5	0.5	0.5	0.5	1.00

At Village Talwandi, Block Kharagpur, Rajpuri District, Chhattisgarh State

Hydrogeology of 10km Buffer Zone of Talwandi Coal Mining Project of M/s NTPC Ltd.

**Table 8.2 Quality of Surface Water**

S.No	Parameters	Kala Nadi (upstream)	Kala Nadi (downstream)	Temp (down)	Pajal Nadi (upstream)	Pajal Nadi (downstream)	Limits (BIS:2008)
<b>A. General &amp; Physical</b>							
1	Appearance	Clear	Clear	Clear	Clear	Clear	-
2	Colour/Turbidity (NTU)	5	20	25	5	20	25
3	Turbidity (NTU)	12	30	34	5	6	10
4	Dissolved Conductivity (µS/cm)	802	84	127	85	828	-
5	Odour	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable
6	pH	7.25	8.13	7.22	7.58	7.58	6.5-8.5
<b>B. CHEMICAL - INORGANIC</b>							
7	Total Dissolved Solids	89	84	88	113	109	500
8	Total Hardness (CaCO <sub>3</sub> )	37	44.0	35	42.8	218	500
9	Calcium Hardness	26	25.2	21.2	31.2	188	-
10	Magnesium Hardness	6	18.4	4.7	21.2	128	-
11	Ammonium	1.8	4.71	2.1	1.87	30.9	100
12	Chloride	11.8	12	8.2	14.1	38.4	250
13	Total Alkalinity	37.1	43.2	50	42	124	500
14	Chloride	4.78	5.7	5.2	7.1	124	1000
15	Sulphate	4.2	2.38	8	21.6	4.2	400
16	Fluoride	4.25	6.15	1.28	1.25	11.11	1.5
17	Nitrate	2.78	2.25	6.68	2.87	11.11	45
18	Nitrosate	2.028	0.12	0.18	2.14	8.2	0.3
19	Copper	8.5	8.2	8.5	8.5	8.2	1.5

At Village Talwandi, Block-10, Jhansi, Rajahmundry District, Chittoor District, West.

Hydrogeology of 10km Buffer Zone of Talwandi Coal Mining Project of M/s NTPC Ltd.

20	Total Iron	1.46	0.82	1.1	2.46	11.11	1
21	Free Iron (ppm)	8.5	8.2	8.5	8.5	8.2	0.3
22	Temperature	28	28	27	27	28	-
23	Dissolved Oxygen	8.45	8.84	8.45	8.12	8.78	NA
24	Total Suspended Solids	220	256	215	8	84	NA
25	DOC	8.5	8.2	8.5	8.5	8.2	NA
26	COC	8.5	8.2	8.5	8	5	NA
27	Phosphate	2.1	2.1	2.1	2.42	1.8	NA
28	Sulphur	4.2	4.8	5.2	5.28	7.8	NA
29	Pressure	8.5	8.2	8.5	7.84	11	NA
30	Freezing Point	18.2	21.7	18.5	7.48	8.1	NA
31	Oil & Grease	8.2	8.2	8.2	8.2	8.2	NA
32	Phenolic Compounds	Absent	Absent	Absent	Absent	Absent	0.02

Note: Concentrations are in mg/L. ND: Never Detected Level

At Village Talwandi, Block-10, Jhansi, Rajahmundry District, Chittoor District, West.



## CHAPTER-10

## DYNAMIC GROUND WATER RESOURCES

Rainfall is the principal source of ground water recharge in the study watershed zone. For estimation of ground water resources and stage of ground water development in the buffer zone, GEC (Ground Water Resource Estimation Committee, 1997) norms have been adopted and are described below.

## A) Ground Water Recharge

## a) Monsoon Ground Water Recharge

## i) Based on Rainfall Infiltration Method

Total Area	: 314 sq.km
Area suitable for recharge	: 154sq.km
Average Rainfall	: 1165 mm.
Infiltration factor	: 20%
Annual Recharge	: 35.982 MCM

## ii) Based on Water Table Fluctuation Method

Area suitable for recharge	: 154 sq.km
Mean water level fluctuation	: 3.00m
Specific yield	: 9%
Maximum Ground Water Recharge	: 41.58 MCM

The ground water resource estimated by Water table fluctuation method is more. Therefore as per the norms of GEC, resources by infiltration method is to be adopted.

## b) Recharge through other sources

Recharge through other sources primarily constitutes recharge through surface water irrigation. Return recharge from surface water irrigation is estimated to be 30% of the applied water for irrigation. As per the district irrigation department, about 504 ha of land is irrigated in the study area. If the gross irrigation requirement is taken as 0.5 ha.m. As per the norms of Ground Water Resource Estimation Committee (GEC-97), total applied water will work out to be 272 ha.m. The return seepage will be 30% of 267 ha.m i.e. 80.1 ha.m or 0.801 MCM.

(c) Hence annual ground water resources will be

$$35.882 \text{ MCM} + 0.801 \text{ MCM} \\ = 36.683 \text{ MCM}$$

#### B) Ground Water Draft

Ground water is mainly used for domestic, irrigation and industrial need. To estimate the ground water use, Census data of 2001 have been used for population and irrigated area

#### Draft for Drinking Use

Population using groundwater as drinking water	38041
Per Capita	70 lit/day
Annual Ground Water Use	1.016716 MCM

#### Irrigation Use

About 534 ha of land is being irrigated through ground water. Considering 50 cm/ha of ground water use, total ground water need for irrigation works out to be 2.67 MCM

#### Industrial Use

In the study area there is no industry hence ground water requirement for industrial use has been taken to be zero.

#### Total Ground Water Utilization

$$1.016716 \text{ MCM} + 2.67 \text{ MCM} + 0 \text{ MCM} \\ = 3.68672 \text{ MCM}$$

#### Ground Water Balance

Annual Resources = 36.683 MCM

Annual Utilization = 3.68672 MCM

Balance G/W = 32.99628 MCM

#### Stage of Ground Water Development

The stage of ground water development in an area is taken as the ratio of Gross annual draft for all uses in the total utilizable ground water resource or net annual ground water availability

Thus the stage of ground water development (in %) in the buffer zone is

50

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At Village Talaspali, Block-Ghughoda, Raigarh District, Chhattisgarh State



Hydrogeology of 10km Buffer Zone of Talipali Coal Mining Project of M/s.NTPC Ltd

$$\frac{\text{Net Ground Water Draft}}{\text{Net Ground Water Availability}} \times 100$$

$$= \frac{(3.68972/36.660)}{1} \times 100$$

$$= 10.058 \%$$

The unit of assessment as per GCG norms are categorized for ground water development based on two criteria:

- i. Stage of Development
- ii. Long term trend of pre & post monsoon water level

Since the buffer zone represents an area where stage of development is 10.058 % and there is no long term decline of pre & post monsoon water level, the area is categorized as safe.

## CHAPTER-11

### CONCLUSION

Talaspali Coal Mining Project of National Thermal Power Corporation Ltd is located in Gharghoda Block of Raigarh district, Chhattisgarh State. The mining lease area is spread over an area of 2113 hectares of land. The Mining Lease area falls in the Survey of India top-sheet no. 64 N/7 & 8 and is bounded by north latitude 22° 13' 35" to 22° 18' 08" N and longitude 83° 28' 42" to 83° 30' 22" E.

The mining will be carried out through open cast methods with Shovel-dumper combination & Continuous Surface Miner.

The climate of the area is tropical monsoon climate with average annual rainfall of 1165mm with annual maximum and minimum temperature of 43°C and 8° C respectively.

The area is characterized by denudational hill ranges in the north with intervening valleys, plateaus in the south, rivers, nallas, reserved forest and water bodies. The surface elevation varies from 600m to 300m above M.S.L. The general surface gradient is from north to south. The major reserved forests in the area are Tolpa west Reserved Forest, Slat RF, Rampur RF and Dandongri RF. The area is drained by river Kalo and its tributaries and other small streams. The river Kalo flows in the eastern part in north to south direction.

The area is underlain by rocks of the Gondwana Super Group and granite gneiss.

The coalfield displays the complete sequence of Lower Gondwana rocks from Tachir to Kamthi.

The pre-monsoon depth to water level varies in the range between 5.4m bgl and 13.87m bgl. The post-monsoon depth to water level varies in the range between 3.8m bgl and 8.3m bgl. The stage of ground water development of the study area has been calculated to be 10.058%.

The ground water samples of the area show that water is fit for drinking as well as for domestic purposes.

The surface elevation of mining lease area varies between 340m amsl and 260m amsl. On an average depth to water table in the mining area lies at 325m amsl. At the end of 1<sup>st</sup> year of mining activity the bottom will be 300m amsl. So mining activities will interact

Hydrogeology of 10km Buffer Zone of Talaspali Coal Mining Project of M/s NTPC Ltd.

water table. De-watering of mining pit is necessary for safe mining. The quantity of probable de-watering water available at the end of 1<sup>st</sup> year has been estimated to be 900 m<sup>3</sup>/day, 1320 m<sup>3</sup>/day at the end of 2<sup>nd</sup> year and 1810 at the 3<sup>rd</sup> year of mining. The quantity will increase with progress of mining activity. The pit de-watering water will be used for dust suppression, green belt development and drinking and domestic uses etc. The excess de-watering water if any will be recharged to ground water system at hydrogeologically suitable place through recharging structures. The quantity of de-watering water will be assessed every year.





## Additional Annexure-13

## ANNEXURE-VIIIIF

## NOTE ON UNDERGROUND MINING

## 1.1 DISPOSITION OF SEAMS AND SELECTION OF MINING TECHNOLOGY

Mechanized opencast mining of various coal seams commencing from the topmost X seam to IV seam has been planned. The various coal seams/ splits available below IV seam and the partings between various such horizons is detailed at Table 1.1.

Table – 1.1 - Thickness of Seams/Partings below III Seam

Coal Seams	Seam (m)		Parting (m)		Dominant Thickness (m)
	Minimum	Maximum	Minimum	Maximum	
III L	0.12	3.25			0.50-1.5
Parting			24.57	44.55	33.0-39.0
III	0.66	5.97			2.0-5.5
Parting			31.1	55.83	33.0-51.0
Parting			31.1	55.83	33.0-51.0
III L3	0.5	3.09			<0.90
Parting			13.39	40.9	28.0-38.0
III L2	0.07	2.68			<0.90
Parting			5	60.39	35
III L1	0.05	1.54			<0.90
Parting			1.27	20.59	3.0-14.0
II	0.13	5.92			0.50-2.50
Parting			0.37	3.88	0.50-2.0
II L	0.05	2.45			<0.90
Parting			Around 35.0 m		
I	0.22	0.55			-

From the above table, it is evident that Seam III L below Seam IV (the proposed quarry floor) has thickness varying from 0.12m to 3.25m although the seam has



not acquired workable thickness in the the mining area as the prevalent thickness in 83% of boreholes varies from 0.5m to 1.50m.

The seam below seam III, is Seam II which has acquired workable thickness in the mining area (the prevalent seam thickness is 2.0 to 5.50 m in 86% of boreholes). The bottommost Seam IV has been planned to be worked by Opencast. The Final stage plan of the OC workings has proposed to fill the workings with OB upto a height of 120m above the surface height. A void has been proposed to be left in the OC workings and would normally be filled with water. The OB dumps of the OC workings are watercharged during rainy season. The parting between Seam III and Seam IV is less than 60m in most of the mining area. There would be dead load of the 120m high dump on the surface of the Underground workings. Considering the height of the dump, the depth of the Seam III workings (more than 250m in most of the area), the water filled void on the surface and water charged strata of OB on the surface of the mine during rainy season, the seam III has been considered to be unsafe to work by UG method.

Detailed study of the Geological Report has revealed that possibility of any belowground mining in Seam II L1 and II L3 does not exist due to poor development of the carbonaceous horizons. Seam II has developed working thickness in the block barring eastern side. Seam II L2 & Seam II L3 have attained workable thickness in north west and south west areas of the coal block in very small areas. The seam II L2 and II L3 have workable area at a depth higher than 500m in the south western side. These seams have developed workable thickness in a very small area in the North Western side at a depth higher than 300m. Accessing these areas from Seam II would involve thin seam drivage or drivage of drifts. This is considered to be non economical as the workable reserves are meagre.

The Seam Folio plans of Seam II indicate that this seam has the very good potential to be mined by underground mining operation as it has developed workable thickness for UG mining in the mining area (in from the central to western portion). The prevalent workable thickness of the II Seam varies from

1.5 to 5m. The depth of the workings vary from 200m to greater than 600m in the deepest portion of the mining area.

In CIL mines, Bord & Pillar method using SDL / LHD is in vogue. This is a semi mechanized technology and involves Blasting operations. The work force is well versed with the various operations. The manpower deployment in the working districts being high and the production to the tune of 100 tons per day with SDL and 150 tons per day with LHD machine is being achieved in Indian mines. Due to low productivity and high manpower deployment this technology, it would not be profitable to work by SDL/LHD.

The two prevalent methods for Mass production deployed in the Indian Mines are Continuous Miner Technology and Longwall technology.

Continuous Miner Technology on Bord & Pillar method is in operation in many mines of CIL. This technology is very flexible and the blasting operations cycle is also not used in this method. The shuttle-car used in the CM package is a coal hauling machine is tyre mounted likely the LHDs being used in the CIL mines. The continuous Miner machine is available in wide cutting ranges. These days CM on hiring basis is being used in many mines of CIL and the production to the tune of 2000 tpd and more is being achieved in mines. In the hiring mode of CM technology, the district manpower is provided by the private party. The CM technology is deployable in mines upto a depth of around 400m.

CM technology is normally not deployed in high depth mines due to the consideration of load bearing capacity of max pillars size of 48m x 48m permitted by the Coal Mines Regulations. The geomining conditions of high depth and dead load of 120m of backfilled OB on surface do not permit the deployment of CM technology in this mine.

Powered Support Longwall (PSLW) technology is generally suitable where comparatively large area free from faults and geological disturbances available for deployment. Long panels can be made for final extraction, as the method is highly inflexible. The property should not have large and abrupt variation in seam thickness. Besides, as the method involves cutting/shearing (no blasting) and the

rate of extraction is very high, it ensures better percentage of extraction, ease of management and is safer. Longwall panels operate on "straight line" extraction method.

A number of Longwall faces have been operated in the mines of CIL in collaboration with European Companies and even with Chinese collaboration. Till date the best results have been given by the Chinese packages. Longwall packages also require additional gate road dridge equipment. A provision of atleast two CM packages for winning the districts and main dip drivages be made. Two road headers would be required for gate road dridge of the mine. Considering the high depth and the dead load of 120m OB on surface, the seam II has been proposed to be worked by Longwall technology.

## 1.2 GEOLOGICAL RESERVES

The distribution of geological reserves in Seam II is given in Table-1.2.

Table-1.2 - Thickness-wise Geological Reserves

SN	Coal Seam	Thickness zone (m)	Geological Reserves (m.tas)
1	Seam II	1.2-1.0	2.21
		1.0-1.0	7.74
		>1.0	28.29
<b>Total</b>			<b>38.24</b>

The extractable reserves, excluding fault barriers, panel barriers and boundary barriers, are given at Table-1.3.

Table-1.3 - Extractable Reserves vis-à-vis Geological Reserves

SN	Coal Seam	Geological Reserves (M.T)	Extractable Reserves (M.T)
1	Seam II	38.24	28.25

### 1.3 MAIN MINE ENTRIES

Considering the availability of land as per the OC planning of higher seams, the only option suitable for the mine is working by two shafts. One of the shafts can shall be used as return airshaft and the coal handling and manwinding shall be carried from the other shaft. The depth of the shafts has been considered to be 245 m.

Though it is ideal to locate such mine openings around middle of the area considered for belowground workings, yet existence of opencast mining operations does not permit to have such a choice. Possibility of working by belowground method through two independent mine units, so as to get higher production capacity was also considered. It is found that sizeable coal reserves of opencast mine get blocked as also the opencast mine operations would be constrained by such planning. Therefore, only one belowground mine unit has been considered at this project.

### 1.4 MINE CAPACITY AND LIFE OF THE MINE

Use of one set of Longwall in average seam thickness of about 3.0m with provision of adequate gate/trunk transport is likely to produce on an average of about 1.7 MTPA. The two CMs having productivity of 0.5Mtpa are likely to produce 1 Mtpa per annum. The total extractable reserves are to the tune of 28.24 MT. The reserves for Longwall alongwith roadheaders driveage would last for around 10 years and those for CM would last for 12 years. The life of underground workings is expected to be 12 years from completion of Opencast workings. The sinking of shafts and construction of surface infrastructure are proposed to be carried out as parallel activity with OC workings.

## 1.5 MINE VENTILATION

The working belowground mines in Mand-Rajgarh Coalfield are placed in Degree-I category of gasiness. It is, therefore, expected that the proposed underground mine workings at Tasepati Coal block would also fall in same Degree-I of gasiness. However a scientific study for the purpose would be carried out. Accordingly, ventilation provisions in this are based on Degree-I gasiness. These provisions may need to be altered if any change in degree of gasiness is found on actual determination as required by statute.

Exhaust ventilation system is considered for the proposed mine with one of the shafts provided with a main mechanical ventilator with suitably designed air lock arrangements & escape.

A. Pv300 or equivalent fan with 350 KW motor would be suitable for the mine.

APPROVED

## Additional Annexure-14

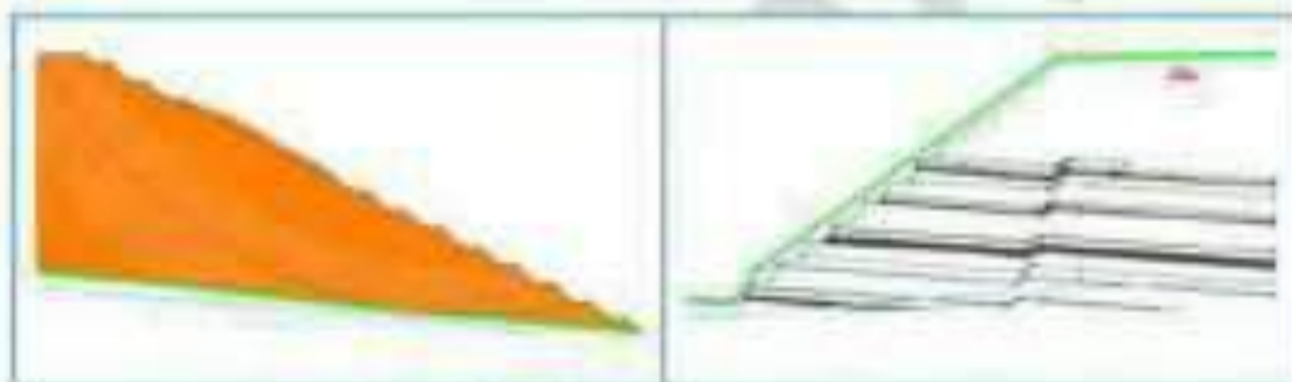


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ANNEXURE-VIIB

For Internal use of NITD

**SCIENTIFIC STUDY OF PIT AND DUMP SLOPE  
STABILITY  
FOR  
TALAIPALLI COAL MINING PROJECT**



SEPTEMBER 2022

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## CHAPTER I

### BACKGROUND

#### 1.1 INTRODUCTION

Talapatli coal mining block in the state of Chhattisgarh was initially allotted to NTPC by Ministry of Coal (MoC), vide letter no.13010/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000MW Lara Integrated Power Project which is approximately 60 kms away from the coal block.

Talapatli Block lies in the eastern part of Mand-Rajgarh Coalfield in the state of Chhattisgarh. At the time of allotment, the block was regionally explored by GSI by drilling 15 bores (6474.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

On receiving Letter of Award (LOA) from Ministry of Coal, NTPC Ltd issued Work order to MECL, to carry out detailed exploration in the block. MECL drilled about 102 boreholes (39854.75 mtrs. of drilling) in approximately 20 sq. km. block area for which the Geological Report (GR) was submitted to NTPC on 29.09.08.

On receipt of GR, NTPC awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi. The Mining Plan was prepared by ACMM in 2009 for a rated capacity of 18.00 Mtpa based on the aforementioned GR which was later approved by the Ministry of Coal on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

However, as a consequence to the Judgment of the Hon'ble Supreme Court in September 2014, the block allocation was cancelled which was later re-allotted to NTPC on 08.09.2015.

NTPC planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator (MDO) with scope of works viz. overburden removal, extraction

of coal, construction of CHP & other fixed mine infrastructures, compliance of statutory obligations and other associated activities.

Meanwhile, all requisite statutory clearances and permissions were obtained from the respective statutory bodies. The major statutory clearances out of the above are furnished below:

*Table 2-7: Major Statutory Clearances and Obtaining Date*

Activity	Date of Achievement
Env. Clearance	02.01.13/17.11.15
Forest Clearance	Sl-I: 05.11.12; Sl-II: 29.01.14, 23.05.17(Rev)
Consent to Establish	06.01.15
Consent to Operate	17.03.16
Tripartite Entree Agreement (Bharat, COO & NTPC)	19.05.14 & 04.04.17
DGMS Permission	19.01.18
Coal Controller's permission	21.01.18

### 1.2 NEED FOR THIS REPORT

M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talapalli Coal Block.

The Technical Feasibility Note on Talapalli Coal Block was prepared by CMPDI and was submitted to NTPC and M/s TEMPL in September 2021. The approved Mining Plan was reviewed and it was found to be not feasible. CMPDI recommended revision of the Approved Mining Plan.

Against this backdrop, NTPC has awarded the consultancy service to CMPDI for Scientific Stability Analysis of proposed Pit and Dumps in the Mining Plan Talapalli Coal Block which is being prepared by CMPDI.

### 1.3 SCOPE OF THE STUDY

The scientific stability analysis Report for the Pit & Dumps as per the mining plan includes the following:

#### Stability Analysis of Pit and Dumps

- Stability assessment of the proposed Dumps and Pit Slope designs/ geometry in the Mining plan
- Suitable remedial measures for safe dump management.
- Slope monitoring Techniques to be adopted.

#### 1.4 BASE DOCUMENT

The mining plan prepared by CNSPI is the base document



## CHAPTER 2

### PROJECT SITE INFORMATION

#### 2.1 LOCATION

Talaipalli coal block having an area of 2115.3 ha is bounded by latitude  $22^{\circ} 11' 35''$  &  $22^{\circ} 16' 08''$  N and longitude  $83^{\circ} 25' 49''$  &  $83^{\circ} 37' 22''$  E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaipalli block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd. was pillared by Boundary Pillars BP-1 to BP-05. The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajigath and Kalar-Masha village forming the northern boundary.

Talaipalli block is covered by Survey of India top sheet No. 64N7 & N8 (RF 1:5000). The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaipalli, Kalar-Masha, Ajigath, Chotiguda, Bochirara, Naya Rampur, Raikera and Sajepalli are numerous villages located within the block.

#### 2.2 COMMUNICATION

Talaipalli block is about 35 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaipalli village is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lalanga road. Gharghoda is about 35 km North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway. A large part of the area of investigation is practically inaccessible during monsoon. The nearest railway station is Raigarh, which is 55 km away from Talaipalli block lying on the Mumbai-Howrah main line of SE railways.

### 2.3 PHYSIOGRAPHY AND DRAINAGE

The topography of Talatpalli Block is mostly covered by softer horizons and in general represents an undulating terrain bounded by Edige Pahar in the north and Silot Pahar (580m) in the south. The general ground level elevation of the area varies between 280 m and 340m above MSL.

Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the Block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south.

### 2.4 CLIMATE

The area experiences a sub-tropical climate with very hot and dry summer. In the summer season from March to June, temperature rises to 43° C during the peak period. The monsoon period extends from mid-June to September with an average annual mean rainfall of 1620 mm. The winter season starts from November and continues upto February. During winter the temperature goes down to 18 °C.

## CHAPTER 3

### GEOLOGY AND EXPLORATION

#### 3.1 GEOLOGY OF TALAIPALLI BLOCK

Talaipalli Block is located in the eastern part of Mand-Raigarh Coalfield. The geology of the block is in conformity with the regional set-up. Major part of Talaipalli block is covered by the rocks of Barakar Formation. Barron measure occurs in the southern part of the block. However a small patch of Barron Measures is also noticed in the north western part of the block.

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 3-2 below:

Table 3-2: Geological Succession in Talaipalli Block

Formation	Thickness (m)	Lithology
Recent	0.30 – 18.00	Soil, alluvium
Barron Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and fine coal bands
Barakar	30 – 596	Fine, medium and coarse grained calcareous, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal masses
Talchir	1.00 – 54.30	Khakoe, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

#### 3.1.1 DESCRIPTION OF FORMATION

- **Metamorphics:** Precambrian metamorphic rock constitute the basement of the basin. These are composed of quartzite, mica-schist, granite gneiss and at places intruded by pegmatites or vein quartz. The metamorphics have been intersected in

- 7 boreholes (MNRT-53, 62, RT-6, 9, 12, 13 & 14). The thickness of metamorphic in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-9).
- **Talchar Formation :** The rocks of Talchar formation are not exposed within the block boundary. It is encountered in boreholes RT-5, 6, 9, 10, 12, 13 & 14. The thickness of Talchar as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10). Talchar formation consists of greyish white to greenish grey sandstone and shale, occasionally khaki in colour. At places it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite.
  - **Barakar Formation :** The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 30 – 396 m. Barakar formation constitutes fine to coarse grained, white to grey feldspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27 coal seams have been encountered in this formation besides a few local seams / bands.
  - **Barren Measure Formation :** This formation has occupied the southern part of the block. Besides a small patch of barren measure is preserved in the northern part of the block due to opposite dip of faults formation of grabens. This formation is intersected in 13 boreholes with thickness varying from 18.80 m (MNRT-27) to 143.00 m (MNRT-24). Barren Measure Formation is represented by predominantly grey shale with minor sandstone and intercalation of sandstone and shale.
  - **Igneous Intrusives :** The block is free from any igneous intrusives.
  - **Soil & Alluvium :** Major part of the block is covered by a layer of soil and alluvium. The weathering has affected all the strata below soil to a varying extent. The thickness of soil ranges from 0.90m (MNRT-7, 8) to 18 m (MNRT-59). The depth of weathered zone varies from 6.00 m (MNRT-14) to 27.30 m (MNRT-5).

### 3.1.2. STRUCTURE OF THE BLOCK

The general strike of the bed is NW-SE in the major part of the block, which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from  $4^{\circ}$  to  $8^{\circ}$  towards South-west.

The Geological Plan of the Talaspalli Coal Block is given in Fig. 2-1 below.



Figure 2.1 Geological Plan of Sukhdevi Coal Block

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. The faults details are furnished in Table 2-2 below.

Table 2-2 Details of Faults

Fault No.	Location	Trend	Nature of fault	Throw
F1-F1	Northern part passing near BH Nos. MNRT-24, 27, 22 & 25	East-West to ENE, NE-SW dipping northerly	Dip fault	20m – 65 m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m



Fault No.	Location	Trend	Nature of fault	Throw
F4-F4	Northern part near BH MNRT-11, 24, 43 & 02	East-West dipping northerly	Dip fault	30 – 130 m
F5-F5	Northern western part through BH MNRT-02	East-West	Strike fault	35 m
F6-F6	Northern part passing through MNRT-11	WNE-ESE dipping westerly	Oblique fault	15 – 25 m
F7-F7	Northern part passing through MNRT-11	SW - SE	Oblique fault	20 m
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m
F9-F9	Northern part passing through MNRT-10, RT-4 & MNRT-11	East - West to curvilinear	Strike/Oblique Fault	25m
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0-10 m
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m
F12-F12	Southern part	NW-SE	Oblique	25 m

### 3.1.3 COAL SEAMS

A total of 27 Coal Seams have been encountered in Talagalli Block. The sequence of coal seams is given below:

Seam I is poorly developed in the block. Hence resource of this seam has not been assessed.

Out of the above, seams workable by open cast are from topmost X LA to IV BOT seam due to constraint of space for dumping. The remaining have underground potential. Seams viz. X L-D, X L-C, X L-B, IX L-I, VIII, VII, V Top, V Cl, V Bottom, III, I L-I & I Bottom are poorly developed in the block. Hence resource of these seams has not been assessed.

The sequence of coal seams and pitting is given Table 3-4 below:

Table 3.2: Sequence of Coal Reserves at Pitings

Sl. No.	Coal Reserve	Thickness of Coal Seam (m)		Thickness of Working Layer		Residual Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	1.1A	0.2	0.25	0.02	0.02	0.18-0.23
2	1.1B	0.3	0.35	0.02	0.02	0.28-0.33
3	1.1C	0.4	0.45	0.02	0.02	0.38-0.43
4	1.1D	0.5	0.55	0.02	0.02	0.48-0.53
5	1.1E	0.6	0.65	0.02	0.02	0.58-0.63
6	1.1F	0.7	0.75	0.02	0.02	0.68-0.73
7	1.1G	0.8	0.85	0.02	0.02	0.78-0.83
8	1.1H	0.9	0.95	0.02	0.02	0.88-0.93
9	1.1I	1.0	1.05	0.02	0.02	0.98-1.03
10	1.1J	1.1	1.15	0.02	0.02	1.08-1.13
11	1.1K	1.2	1.25	0.02	0.02	1.18-1.23
12	1.1L	1.3	1.35	0.02	0.02	1.28-1.33
13	1.1M	1.4	1.45	0.02	0.02	1.38-1.43
14	1.1N	1.5	1.55	0.02	0.02	1.48-1.53
15	1.1O	1.6	1.65	0.02	0.02	1.58-1.63
16	1.1P	1.7	1.75	0.02	0.02	1.68-1.73
17	1.1Q	1.8	1.85	0.02	0.02	1.78-1.83
18	1.1R	1.9	1.95	0.02	0.02	1.88-1.93
19	1.1S	2.0	2.05	0.02	0.02	1.98-2.03
20	1.1T	2.1	2.15	0.02	0.02	2.08-2.13
21	1.1U	2.2	2.25	0.02	0.02	2.18-2.23
22	1.1V	2.3	2.35	0.02	0.02	2.28-2.33
23	1.1W	2.4	2.45	0.02	0.02	2.38-2.43
24	1.1X	2.5	2.55	0.02	0.02	2.48-2.53
25	1.1Y	2.6	2.65	0.02	0.02	2.58-2.63
26	1.1Z	2.7	2.75	0.02	0.02	2.68-2.73
27	1.1AA	2.8	2.85	0.02	0.02	2.78-2.83
28	1.1AB	2.9	2.95	0.02	0.02	2.88-2.93
29	1.1AC	3.0	3.05	0.02	0.02	2.98-3.03
30	1.1AD	3.1	3.15	0.02	0.02	3.08-3.13
31	1.1AE	3.2	3.25	0.02	0.02	3.18-3.23
32	1.1AF	3.3	3.35	0.02	0.02	3.28-3.33
33	1.1AG	3.4	3.45	0.02	0.02	3.38-3.43
34	1.1AH	3.5	3.55	0.02	0.02	3.48-3.53
35	1.1AI	3.6	3.65	0.02	0.02	3.58-3.63
36	1.1AJ	3.7	3.75	0.02	0.02	3.68-3.73
37	1.1AK	3.8	3.85	0.02	0.02	3.78-3.83
38	1.1AL	3.9	3.95	0.02	0.02	3.88-3.93
39	1.1AM	4.0	4.05	0.02	0.02	3.98-4.03
40	1.1AN	4.1	4.15	0.02	0.02	4.08-4.13
41	1.1AO	4.2	4.25	0.02	0.02	4.18-4.23
42	1.1AP	4.3	4.35	0.02	0.02	4.28-4.33
43	1.1AQ	4.4	4.45	0.02	0.02	4.38-4.43
44	1.1AR	4.5	4.55	0.02	0.02	4.48-4.53
45	1.1AS	4.6	4.65	0.02	0.02	4.58-4.63
46	1.1AT	4.7	4.75	0.02	0.02	4.68-4.73
47	1.1AU	4.8	4.85	0.02	0.02	4.78-4.83
48	1.1AV	4.9	4.95	0.02	0.02	4.88-4.93
49	1.1AW	5.0	5.05	0.02	0.02	4.98-5.03
50	1.1AX	5.1	5.15	0.02	0.02	5.08-5.13
51	1.1AY	5.2	5.25	0.02	0.02	5.18-5.23
52	1.1AZ	5.3	5.35	0.02	0.02	5.28-5.33
53	1.1BA	5.4	5.45	0.02	0.02	5.38-5.43
54	1.1BB	5.5	5.55	0.02	0.02	5.48-5.53
55	1.1BC	5.6	5.65	0.02	0.02	5.58-5.63
56	1.1BD	5.7	5.75	0.02	0.02	5.68-5.73
57	1.1BE	5.8	5.85	0.02	0.02	5.78-5.83
58	1.1BF	5.9	5.95	0.02	0.02	5.88-5.93
59	1.1BG	6.0	6.05	0.02	0.02	5.98-6.03
60	1.1BH	6.1	6.15	0.02	0.02	6.08-6.13
61	1.1BI	6.2	6.25	0.02	0.02	6.18-6.23
62	1.1BJ	6.3	6.35	0.02	0.02	6.28-6.33
63	1.1BK	6.4	6.45	0.02	0.02	6.38-6.43
64	1.1BL	6.5	6.55	0.02	0.02	6.48-6.53
65	1.1BM	6.6	6.65	0.02	0.02	6.58-6.63
66	1.1BN	6.7	6.75	0.02	0.02	6.68-6.73
67	1.1BO	6.8	6.85	0.02	0.02	6.78-6.83
68	1.1BP	6.9	6.95	0.02	0.02	6.88-6.93
69	1.1BQ	7.0	7.05	0.02	0.02	6.98-7.03
70	1.1BR	7.1	7.15	0.02	0.02	7.08-7.13
71	1.1BS	7.2	7.25	0.02	0.02	7.18-7.23
72	1.1BT	7.3	7.35	0.02	0.02	7.28-7.33
73	1.1BU	7.4	7.45	0.02	0.02	7.38-7.43
74	1.1BV	7.5	7.55	0.02	0.02	7.48-7.53
75	1.1BW	7.6	7.65	0.02	0.02	7.58-7.63
76	1.1BX	7.7	7.75	0.02	0.02	7.68-7.73
77	1.1BY	7.8	7.85	0.02	0.02	7.78-7.83
78	1.1BZ	7.9	7.95	0.02	0.02	7.88-7.93
79	1.1CA	8.0	8.05	0.02	0.02	7.98-8.03
80	1.1CB	8.1	8.15	0.02	0.02	8.08-8.13
81	1.1CC	8.2	8.25	0.02	0.02	8.18-8.23
82	1.1CD	8.3	8.35	0.02	0.02	8.28-8.33
83	1.1CE	8.4	8.45	0.02	0.02	8.38-8.43
84	1.1CF	8.5	8.55	0.02	0.02	8.48-8.53
85	1.1CG	8.6	8.65	0.02	0.02	8.58-8.63
86	1.1CH	8.7	8.75	0.02	0.02	8.68-8.73
87	1.1CI	8.8	8.85	0.02	0.02	8.78-8.83
88	1.1CJ	8.9	8.95	0.02	0.02	8.88-8.93
89	1.1CK	9.0	9.05	0.02	0.02	8.98-9.03
90	1.1CL	9.1	9.15	0.02	0.02	9.08-9.13
91	1.1CM	9.2	9.25	0.02	0.02	9.18-9.23
92	1.1CN	9.3	9.35	0.02	0.02	9.28-9.33
93	1.1CO	9.4	9.45	0.02	0.02	9.38-9.43
94	1.1CP	9.5	9.55	0.02	0.02	9.48-9.53
95	1.1CQ	9.6	9.65	0.02	0.02	9.58-9.63
96	1.1CR	9.7	9.75	0.02	0.02	9.68-9.73
97	1.1CS	9.8	9.85	0.02	0.02	9.78-9.83
98	1.1CT	9.9	9.95	0.02	0.02	9.88-9.93
99	1.1CU	10.0	10.05	0.02	0.02	9.98-10.03
100	1.1CV	10.1	10.15	0.02	0.02	10.08-10.13
101	1.1CW	10.2	10.25	0.02	0.02	10.18-10.23
102	1.1CX	10.3	10.35	0.02	0.02	10.28-10.33
103	1.1CY	10.4	10.45	0.02	0.02	10.38-10.43
104	1.1CZ	10.5	10.55	0.02	0.02	10.48-10.53
105	1.1DA	10.6	10.65	0.02	0.02	10.58-10.63
106	1.1DB	10.7	10.75	0.02	0.02	10.68-10.73
107	1.1DC	10.8	10.85	0.02	0.02	10.78-10.83
108	1.1DD	10.9	10.95	0.02	0.02	10.88-10.93
109	1.1DE	11.0	11.05	0.02	0.02	10.98-11.03
110	1.1DF	11.1	11.15	0.02	0.02	11.08-11.13
111	1.1DG	11.2	11.25	0.02	0.02	11.18-11.23
112	1.1DH	11.3	11.35	0.02	0.02	11.28-11.33
113	1.1DI	11.4	11.45	0.02	0.02	11.38-11.43
114	1.1DJ	11.5	11.55	0.02	0.02	11.48-11.53
115	1.1DK	11.6	11.65	0.02	0.02	11.58-11.63
116	1.1DL	11.7	11.75	0.02	0.02	11.68-11.73
117	1.1DM	11.8	11.85	0.02	0.02	11.78-11.83
118	1.1DN	11.9	11.95	0.02	0.02	11.88-11.93
119	1.1DO	12.0	12.05	0.02	0.02	11.98-12.03
120	1.1DP	12.1	12.15	0.02	0.02	12.08-12.13
121	1.1DQ	12.2	12.25	0.02	0.02	12.18-12.23
122	1.1DR	12.3	12.35	0.02	0.02	12.28-12.33
123	1.1DS	12.4	12.45	0.02	0.02	12.38-12.43
124	1.1DT	12.5	12.55	0.02	0.02	12.48-12.53
125	1.1DU	12.6	12.65	0.02	0.02	12.58-12.63
126	1.1DV	12.7	12.75	0.02	0.02	12.68-12.73
127	1.1DW	12.8	12.85	0.02	0.02	12.78-12.83
128	1.1DX	12.9	12.95	0.02	0.02	12.88-12.93
129	1.1DY	13.0	13.05	0.02	0.02	12.98-13.03
130	1.1DZ	13.1	13.15	0.02	0.02	13.08-13.13
131	1.1EA	13.2	13.25	0.02	0.02	13.18-13.23
132	1.1EB	13.3	13.35	0.02	0.02	13.28-13.33
133	1.1EC	13.4	13.45	0.02	0.02	13.38-13.43
134	1.1ED	13.5	13.55	0.02	0.02	13.48-13.53
135	1.1EE	13.6	13.65	0.02	0.02	13.58-13.63
136	1.1EF	13.7	13.75	0.02	0.02	13.68-13.73
137	1.1EG	13.8	13.85	0.02	0.02	13.78-13.83
138	1.1EH	13.9	13.95	0.02	0.02	13.88-13.93
139	1.1EI	14.0	14.05	0.02	0.02	13.98-14.03
140	1.1EJ	14.1	14.15	0.02	0.02	14.08-14.13
141	1.1EK	14.2	14.25	0.02	0.02	14.18-14.23
142	1.1EL	14.3	14.35	0.02	0.02	14.28-14.33
143	1.1EM	14.4	14.45	0.02	0.02	14.38-14.43
144	1.1EN	14.5	14.55	0.02	0.02	14.48-14.53
145	1.1EO	14.6	14.65	0.02	0.02	14.58-14.63
146	1.1EP	14.7	14.75	0.02	0.02	14.68-14.73
147	1.1EQ	14.8	14.85	0.02	0.02	14.78-14.83
148	1.1ER	14.9	14.95	0.02	0.02	14.88-14.93
149	1.1ES	15.0	15.05	0.02	0.02	14.98-15.03
150	1.1ET	15.1	15.15	0.02	0.02	15.08-15.13
151	1.1EU	15.2	15.25	0.02	0.02	15.18-15.23
152	1.1EV	15.3	15.35	0.02	0.02	15.28-15.33
153	1.1EW	15.4	15.45	0.02	0.02	15.38-15.43
154	1.1EX	15.5	15.55	0.02	0.02	15.48-15.53
155	1.1EY	15.6	15.65	0.02	0.02	15.58-15.63
156	1.1EZ	15.7	15.75	0.02	0.02	15.68-15.73
157	1.1FA	15.8	15.85	0.02	0.02	15.78-15.83
158	1.1FB	15.9	15.95	0.02	0.02	15.88-15.93
159	1.1FC	16.0	16.05	0.02	0.02	15.98-16.03
160	1.1FD	16.1	16.15	0.02	0.02	16.08-16.13
161	1.1FE	16.2	16.25	0.02	0.02	16.18-16.23
162	1.1FF	16.3	16.35	0.02	0.02	16.28-16.33
163	1.1FG	16.4	16.45	0.02	0.02	16.38-16.43
164	1.1FH	16.5	16.55	0.02	0.02	16.48-16.53
165	1.1FI	16.6	16.65	0.02	0.02	16.58-16.63
166	1.1FJ	16.7	16.75	0.02	0.02	16.68-16.73
167	1.1FK	16.8	16.85	0.02	0.02	16.78-16.83
168	1.1FL	16.9	16.9			

## CHAPTER 4

### METHOD OF MINING

#### 4.1 PROPOSED METHOD OF MINING

Considering the geo-mining characteristics of the block, dumping space constraints and for conservation of resource, it is proposed to extract the coal reserves upto Seam IV BOT using open cast mining Method because of following reasons --

i) Occurrence of multiple seam with a significant number having low thickness between 0.5m-1.5m. Also, some seams are thick and are above 1m in thickness. Coal loss in such seam conditions can be minimized by opencast mining method.

ii) The existence of very low angle for entry to bottom-most seam considered (Seam IV BOT) in the eastern part of the block makes opencast mining an obvious choice.

The deposit has therefore been proposed for mining by opencast method up to the Seam IV BOT Floor. Seams below IV BOT shall be considered for LC mining after exhaustion of OC mine.

#### 4.2 CHOICE OF TECHNOLOGY

The operational factors include:

- Multi-Seam operation involving 19 seams horizons.
- Effective seam thickness varying from 1.00 to 9.10 m with majority of seams having less effective thickness varying from 1.00 to 2.00m.
- Mild seam gradient.
- Ore with varying parting thickness.

Based on the above factors surface mine has been considered for extraction of coal as surface mine elements having to deal. Blasting in comparatively less thick coal seams leads to higher contribution of extracted coal.

### Stability Analysis of Pit and Dumps

As removal of overburden with varying parting thickness requires flexible operation, shovel-dumper combination with conventional system of mining i.e. inclined string has been considered for removal of overburden.

For a total capacity of 25.0 Mtpa, it is proposed to deploy 10-12 cum Hydraulic Shovel/Backhoe and 20-22 Cum Hydraulic shovel/backhoe with 100T and 200T Rear Dumper respectively for OB. For this parting lower size equipment shall be deployed. For Coal, Surface Mixer with Front End Loader and 40T Dumper shall be deployed.

#### 4.3 CONSTRAINTS ON MINE DEVELOPMENT

The following constraints in open-pit working of the deposit have been envisaged:

- The block area being surrounded by coal bearing blocks and hills in all sides, availability of any land for external dumping, outside the block area appears remote.
- Kelo river flowing along the north-eastern side of the block.
- Presence of about 08 villages (fully or partly) within the proposed mining area.
- High initial Depth of base seam in the western side due to presence of several faults and high stripping ratio especially in the western side of the block requires huge amount of temporary external dump in the dip side which needs to be re-handled later.

#### 4.4 PIT DELINEATION: MINE BOUNDARY OPTIONS

As the block area is surrounded by coal bearing blocks on all sides and reserve forest, there is not availability of any land for external dumping outside the block area.

The mine boundary for the pit has been delineated taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

Considering the above, the pit is formulated with maximum possible external OB dump on the dip side within the block to be re-handled later and internal dumping in the denuded area.

**Pit optimization has been done considering constraint on space availability for dumping of waste.**

The pit boundary has been fixed leaving safety barrier, conveyor corridor along the eastern, southern and western boundary. Also, the infrastructural facilities (MGR, Silos, workshop etc) is proposed to be located in the south-west corner of the block.

### Stability Analysis of Pit and Dumps

The proposed Pit has been formulated considering Seam IV as base seam. Seam IV has been taken as the base seam for the pit since going upto Seam III which is only 4-4.5m thick and is 30-40m below seam IV increases the O/D handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. So, Optimum mining for the Tolipalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal.

Considering the above quarry surface within the block has been delineated as follow:

North	East	South	West
50m from block boundary, foothill of the Toige Hill in NW and leaving area for UG infrastructure in north near BH MRT-02.	60m from edge of Kalo river and 50m from Block boundary	50m from block boundary	50m from Block boundary and leaving area for infrastructure in south-west.

#### 4.5 RATED CAPACITY:

Revised Mining Plan for Tolipalli Coal Block has been prepared for a rated capacity of 25.0 Mtpa of Coal from Open-pit mine. This output is considered based on thickness of multiple coal seams (19 No. of Coal Horizons for OCP) and strike length of ~7 Km.

#### 4.6 BASIC PROJECT AND MINE PARAMETERS:

The basic project parameters and mine parameters is given below:

Sl. No.	Parameters	Unit	Value
1	Net Geological Reserve	Mt	1267.149
2	Extractable Reserve by OC method	Mt	671.26
3	O/D Volume	Mcum	2754.39
4	Stipping ratio	Count	4.33
5	Target Capacity	Mtpa/year	25
6	tentative Mine life	Years	31

Sl. No.	Parameter	Unit	Value
1	Maximum length	m	140
2	Usual strike length along the Mine Floor along the Mine Surface	m	4000
		m	3300
4	Usual dip rise length on the Mine Floor on the Mine Surface	Km	2300
		Km	3200
6	Area On the Mine Floor On the Mine Surface	ha	1301.10
		ha	1830.83

#### 4.7 SEQUENCE OF MINING:

The block has NW-SE strike of around 5 km. Opencast mining for the Talaspalli coal block has been proposed upto Seam IV, as suggested above to maximize the recovery of coal and effective dump management. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping and infrastructures. The peak rated capacity for the block is proposed to be 25.00 Mtpy.

To ensure availability of adequate quantity of coal and early reaching of target capacity, a two-entry scenario has been envisaged, one on the north eastern side and the other on the south western side. Seam IV will be accessed from both the side which will form the base of the quarry. Then working from of both the quarry will advance towards south and towards each other eventually merging into a single quarry with full strike length after about 9-10 years.

In the initial years, simultaneous working of mechanized opencast mine and the proposed belowground mine may pose operational problems due to massive production from the opencast unit. As such, it is considered prudent to start underground mine work after exhaustion of opencast workings.

OB will be transported through flank roads to temporary external OB dumps on dip side and Internal OB dumps. Coal is proposed to be transported through ramps and flank roads. Coal from both pit in initial years and also after merger of the pit will be transported to mobile coal handling

arrangement at the surface in both eastern and western side and thereafter to Coal dispatch corner by surface conveyors.

It is proposed to use conventional method of mining viz. inclined slicing with excavators/loaders loading coal and waste into Dumps for hauling.

The mining operation in the block is continuing in the southern part of the block since October 2019 through outcropping seams upto seam VIII. This south pit is projected to extract 1.88 Mt of coal by the end of FY 2022-23. This pit will remain in operation for another 3 years after FY 2022-23. The projected coal production and OB removal from this south pit is given below:

Year	Calendar Year	Existing South Pit	
		Coal (Mts)	OB (Mts)
Up to Base of FY	Up to		
2019-20	Base FY	2.80	26.01
1	2020-21	1.50	11.33
2	2021-22	2.03	16.77
3	2022-23	1.58	5.81
<b>Total</b>		<b>7.91</b>	<b>60.92</b>

Moreover, the work for mining operation through outcropping seams in the north-western side has already been awarded for 5 years upto Seam VIII. The pit will be opened in the north west side as per the proposed mine entry and the mine will produce about 14.60 Mt of coal with 46.63 Mts of OB removal in the 5 years. This OB will be dumped south of the proposed western pit near the pit and will have to be re-handled to proposed temporary external dump in the western part of the block after 5 years.

The proposed coal production and OB removal from the eastern and western pit for first 5 years of operation is given below:

Year	Calendar Year	West Pit		East Pit		Total Coal (Mt)	Total OB (Mts)
		Coal (Mt)	OB (Mts)	Coal (Mt)	OB (Mts)		
Up to Base of FY							
2019-20		1.60	5.31			1.60	5.31
1	2020-21	1.02	6.29	0.98	3.71	2.00	10.00
2	2021-22	0.89	5.39	1.07	5.90	1.96	11.29
3	2022-23	4.71	17.34	1.79	11.06	6.50	28.40
4	2023-24	4.00	21.01	5.00	24.28	9.00	45.29
5	2024-25	0.00	5.84	11.07	30.14	11.07	35.97
<b>Total</b>		<b>11.22</b>	<b>55.78</b>	<b>17.84</b>	<b>75.09</b>	<b>29.06</b>	<b>131.87</b>

#### 4.8 MINING SYSTEM PARAMETERS :

Elements of mining system have been determined in accordance with the parameters of excavators, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.

##### Top OB and thick parting:

Bench height : 10-13 m with 20cum electric-hydraulic shovel/loader

Bench width : Working-40-45m, Non-working- 25m

Bench slope : 70 deg.

##### Parting between seams:

Bench height : as per inter-burden thickness with 10-12 cum electric-hydraulic shovel/loader

Bench width : Working-40-45m, Non-working- 25m

Bench slope : 70 deg.

##### Coal:

Bench height : Seam height with surface Mine

Bench width : 40-45m

Bench slope : 70 deg.

##### Dump:

Bench height : 30m

Bench width : 30m

Bench slope : 37 deg.

#### 4.9 WASTE DISPOSAL STRATEGY:

It is envisaged that initially for 3 years, all the OB generated will be dumped externally from both the eastern and western pit. This temporary external dump is proposed to be located in the southern side of the block. Once sufficient void is created after 3 years of operation, internal dumping will



#### Stability Analysis of Pit and Dumps

start in eastern pit while in the Western pit, internal dumping can be started only from 8th year of operation once the base seam is reached.

The external dumping will commence till 13th year and thereafter from 14th year, this external dump (the OB part) will have to be re-handled back into the quarry void for smooth mine advancement. However, re-handling of 3.73 Mcum/year of Top Soil for spreading over internal dump will start from 10th year only.

Out of the total OB of 2734.58 Mcum, it is estimated that 533.53 Mcum (~19.3%) will be required to be temporarily dumped externally. This 533.53 Mcum will be re-handled back into the quarry after sufficient space is available for accommodation of waste from 14th year and will be re-handled upto 25th year. The lead for re-handling would be around 3.5 km. The Strip ratio for the project including re-handling will be 5.17 cum/t.

The height of the temporary external dump is proposed to be around 120m above ground level upto an RL of +420m and final height of the internal dump is proposed to be 120m above ground level upto an RL of +420m. This will ensure optimisation of the life of the mine to extract maximum mineable coal. However, a slope stability study will be important to determine final dump height and final dump slope as per regulation no. 106, CMR, 2017, and DGMS Circular no. 3, 2020. Slope stability analysis for proposed dumps in the mining plan has been carried out and the factor of safety for dump height upto 120m from DGL was modelled using the cross sections and the material properties collected from the field. The analysis indicates a factor of safety in the range of 1.25-1.50 for various cases.

Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 37° (equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 30 m. Overall slope of dump works out to be 27°-24°. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.

The waste disposal schedule is given below.

## Stability Analysis of Pit and Dumps

No.	Impervious Base (ft)		Normal Direction		Inclination	Top Slope		Steady State Factor	
	Height	Length	Height	Length		Height	Length	Height	Length
Circle No.									
1	2.0	2.0			2.0	2.0			
2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
3	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
4	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
5	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
6	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
7	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
8	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	
9	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
10	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
11	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
12	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	
13	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
14	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
15	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	
16	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	
17	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	
18	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	
19	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	
20	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	
21	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
22	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	
23	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	
24	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	
25	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	
26	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	
27	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	
28	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	
29	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	
30	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	
31	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	
32	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	
33	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
34	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
35	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	
36	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	
37	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	
38	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	
39	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	
40	41.0	41.0	41.0	41.0	41.0	41.0	41.0	41.0	
41	42.0	42.0	42.0	42.0	42.0	42.0	42.0	42.0	
42	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	
43	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	
44	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	
45	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	
46	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	
47	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	
48	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	
49	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	
50	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	
51	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	
52	53.0	53.0	53.0	53.0	53.0	53.0	53.0	53.0	
53	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	
54	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	
55	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	
56	57.0	57.0	57.0	57.0	57.0	57.0	57.0	57.0	
57	58.0	58.0	58.0	58.0	58.0	58.0	58.0	58.0	
58	59.0	59.0	59.0	59.0	59.0	59.0	59.0	59.0	
59	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	
60	61.0	61.0	61.0	61.0	61.0	61.0	61.0	61.0	
61	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0	
62	63.0	63.0	63.0	63.0	63.0	63.0	63.0	63.0	
63	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	
64	65.0	65.0	65.0	65.0	65.0	65.0	65.0	65.0	
65	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	
66	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	
67	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	
68	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	
69	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	
70	71.0	71.0	71.0	71.0	71.0	71.0	71.0	71.0	
71	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	
72	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	
73	74.0	74.0	74.0	74.0	74.0	74.0	74.0	74.0	
74	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	
75	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	
76	77.0	77.0	77.0	77.0	77.0	77.0	77.0	77.0	
77	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0	
78	79.0	79.0	79.0	79.0	79.0	79.0	79.0	79.0	
79	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	
80	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0	
81	82.0	82.0	82.0	82.0	82.0	82.0	82.0	82.0	
82	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	
83	84.0	84.0	84.0	84.0	84.0	84.0	84.0	84.0	
84	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	
85	86.0	86.0	86.0	86.0	86.0	86.0	86.0	86.0	
86	87.0	87.0	87.0	87.0	87.0	87.0	87.0	87.0	
87	88.0	88.0	88.0	88.0	88.0	88.0	88.0	88.0	
88	89.0	89.0	89.0	89.0	89.0	89.0	89.0	89.0	
89	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	
90	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	
91	92.0	92.0	92.0	92.0	92.0	92.0	92.0	92.0	
92	93.0	93.0	93.0	93.0	93.0	93.0	93.0	93.0	
93	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	
94	95.0	95.0	95.0	95.0	95.0	95.0	95.0	95.0	
95	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	
96	97.0	97.0	97.0	97.0	97.0	97.0	97.0	97.0	
97	98.0	98.0	98.0	98.0	98.0	98.0	98.0	98.0	
98	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	
99	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

## 4.10 TYPE OF EQUIPMENT/ HEMM PROPOSED

Equipment	SIZE	No.
<b>OBR</b>		
Hyd Backhoe/Shovel	20-22cum	13
Hyd Backhoe/Shovel	10-12 cum	13
Rear Dumper	200T	144
Rear Dumper	100T	177
RHD Drill	250 mm	23
Dozer with Ripper	850 HP	4
Dozer	410HP	24
<b>COAL</b>		
Surface Miner	3 Mt/y	9



## Stability Analysis of Pit and Dumps

FE Loader	6-7 cum	10
Ram Charger (Coal Body)	65 T	00
DOZER (wheel)	450-600hp	10
<b>COMMON</b>		
Diesel Hydraulic Backhoe	1.5-2.0 cum	2
Water Sprinkler	30KL	10
Mobile Dust Suppression Cannon		10
Mot. Grader	280HP	8
Front Loader		2
Vibratory Compactor	25T	4
Diesel Borewin	9KL	4
Dozer	410 HP	2
Crane	10Ton	4
Crane	25Ton	4
Crane	30Ton	1
T. Handler		4
F.E.L.	5-6 cum	3
Fork Lifter		4
Maintenance Van		2
<b>RECLAMATION</b>		
Diesel Hydraulic Backhoe	1.5-2.0 cum	2
Front Tractor		4
Dozer	410HP	2
Grader	280HP	2
Tipping Truck	25 T	4

## CHAPTER 5

### STABILITY ANALYSIS

#### 5.1 FACTORS GOVERNING THE SLOPE STABILITY

There are two main aspects of slope failure, and they are natural and manmade disturbances. The seismic activities of the earth's crust, rain, tornado, and geology come under the naturally occurring disturbance. The blasting, excavation is a manmade disturbance for slope instability. Following are the main factors that influence slope stability.

#### 5.2 PROPERTIES OF MATERIAL FORMING THE SLOPE

##### a. Shear strength parameters:-

This is the basic parameter that holds the key role to control the stability of the slope. All stability analysis involves knowledge of the shearing strength of the soil but it is more difficult to comprehend it accurately. The shearing resistance of soil comprises basically of the following components:

- The frictional resistance between the individual soil particles at their contact points
- The cohesion between the surfaces of the soil particles, i.e. the structural resistance to displacements of the soil because of the interlocking of the particles
- The shear strength in cohesion-less results from inter-granular friction alone, while in other soils, it results from both internal friction as well as cohesion
- The fundamental shear strength equation proposed by French engineer Coulomb is  $S = C + \sigma \tan \phi$  (4)

##### b. Hydro-geological parameters:-

The effect of groundwater present within the rock mass surrounding an open pit can be detrimental to the stability of the slope (Hoek and Bray, 1981). Therefore, it is expedient to constantly monitor groundwater levels as well as pore pressure to assist in the assessment of slope stability (Ding, et al. 1998). Piezometers are important for monitoring the effectiveness of mine dewatering programs (Grard and McHugh, 2000). Measurement or calculation of water pressure is an integral part of

site investigation for slope stability studies. Information on water pressure is essential for designing and maintaining safe slopes (Girard, et al. 1998).

For hydrogeology study as part of PR, monitoring of profile of water table in and around active mining areas, through groundwater monitoring points, using dug wells/ Piezometers was carried out. The same is assumed to be representative of the hydrostatic condition of the mine bench for the current analysis.

For stability analysis of undisturbed material viz working faces and High wall phreatic line was assumed considering the groundwater level/ piezometric data for the Talaspalli block as provided by the hydrogeology dept, CMDDI.

Hydrostatic pressure/ water level condition (above the ground) within the overburden dumps (rooms/old) can't be directly measured as OB dumps are not stratified Geological Formation. Study of groundwater monitoring levels maybe not be directly required in case of stability of OB dumps as it will not intersect the groundwater table of the surrounding area. However, the rate of infiltration of rainwater may be increased due to loose OB dump material.

Groundwater level and phreatic surface assumptions, piezometric levels were based on the hydrological data of the hydrogeological study of Talaspalli OCP.

### 5.2.1 GEOLOGY OF MINE PIT

The geology of the mine pit plays a vital role in determining the stability of the working pit. Understanding subsol condition includes knowing seam alignment, type of material underneath. In addition to this, it is prudent to know various geological disturbances present in the mineable area.

#### 5.2.1.1 SEISMIC FORCES

##### (a) Earthquake Effect

Earthquake experience by a structure depends on its dynamic characteristics and ground motions such that random motion of the ground, vibration intensity, magnitude of the earthquake, depth of focus, distance from the epicenter, and the strata on which the structure stands.



### Stability Analysis of Pit and Dumps

Seismic forces are considered as per "Indian standard criteria for earthquake resistant design of structures (ISB revision) IS 1893:1984 (reprint 2002) in the following manner -

Seismic force/coefficient  $a_h$  is calculated as per the above IS Code by following two methods and a higher value is taken for slope stability calculation

#### a) Seismic Coefficient Method.

$$a_h = \beta I a_0$$

$\beta$  = Coefficient depending on the soil foundation system

$I$  = Factor depending upon the importance of structures

$a_0$  = basic horizontal seismic coefficient

#### b) Response Spectrum method

$$a_h = \beta F_0 S_d/g$$

$F_0$  = Seismic zone factor for average acceleration spectra

$S_d/g$  = Average acceleration coefficient for appropriate natural period and damping of structure. Value taken from T-  $S_d/g$  graph

$$T = 2.9 H \sqrt{P/G}/2,$$

$T$  = Natural period of vibration for earth fill structure

$H$  = Height,  $P$  = Mass density,  $G$  = modulus of rigidity

Since Talipalli OCP, is situated in Zone III expected Ground Acceleration for zone III due to the earthquake has been calculated as follows

#### 1. Seismic Coefficient Method.

$$a_h = \beta I a_0$$



Here

$$\beta = 1.5, \lambda = 1.5, \alpha\beta = 0.04$$

$$\text{Hence, } a_h = 0.08$$

### II. Response Spectrum method

$$a_h = \beta F_0 S_{aig}$$

$$F_0 = 0.2$$

$S_{aig}$  = Value taken from graph between the natural period of vibration versus average acceleration coefficient

The natural period of vibration  $T$  for earth fill structure will be calculated as follows

$$T = 2.9 H (G_p/G) 1/2, H = 30m$$

$$P = 18000 \text{ N/m}^2$$

$$Q = 13 \text{ MPa} \times 1000$$

$$\text{Hence, } T = 0.234 \text{ sec}$$

$$\text{Now } a_h = 1 * 1.5 * 0.2 * 0.16 = 0.048$$

Hence it was found that the value of horizontal acceleration from a seismic coefficient method is more than the value obtained from the response spectrum method. Hence the same value was considered for incorporating earthquake effect during stability analysis.

### (v) Blasting Effect

Blasting plays a devil's role towards the stability of Pit and Dump Slopes in Mines. Generally, a blast vibration wave of low frequency has a hostile impact on stability (Dowling and Gilbert 1988). Wong and Pang (1992) suggested the Pseudo-Static approach to evaluate the blasting effect on slopes.



Hsieh et al (2002) introduced the Disturbance factor due to blasting, "D" applicable to rock slope. The value of D varies from "0" to "1" where "0" signifies the minimal effect of blasting where "1" means large scale blast having a significant effect on slopes.

The ground motion is directly influenced by scaled distance and a square root of the explosive. Mis-timed-delayed blasts are used for the reduction of PPV of ground vibrations which are connected with the maximum charge weight detonated per delay. Peak particle velocity has been widely accepted as a criterion for evaluating the effect of blasting. Langford and Kishinoue have suggested a predictor equation to calculate peak particle velocity. DGMS has laid down accepted parameters in terms of PPV as shown in the table

Table 3.1 Permissible peak particle velocity (PPV) at the foundation level of structures in mining area in mm/sec

TYPE OF STRUCTURES		Dominant excitation frequency (Hz)		
		< 3 Hz	3-25 Hz	> 25 Hz
A	Building/structures not belonging to owner			
	(i) Domestic houses/structures (Kachha, Brick in cement)	5	10	15
	(ii) Industrial building (RCC) framed structures	10	20	25
	(iii) Object of historical importance and domestic structures	2	5	10
B	Building belonging to the owner with a limited span of life			
	(i) Domestic houses/structures (Kachha, Brick in cement)	10	15	25
	(ii) Industrial building (RCC) framed structures	15	25	30

### 5.3 CALCULATION OF FOS

The shear resistance of the sliding slope is assessed by an index called the factor of safety. The factor of safety gives a relatively static state of the studied slope about its mobilization. This also indicates the risk (rate) of failure hereby. This is a ratio of the shear resistance to shear forces developed at the sliding surface (mobilization force).



The factor of safety generally used is in the range of 1.2 to 1.5 for open-pit mines. Literature found to have categorized that slope is safe with a ratio more than the value of 1.20. Different agencies such as National Coal Board, UK, Appoimia Consulting Engineers, mine branch, Canada, GL Fiserkin, Russia, etc have envisaged a factor of safety more than 1.10 in the design of slope stability is safe if appropriate seismic acceleration is considered and more than 1.20 if seismic acceleration is not considered.

As per DGMS Tech Circular, no-3 of Dt 16/01, 2020 the suggested factor of safety are as follows:

- FOS greater than or equal to 1.3 for temporary slopes
- FOS is greater than or equal to 1.5 for permanent slopes

This factor of safety could either be directly calculated based on the limit equilibrium method or indirectly by numerical modeling using. The factor of safety must be greater than 1 for a stable slope. Due to uncertainties involved in determining the properties of materials, leaving some parameters in violation for simplification, and the presence of some external factors that are not considered for simulation, it is advisable to have a minimum factor of safety of slope as 1.5. Keeping the above discussion in mind, a factor of safety of 1.2 to 1.5 is considered as short-term stability, and a factor of safety of 1.5 and above are considered for long-term stability.

## 5.4 SOFTWARE

### 5.4.1 LIMIT EQUILIBRIUM METHOD

The conventional limit equilibrium method is used in many geotechnical practices to investigate the equilibrium condition and analyze the stability of slope with varying geotechnical data and geometry. The most common methods for limit equilibrium analysis are the method of slices. The soil mass above the assumed slip surface is divided into vertical slices for purpose of analysis. Several different methods of slices are available for analyzing the circular and non-circular conditions.

In the present study limit equilibrium method has been used to compute the factor of safety using the Bishop simplified method.



The Slope analysis of OB Dump Slopes in Talaspalli Coal Mine is performed by limit equilibrium method software namely GALENA. GALENA is based on Limit Equilibrium Method where the user assumes the failure plane with certain limits and GALENA detects the Failure plane with the least factor of safety within the range.

GALENA is powerful and accurate slope stability software and incorporates the Bishop Simplified method of analysis to determine the stability of slope. The Bishop method is used to determine the stability of slope of the circular failure surface. It analyzes the multi-layer slopes with tension cracks, earthquake forces, water pressure, and seepage if any within or above the slope including the phreatic surfaces and piezometric pressures.

### 3.5 CORRELATION OF STRENGTH PROPERTIES

It is generally difficult and expensive to sample and test large samples of the rock mass. Consequently, empirical methods of determining the friction angle and cohesion of rock masses are available in the literature (Duncan C. Wyllie et al.). In empirical methods also it is necessary to categorize the rock mass in terms of both the intact rock strength and the characteristics of the fractures/joints.

One of the methods is Strength Determination by Back Analysis of Failures. Probably the most reliable method of determining the strength of a rock mass is to back analyze a failed, or failing, slope. This procedure involves carrying out a stability analysis with the factor of safety set at 1.0 and using available information on the position of the rupture surface, the groundwater conditions at the time of failure, and any external forces such as foundation loads and earthquake motion, if applicable. In many cases, it may not be possible to carry out a back analysis of a slope in geological conditions like those in which the new slope is to be excavated. In these circumstances, published results of rock mass shear strength can be used in the design. (Duncan C. Wyllie et al.)

As an alternative to back analysis to determine the strength of fractured rock masses, an empirical method was developed by Hoek (1983) and Hoek and Brown (1988) in which the shear strength is represented as a curved envelope. This strength criterion was derived from the Griffith crack theory of rock fracture, as well as from observations of the behavior of rock masses in the laboratory and the field (Maral 1973; Jaeger 1970).

The three parameters defining the curved strength envelope of the rock mass are the tensile strength of the intact rock, and two dimensionless constants  $m$  and  $s$ .

#### 5.6 SAMPLE COLLECTION FROM COAL THE COAL FIELDS

A field visit was made to Talapalli OCP, for site reconnaissance and sample collection in the month of July 2022. The detailed site investigations were carried out. As South Pit is operational, OB material from the Active dump were collected based on litho log profile of the coal field. Main materials contributing to the formation of the dump were collected. Samples were collected at different heights and with a defined spatial variation, to cover the randomness/heterogeneity of sample. Invariably, the number of samples collected per OB dump depend on the size and heterogeneity. The details of the sample collections pictures and number of samples collected from each location are presented below. Few tests such as field moisture content ( $w_{field}$ ) and sand replacement test for in situ unit weight ( $\gamma_{in situ}$ ) were performed at in situ site:





Fig.5.1 Showing sample collection, sample variation and testing of materials.

### 5.7 INPUT PARAMETERS FOR STABILITY ANALYSIS.

The mixed material found in the interface of topsoil and coalmine overburden material is very complex in terms of both material type and its size distribution. The materials properties of these overburdened rocks or rock-soil mixture are most likely to change due to repeated exposure to weathering and particle crushing during the loading and hauling process. The crushed sandstone material being formed by similar kinds of sand grains during sedimentation possesses characteristics somewhat similar to that of sand, while the weak, weathered and crushed materials of shale tend to behave like a clay material formation when subjected to watery conditions.

Estimation of the key physico-mechanical properties of coal mine waste dumps were done considering laboratory studies (from available literature) on mixed earth rock observed in Indian coalmine waste dumps, where the properties of all major constituent materials are taken into consideration.

For high wall/working face material, each material profile is defined by referring to lithological data of the nearby horizon published in the geological report of the coalfield and using the rock lab software.

After correlating the test results from previous scientific study reports of the mine and with lithology data available from borehole along with site-specific literature review with judicial judgment values of shear strength parameters considered are given below.

### 5.8 METHODOLOGY OF THE STUDY

The stability analysis was done by Limit Equilibrium Method (LEM) and the Finite Element Method (FEM). These methods have been used to assess the failure mechanism and to determine the factor of safety.

#### 5.8.1 GEOTECHNICAL ASSESSMENT OF DUMP MATERIAL

The mine is proposed to be worked by shovel-dumper combination. The stability of the slopes primarily depends on the strength properties of the dump material, orientation and geology of the dump foundation, infiltration of the rainfall, drainage, and groundwater condition within the slope. A Factor of Safety of 1.5 has been considered for the long-term stability of the dump slope. The angle of repose was  $37^\circ$ . The stability analyses were done to understand the condition of the proposed slopes.

The Overburden material has been assumed to be placed in the loose state which allows for any free water within the dump to drain out. Therefore, it has been considered that the dump foundation is free draining. Hence piezotic surface is considered to align with the dump base in the modeling for dump slopes.

#### 5.8.2 Geotechnical Characterization of OB Dumps

Disturbed samples were collected appropriate to ground conditions and transported them to Geotechnical laboratory. Laboratory tests were conducted to determine the Index, Engineering properties and IS classification of soils. For determining shear parameters, Large Direct Shear test was carried out using 300mm x 300mm size shear box.

Cohesion, which is a function of adhesive force between the particles is found to vary between 5kPa to 40kPa for the OB material. The Angle of internal friction is found to be varying between  $32^\circ$  to  $35^\circ$  for the OB material.

For rock mass from quarry, A software namely RocLab developed by Rocscience is used in this study which developed on Hoek-Brown strength criterion to derive shear strength values for a

rock mass using the available physico-mechanical properties in the geological report of Talaspalli Coal Block.

Table 5.2 Strength properties of the OBI and Quarry material

Properties Type of Material	Cohesion (kPa)	Friction Angle (degree)	Unit weight kg/m <sup>3</sup>
Overburden Dump	5-40	22-25	1800
Coal	40-60	24	1700
Silt stone	10-30	25	2000
Sand stone	170-190	30	2400
Sandstone fine to medium grained base	150	34	2200

### 5.9 STABILITY ANALYSES

Figure 5.2 shows the overall view of Talaspalli OCP and Fig 5.3 & 5.4 shows cross-sections considered in the analysis. The sections along with the mine dumps, working faces have been taken in consultations with the mine planners for simulation of dump slope stability. Figures 5.5 to 5.20 below shows some of the the model and analysis results of pit and dump slope carried out in this study.



Fig. 3.22: Proposed Dump Area (Plan view) (Scale: 1:100)



Fig. 3.23: Proposed Dump (Section view) (Scale: 1:100)

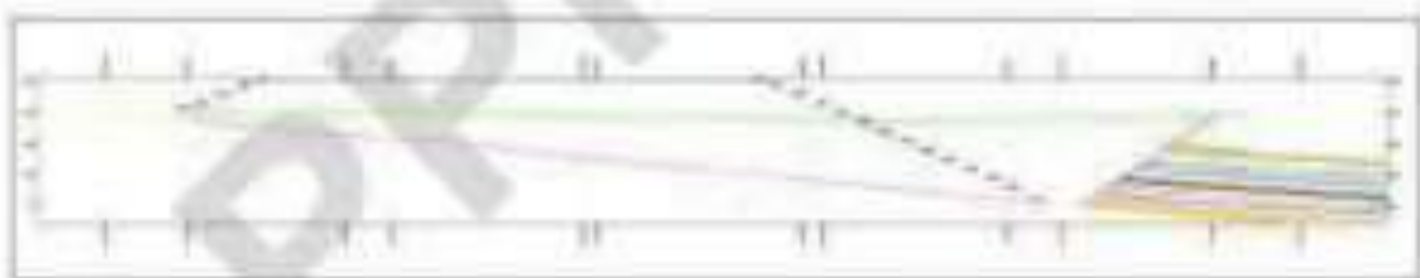


Fig. 3.24: Proposed Dump (Section view) (Scale: 1:100)



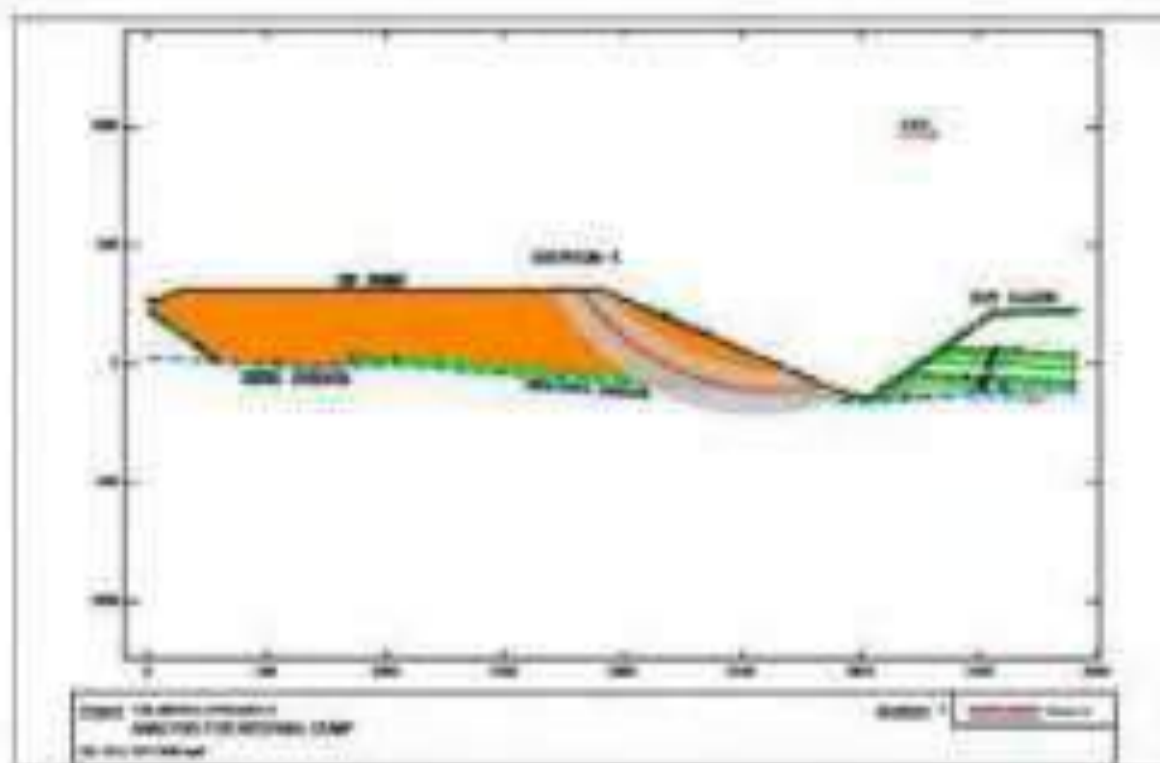
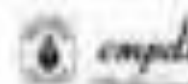


Fig. 2.5. Model 1 (at Section-1) along Final stage Dump Pile

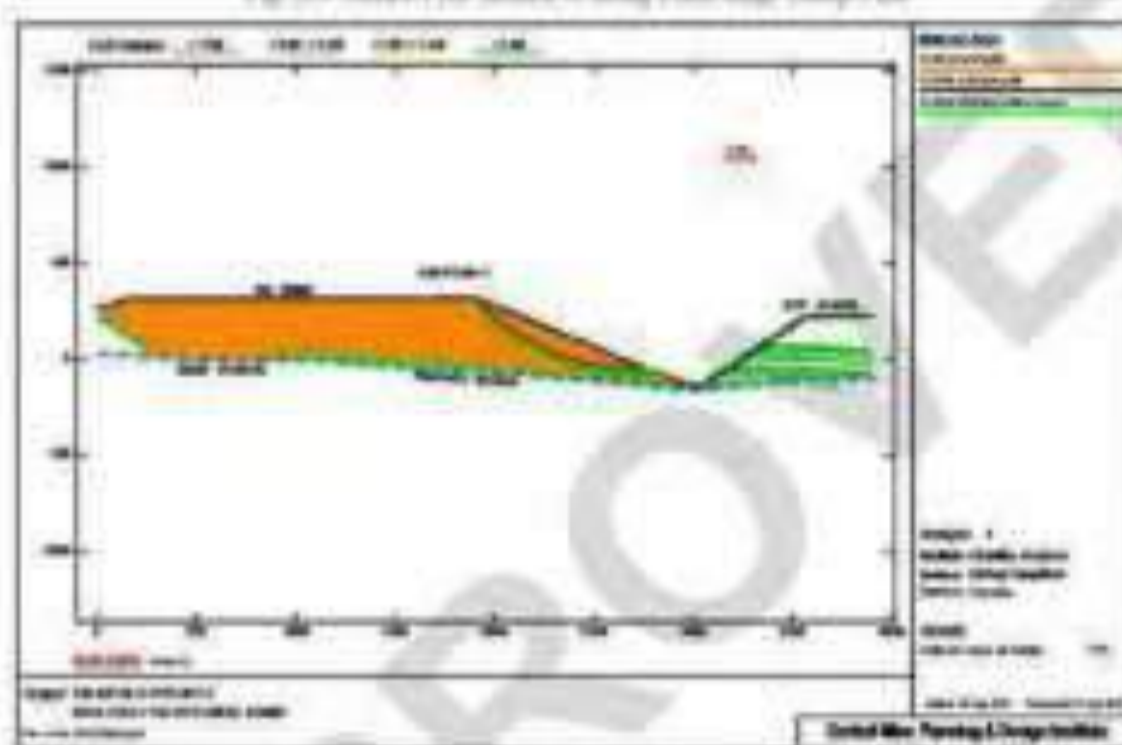


Fig. 2.6. Section 2 (Model 2) at Section-2 along Final stage Dump Pile



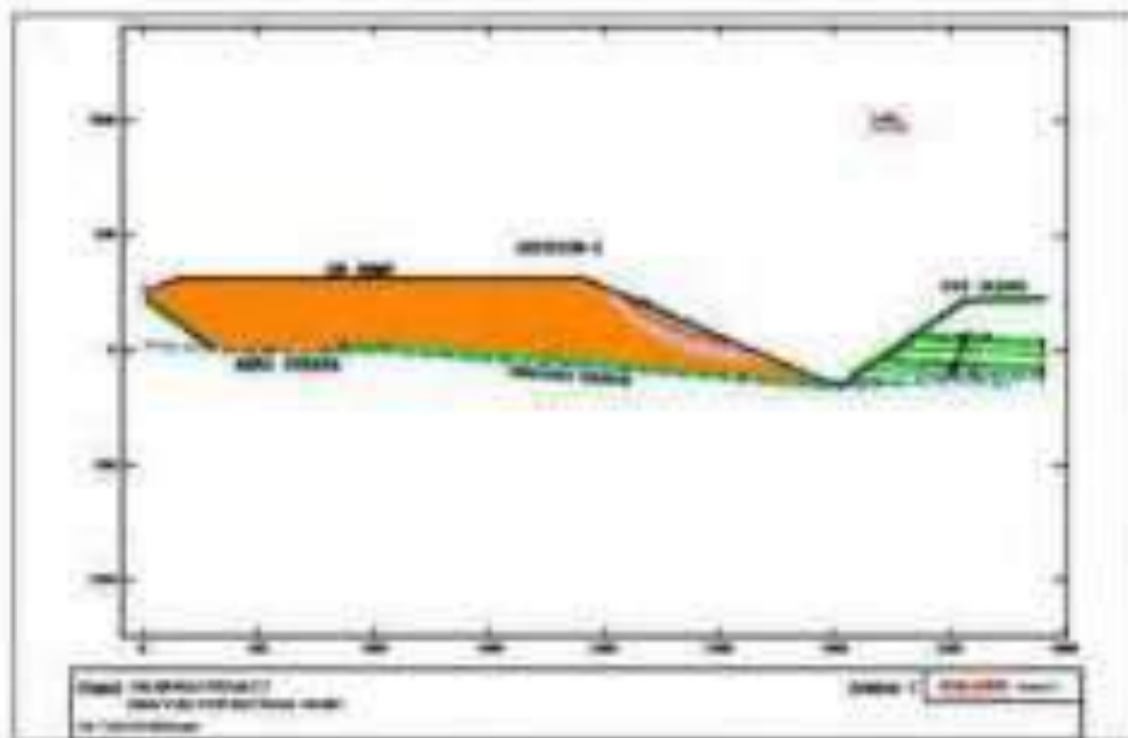


Fig. 3.7 Model 1 for Section-1 along Free Edge Dump Pile

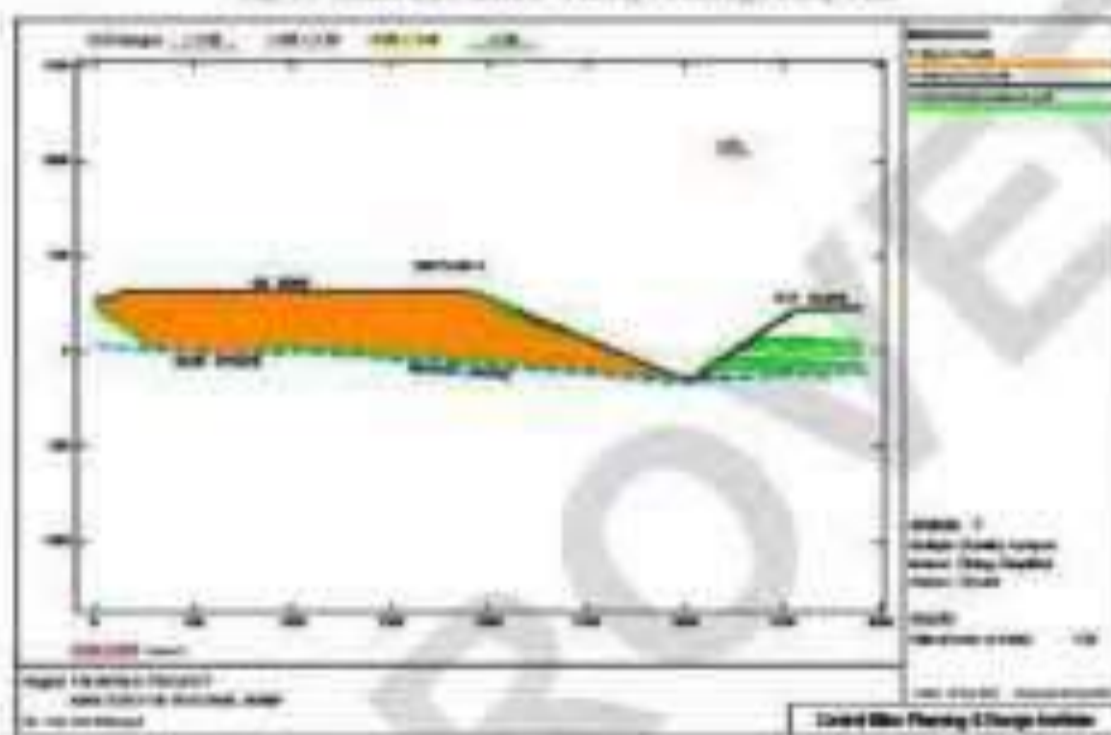


Fig. 3.8 Section for Model 1 for Section-1 along Free Edge Dump Pile

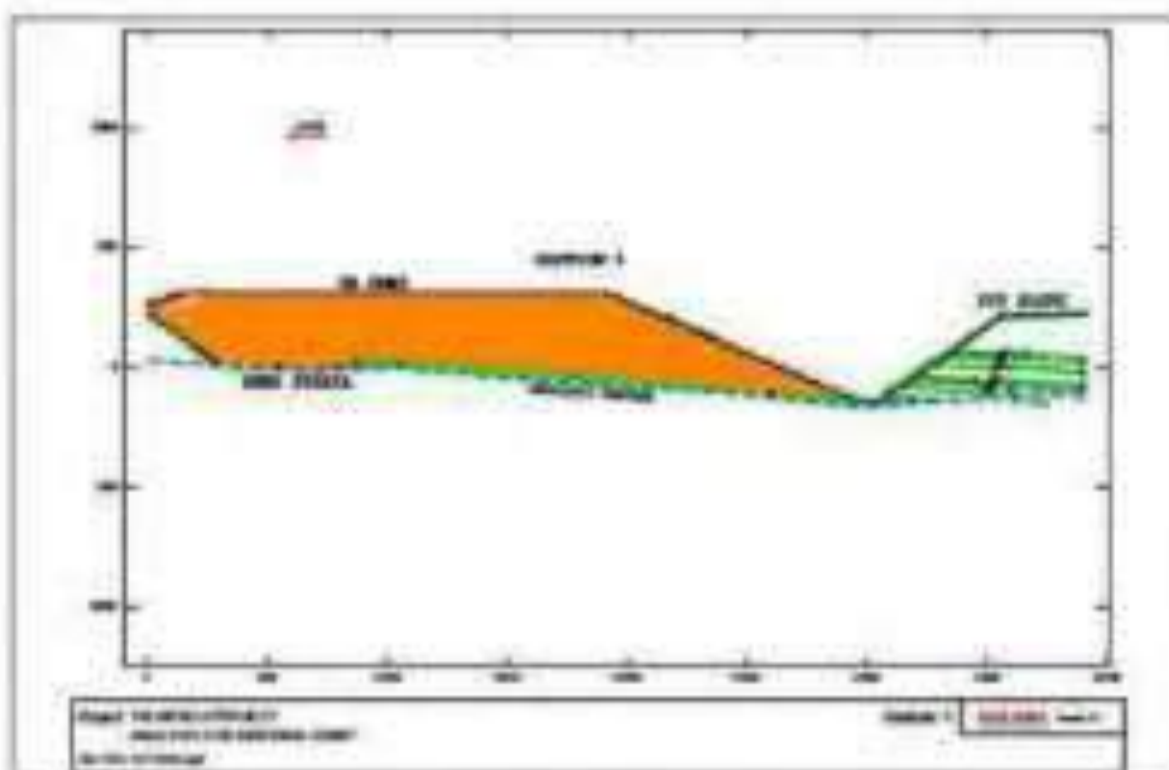
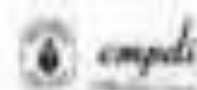


Fig. 2.7 Model A for Section-1 along Pit and Dump Area

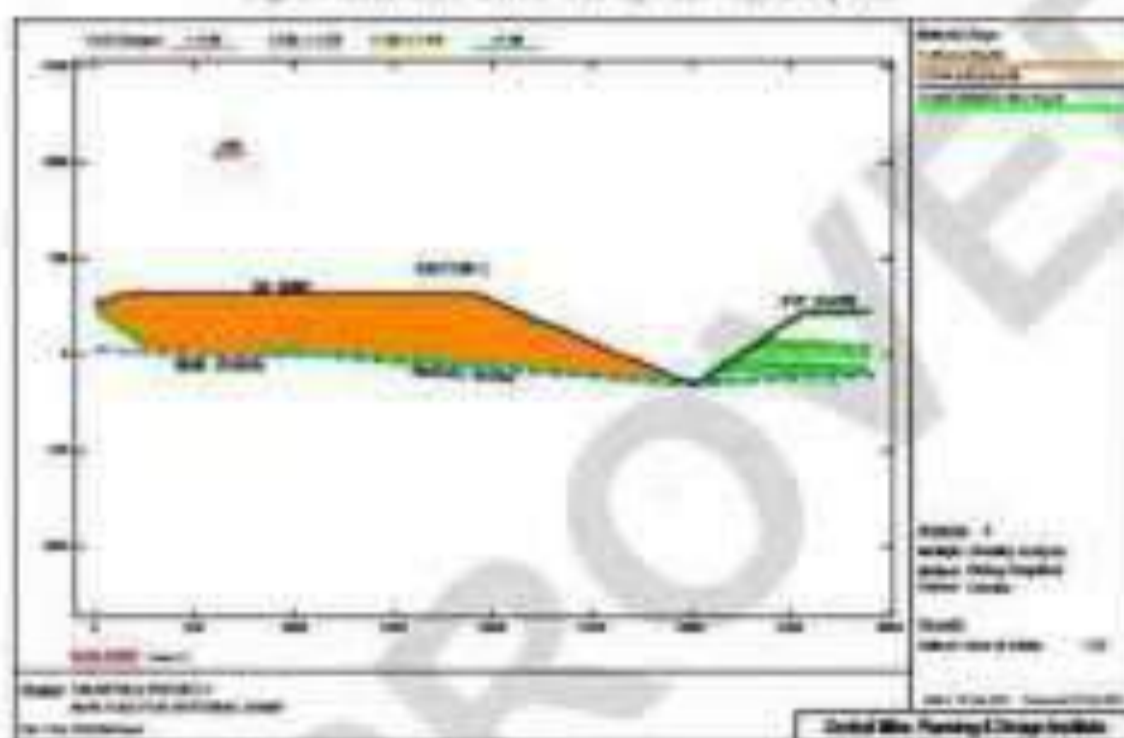


Fig. 2.18 Analysis for Section-1 by Section-1 along Pit and Dump Area

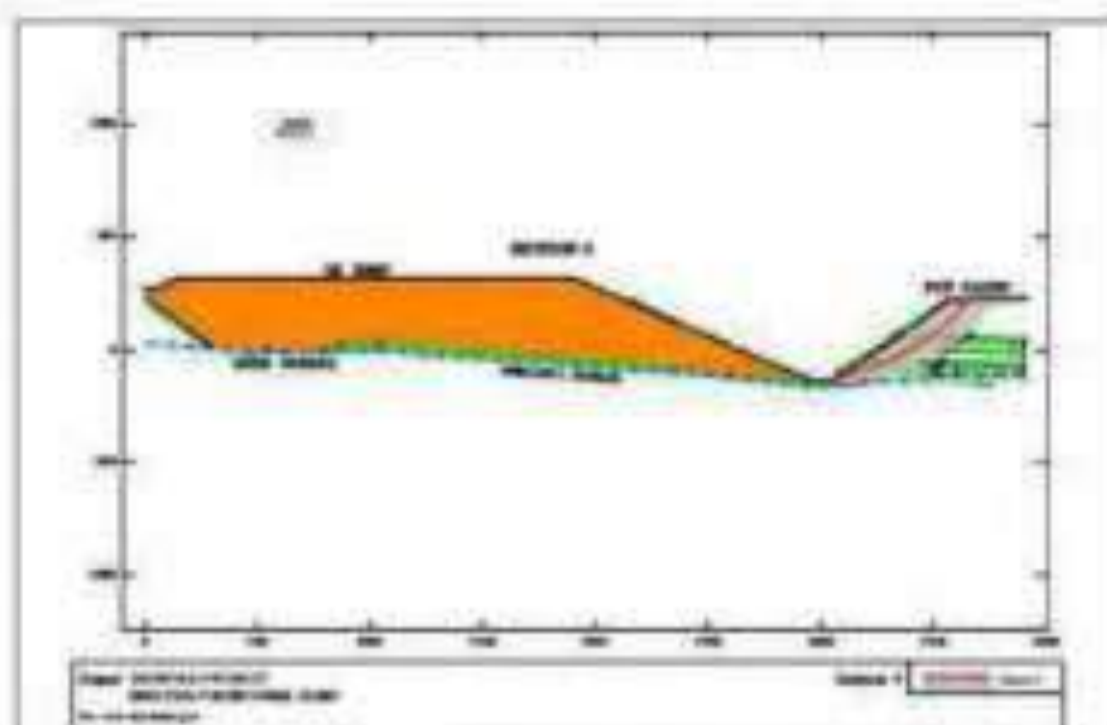


Fig. 3.11 Stability for Section - 1 along fixed slope Pit

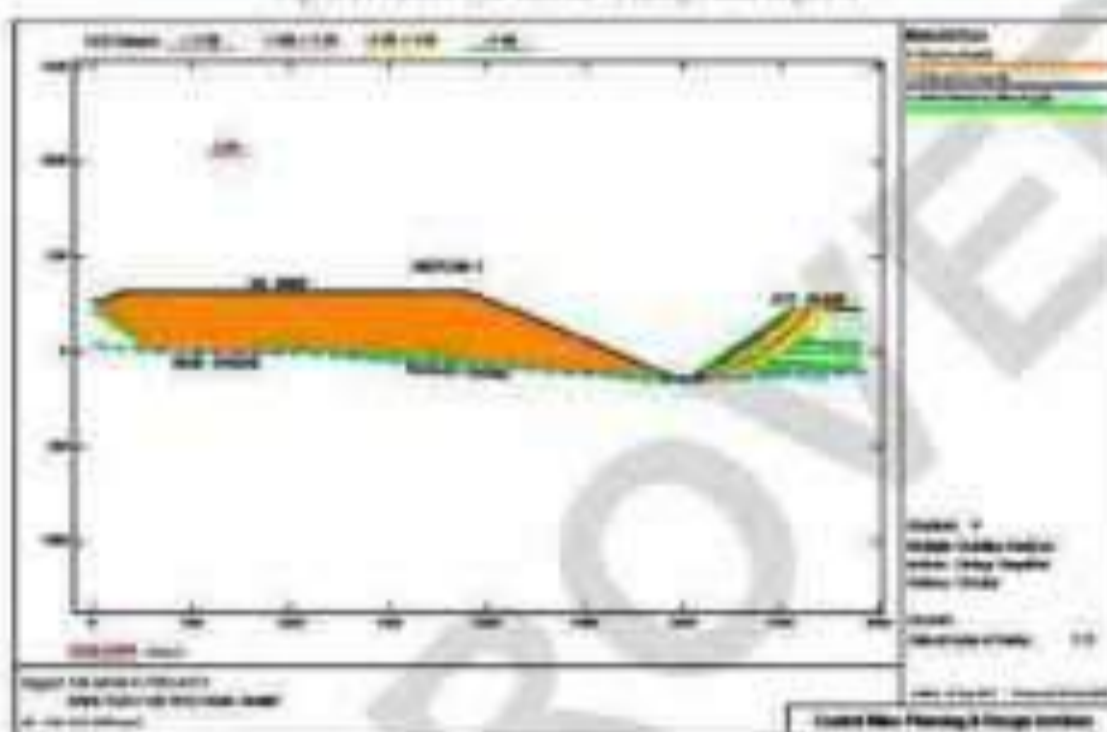
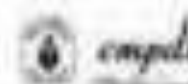


Fig. 3.12 Stability for Section - 2 for section along fixed slope Pit



Stability Analysis for Pit and Dumps: Talaspur Coal Block

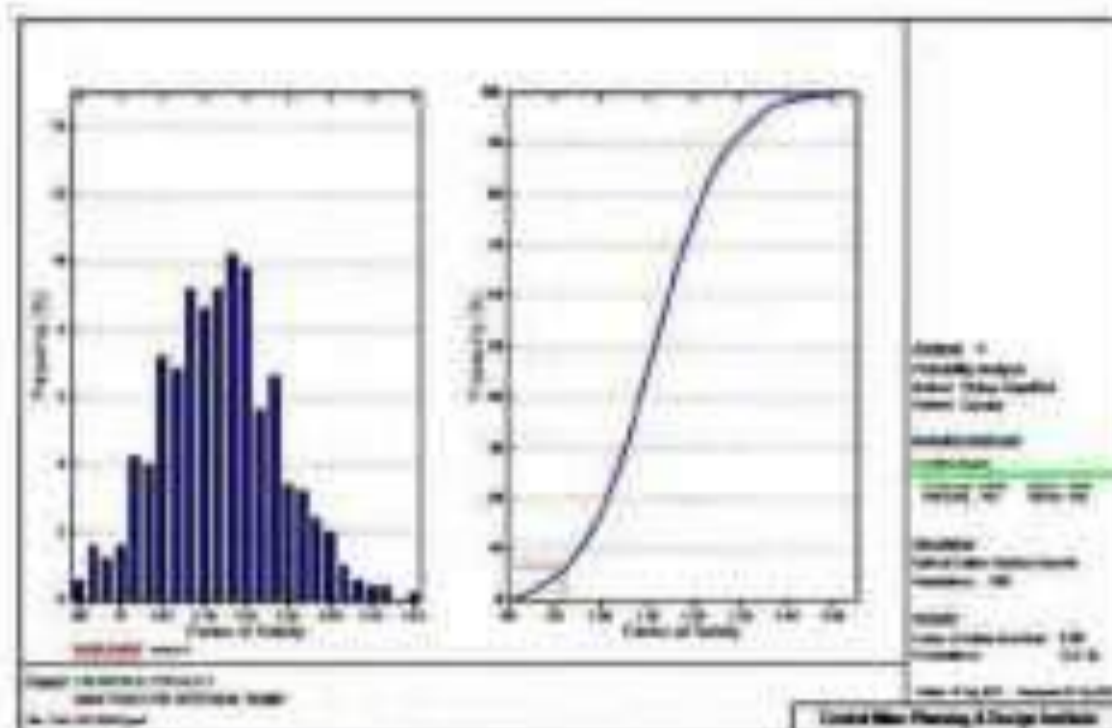


Fig. 5.27 Probability analysis for Final Stage Pit

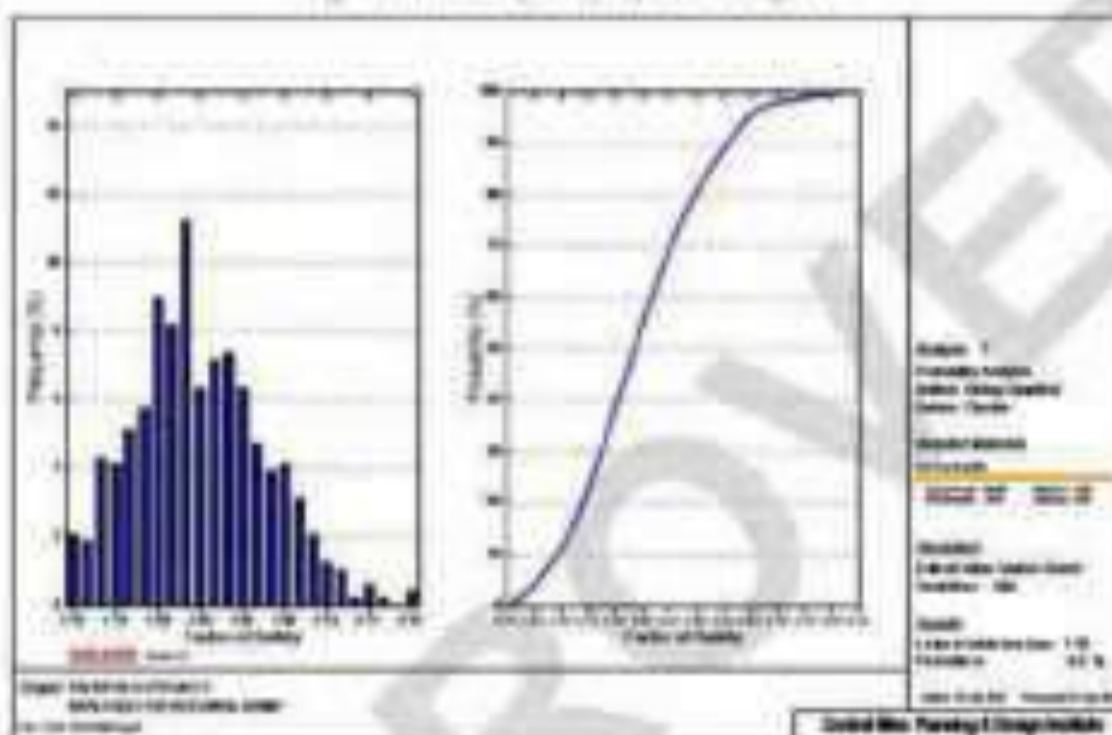


Fig. 5.28 Probability analysis for Final Stage Dump

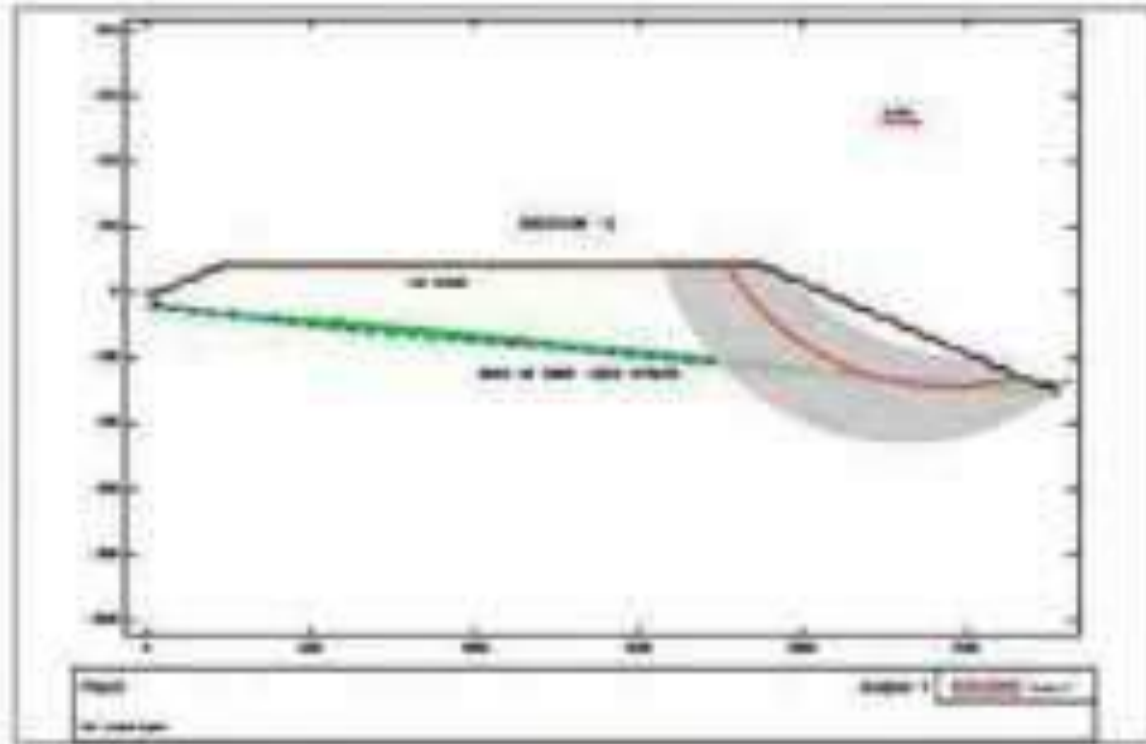


Fig 5.17 (b) Dump 3 for Final Design Dump Plan along section 2

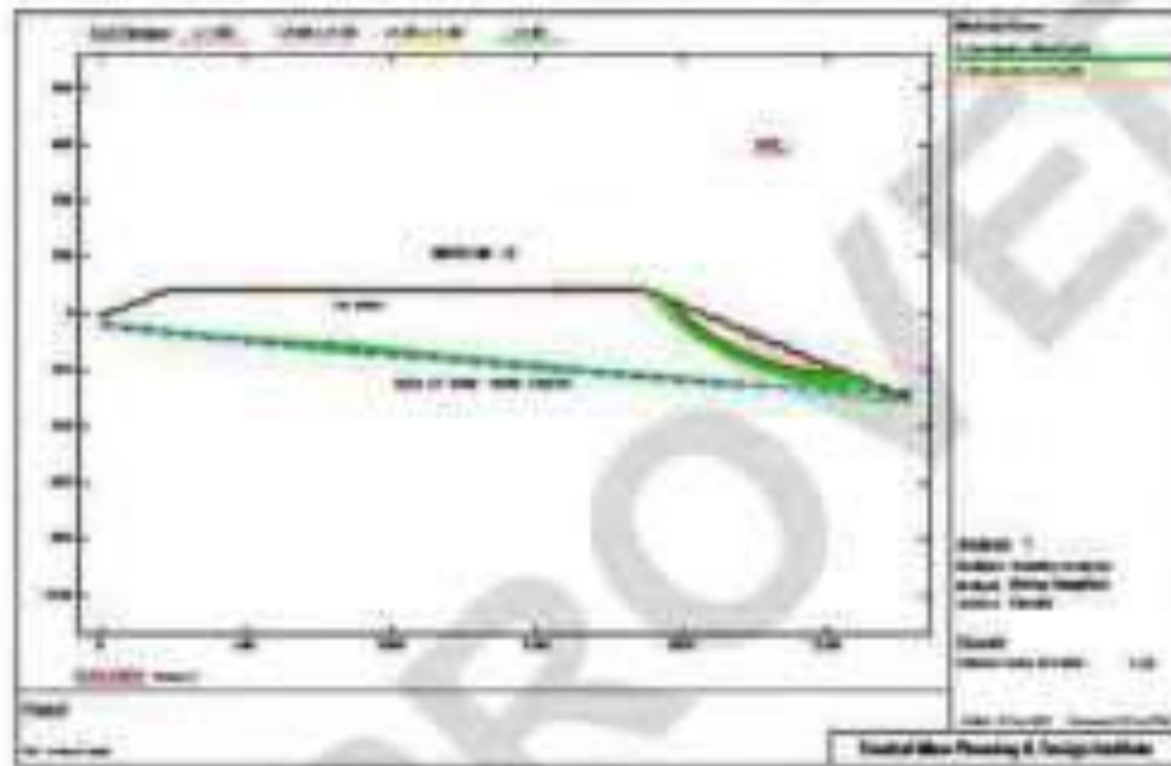


Fig 5.18 (b) Dump 3 for Final Design Dump Plan along section 2

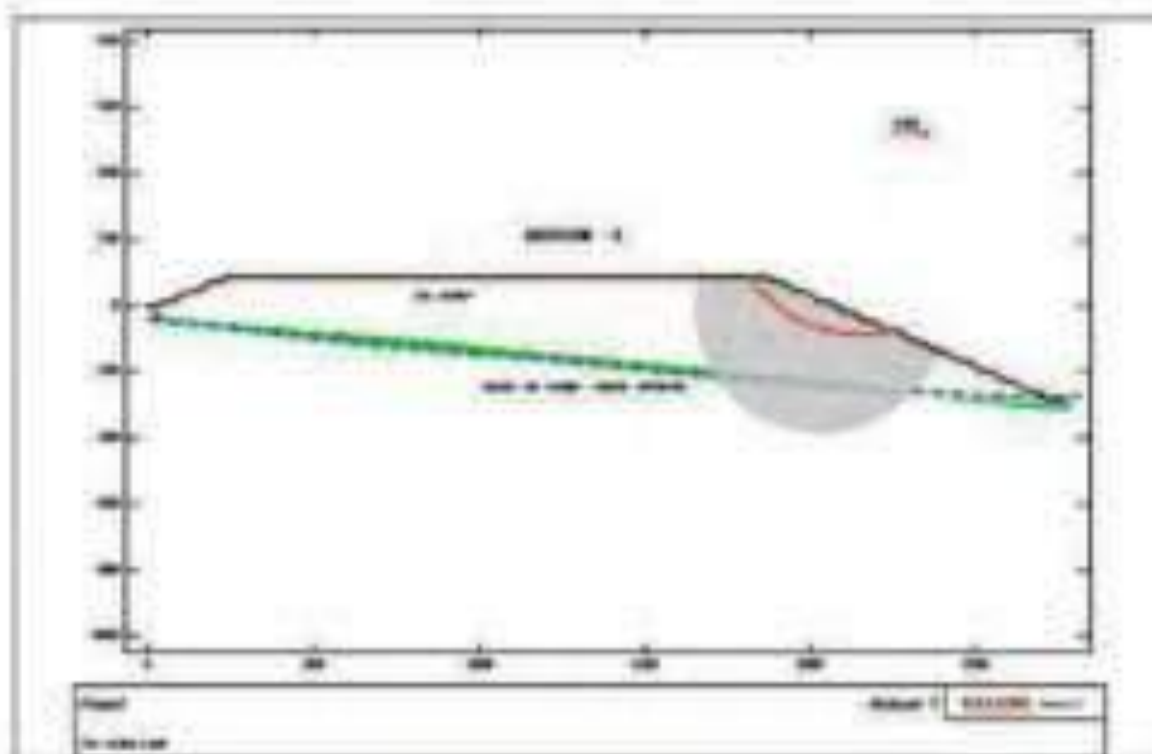
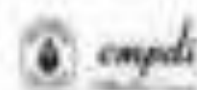


Fig. 3.17. Block 4 for Final Stage Dump Plan along section 2

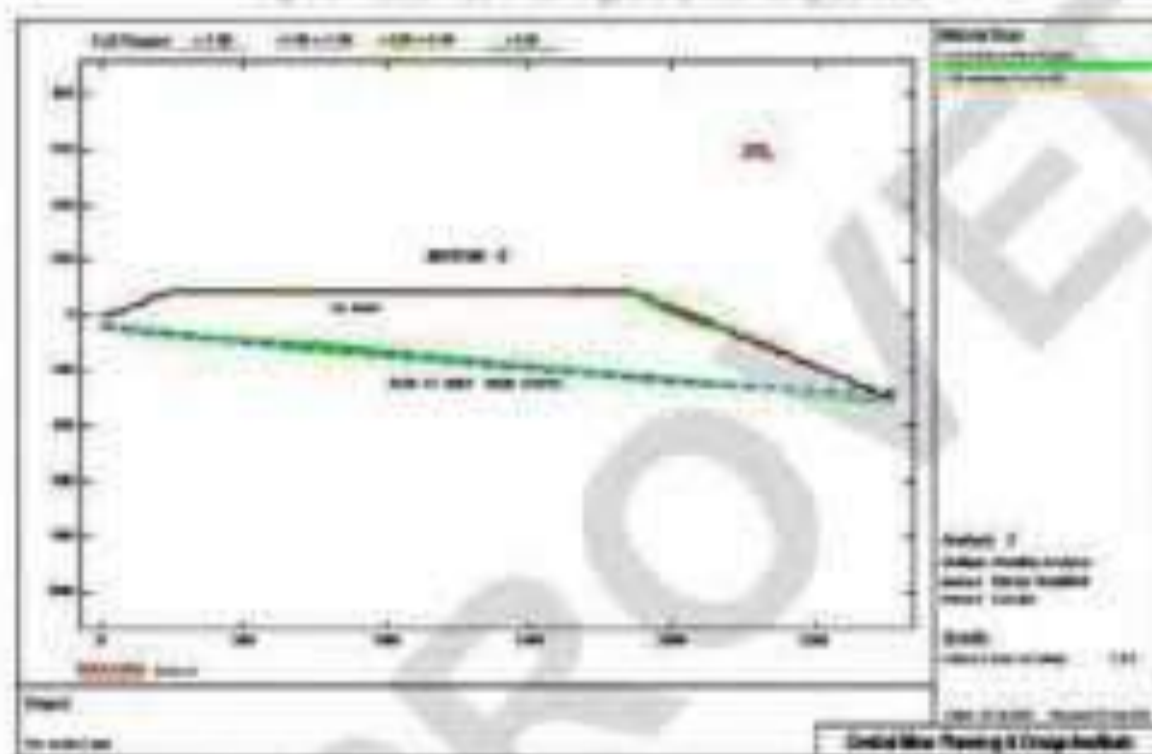


Fig. 3.18. Failure for Block 4 for Final Stage Dump Plan along section 2

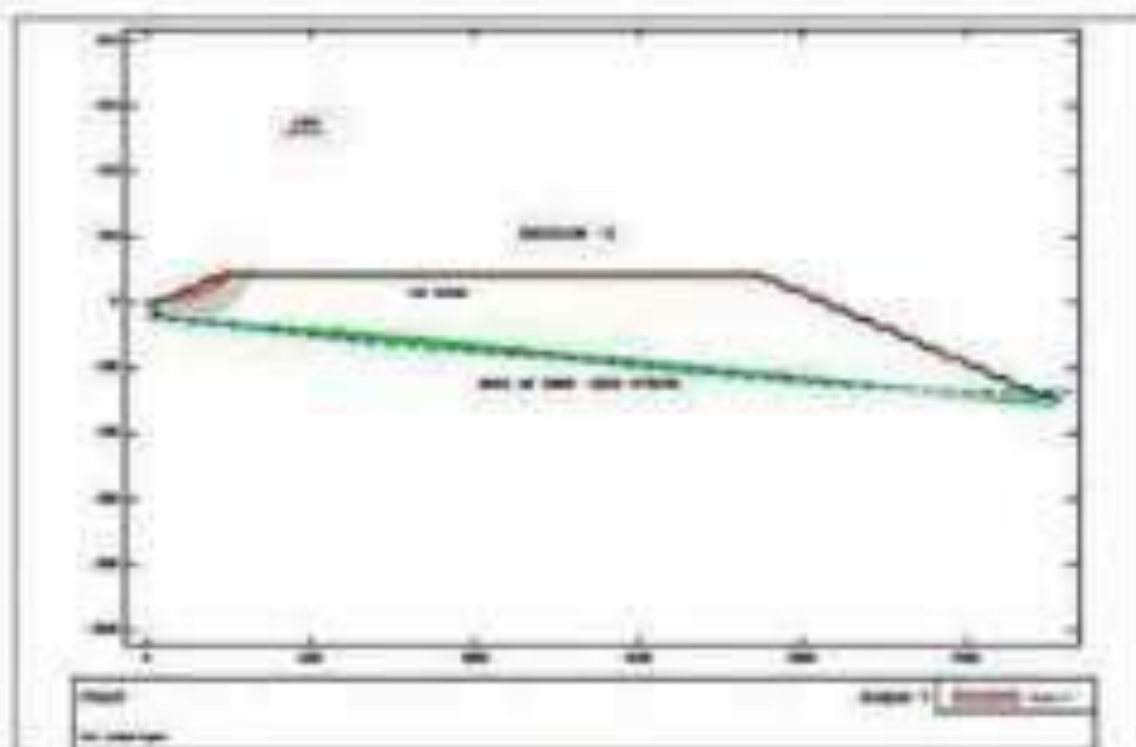
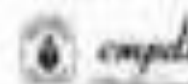


Fig. 3.19 Model 7 for Final Stage Design Plan along section 2

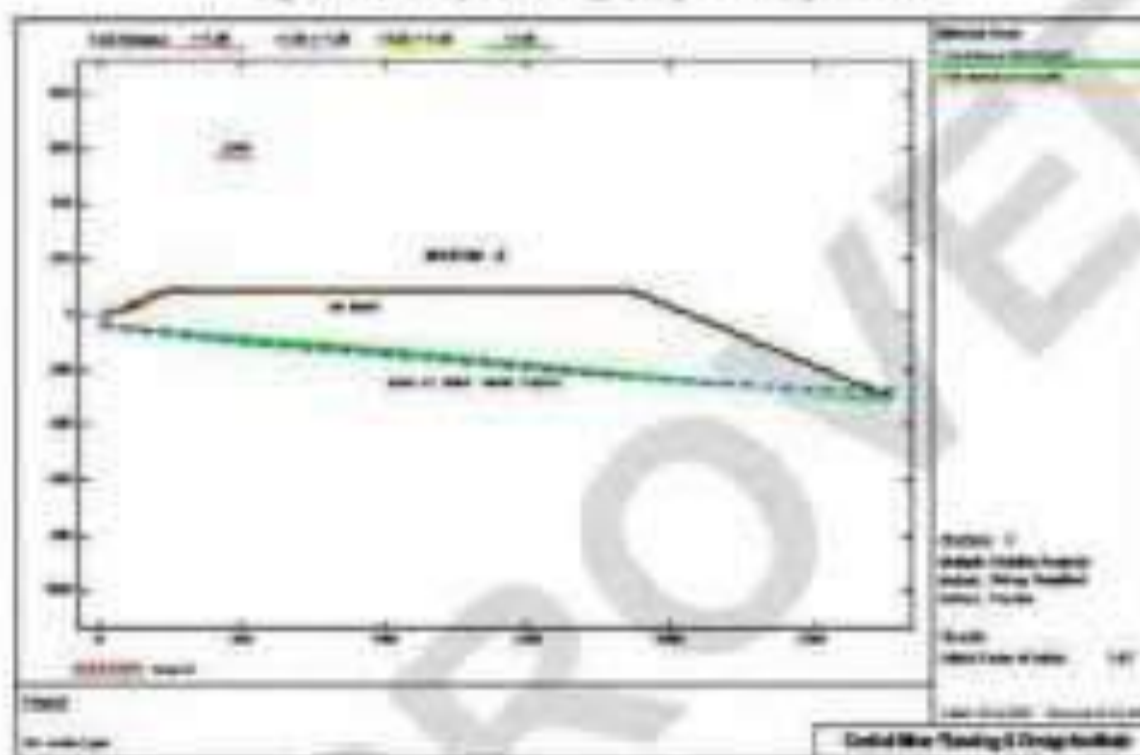


Fig. 3.20 Individual Model 7 for Final Stage Design Plan along section 2

Table 3.1 Summary of Stability analysis results

S.No	Section	Analysis Description	FoS (Range)
<b>Final stage Dump sections</b>			
1	1-1	Final stage Internal dump section along 1-1 for whole benches	1.41-1.55
2		Final stage Internal dump section along 1-1 for intermediate benches	1.31-1.44
3	1-1	Final stage External dump along 1-1 (Left) top benches	1.25-1.32
4		Final stage External dump along 1-1 (Left) intermediate benches	1.30-1.35
5	2-2	Final stage Internal dump section along 2-2 for whole benches	1.44-1.53
6		Final stage Internal dump section along 2-2 for intermediate benches	1.30-1.44
7		Final stage External dump along 2-2 (Left) top benches	1.30-1.44
8		Final stage External dump along 2-2 (Left) intermediate benches	1.45-1.50
<b>Ultimate Pit slope</b>			
17	1-1	Ultimate pit slope along section 1-1, analysis for whole benches	1.25-1.31
18		Ultimate pit slope along section 1-1, analysis for intermediate benches	1.35-1.40
19	2-2	Ultimate pit slope along section 2-2, analysis for whole benches	1.28-1.35
20		Ultimate pit slope along section 2-2, analysis for intermediate benches	1.30-1.40

### 3.18 CONCLUSIONS & RECOMMENDATIONS

The stability analysis for various sections of dump slopes, pit slopes in different conditions was carried out for Tataipath OCP. The factor of safety of 1.2 to 1.3 was taken as short term stability and Factor of safety >1.5 is for long term stability in this study. The conclusions and suggestions of the present study are summarized below. The factor of safety of proposed OB dumps varies from 1.25 to 1.33. This indicates that all the sections under consideration are stable for the short term and majority of the sections are stable for long term stability for the given conditions as indicated in the table above. The lowest FoS is observed observed is 1.25 for OB dump on section 1-1 left side. For the pit slopes the FoS varies from 1.25 to 1.40, indicates a short term stability. From the analysis it can be inferred that the proposed dump geometry in the mining plan is closely safe for short term stability for the given conditions. For the case of long stability, the FoS should be more than 1.5 as stipulated by DGMS. The current analysis was considered the Earthquake force into consideration during the analysis. The analysis, without considering earth quake force





results in a FOS of equivalent to 1.3 is resulted in different sections for pit and dumps slopes for the given conditions.

Considering the above analysis for current filed assessment and conditions the dump and pit geometry proposed in the mining plan can be considered safe.

#### 5.18.1 RECOMMENDATIONS

It is observed that the slopes are short-term stable at some sections this could be due to local concentration of stress. Therefore, during the rainy season, a proper drainage system should be adopted, and precautions should be taken for patchwork.

A few small-scale failures may subsequently cause a big failure. If two or three benches are made steeper at any level in any part/depth of the pit/dump, then it may initiate failures. Although the overall slope angle may be quite low, the steeper slope angles of the three benches may increase the stress at the toe of a relatively steeper part of the slope, which may cause failures. Two or three such small failures may cause a large failure. So, benching should be done properly from top to bottom.

Dump slopes do not fall without warning and may be managed through the design of dump sequencing, re-sloping of the selected areas. Proper monitoring of dump deformations should be carried out. While formation of dumps or after attaining 90m and 50 m of dump height from dump base, a detailed study for stability assessment of dump slopes should be carried out by any reputed agency. The same should be done for pit slopes as well and if any deformation or deviation from approved plan is observed it should be brought to the notice of reputed scientific agency for further assessment.

Any unfavourably oriented structural discontinuity may be present in the mining area, which was not reported in the geological report but exposed during ongoing excavation, it may create unsafe mining conditions. Mapping of such faults on fresh exposure of the pit shall help in detecting any impending failure along those detected weak planes.

In case there are multiple fault planes, the bench design should be such that they do not strike parallel to the fault planes.



Regular monitoring of the dump slopes is also being advised. It is recommended that a qualified person ensure that the dumps are constructed as specified by the design guidelines.

The bench geometry of the mine pit, the ultimate pit should strictly follow specifications as mentioned in the mining plan. In case of use of any other machinery the bench geometry will be guided by the maximum width of machinery & related DCMS guidelines.

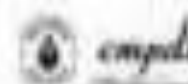
Failure can occur at the local level even if the overall slope of the working pit is found to be safe/flat, but if the individual benches are steeper and do not follow the specified criteria. Hence it is necessary to maintain proper bench geometry having adequate bench width & proper bench height for better stability. Bench geometries stipulated in regulation 106 of CMR 2017 should adhere wherever it is practically feasible for the existing and future planned slopes or slope re-profiling.

The presence of water causes negative consequences for pit stability. Gullied drains are to be provided along the crest side for smooth passage of water. Benches are to be properly graded to inhibit the formation of sludge. Some horizontal pipes may be inserted for draining out water wherever necessary.

While forming dumps as proposed in PR, the slope profile viz bench height and bench angle should be as indicated in PR or CMR 2017 guidelines. The minimum distance between any working bench from the toe of the eventual O/D dump should not be less than 100m.

For any new dumps, re-handled dumps which are comparatively newer and of less height, strict measures should be taken to maintain a tier system of dumping, where each tier should not exceed a height of 30 meters.

An assessment of the engineering and structural geology, strength properties, and related geotechnical controls was thoroughly carried out in this study. These recommendations are valid with a well-developed drainage system and controlled blasting to avoid any damage on the standing final bench slope mass. The final standing slope should be kept undamaged in-situ rock mass condition. If any deviation is observed or the remedial measures are not effective, then the slope angle must be corrected accordingly.



The operating bench width should never be less than double the bench height or as recommended in DCMR, 2017. The unavoidable small-scale bench failures associated with weak sandstone/ weathered rock and intermittent clays could be arrested on these wide benches and large-scale slope failure can be avoided. The extra-wide bench will arrest the local bench failures and there would not be any operational problem. The exposure should be made within such an area, where the bottom could be reached within a maximum of one year. This patch should be backfilled immediately. Long-term exposure reduces the strength quickly in the weak rock mass and results in slope failure.

### 5.11 SLOPE MONITORING PROGRAMME

Monitoring is an indispensable way to safeguard loss of time and machinery from slope failure. The monitoring methods are generally based on the displacement of slope mass. Every slope is subjected to movement. It is crucial to judge the change of displacement or velocity which may be critical. Many researchers have contributed to analyzing the displacement pattern in mine slopes.

#### 5.11.1 VISUAL INSPECTION

A basic element of a slope monitoring program should be visual inspection by the mine geotechnical engineer and members of the engineering staff, combined with observations by all personnel working in the mine. This qualitative, but extremely important aspect of the program should be maintained throughout the life of the mine.

Visual Monitoring is the best practice when done vigilantly. Visual inspection of any cracks, seepage in high walls helps to spot any movement. The development of tension cracks and any change in them can be carefully observed. Visual monitoring also includes identifying weak areas based on spontaneous combustion, weathered zone, or any deformation. A diligent visual survey always helps in taking preventive measures and/or safeguarding men and machinery.

#### 5.11.2 CRACK MONITORING

Crack monitoring techniques typically consist of:

- Regular detailed mapping of location, depth, the width of cracks, rate of extension, and opening.
- Installation of targets on opposite sides of cracks to monitor rates of opening.



- Installation of surface (wireline) extensometers
- Installation of picket lines or lines of targets that can be monitored using theodolite or precise levels to detect changes in alignment, location, or elevation along a given crack or the crest of the slope

#### 5.11.3 MONITORING BY TOTAL STATION

These systems can be installed by mine survey personnel, generally with survey equipment in regular use at the mine. Monitoring stations or pillars are generally installed at places susceptible to displacement. It includes re-handled OB dumps, high wall, etc around the pit perimeter. This network should be tied to at least three stable reference stations well behind the pit crest. Monitoring points (prisms) are established at regular intervals on each wall of the pit and in areas identified from geotechnical investigations as most susceptible to instability.

#### 5.11.4 MONITORING BY SLOPE STABILITY RADAR (SSR)

Slope stability Radars are state of art instruments to detect slope instability and give early warning depending upon the threshold limit. Slope stability radar can remotely scan the pit slope and dump slope within a certain range in a vertical and horizontal direction depending upon its specification. A slope stability radar continuously scans the sloping wall within its range. SSR is so precise it can detect movement up to millimetres. Slope stability's radar effectiveness is evident from the fact that it captures and stores the scanned image of the target area and any minute movement can be distinctively marked. Depending upon the critical velocities considering site-specific geo mining conditions a threshold limit can be set for slope stability radar to give out the early warning in case of undesirable movement. Slope stability radar waves can penetrate through rain, dust, and smoke to provide supreme accuracy in monitoring.

#### 5.11.5 RECOMMENDATION FOR SLOPE MONITORING

- A dedicated geotechnical cell should be formed at the project level which should undertake frequent visual inspection and all the relevant information should be recorded.
- RL measurement of monitoring stations should be thoroughly carried out. The monitoring work is to be supervised and verified by a senior survey officer.
- Visual inspection of any cracks should be done diligently. The widening of cracks should be measured by crack meters and recorded regularly.

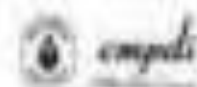


- For necessary equipment installations to continuously monitor slope movement, suitable capital amount provisions are made in the RPR 2021

#### 5.12 LIMITATIONS OF THE STUDY

- Soil is a very complex material. In nature, a heterogeneous type of soil is found which has different properties at different depths and places. Therefore, accurate soil properties cannot be derived in the laboratory by merely testing a few soil samples as it is difficult to simulate the field conditions.
- Judicious judgment based on a combination of theory and practical experience from the past studies shall help to arrive at the right conclusion during making the necessary assumptions for the study.
- In the geotechnical engineering field, many uncertain factors govern the stability analysis which depends on the assumptions made for the study. As a result, the factor of safety determined may vary to some extent from study to study. In the study, all normal failure conditions are checked for the determination of FOS with the best possible assumptions and judgment.





## 5.13 Annexure -I : ROCKMASS PROPERTIES

## Rock Mass properties using Rockdata

## Silt Stone:

## Hoek-Brown Classification

$\sigma_{ci}$  35 MPa

GSI 32

m 7

D 1

## Hoek-Brown Criterion

mb 0.0546086

a 1.19673e-005

b 0.519528

## Failure Envelope Range

Application Slope

$\sigma_{3max}$  0.470468 MPa

Unit Weight 0.021 MN/m<sup>3</sup>

Slope Height 30 m

## Mohr-Coulomb Fit

c 0.0704942 MPa

$\phi$  24.4415 degrees

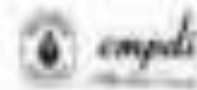
## Rock Mass Parameters

$\sigma_{gt}$  -0.00769832 MPa

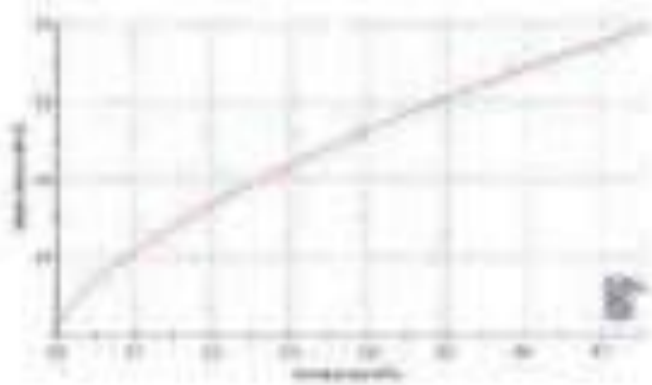
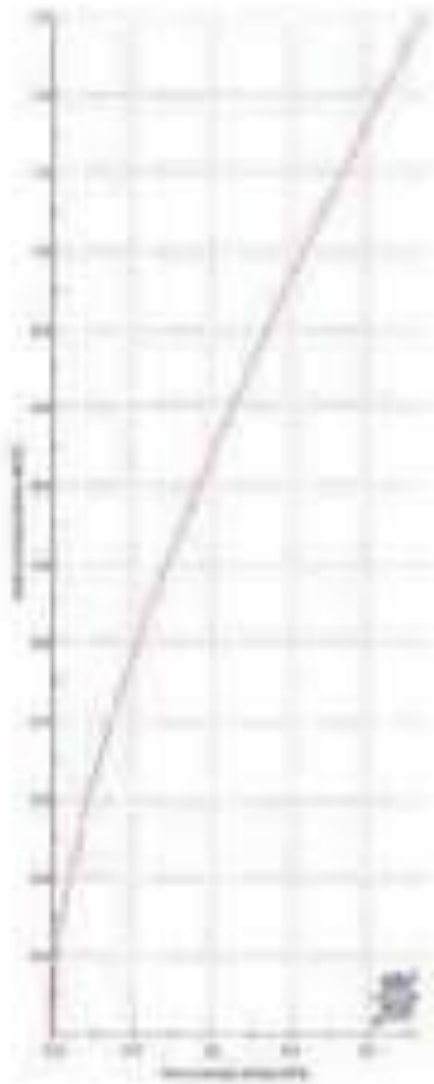
$\sigma_{gt}$  0.0970394 MPa

$\sigma_{gtm}$  0.045213 MPa

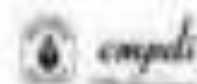
$E_m$  1048.55 MPa



1. **Methodology:**  
 The stability analysis was carried out using the **Finite Element Method (FEM)** using the **PLAXIS 2D** software. The analysis was performed on a **2D cross-section** of the pit and dump. The **soil parameters** were determined from **laboratory tests** and **field observations**. The **boundary conditions** were assumed based on the **geological conditions** and **engineering judgment**.



APDX

**FG-Sand stone:****Hack-Brown Classification**

sig1 75 MPa

GSI 28

mi 15

D 1

**Hack-Brown Criterion**

mb 0.178973

s 3.23305e-005

a 0.31302

**Failure Envelope Range**

Application Slopes

sig1max 0.03714 MPa

Unit Weight 0.024 MN/m<sup>3</sup>

Slope Height 30 m

**Mohr-Coulomb Fit**

c 0.171414 MPa

phi 39.3616 degrees

**Rock Mass Parameters**

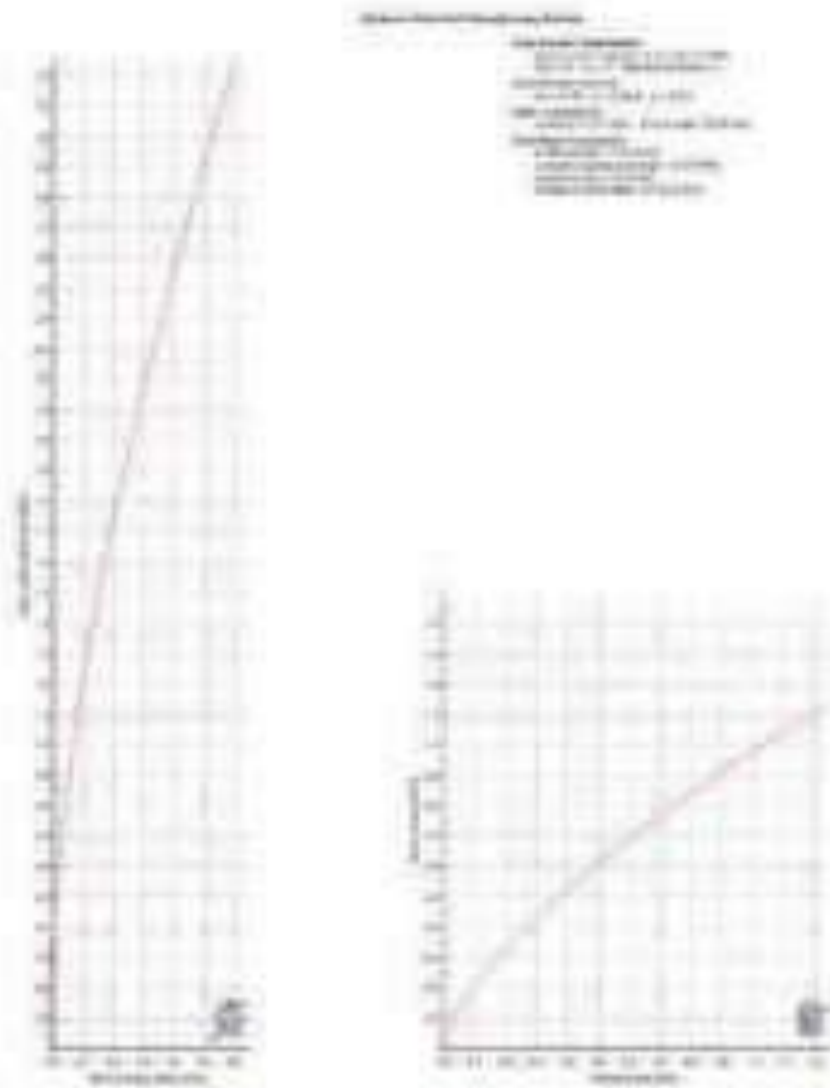
sig1 -0.0126322 MPa

sig2 0.371917 MPa

sig3 3.91395 MPa

Em 2170.2 MPa



**Coal shale :****Hoek-Brown Classification** $\sigma_{ci}$  75 MPa

GSI 28

mi 0

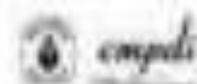
D 1

**Hoek-Brown Criterion**

mb 0.0350439

s 6.14471e-006

k 0.525584



Stability Analysis for Pit and Dumps - Talaspali Coal Block

Failure Envelope Range

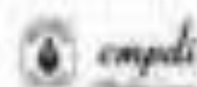
Application Slopes  
 $\sigma_{lim}$  1.261795 MPa  
 Unit Weight 0.017 MN/m<sup>3</sup>  
 Slope Height 30 m

Multi-Coulomb Fit

$c$  0.0399813 MPa  
 $\phi$  24.5234 degrees

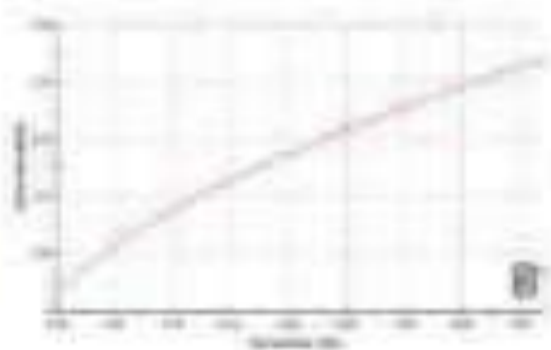
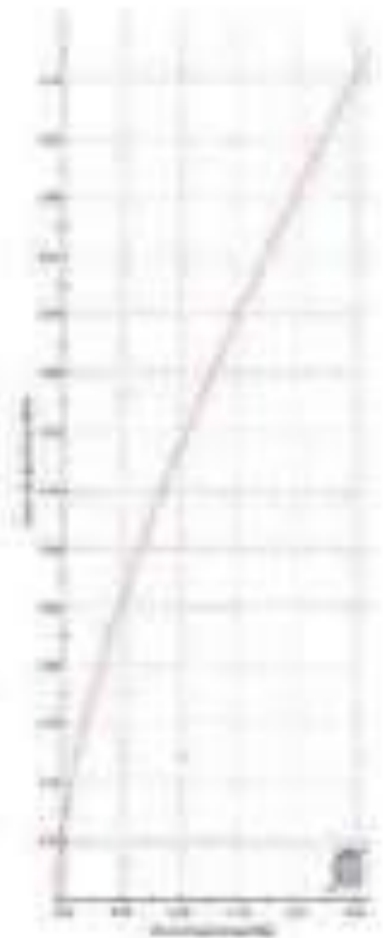
Back Mass Parameters

$\sigma_1$  -1.00613617 MPa  
 $\sigma_2$  0.0633705 MPa  
 $\sigma_3$  0.716737 MPa  
 $F_m$  833.689 MPa



Stability Analysis for Pit and Dams - Talaspur Coal Block

1. **Assumptions**  
 2. **Methodology**  
 3. **Results**  
 4. **Conclusion**  
 5. **References**  
 6. **Appendix**  
 7. **Tables**  
 8. **Figures**  
 9. **Maps**  
 10. **Other**



**Base Rock -sandstone**  
**Hack-Brown Classification**

σ <sub>1</sub>	60	MPa
QNI	40	
mi	13	
D	1	

Rev No. 02/02/2017



Stability Analysis for Pit and Dumps: Talaspali Coal Block

**Rankine-Brown Criterion**

mb 0.178929

s 4.53999e-005

a 0.511368

**Failure Envelope Range**

Application Slopes

siglmax 0.547218 MPa

Unit Weight 0.022 MN/m<sup>3</sup>

Slope Height 30 m

**Mohr-Coulomb Fit**

c 0.134202 MPa

phi 38.4268 degrees

**Rock Mass Parameters**

sigt -0.0152239 MPa

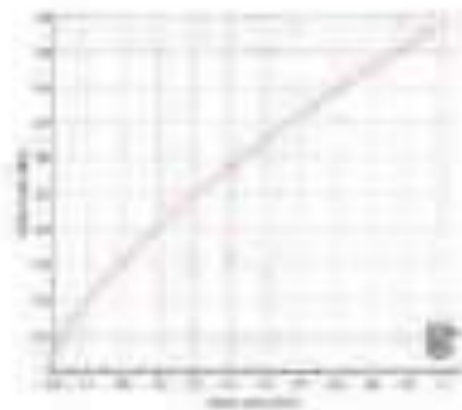
sigc 0.390833 MPa

sigm 3.16561 MPa

Em 2177.94 MPa



Assumptions:  
1. Soil is homogeneous and isotropic.  
2. Failure surface is circular.  
3. Failure is governed by shear failure.  
4. Failure is governed by the Mohr-Coulomb failure criterion.  
5. Failure is governed by the Bishop's simplified method.  
6. Failure is governed by the Janbu's simplified method.  
7. Failure is governed by the Spencer's method.  
8. Failure is governed by the Morgenstern-Price method.



APPROVED

## Additional Annexure-15

EP - 14, Raigarh-18  
Date: 17/1/16



### CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

Commercial Complex, C.G. Housing Board Colony,  
Kabir Nagar, Raipur (C.G.) 492 098

No. 237/TS/CECB/20156

Raipur, dated: 17/1/2016

To,

General Manager,  
M/s N.T.P.C. Limited,  
Talaipali Coal Mining Project,  
Lailunga Road, Garghoda,  
District - Raigarh - 496111 (C.G.)

Sub - Grant of consent under section 25/26 of the Water (Prevention and Control of Pollution) Act, 1974.

- Ref -
1. Environmental Clearance issued by Ministry of Environment and Forests, Government of India vide letter no. J-11015/279/2009-IA. II (M), dated: 02/01/2013.
  2. Permission to Establish issued by Chhattisgarh Environment Conservation Board, Raipur, vide Letter No. 6488/TS/CECB/2015, Raipur, dated: 08/01/2015.
  3. Your application letter no. 5073/TL/2015/CTE/05, dated: 17/07/2015 and subsequent correspondence ending dated: 06/02/2016.

— 00 —

With reference to your above application, consent is hereby granted for a period of one year from the first day of the month of commissioning of the plant subject to the fulfilment of the following terms and conditions -

This consent is valid for following products & production capacity -

S.No.	Product	Production Capacity
1.	Open Cast Coal Mine	18.0 Million Tonnes per Annum (Eighteen point Zero Million Tonnes per Annum)
2.	Underground Coal Mine	0.72 Million Tonnes per Annum (Zero point Seven Two Million Tonnes per Annum)

Note:-

- 1- This consent is granted initially only for the excavation of soil, which is a part of mining process as per the proposal submitted to the Board vide letter dated 27/01/2016. Industry shall intimate regarding installation of coal handling plant along with necessary pollution control equipments and obtain prior permission of the Board for its operation.

-1-

- 2- This consent is granted to the industry without prejudice to the court case pending in the Court of Law and in no way to be taken as a measure of proof that industry has not violated any related environmental laws at any time in the past. Hence whatsoever may be decision of Hon'ble Court, shall be binding on the industry and this Board.

Please acknowledge the receipt of this letter.

For & on behalf of  
Chhattisgarh Environment Conservation Board

*[Signature]*  
**Member Secretary**  
Chhattisgarh Environment Conservation Board  
(2) Raipur (C.G.)

Endt. No: /TS/CECB/2016 Raipur, dated: \_\_\_/\_\_\_/2016  
Copy to -

1. Regional Officer, Regional Office, Chhattisgarh Environment Conservation Board, Raipur (C.G.). Please ensure compliance and report, if any condition/conditions are violated by the industry.
2. Cess Section, Chhattisgarh Environment Conservation Board, Raipur (C.G.)

*[Signature]*  
**Member Secretary**  
Chhattisgarh Environment Conservation Board  
Raipur (C.G.)



## CHHATTISGARH ENVIRONMENT CONSERVATION BOARD

Commercial Complex, C.G. Housing Board Colony,  
Kahir Nagar, Raipur (C.G.) 492 009

### CONSENT LETTER

No. JE/Raipur/CECB/2016 Raipur, dated  
Sub: Consent to M/s N.T.P.C. Limited for the discharge of effluent under  
section 25/26 of the Water (Prevention & Control of Pollution) Act, 1974.  
Ref: Applications Letter No. 5073/TL/2015/CTE/05, dated 17/07/2015 and  
subsequent correspondence ending dated 27/01/2016 of M/s N.T.P.C.  
Limited, (Expiry Date .....)

- With reference to the above application for consent to discharge of effluent into the natural water courses under the Water (Prevention & Control of Pollution) Act, 1974, here-in-after referred to as the Act, M/s N.T.P.C. Limited is authorized by the State Board to discharge its industrial and other effluents arising out of their premises into the local stream/river/well in accordance with the general and special conditions as mentioned in the Annexure.
- This consent shall be valid for a period of one year from the first day of the month of commissioning of the plant.

This consent is valid for following products & production capacity: -

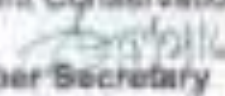
S.No.	Product	Production Capacity
1.	Open Cast Coal Mine	18.0 Million Tonnes per Annum (Eighteen point Zero Million Tonnes per Annum)
2.	Underground Coal Mine	0.72 Million Tonnes per Annum (Zero point Seven Two Million Tonnes per Annum)

#### Note :-

- This consent is granted initially only for the excavation of soil, which is a part of mining process as per the proposal submitted to the Board vide letter dated 27/01/2016. Industry shall intimate regarding installation of coal handling plant along with necessary pollution control equipments and obtain prior permission of the Board for its operation.
- This consent is granted to the industry without prejudice to the court case pending in the Court of Law and in no way to be taken as a measure of proof that industry has not violated any related environmental laws at any time in the past. Hence whatsoever may be decision of Hon'ble Court, shall be binding on the industry and this Board.

Please acknowledge the receipt of this letter.

For & on behalf of  
Chhattisgarh Environment Conservation Board

  
Member Secretary  
Chhattisgarh Environment Conservation Board  
(Raipur (C.G.))

Seal  
Enclosure: Annexure

-1-



(I)  
**ANNEXURE**

**M/s. Sarnipali Opencast Coal Mine**

**Location of Factory:** Bichchinara, Kudumouha, Titapali, Nayarampur, Rakers, Sathepali, Chottiguda and Ajjarah, Tehsil - Gharghoda, District - Raigarh (C.G.)

**Vide consent no. / AE/Raigarh/CECB/2016, dated: .....**

**A. GENERAL CONDITIONS: -**

1. All discharges authorized shall be consistent with terms and conditions of this Consent. Facility expansions, production increases or process Modifications which result in new or increased discharges of pollutants must be reported by submission of a new Consent application or if such new or increased discharge does not violate the effluent limitations specified in the Consent, by submission to the Board details of such new or increased discharges of pollutants in which case the consent may be modified to specify effluent limitations for any pollutants not identified and limited here in the discharge of any pollutant more frequently than or at a level in excess of that identified and authorized by the Consent shall constitute a violation of the terms and conditions of the Consent.
2. After notice and opportunity for the hearing, this consent may be modified, suspended or revoked by the Board in whole or in part during its term for cause including, but not limited to the following: -
  - (a) Violation of any terms and conditions of this Consent
  - (b) Obtaining this Consent by misrepresentation or failure to disclose fully all relevant facts.
  - (c) A change in any condition that requires temporary or permanent reduction or elimination of the authorized discharge.
3. Notwithstanding para(2) above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established for a toxic pollutant which is present in the discharge authorized here in and such standard or prohibition is more stringent than any limitation upon such pollutant in this Consent the Consent shall be revised or modified in accordance with the toxic effluent

standard or prohibition that the Board may consider and the applicant shall be so notified.

4. The applicant shall allow the staff of Chhattisgarh Environment Conservation Board and/or their authorized representative, upon the Presentation of credentials,
  - (a) To enter upon the applicant's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this Consent.
  - (b) To have access to and copy at reasonable time any records required to be kept under the terms and conditions of this Consent.
  - (c) To inspect at reasonable time any monitoring equipment or monitoring method required in this Consent, or
  - (d) To sample at reasonable time any discharge of pollutants.
5. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities of system installed or used by him to achieve compliance with the terms and conditions of this Consent.
6. The issuance of this Consent does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State or local laws or regulation.
7. The Consent does not authorize or approve the construction of any physical structures or facilities or the undertaking of any work in any water course.
8. The specific effluent limitations and other pollution controls applicable to the discharge permitted here in are set forth below as specific conditions. Also set forth below are self-monitoring and reporting requirements. Unless otherwise specified, the applicant shall submit duplicate original copies of all reports to the Chhattisgarh Environment Conservation Board. Except for data determined to be confidential all such reports shall be available for public inspection at the office of the Chhattisgarh Environment Conservation Board. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provide for in section 42 of the Act.

**B. SPECIAL CONDITIONS: -**

1. Initial Effluent limitation during the period beginning on the effective date of this consent and lasting until one calendar year discharge from outfalls shall be limited and monitored by the applicant as specified below: -

- (a) The following shall be limited by the applicant as specified.

S.No.	Effluent Characteristics	Discharge Limitation				Monitoring Requirements	
		Average		Maximum		Frequency of Measurement	Type of Sample
		Mg/l	Kg/Day	Mg/l	Kg/Day		

Daily/Weekly/Monthly/Tri-monthly.

Grab/ 24 Hours Composite.

In Addition to above discharge shall be limited and monitored as specified below.

S.No.	Effluent Characteristics	Discharge Limitation				Monitoring Requirements	
		Average		Maximum		Frequency of Measurement	Type of Sample ↑
		Mg/l	Kg/Day	Mg/l	Kg/Day		

Daily/Weekly/Monthly/Tri-monthly.

Grab/ 24 Hours Composite.

For the purpose of this sub-section, the daily average discharge is the total discharge by weight during the calendar month divided by the number of days in month the production or commercial facility was operating for the purpose of the sub-section the daily maximum discharge means the total discharge by weight during any calendar day.

- (b) The pH shall not be less than 5.5 or greater than 9.0
2. Final effluent Limitation: - During the period beginning from 1st day of month of commissioning of the plant and lasting until the date of expiration of this Consent, discharge from the outfalls shall be limited and monitored by the applicant as specified below:-

- (a) The following shall be limited and monitored by the applicant as specified:

S. No.	Effluent Characteristics	Discharge Limitation				Monitoring Requirements	
		Average		Maximum		Frequency of Measurement*	Type of Sample †
		Mg/l	Kg/Day	Mg/l	Kg/Day		
1	B.O.D.	—	—	30	60.0	Monthly	24 hours Composite
2	C.O.D.	—	—	300	600.0		
3	S.S.	—	—	100	200.0		
	pH 5.5 to 9.0 Flow: 2000 Cum/Day (Industrial & Domestic)					Daily	Grab

- \* Daily/Weekly/Monthly/Tri-monthly  
† Grab/ 24 Hours Composite

Additional, outfalls shall be monitored as follows:

- (i) Flow, Temperature and Total solids: One per month
- (ii) Grab Samples Maximum discharge temperature above upstream receiving water shall be in accordance with the standard of ISI at 40°C.
- (iii) Uniform as per ISI 2490 at 40°C.

The temperature shall be monitored once per month of each outfall. For the purpose of the sub-section the daily average is the total discharge by weight during calendar month divided by the number of days in month that the production or commercial facility was operating for the purpose of this sub-section, the daily maximum discharge means the total discharge by weight during any calendar day.

- (b) The pH shall not be less than 5.5 or greater than 9.0 for outfalls. The samples are taken as monthly, grab samples.

3. Schedule of Compliance for effluent Limitation:- The applicant shall achieve compliance with the effluent limitation specified above for discharge from outfalls in accordance with the following schedule:

- (i) Report of Progress: In-Monthly
- (ii) Completion of final plans by \_\_\_\_\_
- (iii) Award of contract or other commitment of financing \_\_\_\_\_
- (iv) Commencement of construction by \_\_\_\_\_
- (v) Report of construction progress \_\_\_\_\_
- (vi) Completion of construction by \_\_\_\_\_
- (vii) Attainment of operational level by \_\_\_\_\_

Please See on page no 11 to 15

(b) The applicant shall submit to the Consent issuing Authority the required report of progress or where a specific action is required in (a) above to be taken by a certain date a written notice of compliance or non-compliance with each of the above scheduled dates, post marked not later than 14 days following each elapsed date. Each notice of compliance shall include the following:-

- (1) A short description of the non-compliance
- (2) A description of any action taken or proposed by the applicant to comply with the elapsed scheduled requirement without further delay.
- (3) An estimate of any factor which tend to explain or mitigate the non-compliance, and
- (4) An estimate of the date, the applicant will comply with the elapsed scheduled requirement and assessment of the possibility that the applicant will meet the next scheduled requirement time.

4. Compilation of monitoring Data

- (a) Samples and measurements taken to meet the monitoring requirements specified above shall be representative of the volume and nature of monitored discharge.
- (b) Following promulgation of guidelines establishing test procedures for the analysis of pollutants, all sampling and analytical methods used to meet monitoring requirements specified above shall conform to such guidelines. Unless otherwise specified sampling and analytical methods shall conform to the latest edition of the Indian Standard

specifications and where it is not specified the guidelines as per standard methods for the examination of Water & Waste Water 13<sup>th</sup> Edition of the American Public Health Association, New York U.S.A. shall be used.

- (c) The applicant shall take samples and measurement to meet the monthly requirements specified above at the location indicated below:

#### POINT OF SAMPLING

- (i) Outfalls of waste.  
 (ii) 100 meters from point of confluence, down stream to river or lake.

#### 5. Recording of Monitoring activities and Results:

- (a) The applicant shall make and maintain records of all information resulting from monitoring activities by this Consent.
- (b) The applicant shall record for each measurement of sample taken pursuant to the requirements of this Consent the following information:
- (1) The date, exact place and time of sampling
  - (2) The dates on which analysis was performed.
  - (3) Who performed the analysis?
  - (4) The analytical techniques or methods used and
  - (5) The result of all required analysis.
- (c) If applicant monitors any pollutant more frequently as is required by this Consent he shall include the results of such monitoring in the calculation and reporting of values required in the discharge monitoring reports, which may be prescribed by the Board, such increased frequency shall be indicated on the Discharge Monitoring Report form.
- (d) The applicant shall retain for a minimum of 3 years all records of monitoring activities and result including all records of calibration and maintenance of instrumentation and original strip chart regarding continuous monitoring instrumentation. The period of retention shall be the extent during the course of any unresolved litigation regarding the discharge of pollutants by the applicant or when requested by the Central or State Board.

#### 6. Reporting of Monitoring Results:

- (a) Monitoring information required by this Consent shall be summarized and reported by submitting a Discharge Monitoring Report form duly filled in and signed, to the Board's office at the following address:

**CHHATTISGARH ENVIRONMENT CONSERVATION BOARD**  
 Commercial Complex, C.G. Housing Board Colony,  
 Kabit Nagar, Raipur (C.G.) 492 099

- (b) Each submitted Discharge Monitoring Report shall be signed as follows:

- (i) If submitted by Corporation by a Principal Executive Officer of at least the level of Vice-President or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the discharge Monitoring Report originates.
- (ii) If submitted by a partnership firm, by a general partner.
- (iii) If submitted by a sole proprietor, the proprietor.
- (iv) If submitted by a Municipal, State or Central Government or other public enterprises, by a Principal Executive Officer, ranking elected official, commanding officer, or other duly authorized employee.

- (c) All information submitted on the Discharge Monitoring Form shall be based upon measurements and sampling carried out during the three previous calendar months. The first Discharge Monitoring Report shall be submitted for a period ending 60 days from issuance. Thereafter reporting period shall end on the last date of each month. The applicant shall submit a Discharge Monitoring Report post marked no later than 28th day of the month following each completed reporting period.

7. **Limitation of Discharge of Oil Hazardous Substance in harmful quantities:** The applicant shall not discharge oil in quantities defined as harmful in regulations. In addition the applicant shall not discharge hazardous substance into natural water course in quantities defined as harmful in regulations promulgated by the Board. Nothing in this Consent shall be deemed to preclude the institution of any legal action nor relieve the applicant from any

responsibilities, liabilities, or penalties to which the applicant is or may be subject to clauses.

8. Limitation of visible Floating Solids and Foam. During the period beginning date of issuance and lasting until the date of expiration of this Consent the applicant shall not discharge floating solids or visible foam.
9. Disposal of Collected Solids:
  - a) Intake Water Treatment. Solid Sludge's, dirt, silt or other pollutant separated from or resulting from treatment of intake or supply waters prior to use by the applicant shall be disposed of in such a manner as to prevent any pollutant from such materials from entering any such water. Any live fish or other animals collected or trapped as a result of intake water screening or treatment may be returned to water.
  - b) Waste water Treatment. Solid sludge's, filter backwash or other pollutant removed from or resulting from treatment or control of waste water shall be disposed of in such a manner as to prevent any pollutants from such materials from entering natural water.
10. Non-compliance with Effluent Limitations:
  - (a) if for any reason the applicant does not comply with or will be unable to comply with or will be unable to comply with any daily maximum effluent limitations specified in this Consent the applicant shall immediately notify the Consent issuing authority or his designee by telephone No. 0771-2443923/2443934 and provide the Consent issuing Authority with the following information in writing within 5 days of such notification:
    - i) Cause of non-compliance.
    - ii) A description of the non-complying discharge including its impact upon the receiving water.
    - iii) Anticipated time, of non compliance is expected to continue or if such condition has been corrected, the duration of non-compliance.
    - iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and;
    - v) Steps to be taken by the applicant to prevent recurrence of conditions of non compliance.
  - (b) The applicant shall take all responsible steps to minimize any adverse impact to natural waters resulting from non-



compliance with any effluent limitation specified in this Consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.

- (c) Nothing in this Consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance, whether or not such non-compliance is due to factors beyond his control such as equipment break down, electric power failure, accident or natural disaster.

Limitation of Batch Discharge.

**SPECIAL CONDITIONS**

11. Provision for Electric Power Failure: The applicant shall either-
- (a) No later than \_\_\_\_\_ certify in writing to the consent issuing authority that applicant has installed or provided for an alternative electric power source sufficient to operate all facilities utilized by the applicant to maintain compliance with the terms and conditions of the Consent or.
  - (b) No later than 30 days after the effective date of his Consent, certify in writing to the consent issuing authority that upon the reduction, loss, or failure of one or more of the primary sources of electric power to any facilities utilized by the applicant to maintain compliance with the terms and conditions of his consent, the applicant shall halt, reduce or otherwise Control production and/or all discharges in order to maintain compliance with the terms & conditions of this Consent.
12. Prohibition of By pass of Treatment Facilities: The diversion or by-pass of any discharge from facility utilized by the applicant to maintain compliance with the terms and conditions of this Consent is prohibited except:
- (i) Where unavoidable to prevent loss of life, severe property damage, or
  - (ii) Where excessive storm drainage or run off would damage any facilities necessary for compliance with the terms and conditions of this Consent. The applicant shall immediately notify the consent issuing authorities in writing of each such diversion or by-pass in accordance with the procedure specified above for reporting non-compliance.
13. Spill Prevention and Containment Plan: Within 90 days of the effective date of the Consent the applicant shall prepare and

submit to the consent issuing authority, a Spill Prevention, Containment and Countermeasure Plan for the facility covered by this Consent. Such plan shall include the following information and procedures relating to the prevention of spills and unauthorized discharges of oil and hazardous substances:

- (a) A description of a reporting system to be used to notify immediately persons responsible for management of a facility and appropriate State and Central authorities;
- (b) A description of equipment or facilities (including overall facility) for the prevention, containment of spills and unauthorized discharge;
- (c) A list of all oil and hazardous materials used processed or stored at the facility including the normal quantity maintained on the premises for each listed material;
- (d) A brief description of any spills or unauthorized discharge which occurred during the 36 months period preceding the effective date of this Consent and subsequent measures taken by the applicant or reduce the possibility of further spills or unauthorized discharges; and
- (e) An implementation schedule for additional equipment or facilities which might be required for sub para (b) above but which are not yet operational.

### SPECIAL CONDITIONS

1. The mining lease area shall not exceed 2113 hectares.
2. Industry shall ensure continuous, proper and efficient working of industrial and domestic effluent and shall ensure that the treated effluent quality meet the standards prescribed by Board published in Gazette Notification dated 25-03-86. Industry shall provide adequate facility for proper treatment of industrial [mine water including acid mine water (if any), heavy vehicle washing/workshop/ coal handling plant waste water etc.] and domestic effluent generated due to capacity enhancement also. The major parameters of treated effluent shall be kept within the limits as follows -

S. No.	Parameters	Limits
1	pH	5.5 - 9.0
2	Suspended Solids	100 Milligram per Liter
3	BOD	30 Milligram per Liter
4	COD	250 Milligram per Liter
5	Oil and Grease	10 Milligram per Liter

Chhattisgarh Environment Conservation Board may further stipulate stringent limit depending upon environmental conditions.

3. Industry shall provide suitable arrangement of drains/pipes networks to ensure adequate flow for utilization of treated effluent inside the mining lease area. Treated waste waters/effluent shall be recycled for mine operations. The mine discharge water/domestic effluent after proper treatment shall be utilized in plantation, dust suppression, sprinkling on roads or other useful purposes. Industry shall also provide adequate arrangement for supply of treated mine water as maximum as possible to nearby villages for use of different purposes such as irrigation/ agriculture/drinking etc. Industry shall use treated mine water as maximum as possible and the concept of zero discharge shall be adapted to a maximum possible extent. In case of discharge of treated mine water into nalla/river, industry shall ensure the nalla/river un-affected with respect to its water quality and its designated use. Industry shall provide adequate scientific arrangement for ground water re-charging by using treated mine water.
4. Industry shall provide water metering arrangement for the measurement of water utilized and effluent generated.
5. Industry shall use mined out coal for its captive consumption to the Lara Super Thermal Power Project (4000 MW) located at a distance of 60 km. In this regard industry shall establish transportation of coal through MGR system of rail network.
6. Industry shall provide adequate number of influent and effluent quality monitoring stations/points in consultation with Chhattisgarh

Environment Conservation Board. Regular monitoring shall be carried out for relevant parameters. Regular monitoring of surface and ground water quality shall be undertaken around mine area to ascertain the change in the water quality, if any, due to leaching of contaminants from dump area/mine area. Result and data collected shall be analyzed to ascertain the status of water quality and findings shall be submitted to Chhattisgarh Environment Conservation Board.

7. Industry shall ensure continuous running of separate electric metering arrangements with time totalizer for the running of pollution control devices. These arrangements shall be made in such a fashion that any non-functioning of pollution control devices shall immediately stop the electric raw material supply to the production unit and shall remain tripped till the pollution control device/devices are made functional again.
8. Industry shall provide safe and scientific arrangement for handling, collection, storage, transportation and disposal of all solid wastes and over burden etc. Mining rock/boulders shall be used for road making and land filling. Industry shall obtain letter of authorization under Hazardous Wastes (Management and Handling) Rules, 1989 (as amended) from the Board (if required). Appropriate arrangement shall be provided as per law for collection/treatment/storage/ transportation / disposal of hazardous wastes.
9. All the slope of external dumps shall be maintained at a maximum of 28 degrees. Top soil shall be stacked properly in a dump with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area and for green belt development.
10. Backfilling of void (internal dump) shall be done and the mined out area shall be reclaimed to its original surface level. The monitoring of the safety of the internal backfill dump shall be done with the latest technologies and equipment as part of safety measures.
11. Industry shall take effective steps to check the soil erosion from over burden/waste material dumping areas etc. and causing silting problem in nearby nalla/river/pond during rainy season before onset of monsoon. Sufficient numbers of check dams of adequate capacity shall be constructed to prevent the same before onset of monsoon. Check dams and silting ponds of appropriate size shall be constructed to arrest silt and sediment flow from soil and coal/wastes/over burden dumps before onset of monsoon. The water/effluent so collected shall be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly de-silted and maintained. Garland drain of appropriate size shall be constructed before onset of monsoon to collect surface run-offs from

the mining area, topsoil dumps, waste dumps etc. Gulland drain (size, gradient & length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Plantation shall be taken up for soil stabilization along the slopes of the dump. Sedimentation pits shall be constructed at the corners of the gulland drains. The surface run-off shall be de-silted through a series of check dams and drains before final disposal/re-use. Dimension of the retaining wall at the toe of dumps and over burden benches within the mine to check run-off and siltation should be based on the rain fall data.

12. Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers at suitable locations at the proponent's cost in and around mine area. Regular monitoring of surface and ground water quality shall be carried out by establishing a network of stations at suitable locations in mine area/adjacent to mine area. The frequency of monitoring (quality and quantity) shall be four time a year - pre-monsoon (April/May), monsoon (August), post-monsoon (November) and winter (January) seasons. Data generated from groundwater regime monitoring will be submitted to Board on an annual basis.
13. Area brought under afforestation shall be not less than 1876.04 ha which includes, backfilled area (1548.38 ha), which includes area reclaimed after re-handling of temporary external OS dumps and topsoil dump, embankment (15 ha) along ML boundary, infrastructure area (5 ha), along roads, green belt (7.66 ha) and in undisturbed areas/safety zone and in colony outside the ML by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.
14. Industry shall adopt rain water harvesting technique in the mine area and residential area for recharge of ground water before onset of monsoon. Industry shall develop rainwater harvesting structures to harvest the rain water for utilization in the lean season as well as to recharge the ground water table before onset of monsoon. The mine authorities should meet water requirement of nearby village(s) in case the village wells go dry due to de-watering of the mine.
15. Industry shall ensure transportation of fly ash for back filling / beneficial uses by covered vehicles to prevent emission during transportation.
16. Industry shall establish an environmental management cell to carryout function relating to environmental management under the supervision of senior executive who would directly report to the head of

organization. A full-fledged laboratory with qualified technical / scientific staffs to monitor the influent, effluent, ground water, surface water, soil and ambient air quality etc. shall be provided.

17. Necessary fund shall be provided for implementation of above conditions for environmental safeguards. The funds earmarked for environmental protection measures shall be kept in separate account and not diverted for any other purpose.
18. Industry shall obtain statutory clearances/licenses from concerned Central/State Government Departments, Boards, Bodies and Corporations etc. Industry shall follow direction issued by Central/State Government, Central Pollution Control Board/ Chhattisgarh Environment Conservation Board from time to time regarding control of water & air pollution and for environmental conservation.
19. The issuance of 'consent to operate' does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State or local laws or regulations.
20. Any change in product, production/mining capacity, process, raw materials used, project profile (mining technology and scope of working) etc. shall be intimated to the Board and prior permission of the Board shall be obtained for the same.
21. Board may amend/cancel any of the conditions and add new conditions to be incorporated in the permission to establish and consent to operate and further stringent the emission/effluent limit as and when deemed necessary in the interest of environmental protection, change in the project profile or non-satisfactory implementation of the stipulated conditions etc.

This consent and the authorization to discharge shall expire after twelve months starting from the first day of the month of commissioning of the plant. The applicant shall not discharge after the date of expiration. The applicant shall submit such information forms and fees as required by the Board not later than 180 days prior to the date of expiry.

For & on behalf of  
Chhattisgarh Environment Conservation Board

  
Member Secretary  
Chhattisgarh Environment Conservation Board  
Raipur (C.G.)

## Additional Annexure-16



A Maharatna Company

National Thermal Power Corporation Ltd.

(A Public Sector Undertaking)

**TALAIPELLI COAL BLOCK**MAND-RAIGARH COAL FIELD  
DISTRICT - RAIGARH, STATE - CHHATTISGARH**EXPERT REVIEW REPORT  
ON  
MINING PLAN  
(INCLUDING MINE CLOSURE PLAN)  
(1<sup>ST</sup> MODIFICATION)**MPPA Certificate No.: NABET/AFA-MPPA/1A/015  
Issued Date: 30<sup>th</sup> March, 2022



MECON LIMITED, RANCHI

MEC/11/16/QTTS/EDA/R-0



OCTOBER 2022

Sl. No.	Description	Clause No.	Remarks of MECON
1.	Cover Page		Along with Rated Capacity, Peak capacity also to be mentioned separately.
2.	Cover Page		MPPA Cert. No. & Issuing Date to be mentioned.
3.	Index for List of Annexures		All Annexures to be checked as per Index. Followings are missing at present – Annexure 2: Certificate by QPMPPA Annexure 3: Approval of the Company Board Annexure 6: Non-refundable Application fee
4.	Index for List of Plans/ Drawings		All Plans/Drawings to be checked as per Index. Followings are missing at present – Plan 2: Plan certified by QPMPPA Plan 9: Tentative land use plan.
5.	All Plans / Drawings		All Legends to be updated in accordance with features shown in respective plans. The blank Rows in Legend table should be omitted.  For Example, in Geological plan Coal outcrops to be shown in Legend, in Surface plan reserved forest & Protected Forests to be shown in legend. In Reclamation Plan Legends for Plantation area, Water body etc. to be incorporated.





 <b>एनटीपीसी</b> <b>NTPC</b> <small>A Bharat Heavy Electricals Limited Company</small>	<b>EXPERT REVIEW REPORT</b> <b>ON</b> <b>MINING PLAN (INCLUDING MINE CLOSURE PLAN)</b> <b>[LET MODIFICATION] OF TALAI PALLI COAL BLOCK</b> <b>MAND-RAIGARH COAL FIELD</b> <b>DISTRICT- RAIGARH, STATE- CHHATTISGARH</b>	
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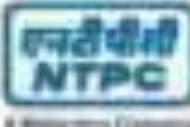

Sl. No.	Description	Clause No.	Remarks of MECON
6.	List of Abbreviations	1.1.4	The following Abbreviations used in the Text to be included in the list of Abbreviations Table –  1. STPP (Clause 1.1.4) 2. CMDPA (Clause 1.3.5) 3. MGR (Clause 3.1.2) 4. OGL (Clause 3.1.2) 5. ORR (Clause 3.1.3) 6. RLS (Clause 5.4) 7. OHE (Clause 5.4) 8. CPCB (Clause 8.2) 9. TDS (Clause 8.2) 10. NAAG (Clause 8.3)
7.	Chapter-1 Project Information	1.1.1	Road – Nearby road distance to be incorporated.  Air link – Nearby Airport Name with distance to be given.
8.	Chapter-1 Project Information	1.1.4	Drainage Pattern – To be elaborated.  Rainfall – Annual rainfall (avg.) along with max. and min. rainfall data to be incorporated in the report.
9.	Chapter-1 Project Information	1.1.2	Alteration/ Vesting order No. to be incorporated.
10.	Chapter-2 Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.2	The coordinates provided does not match with the Block Boundary Coordinates in GR.
11.	Chapter-2 Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.3	In GR, the total area of the Block has been mentioned as 20 Sq. Km. where as in Mining Plan it has been mentioned as 21.194 Sq. Km. The same has to be checked.

 <b>NTPC</b> <small>A Bharat Heavy Electricals Limited Company</small>	<b>EXPERT REVIEW REPORT</b> <b>ON</b> <b>MINING PLAN (INCLUDING MINE CLOSURE PLAN)</b> <b>(LET MODIFICATION) OF TALAIPALLI COAL BLOCK</b> <b>MAND-RAIGARH COAL FIELD</b> <b>DISTRICT- RAIGARH, STATE- CHHATTISGARH</b>	
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Sl. No.	Description	Clause No.	Remarks of MECON
12.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.4	In GR, the total area of the Block has been mentioned as 20 Sq.Km. where as in Mining Plan it has been mentioned as 21.194 Sq.Km. The same has to be checked.
13.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.7	The clause may be corrected as per format/ Guideline provided by MoC for preparation of mining plan which states: "Cardinal Point Co-ordinates of the non-coal/lignite bearing area/siting, mining lease outside the allotted Geological Coal/Lignite Block"
14.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.8	Certificate to be produced as per the requirement.
15.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.1.9	The date of capture of satellite imagery to be provided.
16.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.1	It is mentioned as "It is situated between B-River Coalfield in the northeast and Korba Coalfield in the southwest with more or less similar stratigraphic and tectonic setting".  Please revise the location of Mand-Raigarh Coalfield with respect to Korba Coalfield and B-River Coalfield.
17.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.2	Coal Seam Sequence table should be updated as V Bottom, IV Middle & IV Bottom in Sl. No. 15, 17, 19.
18.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.3	In GR, the total area of the Block has been mentioned as 20 Sq.Km. where as in the Mining Plan it has been mentioned as 21.194 Sq.Km. This has to be checked.

 NTPC <small>A Bharat Heavy Electricals Limited Company</small>	<b>EXPERT REVIEW REPORT</b> <b>ON</b> <b>MINING PLAN (INCLUDING MINE CLOSURE PLAN)</b> <b>(LET MODIFICATION) OF TALAI PALLI COAL BLOCK</b> <b>MAND-RAIGARH COAL FIELD</b> <b>DISTRICT- RAIGARH, STATE- CHHATTISGARH</b>	
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Sl. No.	Description	Clause No.	Remarks of MECON
19.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.17	Grass Geological Reserve figure mismatches with that of Clause No. 1.3.11
20.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.23	To be updated in line with the table of 2.2.14
21.	Chapter-2: Exploration, Geology, Seam Sequence, Coal Quality & Reserve	2.2.24	To be updated in line with the table of 2.2.14
22.	Chapter-3: Mining	3.1.2	In the table showing the Geo-Mining Characteristics of the workable seams for OC, following seams have been considered as workable seams – XLB, ISL3, V TOP, V BOTTOM.  However, in description it is mentioned that, the above mentioned seams are classified as poorly developed seams in the block. Hence, resources of these seams are not considered. It needs to be checked.
23.	Chapter-3: Mining	3.1.2	In the Pn Formulation Strategy, Quarry surface has been taken as 45-50 m from the block boundary. It needs to be verified.
24.	Chapter-3: Mining	3.1.3	25 Mt shall be Rated capacity, instead of peak rated capacity.
25.	Chapter-3: Mining	3.1.4	Capacity spalling to be corrected.
26.	Chapter-5: Infrastructure Facilities	5.2	Power Supply & Illumination: In the first paragraph, workshop has been repeated twice. It needs to be corrected.

 NTPC	<b>EXPERT REVIEW REPORT</b> <b>ON</b> <b>MINING PLAN (INCLUDING MINE CLOSURE PLAN)</b> <b>(LET MODIFICATION) OF TALAI PALLI COAL BLOCK</b> <b>MAND-RAIGARH COAL FIELD</b> <b>DISTRICT- RAIGARH, STATE- CHHATTISGARH</b>	
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Sl. No.	Description	Clause No.	Remarks of MECOIN
27.	Chapter-5: Infrastructure Facilities	5.4	CHD/Mode of Dispatch: Spelling of TalaiPalli OCP to be corrected in the first part.
28.	Chapter-5: Infrastructure Facilities	5.4.	Handling Arrangement: "Each site shall facility of wagon loading" - This sentence shall be suitably corrected.
29.	Chapter-8: Progressive & Final Mine Closure Plan	8.10.1	In Abandonment cost table, Quantity & Unit cost are not given. Hence, Total amount calculation to be verified by NTPC.
30.	Chapter-8: Progressive & Final Mine Closure Plan	8.10.2	Balance Corpus for which provision is to be made - Please mention <u>(in Rs. Lakh)</u>  Balance Life of Mine - Please mention <u>(in Years)</u>



			Seam I is poorly developed in the block having non-adequate thickness and therefore its reserve is not assessed in the Geological Report.
1.1.21	OP Seams	OP has revised as compared to the previously approved mining plan. To be considered/corrected.	The Previously approved Mining Plan has proposed Opened Mining upto Seam II which is below Seam IV level. This is technically and operationally not feasible due to lack of dumping space. Therefore, the revised Mining Plan has proposed the Opened Mining upto Seam IV that which is above Seam II. This has resulted in removal of less OP than the previously approved mining plan and hence the reduction of OP.
1.1.3	Base level of Mining Plan/ Mine Closure Plan	Base level cannot be lower than the state of subsidence of mining plan.	Corrected.
1.5.3	Lease area 'IV'	Reasons for change in block area, geological reserve and extractable reserve may be informed.	At the time of allotment of the Block in 2006, the Talsadda Block boundary was not in WGS84 co-ordinate system. On request of NTPC, CMPC carried out the 2010 survey in WGS84 coordinate system and finalized the block boundary. This has resulted in change of 9.4 Ha in block area on plan and on surface ground and change in bounding coordinates. A corrigendum to the allotment order No. 105/11/001/04A dated 10.04.2010 was issued by the Ministry of Coal vide order no. 105/11/001/04A dated 16.04.2012 regarding this which is attached at Annexure-I.

			The Net Geological Reserve of 1207.145 Mt mentioned in the Revised Mining Plan is as per the Geological Report prepared by MGL in September 2008. The Gross Geological Reserve is arrived at by considering 10% geological loss which is mentioned in the Geological Report.
			The subsurface reserve has changed since the base level for Opened Mining has changed from Seam II in the previous approved Mining Plan to Seam IV in the proposed Revised Mining Plan due to lack of space for dumping. Also, some area for conveyor corridor for evacuation of coal and infrastructure has been excluded from mining since mine cannot run without these infrastructures.
1.2.1	Production Schedule as per mining permission (under provisions of CRDPA if any)/Allotment Agreement.	Criteria to be given.	The planned production schedule is given in I.A.T.
2.2.12	Seams not considered for Mining with Reserve.	View is differently stated in the previously approved mining plan?	In the previously approved Mining Plan, the pit was formulated considering Seam II as base level for opened mining and the entire dump was accommodated internally. On examination of the previously approved Mining Plan, it was found not to be technically and operationally not feasible and so revision of the mining plan was recommended.

			<p>The Revised Mining Plan has been formulated considering Seam IV but as base seam. Seam IV but has been taken as the base seam for the advance going with Seam II which is only 4-4.5m thick and is 30-40m below seam IV but increases the DG loading to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. So, Opencast mining for the Telesahi coal block has been proposed with Seam IV but to expedite the recovery of coal by Opencast Mining.</p> <p>As simultaneous working of US and OC is not operationally safe, Seams below IV but will be planned for US mining at the end of OC mine life as per the scientific study based technology options available at that time.</p>
3.1.6	Rated Capacity 'MTPA'	PRC of mine is being achieved in 2027-28. Reasons of same may be given.	It is because the mine will encounter upper seams (Seams II, L3, X but etc.) in the later stage after 10-14 years. This will increase the cumulative thickness of coal and production can be increased to 25 MTPA.
3.1.7	Yearly Coal production Plan 'MT'	Annual scheduled production for year 2027-28 is less in the proposed MP in comparison to previously approved MP. Same needs to be reviewed.	The base seam of IV but is at a depth of 200m in the western side of the block. It will require time to reach that kind of depth and then only can production can be ramped up. The schedule of production given is optimized based on the prevailing condition, temporary external dump requirement, wall etc.

3.2.2	Reason for which Mining Lease has been granted to be reviewed is to be specified.	Mt of mine to be quantified	Corrected. If & in years.
1.3.10	Extractable Reserves 'MT'	Extractable reserves have been reduced as compared to the previously approved mining plan. To be explained/detailed.	The extractable reserves has reduced since the base seam for Opencast Mining has changed from Seam II to the previous approved Mining Plan to Seam IV in the proposed Revised Mining Plan due to lack of space for dumping. Also some area for conveyor corridor for subsidence of coal and infrastructure has been excluded from mining since mine cannot run without these infrastructures.
1.3.1	Block Area in 'Ha'	Geological block area, geological block area projection, lease area, project area have been changed as compared to the previously approved mining plan. To be explained/detailed.	At the time of allotment of the block in 2006, the Telesahi block boundary was not in WGS84 co-ordinate system. On request of NTPC, CBPD carried out the DGPS survey in WGS84 coordinate system and finalized the block boundary. This has resulted in change of 0.8 Ha in block area as per plan on surface ground and change in boundary coordinates. A corrigendum to the allotment order No. 10301/001/59A dated 10.01.2015 was issued by the Ministry of Coal vide order no. 10301/001/59A dated 04.04.2020 regarding this which is attached as Annexure-I.
1.3.04	Handling of Rejects	1.3.05. Excavation area and safety zone area have been reduced while infrastructure area, green belt and waterlogged area have been fulfilled as	in the earlier approved Mining Plan, no breaking of land use other than excavation area and safety zone was provided.

		completed to the previously approved mining plan. To be explained/corrected.	In the proposed Mining Plan, detailed assessment of land use pattern has been done and provided accordingly.
1.8.11	Open Geological Reserve 'B'	Open Geological reserves, blocked reserves, variable reserves and extractable reserves have been changed as compared to the previously approved mining plan. To be explained/corrected.	<p>The Open Geological Reserve of 1267.143 SR mentioned in the Revised Mining Plan is as per the Geological Report prepared by MDC, in September 2022. The Open Geological Reserve is arrived at by considering 10% geological loss, which is mentioned in the Geological Report.</p> <p>The blocked reserve, variable reserve and extractable reserve has changed since the zone used for Open-pit Mining has changed from Zone III in the previous approved Mining Plan to Zone IV in the proposed Revised Mining Plan due to lack of space for dumping. Also, some area for conveyor corridor for evacuation of coal and infrastructures has been excluded from mining area mine cannot run without these infrastructures.</p>

APPROVED



## Additional Annexure-18

COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MNDIE ACT 1967 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN (1<sup>ST</sup> MODIFICATION) OF TALADHALLI COAL BLOCK, M/V NTPC LTD HELD ON 02/02/2022 THROUGH VIDEO CONFERENCE

S/No.	Observation	Compliance
1	Changes made in the mining plan as compared to the approved mining plan shall be furnished as an annexure. The production schedule proposed shall be compared with the approved mining plan.	Furnished as Annexure-15
2	It has been stated that using air-compression is not possible if opencast mine were to be opened with Seam IV as base seam, as was proposed in the earlier approved mining plan. It shall be elaborated with relevant data (X).	A Conceptual Report on Proposed Opencast Mining is furnished as Annexure-22 wherein it is clearly demonstrated that this is the best possible option to extract maximum reserves.
3	Seams below Seam IV has been proposed to be mined by underground mining method. However, its location programme / mining details as per guidelines of MoC dated 29.05.2020 regarding mining plan has been given. To be submitted.	A Conceptual Report on UG Mining is attached as Annexure-21.
4	No projection of a part of coal bearing area in the south west part of the geological block has been done. To be corrected.	A Conceptual Report on Projection of South West Area is attached as Annexure-21.
5	Annexure 26/1 Approval as per guidelines of MoC dated 29.05.2020 shall be given.	Complied.

6	Additional Annexure-18 Observations made during Expert Review has been given. However, certification to the observations made by the expert proposed and verification done by the agency carrying out the above review shall also be submitted.	Complied.
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## Additional Annexure-19

**CHANGES MADE IN THE PROPOSED REVISED MINING PLAN AS COMPARED TO THE APPROVED MINING PLAN**

Sl. No.	Particulars	Approved Mining Plan	Proposed Revised Mining Plan	Remarks
1	Block Area in "Ha"	2113 Ha	2119.40 Ha	At the time of allotment of the Talaspali coal Block in 2006, the block boundary was not in WGS84 co-ordinate system. On request of NTPC, CNPDI carried out the DGPS survey in WGS84 co-ordinate system and finalized the block boundary. This has resulted in change of 6.4 Ha in block area <b>on plan not on surface ground</b> and change in bounding coordinates.
2	Lease area "Ha"	2113 Ha	2119.40 Ha	Same as above
3	Project Area "Ha"	2113 Ha	2119.40 Ha	Same as above
4	Base seam for OC Mining	Seam II	Seam IV Bot	This Revised Mining Plan has been formulated considering Seam IV Bot as base seam which is above Seam II. Seam IV Bot has been taken as the base seam for the pit since going upto Seam II which is only 4-6.5m thick and is 50-60m below seam IV Bot increases the OB handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~377 Mt of Coal (Conceptual Report provided as Annexure 20). So, Opencast mining for the Talaspali coal Block has been proposed upto Seam IV Bot to maximize the recovery of coal by Opencast Mining.
5	Life of the Project "Yrs"	OC-34 years UG-34 years	OC-31 years UG- to be planned at the end of OC mine life	Since, Base seam for OC mining has changed from Seam II to Seam IV Bot, Extractable reserve has also get changed and thus life of OC mine has also get changed.
6	Production Target "MTPA"	OC-18 MTPA UG- 0.72 MTPA	OC-25 MTPA UG- to be planned at the end of OC mine life	Considering strike length and average thickness of coal, 25 MTPA is the optimum capacity of the Talaspali Coal Mine.



11	Extractable Reserves "Mt"	OC-643.68 Mt UG-17.57 Mt	OC-621.56 Mt UG will be planned later	Same as above. Moreover, the extractable reserve of 643.68 Mt by OC in the approved Mining Plan is incorrect even if it is assumed to be technically feasible to mine up to base seam II. While reviewing the approved Mining Plan (Technical Feasibility Note on Talapali Coal Block attached as Annexure-22), the extractable reserve by OC was found to be 710.80 Mt, assuming there is no dumping space constraint.																																																							
12	OB in MM3	3777.07 Cum	2734.58 Cum	The approved Mining Plan has proposed Opencast Mining upto Seam II which is below Seam IV Set. This is technically and operationally not feasible due to lack of dumping space. Therefore, in this revised Mining Plan, Opencast Mining is proposed with base seam of Seam IV Set which is above Seam II. This has resulted in removal of less OB than the approved mining plan.																																																							
13	SR Mt/ha	4.48 cum/ha	4.31 cum/ha	Same as above																																																							
14	Production Schedule	<table border="1"> <thead> <tr> <th>Year</th> <th>Coal (Mt)</th> <th>Year</th> <th>Coal (Mt)</th> </tr> </thead> <tbody> <tr><td>1</td><td>3.50</td><td>1</td><td>3.50</td></tr> <tr><td>2</td><td>4.00</td><td>2</td><td>4.00</td></tr> <tr><td>3</td><td>8.00</td><td>3</td><td>7.58</td></tr> <tr><td>4</td><td>11.00</td><td>4</td><td>9.00</td></tr> <tr><td>5</td><td>18.00</td><td>5</td><td>14.40</td></tr> <tr><td>6</td><td>18.00</td><td>6</td><td>18.00</td></tr> <tr><td>7</td><td>18.00</td><td>7</td><td>12.00</td></tr> <tr><td>8 to 47</td><td>18.00/yr</td><td>8 to 18</td><td>12.00/yr</td></tr> <tr><td>48</td><td>15.00</td><td>19 to 29</td><td>25.00/yr</td></tr> <tr><td>49</td><td>10.00</td><td>30</td><td>12.00</td></tr> <tr><td>50</td><td>7.00</td><td>31</td><td>6.68</td></tr> <tr><td>51</td><td>6.00</td><td></td><td></td></tr> <tr><td>52</td><td>3.18</td><td></td><td></td></tr> </tbody> </table>	Year	Coal (Mt)	Year	Coal (Mt)	1	3.50	1	3.50	2	4.00	2	4.00	3	8.00	3	7.58	4	11.00	4	9.00	5	18.00	5	14.40	6	18.00	6	18.00	7	18.00	7	12.00	8 to 47	18.00/yr	8 to 18	12.00/yr	48	15.00	19 to 29	25.00/yr	49	10.00	30	12.00	50	7.00	31	6.68	51	6.00			52	3.18			<p>The base seam of Seam IV Set is at a depth of 200m in the western side of the block. It will require time to reach that kind of depth and then only can production can be ramped up. The schedule of production given is optimized based on the geo-mining condition, temporary external dump requirement, concurrent backfilling and total accommodation of OB, lead etc. The rated capacity of the mine has been increased to 15 MTPA from 12 MTPA.</p>
Year	Coal (Mt)	Year	Coal (Mt)																																																								
1	3.50	1	3.50																																																								
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## Additional Annexure-20



**cmpdi**  
*A Mine Planning Company*

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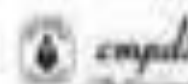
**CONCEPTUAL REPORT FOR  
OC MINING OF  
TALAIPALLI COAL BLOCK**



**JUNE 2022**

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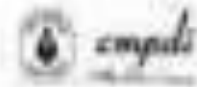


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## CHAPTER 1 BACKGROUND

### 1.1 INTRODUCTION

Talipalli coal mining block in the state of Chhattisgarh was initially allotted to NTPC by Ministry of Coal (MoC), vide letter no.13014/29/2003-CA-1, dated 25.01.2006, for meeting coal requirement for the proposed 4000MW Late Integrated Power Project which is approximately 60 kms away from the coal block.

Talipalli Block lies in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. At the time of allotment, the block was regionally explored by GSI by drilling 15 holes (6434.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

On receiving Letter of Award (LOA) from Ministry of Coal, NTPC Ltd issued Work order to MFCI to carry out detailed exploration in the block. MFCI drilled about 302 boreholes (38854.75 mtrs. of drilling) in approximately 30 sq. km. block area for which the Geological Report (GR) was submitted to NTPC on 28.09.08.

On receipt of GR, NTPC awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi. The Mining Plan was prepared by ACMM in 2008 for a rated capacity of 18.20 Mtpa based on the aforementioned GR which was later approved by the Ministry of Coal on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

However, as a consequence to the judgment of the Hon'ble Supreme Court in September 2014, the block allocation was cancelled which was later re-allotted to NTPC on 08.09.2015.

NTPC planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator (MDO) with scope of works viz. overburden removal, extraction of coal, construction of CHP & other fixed mine infrastructures, compliance of statutory obligations and other associated activities.

Meanwhile, all requisite statutory clearances and permissions were obtained from the respective statutory bodies. The major statutory clearances out of the above are furnished below:

Table 2.1: Major Statutory Clearances with Clearing Date

Activity	Date of Achievement
Env. Clearance	02.01.13/13.11.15 (Rev.)
Forest Clearance	St-I: 05.11.12; St-II: 29.01.14; 23.05.17(Rev)
Consent to Establish	06.01.15
Consent to Operate	17.03.16
Tripartite Escrow Agreement (Banker, CCD & NTPC)	15.05.14 & 04.05.17
DGM's Permission	19.01.18
Coal Controllers permission	31.01.18

## 1.2 NEED FOR THIS CONCEPTUAL REPORT

M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talaspalli Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL has claimed that as per their calculations 808.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.92 to 5.25 Cum/t. Along with this, the issue of accommodation of excess CB in the designated dump area including temporary external dump and unfeasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan has

also been raised by M/s TEMPL. There were a series of discussion/meetings held between NTPC and TEMPL to resolve the issue.

Subsequently, M/s TEMPL chose to rescind the contract through their Notice dated 04.05.2021 and filed a Commercial Suit before Hon'ble Delhi High Court. Subsequent to few hearings and submissions made by both the Parties, the Hon'ble Delhi High Court directed both the parties for mutual discussions for amicable resolution of the issue which was complied by both the Parties by holding meetings wherein M/s TEMPL requested for appointment of independent Expert for review of the mining plan of Talaspalli coal mining project.

Thereafter, M/s TEMPL and NTPC requested CNPDI for review of the technical parameters of the Talaspalli coal mining project on urgent basis which was accepted by CNPDI.

The Technical Feasibility Note on Talaspalli Coal Block was prepared by CNPDI and was submitted to NTPC and M/s TEMPL in September 2021. The approved Mining Plan was reviewed and it was found to be not feasible. CNPDI recommended revision of the Approved Mining Plan.

Against this backdrop, NTPC has awarded the consultancy service to CNPDI for Preparation of Conceptual Report, Mining Plan and feasibility Report for Talaspalli Coal Block to CNPDI.

### **1.3 SCOPE OF THE CONCEPTUAL REPORT**

The Conceptual Technical Report will study the pit & dump options and finalise the base option along with mutually agreed project criteria that would form the basis of detailed study in the Mining plan and Feasibility Report.





The conceptual report has outlined the preliminary delineation of Open-pit boundary options and assessment of likely mineable reserves and waste quantities. It has also tentatively assessed the rated capacity, production buildup and mining strategy with respect to O/S dumping.

#### **1.4 BASE DOCUMENT**

The Geological Report on Detailed Exploration for Coal: Talajpalli Coal Block (September 2008) prepared by MECL forms the base document for the above assignment.

APPROVED

## CHAPTER 2

### PROJECT SITE INFORMATION

#### 2.1 LOCATION

Talaspali coal block having an area of 2115.5 ha is bounded by latitude  $22^{\circ} 13' 35''$  &  $22^{\circ} 16' 05''$  N and longitude  $83^{\circ} 25' 49''$  &  $83^{\circ} 30' 22''$  E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaspali block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd., was pilared by Boundary Pillars BP-1 to BP-65. The Kato river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Seppali, west of Chotiguda forming the western boundary. Ajigarh and Kukur-Maucha village forming the northern boundary.

Talaspali block is covered by Survey of India top sheet No. 54N(7 & N/8) (RF 1:50000). The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaspali, Kulkur-Maucha, Ajigarh, Chotiguda, Bichinara, Naya Rampur, Raikera and Sajhepali are numerous villages located within the block.

#### 2.2 COMMUNICATION

Talaspali block is about 55 km away from Raigarh township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Anthabapur State Highway. Talaspali village is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lalunga road. Gharghoda is about 35 km North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway. A large part of the area of investigation is practically inaccessible during monsoon. The nearest railway station is Raigarh which is 55 km away from Talaspali block lying on the Mumbai-Howrah main line of SE railways.

### 2.3 PHYSIOGRAPHY AND DRAINAGE

The topography of Talespali block is mostly covered by softer horizon and in general represents an undulating terrain bounded by Tolga Pahar in the north and Silot Pahar (580m) in the south. The general ground level elevation of the area varies between 280 m and 360m above MSL.

Kelo River is flowing through the south-eastern part of the present area, constitute the main drainage system. The main subsidiary stream channel draining the block from north-west to south-east joins the Kelo River at the extreme south-eastern part of the area. This subsidiary stream channel is fed by number of small tributaries rising from hills both from north and south.

### 2.4 CLIMATE

The area experiences a sub-tropical climate with very hot and dry summer. In the summer season from March to June, temperature rises to 45<sup>o</sup> C during the peak period. The monsoon period extends from mid-June to September with an average annual mean rainfall of 1620 mm. The winter season starts from November and continues upto February. During winter the temperature goes down to 18.8<sup>o</sup> C.

### 2.5 LAND USE, FLORA & FAUNA

Forest cover is found in the south eastern part of the block. Small land patches having forest cover are available in central part of the block. Remaining part of the area is mostly cultivated land. Cultivation and collection of forest products are the main occupation of the people of the area. The soil of the area is having fair to medium range of fertility. The main crop grown in this area is paddy. The commonly found flora in the area are Sal, Teak, Bija, Mango, Neem, Tendu etc. Wild animals found are elephants, wild dogs & bears etc.



## 2.6 VILLAGES AND HABITATION

Total eight number of village lies within the Talapali Block as per the Socio-Economic Survey report (2007) provided by NTPC. The details are as under:

Table 2.1: Particulars of the Village within Talapali Coal Block

S.No.	Name of the Village	Proposed load to be supplied (t/ann)
1.	Talapali	751.31
2.	Bichnera	610.36
3.	Navarempur	481.31
4.	Baharucha	298.76
5.	Rakera	1452.17
6.	Chotiguda	635.36
7.	Ajgerh	46.86
8.	Sakhpali	288.36
	<b>Total</b>	<b>5147.49</b>

The demographic pattern of the villages viz. Talapali, Bichnera, Navarempur, Kudumuka, Rakera, Chotiguda, Ajgerh & Sakhpali as per Socio-Economic Survey (2007) provided by NTPC is detailed in Table 2-2 below:

Table 2-2: Demographic profile of the villages

Name of village	Males	Females	Total Population	SC	ST	Other
Talapali	121 (49.5)	124 (50.5)	244	18 (9.8)	124 (51.2)	102 (41.2)
Bichnera	268 (48.5)	277 (51.5)	545	118 (21.6)	181 (33.2)	246 (45.2)
Navarempur	177 (36.4)	174 (36.6)	351	28 (7.9)	137 (39.3)	186 (52.8)
Baharucha	76 (48.4)	81 (51.6)	157		149 (94.3)	8 (5.7)
Rakera	1821 (49.5)	1864 (50.5)	3685	82 (2.2)	1494 (40.5)	2769 (75.3)
Chotiguda	388 (48.3)	410 (50.7)	798	114 (14.3)	443 (55.5)	241 (30.2)
Ajgerh	130 (32.4)	91 (22.3)	221		138 (62.4)	83 (37.6)
Sakhpali	111 (33.1)	101 (29.8)	212	57 (26.8)	119 (56.1)	36 (17.1)
<b>Total</b>	<b>2422 (48.6)</b>	<b>2464 (50.4)</b>	<b>4886</b>	<b>487 (10.0)</b>	<b>2777 (56.9)</b>	<b>3622 (73.1)</b>

\*Figures in parentheses show percentage

## CHAPTER 3

### GEOLOGY AND EXPLORATION

#### 3.1 EXPLORATION ACTIVITIES

The Ministry of coal allocated Talaspalli Block for exploitation to NTPC Ltd., after conducting the detailed exploration. As mentioned above the block was regionally explored by GSI and estimated 964.88 million tonnes of indicated category coal reserves based on only 15 boreholes data. NTPC Ltd. after receiving letter of award (LOA) from Ministry of Coal, decided that MECL shall carry out detailed exploration in the block by drilling boreholes at 400m x 400m grid interval, involving around 45,000m. drilling in 105 proposed boreholes with related geological work, so as to convert the indicated category of coal reserves to prove category.

MECL commenced the task of detailed exploration for coal in Talaspalli block on behalf of NTPC Ltd, on 11.08.2006 by deploying 3 rigs initially. Two projects were coined for the purpose of administrative control and for smooth functioning of drilling and related geological work. Progressively the rigs were increased in these projects to even 13 rigs (during April & May - 2007) to complete the task. Thus by 10.08.2007 a total of 33716.85 m. of drilling was done from 85 boreholes.

It was likely that the drilling target in Talaspalli block would have been completely achieved as per schedule, but due to the onset of monsoon and non-approachability to drill sites and also stoppage of work by the forest authorities, the exploration activities were temporarily suspended.

The drilling operation was resumed on 21/12/2007 after the completion of monsoon and harvesting. A total of 17 boreholes (MNRT-26 to MNRT-102) and two suspended boreholes MNRT-20 (Depth 187.50 – 428.20 = 241.70 m) and MNRT-24 (Depth 329.50 – 525.62 = 196.10 m.) were completed involving 6138.10 m. drilling. A total of 39854.75

m. drilling is done in 102 MNRT series boreholes in Talajpalli block by MECL. A grand total of 46286.30 m. drilling has been done by MECL & GSI in 117 boreholes (MNRT & RT series) in Talajpalli block.

The financial year wise break-up of drilling in Talajpalli block by MECL is given below :

Year 2006-07	)	22433.70 m.
Year 2007-08	)	10615.15 m.
Year 2008-09	)	805.90 m.
<b>Total Drilling</b>	<b>=</b>	<b>33854.75 m.</b>

A total of 20100.00 m in 48 BHs, out of 102 boreholes drilled in the block have been geophysical logged using multi parameter probes.

#### SAMPLING AND ANALYSIS

The carbonaceous horizons (coal, shaly coal and carbonaceous shale) of all correlatable coal seams as well as non-combustible bands of significant thickness from the boreholes drilled by MECL in this block were sent for band by band analysis to chemical laboratory, MECL, Nagpur. Before sending it to the laboratory, the samples prepared after crushing at ( ) 72 mesh sizes, coring and quartering, packing etc. were done at project level only.

A total of 2005.41m of coal sampling in 102 boreholes have been carried out. All the samples have been sent for conducting band by band analysis.

After obtaining band by band analysis, the seam overall analysis at 60% RH & 40 °C for all correlatable coal seams having thickness >0.30 m. were advised for BCS, I-30, I-100 thickness of seams. Some IP seam thickness was also analysed. Two seams were occasionally clubbed some time with above / below bands & result obtained for the combined thickness. Similarly, a few unworkable coal seams / bands were also subjected to overall analysis at 60% RH and 40°C. In addition to the seam overall analysis, special tests such as Ultimate analysis, GCV, AFT, Ash analysis, HGI, Sulphur Distribution, Total

Sulphur, Phosphorous content, Swelling Index and Coke Type have also been carried out as per the stipulated norms.

### 3.2 REGIONAL GEOLOGY

The extensive occurrences of Barakar and supra-Barakar rocks amidst isolated Talchr outcrops spread between latitudes 21°45' to 22°42' and longitudes 83°01' to 83°44', constitutes Mand-Raigarh Coalfield. It is situated between Ib-River Coalfield in the southeast and Korba Coalfield in the southwest with more or less similar stratigraphic and tectonic setting. The coal measures in the Mand-Raigarh basin are exposed in three well defined patches due to erosion of the overlying Kamthi rocks along the drainage of the prominent rivers.

Generalized stratigraphy of Mand-Raigarh Coalfield is given at Table 3-1.

Table 3.1 Generalized Stratigraphic Sequence

Age	Formation	Thickness (m)	Lithology
1	2	3	4
Recent to subrecent			Alluvial soil pebbly to bouldery bed with silty clay band, laterite etc.
Cretaceous to Eocene	Deccan Traps		Basalt flows & dolerite dykes
Lower to Middle Triassic	Kamthi	2851	Poorly sorted, frequently ferruginous, coarse to very coarse grained, locally graded to pebbly, mega cross bedded sandstone containing, brownish grey to buff coloured clay clasts. A fossiliferous red claystone to siltstone bed occurs at the base.



Upper Permian to Lower Permian	Fariganj	180	Mostly fine to medium grained, grayish white, micaceous sandstone and siltstone with claystone, shale, minor coarse grained sandstone and two coal seams of inferior grade.
	Barren Measure	300	Dominantly grey claystone/grey shale with siltstone and iron stone bands; interbanded sequence of fine to medium grained sandstone and shale
	Barakar	425-300	Medium to coarse and very coarse grained even gritty, sandstone at the lower part followed upward by fine to medium grained assemblage with grey claystone/shale which become predominant towards the upper part, number of coal seams and carbonaceous shale
	Karharbar(7)	23	Mottled at places carbonaceous sandstone, frequently associated with pebbles of quartzite granite etc. of various shapes and sizes
Upper Carboniferous to lowermost Permian	Talche	150+	Very fine to fine grained sandstone with siltstone and shale, occasionally greenish in nature, at places with matrix based variegated polymictic conglomerate.

### 3.2.1 DESCRIPTION OF GEOLOGICAL FORMATIONS

The geological formations of Mand-Rajgarh Coalfield are briefly described below:

- **Precambrian** :The Precambrian rocks comprising granite gneiss, mica schist, phyllites and quartzites along with quartz veins & pegmatites occur along the northern, northeastern periphery. The strike of the foliation varies from E-W to N70°W – 570°E with 50° to 70° dip towards west.
- **Talchi Formation** : The Talchi sequence begins with tillite at the base and overlies the basement unconformably. It occurs as a continuous strip along the northern periphery of the basin. Along the southern boundary, Talchis crop out as narrow, elongated discontinuous strips disrupted by faults. The Mand-Rajgarh basin shows widespread development of basal tillite pointing to advancement of ice from the surrounding Precambrian uplands.
- **Karharbari Formation** : Karharbari formation is developed in a limited area. It consists of mottled, at places carbonaceous sandstone, frequently associated with pebbles of quartzite, granite etc. of various shapes and sizes.
- **Barakar Formation** : The Barakar formation conformably overlies the Talchi sediments over the major part of coalfield and covers a large tract within the coalfield. It is represented predominantly by multistored cross-bedded feldspathic sandstone which are highly kaolinised and friable with subordinate shales, carbonaceous shales and coal seams. The sandstone are mostly medium to very coarse grained and milky white to grayish white in colour.
- **Sarren Measure Formation** : Sarren Measure formation overlies conformably over Barakar formation. This formation comprises of predominantly grey



claystone/grey shale with siltstone and iron stone bands and interbanded occurrence of fine to medium grained sandstone & shale.

- **Rangarij Formation:** Rangarij formation has been demarcated in south-eastern and south-western part, besides patchy occurrence in north-western part. It is represented by mostly fine to medium grained sandstone, siltstone with clay stone, shale, fine to coarse grained sandstone and coal seams / bands of inferior grade.
- **Kamthi Formation:** The rocks of Kamthi formation are well exposed at higher contours of the flat topped hills. It is represented dominantly by coarse, friable, porous, brownish to red cross bedded sandstone and argillaceous beds. The nature of the contact between Kamthi & Barakans is variable and is somewhat discordant and at places the Kamthi strata overlap the older units.
- **Intrusives/Deccan Trap:** A number of basic dykes, sills and flows have been observed in the Uprona-Porea area in the northern part of the coalfield. The basic rock comprise fine grained basaltic to coarse grained gabbroid type. The flows at places have been altered to laterite.

### 3.2.2 COAL SEAMS

The regional exploration carried out in the western part of Mand-Raigarh coalfield along the eastern bank of Mand river in northern part of Dhatamajgarh-Khergauri, Ongane - Poria as well as Chhat area have revealed the presence of a number of coal seams in this coalfield. Exploration in the north-western and western part of the coalfield reveals number of coal seams and these have been numbered as I to XXXI and so on in ascending order.



The coals of this coalfield are generally banded in nature and are not devolatilised. The coals in general, are low in rank, high in volatile and non-coking type.

### 3.2.3 REGIONAL STRUCTURE

The Mand-Rajgarh Coalfield is an asymmetrical basin with an approximately NW-SE axis. It is a part of B-Mand-Korba master basin lying within the Mahanadi graben. It displays a typical half-graben configuration, with the southern boundary marked by a major NW-SE zone of faulting coinciding with the trend of the Mahanadi graben and the northern boundary not faulted over the major part. In the Mand Valley proper, the coal measures lying between Kharsa & Dharamrajgarh display a broad synclinal structure with its axis running just south of Sihra. The northern limb of the Mand river basin is exposed to the north of the Sihra-Dharamrajgarh area where the Barskar beds are found to strike broadly in NW-SE direction. The beds dip at low angle 51 – 70 towards south-west. In the southern limb, the strike is approximately NW-SE with minor variations and the beds dip towards north-east.

The other structural element in this basin belt comprises normal gravity faults. The available surface and sub-surface data indicate that the area lying on both sides of Mand river is traversed by number of sub-parallel faults of considerable linear extent, though the surface expressions of faults are very limited or entirely lacking. Two sets of faults trending WNW-ESE to NW-SE and N-S occur. The former generally has down throws against the dip i.e. towards north while the latter has easterly throw. The amount of throw varies from 10m. to 150m.



### 3.3 GEOLOGY OF TALASPALLI BLOCK

Talaspalli Block is located in the eastern part of Mand-Rajgarh Coalfield. The geology of the block is in conformity with the regional set up. Major part of Talaspalli block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 3-2 below:

Table 3.2: Geological Succession in Talaspalli Block

Formation	Thickness (m)	Lithology
Recent	0.50 - 18.00	Soil, alluvium
Barren Measures	18.80 - 141.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barakats	~ 50 - 598	fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fine clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Takhar	1.00 - 54.30	Khakke, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

#### 3.3.1 DESCRIPTION OF FORMATION

- Metamorphics:** Precambrian metamorphic rock constitute the basement of the basin. These are composed of quartzite, mica-schist, granite gneiss and at places intruded by pegmatites or vein quartz. The metamorphics have been intersected in 7 boreholes (MNRT-13, 62, RT-8, 9, 12, 13 & 14). The thickness of metamorphics in boreholes varies from 1.00m (MNRT-62) to 9.90m (RT-8).

- **Talchir Formation :** The rocks of Talchir formation are not exposed within the block boundary, it is encountered in boreholes RT-5,6,9,10,12,13 &14. The thickness of Talchir as intersected in boreholes varies from 1.20m (RT-12) to 54.30m (RT-10). Talchir formation consists of greyish white to greenish grey sandstone and shale, occasionally khales in colour. At places it is embedded with pebbles of quartzite, mica-schist, granite gneiss and of pegmatite.
- **Barakar Formation :** The major part of the block is covered with Barakar formation. Thickness of Barakar formation as intersected in borehole varies from 20 – 536 m. Barakar formation constitute fine to coarse grained, white to grey feldspathic, micaceous sandstone, shale and carbonaceous shale with economic coal horizons. A total of 27 coal seams have been encountered in this formation besides a few local seams / bands.
- **Barren Measure Formation :** This formation has occupied the southern part of the block. Besides a small patch of barren measure is preserved in the northern part of the block due to opposite dip of faults formation of graben. This formation is intersected in 15 boreholes with thickness varying from 18.80 m (MNRT-27) to 143.00 m (MNRT-24). Barren Measure Formation is represented by predominantly grey shale with minor sandstone and intercalation of sandstone and shale.
- **Igneous Intrusives :** The block is free from any igneous intrusives.
- **Soil & Alluvium :** Major part of the block is covered by a layer of soil and alluvium. The weathering has affected all the strata below soil to a varying extent. The

thickness of soil ranges from 0.50m (MNRT-7, 8) to 18 m (MNRT-5R). The depth of weathered zone varies from 5.00 m (MNRT-3A) to 27.30 m (MNRT-5).

### 3.3.2. STRUCTURE OF THE BLOCK

The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from  $4^{\circ}$  to  $8^{\circ}$  towards South-west.

The Geological Plan of the Talaspalli Coal Block is given in Fig. 3-1 below:



Figure 3-1 Geological Plan of Talaspalli Coal Block

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which three faults namely fault F1-F3,



F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. The faults details are furnished in Table 2-2 below:

Table 2-2 Details of Faults

Fault No.	Location	Trend	Nature of fault	Throw
F1-F1	Northern part passing near BH No. MNRT-24, 27, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20m – 25 m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m.
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m.
F4-F4	Northern part near BH MNRT-31, 24, 43 & 62	East-West dipping northerly	Dip fault	30 – 110 m
F5-F5	Northern western part through BH. MNRT-62	East-West	Strike fault	35 m
F6-F6	Northern part passing through MNRT-31	WNE-ESE dipping westerly	Oblique fault	15 – 25 m.
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	21 m.
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m.
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11.	East - West to curvilinear	Strike/Oblique fault	25m
F10-F10	Northern part passing through RT-7.	NE-SW	Oblique curvilinear	0-10 m.
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m.
F12-F12	Southern part	NW-SE	Oblique	25 m.

### 3.3.3 COAL SEAMS

Detailed exploration in Talabari Block has revealed the presence of coal bearing horizons belonging to Barakar Formations. These carbonaceous horizons could be distinctly demarcated as upper, middle and lower columns of Barakar formation. Altogether 26 workable coal seams are developed in the block. Besides these workable seams there are few non-workable persistent bands occurring throughout the block. All the 26 seams are mainly composed of coal, shaly coal, carbonaceous shale and shale. The coal is dull in appearance high in moisture and is of non-coking type. The seams are not affected by any igneous intrusive.

Seam XIA is the top most seam in the block, developed persistently in the southern part of the block over a limited area. Seam-X has split into 4 major sections as X-LA, X-LB, X-Top and X Bottom. X Bottom seam underlies the X Top seam and is the thickest coal seam among X group of seam. Similarly seam-IX has 3 sections, (IX-L2, IX-L1 & IX) seam-VI has 3 sections, VI Top, VI Middle and VI Bottom, seam V has 3 splits as V Top, V Middle, V Bottom. Seam IV has 4 sections, IV Top, IV Middle, IV L & IV Bottom. Seam-III has two splits as seam III L and seam III. Whereas seam-II has 5 splits, sections as II L3, II L2, II L1, II and II L. Seam-I is poorly developed in the block and do not attain workable thickness.

The sequence of coal seams and parting is given Table 3-4 below:

Table 3-4 Sequence of Coal Seams & Parting

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	XIA	0.20	1.05			0.50-0.90
	Parting			5.41	11.90	0.0-0.5
2	XLB	0.30	1.28			0.00-0.90
	Parting			4.37	14.88	4.0-6.0
3	XTop	0.40	3.60			1.00-1.15
	Parting			0.20	5.00	1.0-2.0

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
4	8 Bot	1.0	8.1			1.3-6.0
	Parting			2.3	20.13	3.5-15.5
5	IX L2	1.2	3.55			1.2-2.0
	Parting			13.59	21.54	17.9-18.3
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.63	11.87	8.0-8.0
7	IX	0.96	6.96			1.5-6.0
	Parting			6.30	16.13	9.0-12.0
8	XII	2.06	6.64			4.0-6.5
	Parting			17.68	42.03	20.9-25.9
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-24.0
10	VI Top	0.37	3.42			1.2-1.0
	Parting			0.56	8.23	0.8-1.5
11	VI Mid	3.09	10.81			3.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.73			0.10-3.0
	Parting			2.80	28.45	14.0-22.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.3
14	V Mid	0.15	3.78			0.50-2.50
	Parting			4.55	18.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0
	Parting			15.18	30.14	17.8-23.8
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	8.95	1.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.30	2.25			0.80-1.6

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
	Parting			24.57	44.25	31.0-38.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	31.0-51.0
22	II.3	0.50	3.09			+0.90
	Parting			18.39	40.8	21.0-38.0
23	II.2	0.07	2.68			+0.90
	Parting			5.0	60.39	35.0
24	II.1	0.05	1.54			+0.90
	Parting			1.27	20.39	3.0-14.0
25	I	0.15	5.62			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II	0.05	2.45			+0.90
	Parting			Around		
27	I	0.21	0.55			1.7

### 3.3.4. RESERVES

As per GR, a Net Geological Reserve of 1267.145 million tonnes of coal reserves including both opencast and underground reserves varying in grade from 'A' to 'G' have been established in the block. Out of this, 40.275 million tonnes of reserves fall in the indicated category and remaining 1226.867 million tonnes are proved reserves.

Depth-wise Net Geological Reserve and indicated reserve are provided in table 3-5 and 3-6 below



Table 4.6: Depthwise Area Calculations (Square Feet) for Wash

SEAM	DEPTH												TOTAL	
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600		
XLA	0.00	1.191	1.961	0.50	0	0	0	0	0	0	0	0	0	3.652
XLB	0.014	1.195	0.474	0.022	0	0	0	0	0	0	0	0	0	0.89
XTOP	0.40	0.233	0.398	1.014	0.2	0	0	0	0	0	0	0	0	14.728
XBOT	25.054	25.727	11.864	10.545	0.413	0	0	0	0	0	0	0	0	83.403
WLE	7.758	0.007	0.001	0.006	0.010	0	0	0	0	0	0	0	0	20.482
WLT	0.401	0.036	0.041	0.006	0.006	0.000	0	0	0	0	0	0	0	28.233
W	20.286	21.227	10.791	17.461	11.238	0.000	0	0	0	0	0	0	0	102.211
WB	10.400	10.076	20.044	20.00	21.000	2.201	0	0	0	0	0	0	0	126.281
WB	0	0.716	0.324	2.716	0.186	0.002	0	0	0	0	0	0	0	10.246
W TOP	1.002	4.277	0.006	7.716	0.010	0.407	0.000	0	0	0	0	0	0	34.254
W MID	18.066	20.703	40.011	27.046	20.480	24.122	3.000	0.110	0	0	0	0	0	106.016
W BOT	0.172	1.075	1.004	1.400	0.002	0.004	0.000	0.040	0	0	0	0	0	10.004
V TOP	0.001	0.000	0.001	0.007	0.000	0.000	0.000	0.000	0	0	0	0	0	07.010
V MID	0.002	0.003	0.001	0.004	0.001	0.001	0.001	0.001	0	0	0	0	0	26.707
V BOT	4.000	0.007	0.001	0.400	0.002	0.004	4.000	0.001	0.001	0	0	0	0	42.211
W TOP	0.100	11.127	11.21	20.700	10.000	10.000	0.000	0.100	0.00	0	0	0	0	63.227
W MID	0.40	10.000	10.000	27.000	20.000	22.700	10.00	10.000	1.10	0.000	0	0	0	100.477
W	0.304	0.000	0.110	0.010	0.000	0.002	0.107	1.000	0.001	0.000	0	0	0	27.101
W BOT	0.017	0.010	0.010	10.000	10.000	11.000	7.700	0.000	1.000	0.001	0	0	0	73.000
W	0.000	0.01	0.001	0.001	0.010	0.010	4.000	1.071	0.700	0.10	0.000	0.010	0.010	20.000
W	0	1.777	1.000	7.000	11.077	17.001	10.700	10.070	0.001	0.700	0.002	0.100	0.100	60.000
WLE	0	0	0.000	0.000	0.000	0.000	0.000	1.100	0.000	1.07	1.000	0.001	0.001	17.000
WLE	0	0	0.000	0.000	0.001	0.000	1.001	1.000	0.001	1.070	0.700	0.20	0.001	0.001
WLT	0	0	0	0.100	0.000	0.000	0.000	0.700	1.000	1.000	0.00	0.100	0.001	0.001
W	0	0	0	0.407	1.700	4.001	0.000	7.000	0.000	0.000	4.700	0.000	0.000	42.700
W	0	0	0	0	0.000	0.000	0	1.000	0.700	1.000	0.000	0.000	0.000	4.000
TOTAL	432.410	200.000	214.000	310.100	180.000	480.000	10.000	80.000	11.000	14.000	10.000	0.000	0.000	1007.100



Table 4.6: Depthwise Area Calculations (Square Feet) for Wash

SEAM	DEPTH												TOTAL	
	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500	500-550	550-600		
XLA	0.010	0.010	0.000	0.000	0	0	0	0	0	0	0	0	0	0.020
XLB	0	0.010	0.000	0.000	0	0	0	0	0	0	0	0	0	0.020
XTOP	0	0.110	0.010	0.000	0.000	0	0	0	0	0	0	0	0	1.020
XBOT	0	0.710	1.001	2.000	0.000	0	0	0	0	0	0	0	0	0.400
WLE	0	0.10	0.000	0.000	0.000	0	0	0	0	0	0	0	0	2.100
WLT	0	0	0.000	0.000	0.000	0.000	0	0	0	0	0	0	0	1.000
W	0	0	0.001	1.000	1.010	0.000	0	0	0	0	0	0	0	4.011
WB	0	0	0.000	1.0	1.000	1.000	0	0	0	0	0	0	0	4.000
WB	0	0	0	0.010	0	0	0	0	0	0	0	0	0	0.010
W TOP	0	0	0	0.000	0.004	0.000	0.000	0.000	0	0	0	0	0	1.404
W MID	0	0	0	0.000	1.001	1.101	2.001	0.110	0	0	0	0	0	0.001
W BOT	0	0	0	0.001	0.101	0.000	0.000	0.000	0	0	0	0	0	0.701
V TOP	0	0	0	0	0.000	0.000	0.000	0.000	0	0	0	0	0	1.000
V MID	0	0	0	0	0.000	0.000	0.000	0.100	0	0	0	0	0	0.700
V BOT	0	0	0	0	0.000	0.000	0.401	0.001	0.000	0.000	0	0	0	1.071
W TOP	0	0	0	0	0	0.004	0.011	0.710	0.000	0	0	0	0	1.000
W MID	0	0	0	0	0	0.001	1.101	0.000	0.000	0.004	0	0	0	0.001
W	0	0	0	0	0	0.000	0.210	0.000	0.210	0.000	0	0	0	0.000
W BOT	0	0	0	0	0	0.000	0.070	0.000	0.401	0.001	0	0	0	1.001
W	0	0	0	0	0.010	0.000	0.000	0.00	0.000	0.700	0.000	0.071	0.000	0.000
W	0	0	0	0	0	0.001	0	0.000	0.110	0.000	0.000	0.000	0.000	1.001
WLE	0	0	0	0	0	0	0	0.000	0.000	0.000	0.070	0.000	0.000	0.000
WLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000
WLT	0	0	0	0	0	0	0	0	0	0	0	0	0	0.000
W	0	0	0	0	0	0	0	0.100	0	0.100	0.000	0.001	0.000	0.001
W	0	0	0	0	0	0	0	0.000	0	0.000	0.000	0.001	0.000	0.001
TOTAL	0.010	1.00	0.001	2.010	2.001	3.101	2.001	1.101	0.700	0.010	0.070	0.071	0.000	10.701



## CHAPTER 4

### MINING: CONCEPTUAL PLAN

Talaspalli Coal Block in Mand-Raigarh coalfield having an area of 21.15 sq. km. has been allotted to NTPC for meeting coal requirement for the proposed 4200MW Lars Integrated Power Project which is approximately 60 kms away from the coal block.

This Conceptual Report concerns with Opencast mining potential only and the UG potentiality shall be separately dealt with in the Mining Plan once the opencast pit and dump option is finalized.

The Conceptual Technical Report has studied the pit & dump options and finalized the base option. It has outlined the preliminary delineation of Open-pit boundary options and assessment of likely mineable reserves and waste quantities. It has also tentatively assessed the rated capacity, production buildup, mining strategy with respect to OB dumping and coal handling strategy.

#### 4.1 ADJACENT BLOCKS

The Talaspalli Coal Block is surrounded by the following:

North:	Beyond in-crop zone
South:	Unexplored area and Dipside of Barod-Bjari Block
East:	Peima Block
West:	Chintapari Extension Block and Dipside of Barod-Bjari Block

#### 4.2 CONSTRAINTS ON MINE DEVELOPMENT

The following constraints in opencast working of the deposit have been envisaged:

- The block area being surrounded by coal bearing blocks and hills in all sides, availability of any land for external dumping, outside the block area appears remote.
- Kelo river flowing along the north-eastern side of the block
- Presence of about 08 villages (fully or partly) within the proposed mining area.
- High initial Depth of base seam in the western side due to presence of several faults and high stripping ratio especially in the western side of the block requires huge amount of temporary external dump in the dip side which needs to be re-handled later.

#### 4.3 PIT DELINEATION: MINE BOUNDARY OPTIONS

Different mine boundary options for opencast mining were studied. The objective of study was to come out with best possible option to maximize the recovery of coal with due consideration to space available within the block for internal and external dumping.

The mine boundary for different pit option has been delineated taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

As discussed with NTPC officials, the height of dump has been considered as 120m above ground level for all the options due to space constraints for dumping of waste.

Based on sequence of mining as per geo-mining parameters and existing constraints pit mine development four options were worked out for Talwandi Block. As discussed with NTPC officials, the height of internal and external dump has been considered as 120m above ground level for all the options due to space constraints for dumping of waste.

##### **Option 1: Base Seam III with full strike and External dump on the dip side of the block**

This pit option has been formulated considering the base seam as Seam III. The entire block and the mandatory safety barriers with conveyor corridor along eastern, western and southern boundary has been considered for fixing the pit surface boundary keeping in mind the availability of dumping space.



The entry is envisaged to be made from both eastern and western side. The external dumping will be done in the dip side of the block. But due to high stripping ratio and lack of space for the internal as well as external dump, the pit shall be constrained to work only until the dumping space is available.

Considering the availability of dumping space (with RL <120 m from ground level), this option has ~177 Mt of mineable coal reserve. The tentative quantity of OBR is ~1350 Mcum with an average stripping ratio of 4.90 cum/t.



Figure 4.3 Option I L/P Plan

**Option II: Base seam III leaving high strip ratio zone on the western side**

This option has been formulated considering Seam III as base seam and also keeping in mind the limited availability of dumping space. Therefore, high strip ratio zone in the western side of the block has been excluded from open cast mining. The pit has been optimized to extract maximum coal. The western boundary of the pit is an arbitrary line considering low strip ratio zone and leaving sufficient external dump space in the western side. The external dump shall be done in the western part of the block and will be merged with internal dump. The infrastructural facilities will be in the south-west corner of the block.

This option has ~505 Mt of mineable coal reserve and ~2304 Mcum of DBR with an average stripping ratio of 4.56 cum/t.



Figure 4.2: Option II Pit Plan

**Option III: Base seam IV with full strike and temporary external dump on the dip side of the Block**

This option has been formulated considering Seam IV as base seam. In this option, the pit boundary has been fixed leaving safety barrier, conveyor corridor along the eastern, southern and western boundary. The infrastructural facilities will be in the south-west corner of the block. The entry will be from both eastern and western side. A temporary dump will be created in the dip side of the block which will be re-handled from 12<sup>th</sup>-13<sup>th</sup> year of operation.

This option has ~631 Mt of mineable coal reserve and ~2735 Mcum of OBR with an average stripping ratio of 4.33 cum/t.



Figure 3.4: Option III Pit Plan

#### Option IV: Base seam IV leaving high strip ratio zone on the western side

This option has been formulated considering Seam IV as base seam. The high strip ratio zone in the western side has been excluded from open cast mining. The pit boundary on the western side has been delineated based on the dumping requirement, dump space availability and maximum extraction of coal. The external dump shall be done in the western part of the block and will be merged with internal dump. The infrastructural facilities will be in the south-west corner of the block.

This option has ~435 Mt of mineable coal reserve and ~2002 Meum of OBR with an average stripping ratio of 4.12 cum/t.



Figure 4.4: Option IV Pit Plan

The above options has been summarized below in table 4-2.

Table 4.2: Pit Development Options

Particulars	Pit Description	Extractable Reserves (Mt)	ORR (Mcum)	SR (cuft)	Stripping (Mcum)	External Dump (within the block) (Mcum)	Temporary External Dump (Mcum)
Option I	Base seam III with full strike and External dump on the dip side of the block.	277	1358	4.4	725	533	-
Option II	Base seam III having high strip ratio zone on the western side.	305	2104	4.36	2364	330	-
Option III	Base seam IV with full strike and temporary external dump on the dip side of the block.	611	2735	4.33	2735	-	400
Option IV	Base seam IV having high strip ratio zone on the western side.	485	3021	4.12	1758	204	-

#### 4.4 RECOMMENDED OPTION: DETAILS

Option III is proposed to be the recommended option for carrying out the detailing work for the mining plan.

This option proposes to mine ~611 Mt of mineable coal reserve and ~2735 Mcum of ORR with an average stripping ratio of 4.33 cum/t. Seam IV has been taken as the base seam for the pit area going upto seam III which is only 4-4.5m thick and is 50-60m below seam IV increases the OS handling to such an extent that dumping space availability becomes a constraint and mine will have to end abruptly mining only ~277 Mt of Coal. As discussed above, the maximum coal extraction is possible in Option III and so with due regards to conservation of coal, Option III has been proposed to be the recommended option.

The Final Stage Quarry Plan for the recommended option i.e. Option III is shown below in Fig 4-5:

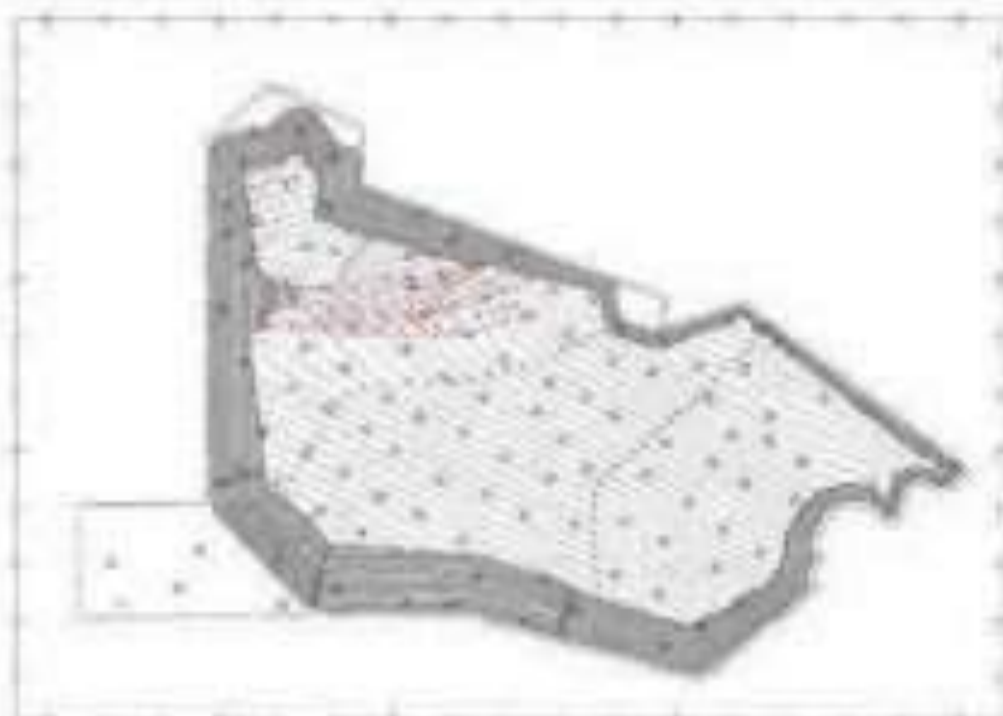


Figure 4-5: Final Stage Quarry Plan

#### 4.4.1 GED-MINING CHARACTERISTICS

The Geological & Mining characteristics of the quarryable block for the proposed Talaspall OCP is given in table 4-2.

Table 4-2: Geo-Mining Characteristics of the Block

S. No.	Particulars	Unit			Usual/ Mean
			Minimum	Maximum	
1	Coal Seam Thickness				
	S 1A	m	0.20	1.04	0.50-0.75
	S 1B	m	0.30	1.20	0.50-0.90
	S 10a	m	0.40	1.00	1.00-1.25
	S 8a1	m	1.40	8.10	1.5-4.0
	S 12	m	1.20	2.50	1.2-2.8
	S 11	m	0.36	1.20	1.2-2.2
	S	m	0.36	0.36	1.5-4.0
	S 9	m	2.00	6.04	4.0-6.5



S. No.	Particulars	Unit	Range		Overall Mean
			Minimum	Maximum	
	VI	m	0.50	3.90	0.50-1.0
	VI Top	m	0.27	3.62	1.2-3.3
	VI Mid	m	3.09	20.01	5.0-9.3
	VI Bot	m	0.48	1.75	0.50-1.0
	V Top	m	0.50	3.09	0.50-1.00
	V Mid	m	0.05	3.73	0.50-2.00
	V Bot	m	0.2	3.4	0.50-1.0
	IV Top	m	0.54	3.76	1.5-3.8
	IV Mid	m	3.01	7.22	3.0-7.8
	IV L	m	0.29	4.07	0.50-1.0
	IV Bot	m	0.55	5.07	1.5-3.1
<b>II</b>	<b>Thickness of Parting</b>				
	Parting IIIA & III B	m	3.81	11.7	6.0-9.1
	Parting IIIA & X TOP	m	3.57	14.80	4.0-6.4
	Parting X TOP & X BOT	m	0.80	2.98	1.0-2.8
	Parting X BOT & XII	m	2.30	20.23	1.5-16.5
	Parting XII & XIII	m	13.59	25.54	17.0-18.5
	Parting XIII & D	m	3.03	11.87	6.0-8.8
	Parting D & VII	m	4.30	16.15	9.0-11.0
	Parting VII & VI	m	17.68	42.01	20.0-25.0
	Parting VII & VI TOP	m	1.08	17.44	4.0-14.0
	Parting VI TOP & VI MID	m	0.56	3.25	1.5-3.1
	Parting VI MID & VI BOT	m	0.80	5.90	1.0-2.8
	Parting VI BOT & V TOP	m	1.80	23.45	14.0-23.0
	Parting V TOP & V MID	m	0.09	18.54	1.5-13.3
	Parting V MID & V BOT	m	4.55	15.95	0.50-12.0
	Parting V BOT & IV TOP	m	15.19	30.19	17.0-21.0
	Parting IV TOP & IV MID	m	5.30	20.11	6.0-10.0
	Parting IV MID & IV L	m	0.75	6.05	1.5-5.1
	Parting IV L & IV BOT	m	0.70	4.55	0.50-1.0
	Parting IV BOT & III L	m	3.08	21.54	14.0-17.0
	Parting III L & III	m	28.57	44.58	33.0-39.0
<b>III</b>	<b>Seam Gradient</b>	degree			4°-8°
<b>IV</b>	<b>Maximum Depth</b>	m			340
<b>V</b>	<b>Specific Gravity</b>	1/cum			1.85
	- Tail				1.85
	- Overburden				2.4

#### 4.4.2. BASIC PROJECT AND MINE PARAMETERS

The basic project parameters and mine parameters for the recommended option is presented below in table 4-3 and table 4-4.

Table 4.3. Basic Project parameters for recommended option

Sl. No.	Parameters	Unit	Value
1	Net Geological Reserve	Mt	1267.145
2	Extractable Reserve	Mt	631.56
3	OB Volume	Mcum	2734.90
4	Stripping ratio	Cum/t	4.33
5	Target Capacity	Mt/year	25
6	Tentative Mine life	Years	31

Table 4.4. Mine parameters for recommended option

Sl. No.	Parameters	Unit	Value	
1	Maximum depth	m	340	
2	Usual strike length:	along the Mine Floor	m	4800
		along the Mine Surface	m	1300
4	Usual dip rise length:	on the Mine Floor	km	2500
		on the Mine Surface	km	3200
6	Area:	On the Mine Floor	ha	1298.88
		On the Mine Surface	ha	1679.35

#### 4.4.3. EXTRACTABLE RESERVES

For furnishing account of reserves, Net Geological Reserve has been arrived by taking geological loss of 10 % from Gross Geological Reserve. Mining loss of 5 % has been taken to arrive at the open-castable mineable reserves.

The seam-wise reserve and OB/parting is presented below in table 4-5.

Table 4.2: Seam and Partings reserve

S.No.	Seam	Coal (Mte)	Cumulative Coal (Mte)	OB (Mcum)	Cumulative OB (Mcum)
1	X-1A	0.10	0.10	104.09	104.09
2	X-1B	0.26	0.36	19.60	123.69
3	X-TOP	6.85	7.21	68.32	192.01
4	X-BOT	52.94	50.85	18.93	173.08
5	IX-1	28.64	79.49	95.99	269.07
6	IX-L1	28.75	97.24	217.11	486.18
7	IX	68.17	165.41	84.25	570.43
8	VIII	81.28	246.69	127.96	698.39
9	VII	3.57	250.26	212.69	911.08
10	VI-TOP	28.60	278.66	105.25	1016.33
11	VI-MID	130.38	409.04	21.72	1038.05
12	VI-BOT	4.11	413.15	26.25	1064.30
13	V-TOP	7.05	420.20	240.63	1304.93
14	V-MID	37.64	457.84	199.78	1504.71
15	V-BOT	22.72	480.56	119.69	1624.40
16	IV-TOP	53.04	533.60	273.08	1897.48
17	IV-MID	82.89	616.49	116.61	2014.09
18	IV-1	28.81	645.30	25.21	2039.30
19	IV-BOT	45.66	690.96	20.00	2059.30
		<b>631.56</b>		<b>2734.90</b>	

#### 4.4.4 CHOICE OF TECHNOLOGY

The operational factors include

- Multi-Seam operation involving 19 seams horizons.
- Effective seam thickness varying from 1.00 to 9.00 m with majority of seams having less effective thickness varying from 1.00 to 2.50m.
- Mild seam gradients.
- OB with varying parting thickness.

Based on the above factors surface miner has been considered for extraction of coal as surface miner eliminates blasting in coal. Blasting in comparatively less thick coal seams leads to higher contamination of extracted coal.

As removal of overburden with varying parting thickness requires flexible operation, shovel-dumper combination with conventional system of mining i.e. inclined slicing has been considered for removal of overburden.

For a rated capacity of 25.0 Mtpa, it is proposed to deploy 10-12 cum Hydraulic Shovel/backhoe and 20-22 Cum Hydraulic shovel/backhoe with 200T and 100-200T Rear Dumper respectively for OB. For thin parting lower size equipment shall be deployed. For Coal, Surface Miner with Front End Loader and 100T Dumper shall be deployed.

The details of the fleet size will be presented in the Mining Plan.

#### 4.4.5 MINING SEQUENCE, METHOD OF MINING AND MINING SYSTEM

The block has NW-SE strike of around 5 km. Opencast mining for the Talaspalli coal block has been proposed upto Seam IV as suggested above to maximize the recovery of coal. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping. The peak rated capacity for the block is proposed to be 25.00 Mtpa.

To ensure availability of adequate quantity of coal and early reaching of target capacity, a two-entry scenario has been envisaged: one on the north eastern side and the other on the western side. Seam IV will be accessed from both the side which will form the base of the quarry. Then working front of both the quarry will advance towards south and towards each other eventually merging into a single quarry with full strike length after about 9-10 years.

In the initial years, simultaneous working of mechanized opencast mine and the projected belowground mine may pose operational problems due to massive production from the opencast unit. As such, it is considered prudent to start underground mine work after exhaustion of opencast workings.

OB will be transported through flank roads to external OB dumps and Internal OB dumps. Coal is proposed to be transported through ramps and flank roads. Coal from both pit in initial years and also after merger of the pit will be transported to mobile crushing arrangement at the surface in both eastern and western side and thereafter to Coal dispatch center by surface conveyors.

It is proposed to use conventional method of mining viz. Inclined stiling with excavators/loaders loading coal and waste into Dumpers for hauling.

#### Mining System

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dumps.

With due consideration to geo-mining characteristics of the deposit and as envisaged in the Mining Plan, the mine is proposed to be worked by shovel-dumper combination as well as Surface Miner.

Design of mining system has been done considering safety guidelines of Directorate General of Mines Safety (DGMS). However, during mine operations, the safety rules, regulations and various circulars issued by DGMS should be strictly followed and adhered to.

The height of the shovel benches in OB varies from inter-burden thickness to 10-15m. The width of the working benches has been considered as 40-45m and the width of non-working benches has been considered as 25m.

The slope of each bench is proposed as 70°, but the overall running slope in working faces will be around 18°. The ultimate pit slope is varies between 30 deg to 37 deg.

Perseverent bands of thickness more than 1m present in coal seams are proposed to be mined separately.

Bench height of OB dumps formed by Shovel-Dumper system will be 30m and slope of individual dump benches will be 37° (equal to angle of natural repose of OB material). Width of berm between two adjacent benches will be 30 m.

Proposed System Parameters are tabulated and given below in table 4-6.

Table 4-6: System Parameters

Sl. No.	Particulars	Unit	Pit	Dump
1	Bench height	m	10-15/IB thickness	30
2	Working bench width	m	40-45	30
3	Nonworking bench width	m	25	30
4	Bench slope	Deg.	70	37

#### 4.4.6 PRODUCTION BUILD-UP AND RATED CAPACITY

The mine has been planned for a peak capacity of 20 Mtpa of coal production. The mine will achieve a capacity of 22 Mt in 6<sup>th</sup> year and after encountering new seams, the mine will reach the target capacity of 25 Mt in 15<sup>th</sup> year only. The production build-up with heavy OB quantities is given below in table 4-7.

Table 4.7: Tentative Production Build-up schedule

Year	Coal (Mt)		Natural OB (Mcum)		SR (tonn/d)	
	Annual	Cumm.	Annual	Cumm.	Peaking	Cumm.
1	2.00	2.00	8.45	8.45	4.73	4.73
2	5.00	7.00	22.77	32.22	4.55	4.60
3	8.00	16.00	40.17	72.39	4.44	4.52
4	11.00	29.00	58.38	130.78	4.44	4.51
5	18.00	47.00	79.55	210.33	4.42	4.48
6	22.00	69.00	100.69	321.02	5.03	4.85
7	22.00	91.00	100.69	421.71	5.03	4.74
8	22.00	113.00	100.69	522.41	5.03	4.80
9	22.00	135.00	100.69	623.10	5.03	4.84
10	22.00	157.00	100.69	723.79	5.03	4.86
11	22.00	179.00	98.11	824.90	4.37	4.80
12	22.00	201.00	94.14	924.05	4.28	4.75
13	22.00	223.00	94.14	1028.19	4.28	4.70
14	22.00	245.00	94.14	1132.34	4.28	4.66
15	25.00	270.00	105.90	1247.64	4.21	4.62

#### 4.4.7 WASTE DISPOSAL STRATEGY

It is envisaged that initially for 3-4 years, all the OB generated will be dumped externally from both the eastern and western pit. This temporary external dump is proposed to be located in the southern side of the block. Once sufficient void is created after 3-4 years of operation, internal dumping will start in eastern pit while in the Western pit, internal dumping can be started only from 6<sup>th</sup> year of operation once the base seam is reached.

The external dumping will continue till 13<sup>th</sup> year and thereafter from 13<sup>th</sup> year, the external dump will have to be re-handled back into the quarry void for smooth mine advancement.

Out of the total OB of ~2735 Mcum, it is estimated that ~490 Mcum (~18%) will be required to be dumped externally temporarily. This ~490 Mcum will be re-handled back

into the quarry after sufficient space is available for accommodation of waste from 13<sup>th</sup> year.

The height of the temporary external dump is proposed to be around 120m above ground level upto an RL of +420m and final height of the external dump is proposed to be 120m above ground level upto an RL of +420m. This will ensure optimization of the life of the mine to extract maximum mineable coal. However, a slope stability study will be imperative to determine final dump height and final dump slope as per regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020.

Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 17° (equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 30 m. Overall slope of dump works out to be 13°-14°. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.

During mining operation, OB dump stability, high-wall slope stability for OB bench parameters, and maximum OB dump height should be adopted and modified as per the scientific study and DGMS permission.

#### 4.5 INFRASTRUCTURE AND FACILITIES

##### 4.5.1 COAL HANDLING AND DISPATCH ARRANGEMENT

The mine is proposed to begin through two quarries: East Pit and West pit. Talatpalli mine is planned for maximum production of 25.0 Mtpa. These two quarries will join around 10 th year, however coal production will continue from both end. As proposed in Mining Plan, coal will be produced through surface miner (-100 mm size). Therefore, crushing of





coal will not be required for handling and despatch. Total coal produced from Talaspalli Project will be loaded into railway wagon at nearby proposed railway siding through silo and RLS for final despatch and transportation up to final destination. A dedicated MGR has already been planned and under construction in the south-western part of the block for coal loading and despatch.

Coal handling plant is proposed to cater entire production of coal from OCP and accordingly facilities of receiving of coal, required conveying system, storage bunker and reclamation of coal from bunker with conveying through belt conveyors to silo and loading into rail wagon through rapid load out system.

#### Eastern quarry:

The proposed coal handling system includes receiving of ROM coal at surface produced through surface miner. ROM coal from eastern quarry will be transported at surface through dumpers/trucks which will be received in receiving hoppers for conveying of coal through belt conveyors.

Suitable receiving arrangement for coal produced through surface miner (-100 mm size) in Truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. These receiving arrangement for coal have been proposed near mine quarry mouth to minimize the truck/dumper movements. The receiving pit/ station along with the conveyors may be shifted as per the mine advancement and requirement during mine operation.

Initially, truck receiving hoppers are considered, however, suitable alternative receiving arrangement either through feeder/ Chain feeder/Truck receiving station may also be considered at later stage according to mine condition and space availability at receiving pits.

The above proposed receiving station have been proposed for eastern quarry and at the southern side of the mine at a suitable location. It shall be shifted as per the mine

advancement of eastern quarry. The location plan shown for receiving stations and other system of coal handling are tentative and it may change as per requirement.

Coal from receiving station shall be conveyed through suitable capacity belt conveyors along the southern and eastern boundary of the eastern quarry at surface through series of conveyors. Further this coal will be conveyed and stored into a bunker of suitable capacity with the help of tripper. The storage bunker has been placed near proposed silo in the space provided for infrastructures to ease the wagon loading.

#### Western quarry:

Coal produced through surface miner (-100 mm) from western quarry shall be transported by truck/ dumpers at surface and received in a hopper. Suitable receiving arrangement for coal produced through surface miner (-100 mm size) in truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. These receiving arrangement for coal have been proposed near mine quarry mouth to minimize the truck/dumper movements. The receiving pit/ station along with the conveyor may be shifted as per the mine advancement and requirement during mine operation. Coal from receiving stations shall be conveyed through suitable capacity belt conveyors along the western boundary of the western quarry at surface through series of conveyors. Further this coal will be conveyed and stored into a bunker of suitable capacity with the help of tripper.

#### Loading & Despatch:

Coal from bunker will be reclaimed through suitable capacity feeders and fed to proposed silos through suitable capacity of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading silo. Two nos. silo will be placed on two different rail lines of proposed railway siding for loading of coal into railway wagons. Both the silos are connected with the bridge conveyors for feeding of coal into silos to ensure flexibility in loading.



#### 4.5.2 WORKSHOP

For maintenance and repair of equipment deployed at Talaspalli coal block, a workshop facility have been envisaged at the south-west corner of the block earmarked for infrastructural facilities. Daily maintenance, scheduled maintenance and repair are proposed to be carried out in the project workshop.

#### 4.5.3 PUMPING

Adequate number of pumps will be provided to dewater the inflow of water due to precipitation falling within the active pit limit during the monsoon season to enable the mining activity to continue round the year.

#### 4.5.4 POWER SUPPLY

A NTPC substation is already under operation at the site. Permanent Power shall be available from 132 KV / 33 KV NTPC Substation at Raikara village within the block in the south-west corner of the block which has been earmarked for infrastructure facilities.



## CHAPTER 5

## CONCLUSION AND RECOMMENDATIONS

## 5.1 RECOMMENDATIONS

The Conceptual Report has been prepared for optimum extraction of coal under the present constraints and lack of space for waste disposal, keeping in view safety and other necessary conditions. The given figures are tentative and may get updated during detailed planning.

- The conceptual note presents various pit options for Talipalli Coal Mine which is presented below:

Particulars	Pit Formulation:	Extractable Reserves (Mtd)	ORB (Mtd)	SR (m:1)	Backfilling (Mtd)	External Dump (within the Block) (Mtd)	Temporary External Dump (Mtd)
Option I	Base seam II with full strike and External dump on the dip side of the block.	277	1156	4.9	725	629	-
Option II	Base seam II leaving high strip ratio zone on the western side.	505	2304	4.58	1989	325	-
Option III	Base seam IV with full strike and temporary external dump on the dip side of the Block.	831	2725	4.33	2725	-	400
Option IV	Base seam IV leaving high strip ratio zone on the western side.	485	2002	4.12	1796	204	-

It is apparent from the above table that Option III gives maximum extractable coal at low strip ratio and therefore it is recommended as the base option. Other options are

not attractive due to constraints of dumping space availability and adverse stripping ratio.

- The mine will be designed with a rated capacity of 25Mtpa which is likely to be achieved in 15<sup>th</sup> year. However, the mine will reach a capacity of 22 Mtpa in 6<sup>th</sup> year of mine operation.
- The mine life is tentatively estimated to be 31 years with an average stripping ratio of 4.33 cum/t.
- It is proposed to deploy 20-22 cum Hydraulic Shovel/backhoe and 10-12 cum hydraulic shovel/backhoe with 150T-200T dumper and 100T dumper respectively for a peak annual OB of ~110 Mcum. For Coal, Surface miner with FEL and 100T dumpers is proposed to be deployed.
- Coal produced through surface miner (-100 mm) from both side of the quarry (Eastern and western) shall be transported by truck/ dumpers at surface and received in a hopper. Suitable receiving arrangement for coal produced through surface miner (-100 mm size) in truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. It is proposed to have two separate truck receiving station and conveyor system at the eastern and western boundary of the mine to minimize the lead. The receiving pit/ station along with the conveyor may be shifted as per the mine advancement and requirement during mine operation. Coal from receiving stations shall be conveyed through suitable capacity belt conveyors at surface through series of conveyors. Further this coal will be conveyed and stored into a bunker of suitable capacity with the help of tripper. Coal from bunker will be reclaimed through suitable capacity feeders and fed to proposed silos through suitable capacity of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading Silo.

- The figures worked out in the conceptual report may undergo minor changes during the course of detailed planning for the Mining Plan.
- The key parameters proposed in the Conceptual Report is required to be finalized and confirmed by NTPC to start the work on Mining Plan/FR.
- Some additional inputs have to be provided by NTPC for preparation of Mining Plan. The list of inputs is attached as Annexure 1. The requirement of other inputs for feasibility report preparation will be communicated separately.

PLATES  
PLATE I



Scale: 1:50000

11

PLATE II



Scale: 1:50000

12



PLATE III



Scale No. 20000000

10

PLATE IV



Scale No. 20000000

10





## Additional Annexure-21



**CONCEPTUAL NOTE  
FOR  
ASSESSMENT OF UG MINING POTENTIALITY OF  
TALAIPALLI BLOCK  
& PROJECTIZATION OF SOUTH WEST AREA OF  
THE BLOCK**



**FEBRUARY 2023**

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APPROVED



## 1.0 INTRODUCTION

Mining Plan and Mine Closure Plan (1<sup>st</sup> Modification) of Talaspali Coal Block of M/s NTPC Ltd is has been prepared at CMPDI (HQ). The said Coal Block shows the existence of 27 coal horizons with their splits. Coal extraction by opencast has been proposed up to seam-IV Bot. Underground mining potentiality of left out coal Seam III and Seam II in whole of the block along with the small portion of the overlying Seams (Seams IV Mid, V Bot, VI Mid and VI) in the South West Corner (below the area considered for Surface infrastructures) has been assessed. Also, opencastable reserve upto VII seam in the south west corner below the area considered for infrastructures has been estimated.

## 2.0 LOCATION

Talaspali coal block having an area of 2115.5 ha is bounded by latitude 22° 13' 35" & 22° 16' 08" N and longitude 83° 25' 49" & 83° 30' 22"E. It is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. Talaspali block roughly forms a rectangle, the longer axis is NW-SE direction forming the length of the block, and the shorter axis NE-SW direction forming the width. The block boundary allocated to NTPC Ltd., was pilared by Boundary Pillars BP-1 to BP-65. The Kelo River forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south, Sahapali, west of Chotguda forming the western boundary. Ajgarh and Kuder-Maaha village forming the northern boundary.

Talaspali block is covered by Survey of India top sheet No. 64N/7 & 8 (RF 1:50000). The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Villages such as Talaspali, Kuder-Maaha, Ajgarh, Chotguda, Bichhinara, Naya Rampur, Raikera and Sahapali are located within the block.



### 3.0 DESCRIPTION OF THE BLOCK

The block extends over an area of about 21.19 Sq km, in which forest cover is extended over an area of about 7.10 Sq km. The limits of Block Boundary are defined as given below:

North:	Beyond in-crop zone
South:	Unexplored area and Dipside of Barod-Bijari Block
East:	Peermal Block
West:	Chintapani Extension Block and Dipside of Barod-Bijari Block

### 4.0 GEOLOGICAL STRUCTURE

The general dip and strike of the seams within the geological coal block area as under:

i) Strike	Strike is approximately NW-SE with minor variations
ii) Dip	The beds dip at low angle $4^{\circ}$ - $8^{\circ}$ towards south-west.

### 5.0 DETAILS OF SEAMS FOR UG MINING

#### 5.1 SEAM SEQUENCE

The Seam Sequence is given below:



Sequence of Coal Seams &amp; Partings

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.6	6.1			3.5-6.0
	Parting			2.3	20.15	3.5-16.5
5	IX LZ	1.2	2.55			1.2-2.0
	Parting			13.59	21.54	17.0-18.5
6	IX LI	0.36	1.85			1.2-2.0
	Parting			5.65	11.87	6.0-8.0
7	IX	0.96	6.06			3.5-6.0
	Parting			6.30	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.5
11	VI Mid	3.09	10.01			5.0-9.0
	Parting			0.85	5.98	1.0-2.0
12	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Parting			9.08	18.94	11.5-18.5
14	V Mid	0.16	3.73			0.50-2.60
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0



S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
	Parting			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.30	20.13	6.0-10.0
17	IV Mid	0.98	7.24			3.5-7.0
	Parting			0.75	6.95	3.5-5.5
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bnf	0.55	5.67			1.5-3.5
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.5
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	3.08			<0.90
	Parting			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			<0.90
	Parting			5.0	60.39	35.0
24	II L1	0.05	1.54			<0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.82			1.5-2.5
	Parting			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			<0.90
	Parting			Around 35.0 m		
27	I	0.22	0.55			-



## 5.2 SEAMS CONSIDERED FOR UG MINING

The Seam III and Seam II below Seam IV Bot (bottommost seam of the OC mine) have attained underground workable thickness over most of the block area consistently and have been considered to be mined after the completion of OC mining.

In addition to Seam I and Seam III, Seams IV Mid, V Bot, VI Mid and VII lying in a very small area on the south west corner of Talapali Block have been considered for UG mining. This area on the south west corner of the block has been earmarked for infrastructures required for OC mining. Only the above mentioned seams have achieved UG workable thickness in this area. All the other Seams above Seam III in this area have been found to be unworkable by UG methodology.

However, the top seams (Seam X-Top to VIII) in this area will be extracted by OC mining after relocation of infrastructure facilities after the end of OC mine life of 31 years.

## 5.3 DETAILS OF GEOLOGICAL RESERVE FOR UG MINING

Seams	Net Geological Reserve (Mt)	Area Considered
VII	5.34	South west area considered for infrastructures
VI-MID	15.94	South west area considered for infrastructures
V-BOT	2.84	South west area considered for infrastructures
IV-MID	12.58	South west area considered for infrastructures
III	80.05	Whole Block
II	42.78	Whole Block
<b>Total</b>	<b>159.52</b>	



## 6.0 STRATEGY FOR UG MINING

Mechanized opencast mining of various coal seams commencing from the topmost X seam to IV Bot seam has been planned. The various coal seams/ splits available below IV Bot seam and the partings between various such horizons have been examined.

It is evident that Seam III, below Seam IV Bot (the proposed quarry floor) has thickness varying from 0.12m to 3.25m although the seam has not acquired workable thickness in the mining area as the prevalent thickness in 83% of boreholes varies from 0.5m to 1.50m. The seam folio plan of Seam III, (Plate- 10B30) for Talapalli Block can be referred for the purpose.

The seam below seam III, is Seam II which has acquired workable thickness in the mining area (the prevalent seam thickness is 2.0 to 5.50 m in 88% of boreholes). The seams upto Seam IV Bottom have been planned to be worked by Opencast. The OC workings are proposed to be filled with OB upto a height of 120m above the surface height in the final stage of the workings (Refer Final Stage Dump Plan, plate- 21E). The parting between Seam IV Bottom and Seam II varies from 42m to 57m (Isoparting plan annexed). The thickness of Seam II in most of the mine area varies from 2m to 5m. The working of Seam II by underground, attracts the following provisions of Coal Mine Regulations (marked in *italic*).

*The Coal Mine Regulations and the circulars issued thereunder state that "no working which has approached within 60m of any other working (not being a working which has been physically examined and found to be free from accumulation of water or other liquid matter or any material that is likely to flow when wet), whether in the same mine or in an adjoining mine, shall be extended further except with the prior permission in writing of the Chief Inspector and subject to such conditions as he may specify therein.*

*For the purposes of this sub-regulation, the distance between the said workings shall mean the shortest distance between the workings of the same seam or between any two seams or sections, as the case may be, measured in any direction whether horizontal, vertical or inclined.*





The mine surveyor in the mine is supposed to record in a bound paged book the full facts when working of the mine have approached to about 120m from the mine boundary or from disused or waterlogged workings. Every entry in such bound paged book is supposed to be signed and dated by the surveyor and countersigned and dated by the manager.

A void has been proposed to be left in the OC workings in the final stage of the Opencast operations (Refer plate-21E) and would normally be filled with water. Although, the pumping operation round the clock in OC mine is a practice, the OB dumps of the OC workings are watercharged during rainy season.

Therefore, for working Seam III, the DGMS will require scientific studies to be carried out for stability of the parting.

Also in Tatapali block, there would be dead load of the 120m high dump above the Original Ground Level. Therefore, for working Seam III under the dead load of 120m, DGMS will stipulate a scientific study for the estimation of impacts of dead load of internal dump over the parting between roof of seam III and floor of seam IV Bot (i.e. floor of quarry). Depilaring of Seam III with caving may lead to danger of slope failure of dump due to subsidence. Also, simultaneous UG and OC workings statutorily require withdrawal of manpower from UG workings when blasting operations in OC workings are to be carried out. The movements due to HEMM in OC also have its safety implications in UG operations. Therefore, in this Mining Plan simultaneous UG and OC operations have not been considered. However, the construction period of the UG mine is proposed to begin 4 years before the completion of OC activities.

The parting between IV Bot and Seam III varies from around 42m to 57m i.e. less than 15t where t is the thickness of Seam III in certain areas within the block. Therefore, DGMS may not permit the depilaring of Seam III in many panels due to safety risk of overriding of pillars. However, extractable



reserves of Seam III have been assessed considering that permission for depilaring operations subject to certain conditions will be granted by DGMS.

Detailed study of the Geological Report has revealed that possibility of any belowground mining in Seam III.1 and II. does not exist due to poor development of the carbonaceous horizons. Seam II has developed working thickness in the block barring eastern side. Seam III.2 & Seam III.3 have attained workable thickness in North West and south west areas of the coal block in very small areas. The seam III.2 and III.3 have workable area at a depth higher than 500m in the south western side. These seams have developed workable thickness in a very small area in the North Western side at a depth higher than 300m. Accessing these areas from Seam II would involve thin seam drivage or drivage of drifts. Hence, Seam III.2 and Seam III.3 are considered to be non economical as the workable reserves are meagre.

The Seam Folio plans of Seam II (Plate- 10032) indicate that this seam has the very good potential to be mined by underground mining operation as it has developed workable thickness for UG mining in the mining area on from the central to western portion. The prevalent workable thickness of the II Seam varies from 1.5 to 5m. The depth of the workings vary from 230m to greater than 600m in the dipmost portion of the mining area.

The Surface Infrastructures (Merry-go-Round, Workshop, CHP, Silo etc) in this Mining Plan have been proposed in the south west corner of the Talapali block. The seams below this small area were examined for their mining potentiality. The seams from X Top to VIII are being proposed to be worked by OC method after relocation of the surface infrastructures at a suitable place within the block at the end of life of OC mine i.e. 31 years proposed in the Mining Plan.

The other seams below this area and above Seam II were examined for their workability by UG technology. The seams VII, VI Mid, V Bot and IV Mid have



been found to have developed workable thickness. It is proposed to drive 3 drifts from Seam III to VII for working these seams in this area.

## 7.9 UG MINING TECHNOLOGY

The Bord & Pillar method using SDL / LHD is the most prevalent underground mining method being used in the Indian mines. This is a semi mechanized technology and involves blasting operations. The work force is well versed with the various operations. The manpower deployment in the working districts being high and the production to the tune of 100 tons per day with SDL and 200 tons per day with LHD machine is being achieved in Indian mines. The reserves, the extent of mine and the high production requirements of the country call for deploying Mass Production Technology in Talapali Block.

The two prevalent methods for Mass production deployed in the Indian Mines are **Continuous Miner Technology and Longwall technology**.

Continuous Miner Technology on Bord & Pillar method is in operation in many mines of CIL. This technology is very flexible and it deploys coal cutting instead of blasting. This makes the technology less hazardous and more productive. The shuttle car used in the CM package is a coal hauling machine is tyre mounted like the LHDs being used in the CIL mines. The continuous Miner machine is available in wide cutting ranges. These days CM on firing basis is being used in many mines of CIL and the production to the tune of 2000 tpd and more is being achieved in mines. In the firing mode of CM technology, the district manpower is provided by the private party. The CM technology has been deployed in mines upto 400m depth in India.

**Powered Support Longwall (PSLW) technology** is generally suitable where comparatively large area free from faults and geological disturbances available for deployment. Long panels can be made for final extraction, as the method is highly inflexible. The property should not have large and abrupt variation in seam thickness. Besides, as the method involves cutting/shearing



(no blasting) and the rate of extraction is very high. It ensures better percentage of extraction, ease of management and is safer. Longwall panels operate on "straight line" extraction method.

A number of Longwall faces have been operated in the mines of CIL in collaboration with European Companies and even with Chinese collaboration. Till date the best results have been given by the Chinese packages. Longwall packages also require additional gate road drivage equipment.

The two seams which have achieved Underground workable thickness in most of the area are Seam II and Seam III. A small portion of the block on the south west corner has been proposed to be worked by Underground in the upper seams which have achieved workable thickness. The upper seam III has a restriction of less than 60m parting with the bottom most seam IV Bot in the Opencast Quarry. For the purpose of Flexibility in operations, the CM technology has been preferred in working the seam III. Most of the working area in this seam is at depths suitable for deployment of Continuous Miners. The lower prominent workable seam is Seam II which has depths ranging from 200m to 550m. The Western side of this seam has not achieved workable thickness. Some large portions of the property are completely fault free. These thick fault free portions have been chosen for deployment of Longwall technology. The main dip development of Seam II has been proposed to be worked with CM technology.

The higher seams in the Southwest portion have been proposed to be worked with CM technology considering the flexibility and productivity of the technology.



### 8.9 TENTATIVE EXTRACTABLE UG RESERVE

Seams	Net Geological Reserve (Mt)	Extractable Reserve (Mt)	Area Considered
VII	5.34	2.22	South west area considered for infrastructures
VI-MID	15.94	8.12	South west area considered for infrastructures
V-BOT	2.84	0.77	South west area considered for infrastructures
IV-MID	12.58	8.45	South west area considered for infrastructures
III	80.05	53.71	Whole Block
II	42.78	28.25	Whole Block
<b>Total</b>	<b>159.52</b>	<b>99.52</b>	

### 9.0 MAIN MINE ENTRIES

Considering the availability of land as per the OC planning of higher seams, the only option suitable for the mine is working by two shafts. The usage of inclines is likely to block very large quantity of coal which can otherwise be extracted by Opencast. One of the shafts can shall be used as intake airshaft (for men winding and material winding) and the coal handling is proposed to be carried from the other shaft. The depth of the shafts has been considered to be 245 m.

Though it is ideal to locate such mine openings around middle of the area considered for belowground workings, yet disposition of seams for opencast mining operations does not permit to have such a choice.

### 10.0 MINE CAPACITY AND LIFE OF THE MINE

The seam II and Seam III would be connected with two shafts from surface till the end of Opencast mine life. The shaft sinking is proposed to be started 4 years prior to the end of OC mine life (31 years).

The total extractable reserves of all the workable seams above seam III in the area on the south west corner of the block being utilized for infrastructure comes to 17.5 Mt the details of which have been provided in table in 8.9. The total extractable reserves in seam III are to the tune of



53.71 Mt. Considering deployment of three CMs in the seams III and above, a life of around 40 Years is envisaged.

In Seam II, it is proposed to deploy one Longwall face alongwith two roadheaders. Considering average thickness of 3m for longwall face alongwith adequate gate/trunk transport is likely to produce on an average of about 1.7 MTPA. The two CM sets of standard height are proposed to be deployed in the Seam II and are likely to produce 1 Mt per annum. The total extractable reserves (Seam II) are in the tune of 28.25 MT. The total nos of CM deployment in the mine is five but considering the constraints of the drift drivages etc. at a time only four CM machines have been considered to be worked in the mine.

The peak production of the mine that can be achieved is around 3.7 Mtpa [(Longwall and roadheader 1.7 Mtpa) + (4 No of SHCCM 2.0)]. However, the average production of the mine can be considered to be 2.5 Mtpa and the life of mine comes to around 40 Years. This capacity of the mine is being envisaged considering the constraints of OC workings above and the restriction of stipulations of DGM5 prior to granting depilating permission in every panel of seam III as the workings are within 60m of the of the IV Bottom workings which may be water charged during rainy season. The scientific study related to determining the hard cover between IV Bottom and Seam III and feasibility of safe depilating of the panels in Seam II has to be carried out. The conditions imposed for depilating are likely to reduce the productivity of CM and also it is envisaged that not all the panels in Seam III will get permission for depilating. There are numerous faults on the North Western side of the property.

The conditions prevailing in the OC mine for a very long period cannot be projected in advance. Likewise with the existing planning of the UG mine, a conceptual plan stipulating the method extraction of UG, the machinery deployment etc. has been provided. However, near the end of completion of OC mining, a detailed UG mine plan will have to be prepared for the purpose.



## 11.0 MINE VENTILATION

The working belowground mines in Mand-Raigarh Coalfield are placed in Degree-I category of gassiness. It is, therefore, expected that the proposed underground mine workings at Taispathi Coal block would also fall in same Degree-I of gassiness. However, a scientific study for the purpose is proposed to be carried out. Accordingly, ventilation provisions in this are based on Degree-I gassiness. These provisions may need to be altered if any change in degree of gassiness is found on actual determination as required by statute.

Exhaust ventilation system is considered for the proposed mine with one of the shafts provided with a main mechanical ventilator with suitably designed air lock arrangements & evases. The ventilation simulation study in the mining plan are proposed to be carried out to establish the size of the motor and the type of the fan for the mine.

## 12.0 OC MINING IN THE SOUTH WEST PART AND TENTATIVE EXTRACTABLE RESERVE

In the Revised Mining Plan, surface infrastructures (CHP, Merry-go-Round, Silo, Workshops, and Sub-station etc) have been proposed in the south west part of the block. At the end of OC mine life of 31 years, the sterilized coal in this small part shall be taken out by both OC and UG method.

Given the shape of the block in South west part, OC mining can only be done upto Seam VII, since going further deep will reduce the working area on the floor which will restrict machine deployment and operation. Rest of the Seams from Seam VII shall be mined by UG method subject to its workability by UG mining.

The tentative Seam-wise opencastable reserve, which can be extracted from the South west part of the block is given below:



Seams	Net Geological Reserve of Quarry upto Seam VIII (Mt)	Extractable reserve by OC upto Seam VIII (Mt)
X-LB		
X-TOP	0.21	0.20
X-BOT	4.05	3.85
IX-L2	1.32	1.25
IX-L1	1.08	1.02
IX	2.54	2.70
VIII	3.03	2.88
<b>Total</b>	<b>12.53</b>	<b>11.90</b>

The total extractable Reserve by OC mining in South West part is tentatively estimated to be 11.90 Mt. The peak capacity of the mine that can be achieved in South West part is around 1.50 Mtpy with the mine life of around 8 years.

Therefore, total estimated reserve which can be extracted by both OC and UG after 31 years of proposed OC mine life is as follows.

Particulars	Extractable Reserve (Mt)	Mine Life (Years)
UG	99.52	40
OC	11.90	8
<b>Total</b>	<b>111.42</b>	-

The above figures may change while doing detailed planning.

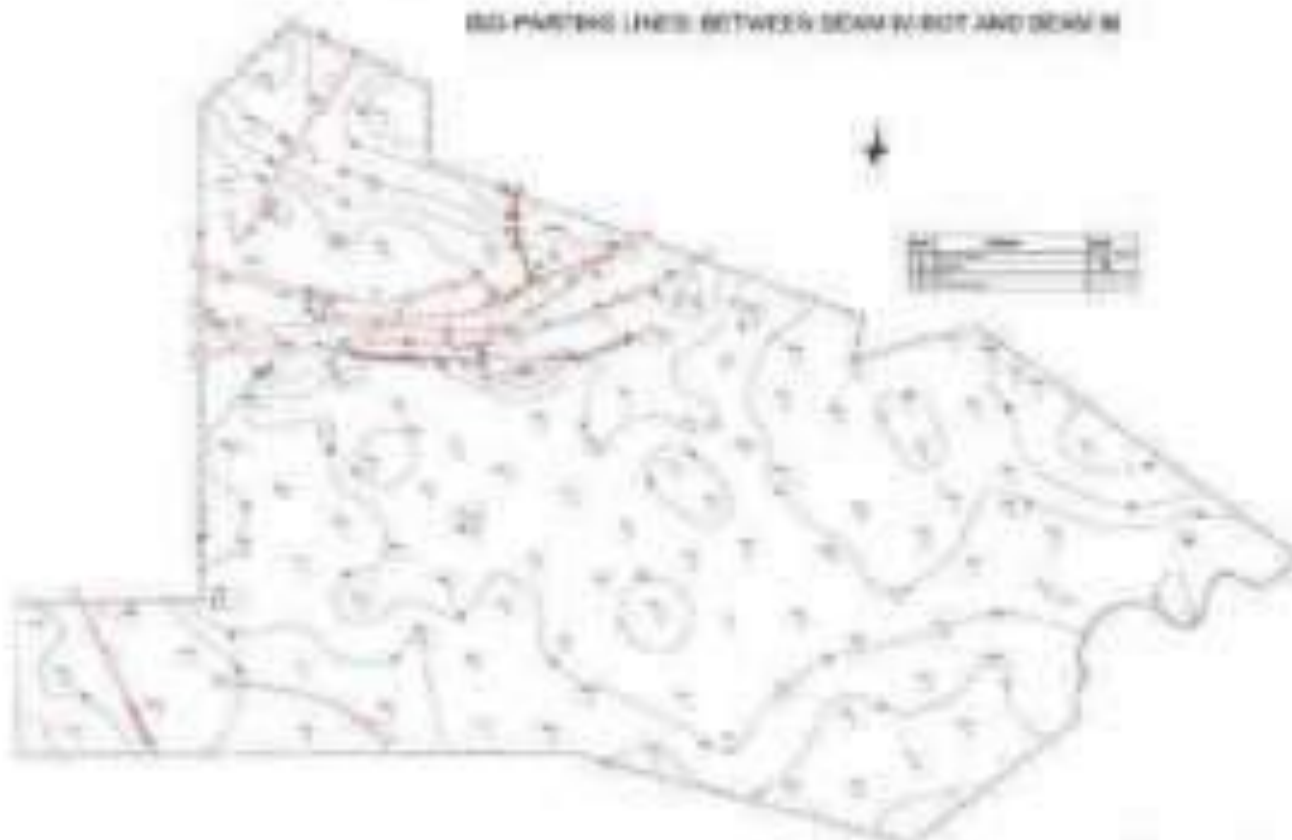
A Revised Mining Plan needs to be prepared after 25 years for UG mining of Whole Block and OC mining upto Seam VII in south western area where infrastructure for proposed Opencast mine is located.



Conceptual Plan for Assessment of L&L probability and DC Mining in South West



BED PARTING LINES BETWEEN SEAM N-BOT AND SEAM M



Conceptual Plan for Assessment of L&L probability and DC Mining in South West



Conceptual Plan for Assessment of L&L probability and DC Mining in South West



## Additional Annexure-22



*cmpdi*  
A Mine Planning Company



**TECHNICAL FEASIBILITY NOTE  
TALAIPALLI COAL BLOCK**



SEPTEMBER 2021

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**DISCLAIMER**

For the preparation of this Report, the MINEX Model, Approved Mining Plan and other Stage Plans/Data for Talapali Coal block as provided by NTPC Ltd has been relied upon by CMPDI. CMPDI has not verified data provided by NTPC Ltd for accuracy and does not warrant the accuracy of, or make any other warranties or representations regarding this Report if there is any discrepancy in the data provided by NTPC Ltd. Further, this Technical review is a broad assessment and is subject to refinement in the detailed planning.

We have done our best to ensure that the alternate feasible option for Opencast Mining of Talapali coal block provided to the client is the most feasible option in the existing circumstances. We do not claim that this is the only and/or best option for this purpose.

No assurance is given that a position contrary/different to the opinions expressed herein will not be asserted by any person, entity, authority and/or sustained by an appellate authority or a court of law.



## CHAPTER 1

### BACKGROUND

#### 1.1 INTRODUCTION

Talapalli coal mining block in the state of Chhattisgarh was initially allotted to NTPC by Ministry of Coal (MoC), vide letter no.13016/29/2003-C2-L, dated 25.01.2006, for meeting coal requirement for the proposed 4000MW Lars Integrated Power Project which is approximately 60 kms away from the coal block.

Talapalli Block lies in the eastern part of Mand-Raigarh Coalfield in the state of Chhattisgarh. At the time of allotment, the block was regionally explored by GSI by drilling 15 holes (8434.55m) and estimated coal reserves of 964.88 million tonnes of indicated category were assessed.

On receiving letter of Award (LOA) from Ministry of Coal, NTPC Ltd issued Work order to NECL to carry out detailed exploration in the block. NECL drilled about 302 boreholes (39854.75 mtrs. of drilling) in approximately 20 sq. km. block area for which the Geological Report (GR) was submitted to NTPC on 29.09.08.

On receipt of GR, NTPC awarded the consultancy for preparation of Mining Plan and Feasibility Report for this block to Advance Coal Management & Marketing Pvt. Ltd. (ACMM), New Delhi. The Mining Plan was prepared by ACMM in 2009 for a rated capacity of 18.00 Mtpa based on the aforementioned GR which was later approved by the Ministry of Coal on 31.03.2010. Subsequently, all statutory clearances were obtained on the basis of the approved Mining Plan.

However, as a consequence to the judgment of the Hon'ble Supreme Court in September 2014, the block allocation was cancelled which was later re-allotted to NTPC on 08.09.2015.

NTPC planned to develop and operate the mine through outsourcing by appointing a Mine Developer and Operator (MDO) with scope of works viz. overburden removal, extraction of coal, construction of CHP & other fixed mine infrastructures, compliance of statutory obligations and other associated activities.

Meanwhile, all requisite statutory clearances and permissions were obtained from the respective statutory bodies. The major statutory clearances out of the above are furnished below:

Table 1.1: Major Statutory Clearances with Obtaining Date

Activity	Date of Achievement
Env. Clearance	02.01.13/13.11.15 (Rev.)
Forest Clearance	St-I: 09.11.12; St-II: 29.01.14; 23.05.17(Rev)
Consent to Establish	06.01.15
Consent to Operate	17.03.16
Tripartite Escrow Agreement (Banker, CCD & NTPC)	15.05.14 & 04.05.17
DIMS Permission	19.01.18
Coal Controllers permission	31.01.18

NTPC issued the 1st NIT for appointment of MDO (for 404.5 MMTPA of coal extraction with a stripping ratio of 4.3 Cum./t in a period of 25 years as per Approved Mine Plan) on 11.12.2015. M/s. NCC-SGR Consortium was declared successful in the bid and was awarded the contract on 13.11.2017, but due to one FIR filed by CBI on corruption charges involving one of the Directors of SGR & NTPC, the contract was terminated on 04.07.2018.

Thereafter, Second NIT for appointment of MDO (for 404.5 MMTPA of coal extraction with a stripping ratio of 4.3 Cum./t in a period of 25 years as per Approved Mine Plan) was issued on 19.08.2019. M/s. Thiruvani Earthmovers Pvt. Ltd. (TENPL) emerged as the successful bidder and was appointed as MDO on 26.08.2020.

## 1.2 REASON FOR THIS TECHNICAL FEASIBILITY STUDY

M/s TEMPL was appointed as MDO on 26.08.2020 by NTPC for development and operation of Talapalli Coal Block. Post award of the contract, a dispute developed between M/s TEMPL and NTPC wherein TEMPL has claimed that as per their calculations 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/tonne as specified in the approved Mining Plan. In view of M/s TEMPL, the stripping ratio should be around 4.92 to 5.25 Cum/t. Along with this, the issue of accommodation of excess OB in the designated dump area including temporary external dump and unfeasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan has also been raised by M/s TEMPL. There were a series of discussion/meetings held between NTPC and TEMPL to resolve the issue.

Subsequently, M/s TEMPL chose to rescind the contract through their Notice dated 04.05.2021 and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Subsequent to few hearings and submissions made by both the Parties, the Hon'ble Delhi High Court directed both the parties for mutual discussions for amicable resolution of the issue which was complied by both the Parties by holding meetings wherein M/s TEMPL requested for appointment of independent Expert for review of the mining plan of Talapalli coal mining project.

M/s TEMPL vide letter dated 31.05.2021 (Annexure-4), submitted its consent to NTPC for appointment of CMPDL as an Independent Consultant for review of the technical parameters of the Talapalli coal mining project along with the consent to share the cost of the assignment/fees of CMPDL equally with NTPC. Thereafter, NTPC requested CMPDL vide letter NTPC/CM-HQ/11.CMP/2021/02 dated 01.06.2021 (Annexure-1) to take up this work on urgent basis which has been accepted by CMPDL.

### 1.3 OBJECTIVE OF THE STUDY

The objective of the study is to ascertain the technical feasibility of the mining of the Talipelli Coal Block and determine maximum coal that can be extracted from the block.

The report is aimed at holistically evaluating the feasibility of mining/dumping sequence as per the Approved Mining Plan and if found unworkable, provide an alternate technically feasible option to maximize the mineable coal.

### 1.4 SCOPE OF THE WORK

The agreed broad scope of the work is as below:

- ✓ Examination of two Entry scenarios as per Approved Mining Plan with respect to Mineable Reserves, OB quantities, Average stripping ratio, Waste Disposal Planning and Average Lead.
- ✓ Generate a best possible scenario to maximize mineable coal from the block providing Mineable Reserves, OB quantities, Average stripping ratio, Waste Disposal Planning and Average Lead & Lift and identification of all major assumptions.
- ✓ Provide coal evacuation/handling arrangement up to railway siding with respect to proposed feasible option.

The Schematic drawing and plates with respect to Stage Plans (5<sup>th</sup> year, 10<sup>th</sup> year, 15<sup>th</sup> year, 20<sup>th</sup> year, and 25<sup>th</sup> year) are included in the report.



## CHAPTER 2

### TALASPALLI COAL BLOCK: AN OVERVIEW

#### 2.1 SITE INFORMATION

Talaspalli coal block is located in the eastern part of the Mand Raigarh coalfield and lies in Raigarh district of Chhattisgarh State. The Kelo river forms the eastern boundary of the block and the boundary line passes through Naya Rampur & Raikera village in the south of Sajepalli, west of Chotiguda forming the western boundary. Ajigarh and Katur-Mauha village forming the northern boundary. The block is mostly covered by cultivated land while south-eastern part of the block has Reserve & protected forest cover. Talaspalli, Kuthar Mauha, Ajigarh, Chotiguda, Bichhinara, Naya Rampur, Raikera and Sajepalli are numerous villages located within the block.

The block is about 55 km away from Raigarh Township and is close to Tehsil Headquarters at Gharghoda which lies on Raigarh-Ambikapur State Highway. Talaspalli village is situated in the block & it is about 20 km NE from Gharghoda and is connected with Gharghoda partly by all-weather Gharghoda-Lalunga road. Gharghoda is about 35 km North of Raigarh Railway Station which is on Howrah-Bombay Main Line of South Eastern Railway.

#### 2.2 GEOLOGY, EXPLORATION AND RESOURCES

Talaspalli Block is located in the eastern part of Mand-Raigarh Coalfield. The area of the block is about 20 sq. km. Major part of the block is covered by the rocks of Barakar formations. Barren measure occurs in the southern part of the block. However a small patch of Barren Measure is also noticed in the north western part of the block.

The geological succession evolved on the basis of exploration data generated in the block is given in the Table 2-1 below:

Table 2.1: Geological Succession in Talapalli Block

Formation	Thickness (m)	Lithology
Recent	0.50 – 18.00	Soil, alluvium
Barran Measures	18.80 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal bands
Barehals	30 – 500	fine, medium and coarse grained feldspathic, grey sandstone, micaceous and laminated at places. Grey shale, fine clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Takhe	1.00 – 54.30	thalase, greenish shales & sandstone, occasional pebbly
Basement		Metamorphics

### 2.2.1 STRUCTURE OF THE BLOCK

The general strike of the bed is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. The dip of beds varies from 4° to 8° towards South-west.

The Geological Plan of the Talapalli Coal Block is given in Fig. 2-1 below:



Figure 2.2: Geological Plan of Talapalli Coal Block

The block does not show major tectonic disturbances. A total of 12 numbers of faults have been deciphered from the subsurface data out of which three faults namely fault F1-F1, F4-F4 and F8-F8 are major faults. Most of the faults are restricted to the northern part of the block. The faults details are furnished in Table 2-2 below.



Table 2.2: Details of Faults

Fault No.	Location	Trend	Nature of fault	Throw
F1-F1	Northern part passing near BH No. MNRT-24, 27, 22 & 25	East-West to ENE, NE-SW dipping northerly	Dip fault	20m – 25 m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m.
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	30-35 m
F4-F4	Northern part near BH MNRT-31, 28, 43 & 62	East-West dipping northerly	Dip fault	30 – 130 m
F5-F5	Northern western part through BH MNRT-62	East-West	Strike fault	35 m
F6-F6	Northern part passing through MNRT-31	WNW-ESE dipping westerly	Oblique fault	15 – 25 m
F7-F7	Northern part passing through MNRT-11	NW – SE	Oblique fault	20 m.
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105 m.
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East – West to curvilinear	Strike/Oblique Fault	25m
F10-F10	Northern part passing through RT-7	NE-SW	Oblique curvilinear	0-10 m.
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10 m.
F12-F12	Southern part	NW-SE	Oblique	25 m.

## 2.2.2 COAL SEAMS

Detailed exploration in Talaspalli Block has revealed the presence of coal bearing horizons belonging to Balsekar Formations. These carbonaceous horizons could be distinctly



demarcated as upper, middle and lower columns of Barakar formation. The coal is dull in appearance high in moisture and is of non-caking type.

There are 27 correlatable coal horizons, viz. seams XLA, XLB, X TOP, X BOT, IXL2, XL1, IX, VII, VI, VI TOP, VI MID, VI BOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, III L2, III L1, II, II L & I.

The sequence of coal seams and parting is given Table 2-3 below:

Table 2-3: Sequence of Coal Seams &amp; Parting

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	X LA	0.20	1.06			0.50-0.90
	Parting			5.41	11.90	6.0-9.5
2	X LB	0.30	1.28			0.50-0.90
	Parting			5.57	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.79	3.00	1.0-2.0
4	X Bot	1.6	8.1			3.5-6.0
	Parting			1.3	20.15	3.5-16.5
5	IX L2	1.2	2.55			1.2-2.0
	Parting			11.14	21.54	17.0-18.5
6	IX L1	0.36	1.85			1.2-2.0
	Parting			5.01	11.87	6.0-8.0
7	IX	0.86	6.36			3.5-6.0
	Parting			6.30	16.15	8.0-17.0
8	VII	2.06	6.54			4.0-6.5
	Parting			17.88	42.01	20.0-25.0
9	VII	0.10	3.90			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.5-1.1
11	VI Mid	3.09	10.01			5.0-8.0
	Parting			0.85	5.98	1.0-2.0

S. No.	Coal Seams	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
11	VI Bot	0.48	1.75			0.50-1.0
	Parting			2.80	23.65	14.0-21.0
13	V Top	0.50	5.09			0.50-1.50
	Parting			9.09	18.94	11.5-18.5
14	V Mid	0.15	3.73			0.50-2.50
	Parting			4.55	15.95	0.50-12.0
15	V Bot	0.30	5.40			0.50-2.0
	Parting			13.18	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Parting			5.93	20.13	6.0-10.3
17	IV Mid	0.99	7.24			3.5-7.0
	Parting			0.75	8.95	3.5-5.1
18	IV L	0.23	4.99			0.50-2.0
	Parting			0.70	4.55	0.50-2.0
19	IV Bot	0.55	9.67			1.5-1.1
	Parting			8.05	21.54	14.0-17.0
20	III L	0.10	1.25			0.50-1.1
	Parting			24.57	44.55	33.0-39.0
21	III	0.66	5.97			2.0-5.1
	Parting			31.1	55.99	33.0-51.0
22	II L3	0.50	1.09			+0.90
	Parting			13.38	40.9	28.0-38.0
23	II L2	0.07	1.88			+0.90
	Parting			1.0	40.99	20.0
24	II L1	0.05	1.54			+0.90
	Parting			1.27	20.59	3.0-14.0
25	II	0.13	5.92			1.5-2.5
	Parting			1.37	1.89	0.50-2.0
26	II L	0.05	2.45			+0.90
	Parting			Around		
27	I	0.22	0.55			2.7

### 2.2.3 RESERVES

As per GR, a Net Geological Reserve of 1267.145 million tonnes of coal reserves including both opencast and underground reserves varying in grade from 'A' to 'G' have been established in the block.

### 2.3 BRIEF OVERVIEW OF APPROVED MINING PLAN (OPENCAST MINING)

M/s ACMM prepared the Mining Plan for Talapalli Coal Block in 2010 for a rated capacity of 18.30 Mtpa. As per Mining Plan, this coal block has gross geological reserves of 1400.58 MT. Opencast coal mining has been proposed upto the basal seam III for a total gross geological reserves of 1328.58 MT and the balance 71.99 MT are considered for by below ground method of mining. Salient Features of the Approved Mining Plan is given below:

Table 2-4: Salient Features of Approved Mining Plan

Sl.No	Particulars	
1.	Project Details	Location: Eastern part of Mand-Raigarh Coalfield, Dist- Raigarh, Chhattisgarh Area - 21.15 sq km
2.	Reserves (MT)	a) Gross Geological Reserves -1400.58 b) Net Geological Reserves- 1260.52 c) Mineable Reserves*/Extractable- - Opencast 843.68 - Under ground 416.84 d) Reserves blocked in barrier & Batter 336.69 (* Mining Loss @ 5%) 44.40
3.	Quarry Parameters (m)	Max. depth-404 Max. strike length-6500 Min. strike length-1370 Max. dip rise length-4700 Min. dip rise length-3000



Sl.No	Particulars						
4.	Annual Target Output (MT)	Opencast-18.0 Underground-0.72 (at 100%) & -0.60 (at 85%)					
5.	Total life (Years)	Opencast- Construction - 2 Production - 32 Underground- Construction - 4 Production - 26					
7.	Quality of Coal: Overall Grade - "F" Non-coking	L.H.V (K.Cal/Kg)		Ash %		Moisture %	
		Min	Max	Min	Max	Min	Max
		1310	5832	17.6	45.1	1.2	11
8.	Average Stripping Ratio (M <sup>3</sup> /t)	4.48					
9.	Specific gravity of coal (Average)	1.65 t/cum					
10.	Method of Mining	Opencast - (Shovel-Dumper combination)/ Surface miner Underground- Continuous Miner & Shuttle car combination					

### 2.3.1 MINING STRATEGY

In the Mining plan, it is proposed to mine maximum area leaving a statutory barrier of 7.5m on surface from block boundary. It is also proposed to leave barrier of 60m from Kalo river on the eastern side of the block.

It is proposed to develop infrastructure facility like MGR, Workshop, store, Sub-station, office etc. on the South-Western corner of the property. At the end of the mining operation, it is suggested to dismantle all infrastructure facility on the South-Western corner of the property to extract blocked coal below infrastructure facilities.

To ensure availability of adequate quantity of coal, it has been planned to commence mechanized mining operations by having two independent opencast mines at eastern & western extremities. Accordingly mining operation has been envisaged by driving two

access trenches, one on the east side of the North Eastern side and the other on the western side of the property as shown in Fig 2-2 & 2-3. Both the quarries would advance towards southwards as also towards each other to finally merge into one entity after about 20 years of mine operation.

Internal dump will start once sufficient void space gets available from 5th year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will be placed as temporary external dump within the mine property.

The lead of Coal and lead of OB/partings has been considered as 2.0-3.0 km.



Figure 2-2. First year strip plan as per Mining Plan



Figure 2.3: 3D view stage Plan as per Mining Plan

Some major system parameters for both coal winning & CB removal are given below--

a) For 35 M<sup>3</sup> Electric Rope shovel to be deployed for removal of overburden,

- |                                   |                         |
|-----------------------------------|-------------------------|
| 1) Height of the bench            | - 20 m                  |
| 2) Width of the working bench     | - 50m                   |
| 3) Width of the non-working bench | - 30m                   |
| 4) High wall angle of the bench   | - 70° to the horizontal |

b) for 20 M<sup>3</sup> Hydraulic shovel to be deployed for removal of overburden,

- |                                   |                         |
|-----------------------------------|-------------------------|
| 5) Height of the bench            | - 15m                   |
| 6) Width of the working bench     | - 50m                   |
| 7) Width of the non-working bench | - 30m                   |
| 8) High wall angle of the bench   | - 70° to the horizontal |

c) For 12 M<sup>3</sup> hydraulic shovel working in the thick seam and thick parting:

- |                                   |      |
|-----------------------------------|------|
| 1) Height of the bench            | -15m |
| 2) Width of the working bench     | -40m |
| 3) Width of the non-working bench | -25m |
| 4) High wall angle of the bench   | -70° |

d) For 4.5 M<sup>3</sup> hydraulic shovel working in the thin seam and thin parting:

- |                                   |   |
|-----------------------------------|---|
| 1) Height of the bench            | -equal to thickness of coal seam and thickness of parting |
| 2) Width of the working bench     | -30m  |
| 3) Width of the non-working bench | -25m  |
| 4) High wall angle of the bench   | -70°  |

The above parameters may be modified according to the actual working condition. The high wall angle for the soft DB bench will not be steeper than 45°.

The Final Stage Quarry Plan and Final Stage Dump Plan is shown below in fig. 2-4 and 2-5.



Figure 2-4 Final Stage Quarry Plan to use Mining Plan



Figure 2.5: First Stage Dump Plan for pit Mining Plan

### 2.3.2 CALENDAR PROGRAMME OF EXCAVATION

The summarized calendar programme of excavation is given in Table 2-5 which has been developed based on adopted sequence of open cast mine development at optimum condition of mining operation in the block.

Table 2.5: Calendar Programme of Excavation

Year	Coal	Cumin coal	Retotal		Running		Avg		Adjusted		Running		Avg	
			OB	Cumin OB	OB	OB	OB	OB	OB	OB	OB	OB	OB	OB
	MT	MT	Mcum	Mcum	Cum/y	Cum/y	Mcum	Mcum	Mcum	Mcum	Cum/y	Cum/y	Mcum	Mcum
1	1.00	1.50	6.00	6.00	4.00	4.00	1.60	1.60	3.20	3.20				
2	4.00	5.50	15.00	21.00	4.00	4.00	13.04	20.00	4.76	4.76				
3	9.00	13.50	31.00	51.50	4.00	4.00	34.00	60.50	4.27	4.27				
4	14.00	20.50	51.00	101.50	4.00	4.00	50.25	121.04	3.25	4.18				
5	18.00	26.50	71.00	177.50	4.00	4.00	76.30	192.04	4.26	4.12				
6	22.00	32.50	91.00	249.50	3.80	4.00	76.30	268.04	4.21	4.30				
7	26.00	38.50	111.00	321.50	3.87	3.80	76.30	344.04	4.20	4.29				
8	30.00	44.50	131.00	393.50	3.87	3.80	76.30	420.04	4.19	4.28				
9	34.00	50.50	151.00	464.50	3.87	3.80	76.30	496.04	4.18	4.27				





Technical Feasibility Note: Talapalli Coal Block

Year	Coal	Current coal	Natural		Flaming	Ag	Adjusted		Flaming	Ag
			DB	Current DB	DB	DB	DB	Current DB	DB	DB
			MMscf	MMscf	MMscf	MMscf	MMscf	MMscf	MMscf	MMscf
10	18.00	124.50	71.87	105.07	1.87	1.88	76.50	131.88	4.21	4.17
11	18.00	132.50	70.05	105.72	1.89	1.91	76.50	131.84	4.21	4.17
12	18.00	170.50	68.26	106.38	1.90	1.90	76.50	131.84	4.21	4.17
13	18.00	230.50	66.49	107.04	1.90	1.91	76.50	131.84	4.21	4.17
14	18.00	200.50	66.66	107.30	1.88	1.91	76.50	131.84	4.21	4.17
15	18.00	224.50	66.86	107.56	1.90	1.94	76.50	131.84	4.21	4.18
16	18.00	242.50	67.06	107.82	1.90	1.94	76.50	131.84	4.21	4.18
17	18.00	280.50	75.50	108.52	4.18	1.90	76.50	131.84	4.21	4.17
18	18.00	278.50	76.70	108.74	4.27	1.90	76.50	131.84	4.21	4.17
19	18.00	290.50	76.70	108.95	4.27	1.90	76.50	131.84	4.21	4.18
20	18.00	318.50	76.81	109.06	4.27	4.01	76.50	131.84	4.21	4.18
21	18.00	307.50	76.81	109.28	4.27	4.01	76.50	131.84	4.21	4.18
22	18.00	350.50	75.01	109.49	4.27	4.04	76.50	131.84	4.21	4.18
23	18.00	348.50	75.01	109.70	4.27	4.00	76.50	131.84	4.21	4.18
24	18.00	388.50	75.01	109.92	4.27	4.00	76.50	131.84	4.21	4.18
25	18.00	404.50	75.01	110.13	4.27	4.07	76.50	131.84	4.21	4.20
26	18.00	422.50	76.00	110.34	4.27	4.00	76.50	131.84	4.21	4.20
27	18.00	440.50	76.00	110.55	4.26	4.00	80.00	131.84	4.21	4.21
28	18.00	458.50	74.90	110.76	4.26	4.00	80.00	131.84	4.40	4.21
29	18.00	476.50	74.90	110.97	4.26	4.00	80.00	131.84	4.40	4.22
30	18.00	494.50	74.90	111.18	4.26	4.00	80.00	131.84	4.40	4.22
31	18.00	512.50	74.90	111.39	4.26	4.00	80.00	131.84	4.40	4.23
32	18.00	530.50	76.50	111.60	4.31	4.00	80.00	131.84	4.40	4.23
33	18.00	548.50	81.20	111.81	4.37	4.27	80.00	131.84	4.40	4.23
34	18.00	566.50	81.20	112.02	4.37	4.27	80.00	131.84	4.40	4.23
35	18.00	584.50	81.20	112.23	4.37	4.27	80.00	131.84	4.40	4.23
36	18.00	602.50	81.20	112.44	4.37	4.27	80.00	131.84	4.40	4.23
37	18.00	620.50	81.20	112.65	4.37	4.27	80.00	131.84	4.40	4.23
38	18.00	638.50	81.20	112.86	4.37	4.27	80.00	131.84	4.40	4.23
39	18.00	656.50	81.20	113.07	4.37	4.27	80.00	131.84	4.40	4.23
40	18.00	674.50	81.20	113.28	4.37	4.27	80.00	131.84	4.40	4.23
41	18.00	692.50	81.20	113.49	4.37	4.27	80.00	131.84	4.40	4.23
42	18.00	710.50	81.20	113.70	4.37	4.27	80.00	131.84	4.40	4.23
43	18.00	728.50	81.20	113.91	4.37	4.27	80.00	131.84	4.40	4.23
44	18.00	746.50	81.20	114.12	4.37	4.27	80.00	131.84	4.40	4.23
45	18.00	764.50	81.20	114.33	4.37	4.27	80.00	131.84	4.40	4.23
46	18.00	782.50	81.20	114.54	4.37	4.27	80.00	131.84	4.40	4.23
47	18.00	800.50	81.20	114.75	4.37	4.27	80.00	131.84	4.40	4.23
48	18.00	818.50	81.20	114.96	4.37	4.27	80.00	131.84	4.40	4.23
49	18.00	836.50	81.20	115.17	4.37	4.27	80.00	131.84	4.40	4.23
50	7.00	850.50	76.00	115.38	11.70	4.27	81.41	131.84	4.40	4.40
51	6.00	878.50	76.00	115.59	11.61	4.41	81.99	131.84	4.20	4.40
52	5.00	907.50	64.50	115.80	11.52	4.44	81.58	131.84	4.00	4.40
<b>Total</b>	<b>849.00</b>		<b>8771.87</b>				<b>8771.87</b>			

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It is envisaged to make two quarry entry into the mine one on the east side of the North Eastern side and one on the western side of the property shown in the final stage quarry plan (Fig. 2-4). Year wise coal extraction from east and west quarry for initial five year is summarized in table below:

Table 2.8: Coal extraction from east & west quarry for initial five years

YEAR	COAL(Mt)		OB(Mcum)		Total Coal (Mt)	Total OB (Mcum)
	East	West	East	West		
1	6.45	1.05	2.40	3.20	7.50	7.90
2	1.00	2.97	5.13	13.86	4.00	19.04
3	1.68	6.22	7.06	29.94	6.00	34.08
4	3.13	10.87	4.94	46.43	11.00	55.36
5	3.48	12.52	23.04	33.46	18.00	76.58

The total mineable coal reserves have been estimated as 843.69 Mt at the corresponding OB of 3777.37 Mm<sup>3</sup> at an average SR of 4.48 m<sup>3</sup>/t.

The rated output of 18 Mtpa would be achieved in 5th year of quarry excavation (excluding construction period).

## 2.3.3 LIST OF MAJOR HEMM

The list of major mining machineries upto target year is given below in table 2-7.

Table 2-7: List of HEMM

Sl. No.	Equipment	Size	No	Year				
				1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>
<b>A</b>	<b>Overburden</b>							
1	Electric Shovel	35 Cum	4				2	4
2	Electric Hydraulic Shovel	20 Cum	8	1	2	5	7	8
3	Electric Hydraulic Shovel	4.5 Cum	11	3	8	8	8	11
4	Rear Dumper	240T	41				11	41
5	Rear Dumper	180T	76	3	18	43	67	76
6	Rear Dumper	90 T	92	21	61	61	67	92
7	Electric Drill	311 mm	3				1	3
8	Elec. Drill	250 mm	13	2	4	8	11	13
9	Diesel Drill	180 mm	9	2	3	5	7	9
10	Dozer	450 hp	6	2	3	6	6	6
11	Dozer with ripper	850 hp	5	1	2	3	4	5
<b>B</b>	<b>Coal</b>							
1	Diesel Hydraulic Shovel	12 Cum	1			1	1	1
2	Diesel hydraulic Shovel	4.5 Cum	3	1	2	2	3	3
3	Surface Miner	2200	4				1	4
4	Front end loader	4.5 cum	4				2	4
5	Rear Dumper	25 T	38				19	38
6	Rear Dumper	120T	10			30	10	10
7	Rear Dumper	90 T	26	3	10	18	26	26
8	Elec. Drill	250 mm	2			1	2	2
9	Diesel Drill	180 mm	3	1	2	3	3	3
10	Dozer	450 hp	3	1	1	2	3	3
11	Dozer with ripper	850 hp	3			1	3	3
<b>C</b>	<b>Common</b>							
1	Grader	280 hp	8	2	4	6	7	8
2	Hydraulic Shovel	6.5 Cum	2		1	3	2	2
3	Crane	100 T	4	1	2	3	3	4
4	Crane	30T	4		1	2	2	4
5	Crane	8 T	6	1	2	2	4	6
6	Crane	5 T	4		1	2	3	4
7	Diesel B hole	1.0 Cum	6	2	3	4	5	6
8	FE Loader	5-6 Cum	3	1	2	2	3	3

9	FE Loader	1-2 Cum	4	2	2	3	4	4
10	Diesel Drill	100 mm	4	1	1	2	4	4
11	Dumper	450 hp	4	1	2	3	3	4
12	Diesel bowser		8	3	4	5	7	8
13	Fire tender		3	1	2	3	3	3
14	Boom truck		1	0	1	1	1	1
15	Heavy duty toe truck		3	1	3	3	3	3
16	Fork lift truck	8T	3	1	1	1	1	1
17	Lite Truck		2	1	2	2	2	2
18	Tipping truck	8T	6	2	4	6	6	6
19	Vibratory compactor		4	1	2	4	4	4
20	Tyre handler		4	1	2	3	4	4
21	Mobile maintenance Van		5	1	3	5	5	5
22	Water sprinkler	25kl	10	2	4	6	8	10
0	Reclamation							
1	Grader	280 hp	2					2
2	Dumper	410 hp	2					2
3	Water sprinkler	25kl	2					2
4	Farm Truck		2					2

### 2.3.4 DISPOSAL OF WASTE

In the initial years, when sufficient void to the floor of the basal seam is not created, the OB spoil generated will be temporarily accommodated within the block area to the dip side of the working area and then re-handled back in the void to the floor of the basal seam as internal dump.

Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 60m is above quarry surface. Each tier of OB dump is of 30m height and berm width has been increased to 30m, with the result that the ultimate dump slope is 22 degrees.

Internal dump will start once sufficient void space gets available from 26th year of mine operation. This de-coaled area can be used for internal dumping. Initially overburden will

be placed at two external dump as shown in fig. 2-2 and fig. 2-3 earlier. For first four years of mine operation, OB will be accommodated in external dump only. In 5th year, majority of the OB will be dumped in external dump and only 12.28 Mcum will be accommodated in internal dump. From 8th year onward, no external dumping will be required. Hence, OB will be accommodated in internal dump for rest of the mine life.

As there is no land available for external dump, it has been envisaged to re-handle external dump back to de-coal area of the mine. Re-handling of overburden will start from 8th year of mine operation till 20th year of mine operation. About 264.52 Mcum of external dump will be required which has been planned to re-handle back to the de-coal area of the mine.

Top soil is proposed to be removed separately and dumped outside the quarry in a manner so as not to lose its fertility. The top soil would be spread over the reclaimed land, afterward.

The dumping schedule is given in table 2-3 below:

Table 2-3 Dumping schedule

Year	External dump (Mcum)		Internal dump (Mcum)		Rehandling		Total OB (Mcum)	
	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.	Annual	Cumm.
1	7.83	7.83	0.00	0.00		0.00	7.83	7.83
2	19.04	26.89	0.00	0.00		0.00	19.04	26.89
3	34.00	60.89	0.00	0.00		0.00	34.00	60.89
4	55.20	116.09	0.00	0.00		0.00	55.20	116.09
5	64.21	180.30	12.28	12.28		0.00	76.50	180.44
6	46.38	226.68	31.22	43.50		0.00	76.50	204.94
7	21.17	247.85	55.33	98.83		0.00	76.50	240.44
8	17.62	265.47	58.68	157.51		0.00	76.50	247.94
9	0.00	265.47	76.50	234.01	8.12	8.12	76.50	298.44
10	0.00	265.47	76.50	310.51	18.13	26.25	76.50	374.94
11	0.00	265.47	76.50	387.01	18.13	44.38	76.50	451.44
12	0.00	265.47	76.50	463.51	18.13	62.51	76.50	527.94
13	0.00	265.47	76.50	540.01	25.42	87.93	76.50	604.44
14	0.00	265.47	76.50	616.51	25.42	113.35	76.50	680.94
15	0.00	265.47	76.50	693.01	25.42	138.77	76.50	757.44
16	0.00	265.47	76.50	769.51	25.42	164.19	76.50	833.94
17	0.00	265.47	76.50	846.01	25.42	189.61	76.50	910.44



Year	External dump (Mcum)		Internal dump (Mcum)		Remaniting		Total DM (Mcum)	
	Annual	Current	Annual	Current	Annual	Current	Annual	Current
18	0.00	264.52	78.00	926.02	25.42	215.08	78.00	1181.54
19	0.00	264.52	78.00	1004.32	25.42	240.45	78.00	1296.89
20	0.00	264.52	78.00	1082.62	24.07	264.52	78.00	1387.14
21	0.00	264.52	78.00	1160.92		264.52	78.00	1475.44
22	0.00	264.52	78.00	1239.22		264.52	78.00	1573.74
23	0.00	264.52	78.00	1317.52		264.52	78.00	1582.04
24	0.00	264.52	78.00	1395.82		264.52	78.00	1660.34
25	0.00	264.52	78.00	1474.12		264.52	78.00	1738.64
26	0.00	264.52	78.00	1552.42		264.52	78.00	1826.94
27	0.00	264.52	80.00	1630.72		264.52	80.00	1897.04
28	0.00	264.52	80.00	1712.82		264.52	80.00	1977.34
29	0.00	264.52	80.00	1790.72		264.52	80.00	2057.24
30	0.00	264.52	80.00	1872.82		264.52	80.00	2137.34
31	0.00	264.52	80.00	1952.92		264.52	80.00	2217.44
32	0.00	264.52	80.00	2032.02		264.52	80.00	2297.54
33	0.00	264.52	80.00	2112.12		264.52	80.00	2377.64
34	0.00	264.52	80.00	2194.22		264.52	80.00	2457.74
35	0.00	264.52	80.00	2274.32		264.52	80.00	2537.84
36	0.00	264.52	80.00	2354.42		264.52	80.00	2617.94
37	0.00	264.52	80.00	2438.52		264.52	80.00	2698.04
38	0.00	264.52	87.84	2521.66		264.52	87.84	2778.14
39	0.00	264.52	87.84	2609.20		264.52	87.84	2871.72
40	0.00	264.52	87.84	2697.04		264.52	87.84	2961.56
41	0.00	264.52	87.84	2784.88		264.52	87.84	3049.40
42	0.00	264.52	87.84	2871.72		264.52	87.84	3137.24
43	0.00	264.52	87.84	2960.56		264.52	87.84	3225.08
44	0.00	264.52	87.84	3048.40		264.52	87.84	3312.92
45	0.00	264.52	87.84	3136.24		264.52	87.84	3400.76
46	0.00	264.52	87.84	3224.08		264.52	87.84	3488.60
47	0.00	264.52	87.84	3312.92		264.52	87.84	3576.44
48	0.00	264.52	73.20	3385.12		264.52	73.20	3649.84
49		264.52	40.00	3453.12		264.52	40.00	3697.84
50		264.52	32.41	3465.51		264.52	32.41	3730.05
51		264.52	25.98	3491.52		264.52	25.98	3756.03
52		264.52	21.84	3512.85		264.52	21.84	3777.07
<b>Total</b>	<b>264.52</b>		<b>8512.55</b>		<b>264.52</b>		<b>3777.07</b>	

### 2.3.5 COAL HANDLING AND OFFTAKE

Coal from the quarry will be transported over the haul road provided in the quarry batters duly connected to various coal benches through temporary ramps. Coal dumpers would move up the access trench and on the surface up to the discharge hoppers of primary crushers. Coal will be sized to (-) 200 mm in primary crushers and subsequently to (-) 50 mm size in secondary crushers. Two independent belt conveying circuits on eastern and western side of the block have been envisaged for transporting the crushed coal to the ground bunker at coal dispatch center, planned to be constructed at the south western extremity of the coal block as shown in fig. 2-4.

Suitable arrangement will be provided to draw coal from the ground bunker in to two silos from where coal will be dispatched to the power house over dedicated "Merry Go Round" system of rail network.



Figure 2-4 Surface Plan showing conveyor roads and Coal Dispatch Centre

## CHAPTER 3

### TECHNICAL FEASIBILITY STUDY

As mentioned earlier in the report, the need for this technical feasibility study for Talaspalli coal block arose due to the dispute between NTPC and its MDO M/s TEMPL regarding strip ratio in Approved Mining Plan, issue of accommodation of OB dump and unworkability of Talaspalli mine as per Approved Mining Plan.

As per the scope, the study has been done in two parts. Firstly, the opencast mining part of the approved mining plan has been reviewed with respect to Mineable Reserves, OB quantities, Average stripping ratio and Waste Disposal Planning. Secondly, an alternate feasible option for opencast mining of the Talaspalli Coal Block has been worked out to extract maximum open-castable reserves of coal from the block. Also, the coal evacuation strategy has been reviewed in light of the alternate feasible option.

#### 3.1 REVIEW OF MINING PLAN (OPENCAST MINING)

The Approved Mining Plan has been examined with respect to Stripping Ratio and waste disposal planning. The volumetric calculation is based on the MNEX model of Talaspalli Coal Block prepared by MDC. The MNEX model, Approved Mining Plan and different Stage Pits was provided by NTPC. The Review of Mining Plan has been done up to calendar year 25 since the MDO contract has been awarded for 25 years only. However, the strip ratio of the Final Stage Quarry (32<sup>nd</sup> year) provided in the Mining Plan has been determined to find out the variance in stripping ratio, if any.

As discussed earlier, the Mining plan has envisaged two entries for mining the Talaspalli Block: one on the east side of the North Eastern side and the other on the western side



of the property. It is mentioned in the Mining Plan that both the eastern and western quarry will advance independently and they will merge after about 30 years of mine operation. However, the Mining Plan contains only Final Stage Plans alongwith 1<sup>st</sup> to 5<sup>th</sup> year stage plans. The 25<sup>th</sup> year stage pit has not been provided in the Mining Plan for analysing the volumetric.

Therefore, the 25<sup>th</sup> year Pit has been provided by NTFC based on the identified sequence of operation and 25-year calendar schedule in approved Mining Plan, for like to like comparison of Reserves and Strip Ratio. The 25<sup>th</sup> year stage pit is shown below in fig. no. 3-1



Figure 3-1: 25th Year Stage Pit provided by NTFC

### 3.1.1 RESERVES, OB VOLUME AND STRIPPING RATIO

The Mineable Reserve, OB volume and Average Stripping Ratio for the Talapalli Block has been determined for Year 5, Year 25 and Year 52 (life of the mine) based on the stage pit boundaries provided in the Mining Plan or Stage Pits provided by NTPC. The details are given in table 3-1 below:

Table 3-1 Comparison of Mineable Reserve, OB volume and Stripping Ratio

Year	As per Approved Mining Plan (AMP)			As per CMPDI based on AMP design		
	Coal (Mte)	OB (Mcum)	Stripping Ratio (cum/te)	Coal (Mte)	OB (Mcum)	Stripping Ratio (cum/te)
5	44.50	192.44	4.32	36.08	165.07	4.58
25	404.5	1798.64	4.30	420.50	1868.68	5.04*
52 (Final)	843.69	3777.07	4.48	790.81	4008.5	5.07*

\*Not Workable according to design of Approved Mining Plan as discussed later

The average stripping ratio to produce ~404.5 Mte of coal in 25 years is ~4.30 cum/te as per Mining Plan whereas examination of the Pit boundaries and designs obtained from NTPC to deliver ~404.5 Mte of coal indicates that the average strip ratio is ~5 cum/te (five). The variance in strip ratio is around 16-17%.

According to the Mining Plan, the total Mineable Coal is 843.69 Mte and the total OB volume is 3777.07 Mcum with average strip ratio of 4.48 cum/te. However, analysis of the design of the final stage pit in the Mining Plan and volumetric calculation using MINEX model provided by NTPC suggest that the total mineable coal estimated in the final stage pit is 790.81 Mte and OB volume is estimated to be 4008.50 Mcum. This gives an average strip ratio of 5.07 cum/te which is ~13% more than what is indicated in the Mining Plan.

### 3.3.2 WASTE DISPOSAL PLANNING AND AVAILABILITY OF LAND

As per the Mining Plan, about 264.52 Mcum of OB is likely to be accommodated in the temporary external dump and has been planned to be re-handled back to the de-coaled area of the mine. The temporary external dump is 60m above the ground level with maximum RL of +300m. A particular area in the dip side within the block has been designated for temporary external dump.

Upon examining the design in Mining Plan, it is understood that the maximum OB that can be accommodated in the proposed temporary external dump is ~178 Mcum assuming the swell factor to be 1.2. Therefore, 264.52 Mcum of OB cannot be accommodated in the temporary external dump as envisaged in the Mining Plan.

Further, it has been envisaged in the Mining Plan that the internal dump will start in the 5<sup>th</sup> year of mine operation and from 9<sup>th</sup> year of mine operation sufficient void space will be created such that re-handling of temporary external dump along with yearly OB removed will be accommodated in the generated internal void. The temporary dump has been envisaged to be re-handled till 20<sup>th</sup> year of mine operation.

Upon perusal of the stage pit and sequence of mining in the Mining Plan, it is estimated that to deliver 44.30 Mtpa of coal in 5 years, total OB removed will be around ~204 Mcum rather than 192.44 Mcum given in the Mining Plan. The strip ratio works out to be ~4.58 cum/ta rather than 4.32 cum/ta in the Mining Plan. Further, it has been estimated that at the end of 5<sup>th</sup> year of mine operation, the total internal dump capacity created in the void is ~11 Mcum.

Table 3.2: Estimated OB generated and OB accommodation in designated dump at the end of 5<sup>th</sup> year

Year	Estimated OB (Mcum)	Total OB accommodated (Mcum)			Remarks
		External	Internal	Total	
5	204	178	11	189	Shortage of space for ~15 Mcum of OB

Thus, the total OB accommodation in external and internal dump is estimated to be ~189 Mcum (178 Mcum+ 11 Mcum) at the end of 5<sup>th</sup> year while the total OB estimated to be generated is ~204 Mcum.

This suggests that if the mining sequence and dumping location for temporary external dump identified in the Mining Plan is strictly adhered to, it will effectuate cessation of the opencast mining operation in 5<sup>th</sup> year due to inadequate dumping space and mine will not be able to progress thereafter.

Even when the temporary external dump height is increased to 90m above the ground level upto a RL of +390m, the maximum OB accommodation in external dump would be ~251 Mcum. In 6<sup>th</sup> year stage, total OB generated would be ~285 Mcum and total OB accommodation in internal dump would be ~25 Mcum. So, the mine operation will stop in 6<sup>th</sup> year, even if the height of the dump is increased.

To ensure progression of the mine beyond 5<sup>th</sup> year, a scenario has been evaluated considering the entire land within the lease area is available for dumping and thus external dumping shall be done in the southern extremities of the block.

As per the Mining Sequence followed in the Mining Plan, it is estimated that at the end of 25<sup>th</sup> year, total OB volume generated would be ~2040 Mcum to deliver 604.5 Mtpa of coal. The total internal dumping space created would accommodate ~1175 Mcum (upto RL of +360m) of OB while the Mining Plan envisages backfill of total OB generated (1738.64 Mcum) till 25<sup>th</sup> year by re-handling the temporary external dump. Evidently, the accommodation of total OB internally is not feasible and so re-handling of OB is not

possible. As it happens, the total external dump space beyond the pit boundary of 25<sup>th</sup> year is ~175 Mcum upto an RL of +360m. Therefore, even after utilizing the entire land available for external dump, the total dump accommodation in 25<sup>th</sup> year would be 1390 Mcum [External+Internal] while the total OB generated would be ~2040 Mcum. It is clear that there is no space for dumping available for ~690 Mcum of OB.

Stage-wise generation of OB and availability of dumping space (upto RL of +360m), considering the entire land within the block is available for dumping, for 5<sup>th</sup>, 10<sup>th</sup> and 15<sup>th</sup> year has been determined. The details are given below in table 3-3.

Table 3-3: Stage-wise estimated OB generated and space available for OB accommodation

Year	Coal (Mte)	Estimated OB (Mcum)	Total Dump accommodation upto RL of +360m (Mcum)			Remarks
			External	Internal	Total	
5	44.10	204	688	11	689	Dumping space adequate
10	134.50	675	544	200	753	Dumping space adequate
15	224.50	1360	403	507	930	Dumping space inadequate

It is evident from the above table that mining operation will come to a halt between 10<sup>th</sup> and 15<sup>th</sup> year due to non-availability of sufficient dumping space for OB. Even when the External Dump height is increased to 120m above ground level (4 deck) upto a RL of +350m, the total OB accommodation in external and internal dump will increase to only ~1070 Mcum, thus forcing the mine operation to discontinue in 14<sup>th</sup> year.

Therefore, the examination of the Mining Plan has led to the conclusion that overall, this Mining Plan does not seem to be practical and workable. Mineable coal and mining life given in mining plan is not feasible. Also dump accommodation as suggested in mining plan is not feasible. There is calculation error in stripping ratio as well.

### 3.2 ALTERNATE FEASIBLE OPTION

One of the scope of the work is to provide an alternate feasible option for opencast mining if the Mining Plan is found to be impractical. It is understood from the above that mine operation in accordance with the two entry scenario and mining sequence in Approved Mining Plan is not feasible in the Talaspalli Block since opencast mining cannot progress beyond 5<sup>th</sup> year. It is also apparent that even when the entire land within the block is made available for external dumping and height of external dump within the block is increased to 120m above ground level, mine operation cannot continue beyond 14<sup>th</sup> year.

Taking into consideration the dumping constraint due to inadequate dumping space, an alternate feasible opencast mining strategy has been designed to extract maximum coal from opencast mining. Also, the mining sequence has been determined to minimize the strip ratio. A tentative calendar programme, DB disposal schedule and lead for OB/Coal has also been worked out. Schematic stage plans at an interval of 5 year has been provided in the report. Additionally, due to change in pit design and mining sequence, an alternate coal evacuation/handling strategy has been suggested.

#### 3.2.1 OPENCAST MINING STRATEGY

Opencast mining for the Talaspalli coal block has been proposed upto Seam II as suggested in the mining plan to maximize the recovery of coal. It has been proposed to mine maximum area in the block with due consideration to space required within the block for external dumping. The rated capacity for the block is proposed to be 18.00 Mtpa.

Similar to Approved Mining Plan, a two-entry scenario has been envisaged: one on the north eastern side and the other on the western side. However, due to lack of adequate dumping space, the western quarry is proposed to stop after 5<sup>th</sup> years of operation and





only eastern quarry will continue thereafter. This will optimize the mineable coal and increase the life of the mine thereby conserving coal.

### 3.2.1.1 MINE BOUNDARY

The mine boundary for the western and eastern quarry has been delineated taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

#### WEST PIT

The west pit has been proposed upto Seam VI and will operate for 5 year only. This is due to the fact that backfilling of western pit would be required after 5 years to create adequate dumping space for the subsequent year's OB to be dumped. Also, the pit is designed upto VII i.e. 110m depth as there is lack of space for the pit to go upto Seam 81 in 5 years which is at a depth of ~250m. The pit boundaries for the western pit is given below:

**Northern Boundary** : Foot of the hill in northwest and 7.5m from the block boundary

**Southern Boundary** : Extent of the pit upto 5 year of operation

**Eastern Boundary** : 7.5m from the block and extent of the pit upto 5 year of operation

**Western Boundary** : 7.5m from the block boundary

### **EAST PIT**

The East pit has been proposed upto Seam III. The major considerations for delineation of Eastern Pit boundary are strip ratio minimization and requirement of external dump space within the block. The pit boundaries for the eastern pit is given below:

**Northern Boundary** : 7.5m from the block boundary

**Southern Boundary** : 100m from the block for conveyor corridor and magazine

**Eastern Boundary** : 60m from Kalo rover and 7.5m from block boundary

**Western Boundary** : Fault F1 and an arbitrary line considering low strip ratio zone and leaving sufficient external dump space in the western side

### **3.2.1.3 MINEABLE RESERVE**

For furnishing account of reserves, Net Geological Reserve has been arrived by taking geological loss of 10 % from Gross Geological Reserve. Mining loss of 5 % has been taken to arrive at the open-castable mineable reserves.

Total open-castable mineable reserve has been estimated as 411.66 Mte at a strip ratio of 4.62 cum/te. Tentative Reserve assessment for opencast mining is given below in table 3-4.



Table 3.4: Mineable reserve assessment for Opencast Mining

Particulars	Value in Mte
Net Geological Reserve as per GR	1267.13
Open-castable Net Geological Reserve	575.78
Net Geological Reserve blocked in better	142.43
<b>Available Net Geological Reserve for Opencast Mining</b>	<b>433.33</b>
Less: Mining Loss@ 5%	21.67
<b>Mineable Reserve for Opencast Mining</b>	<b>411.66</b>

Seam-wise mineable reserve for opencast mining is furnished below in table 3.5:

Table 3.5: Seam-wise Mineable Reserve

Seams	Net Geological Reserve (Mte)	Mineable Reserve (Mte)
X-1A	0.00	0.00
X-1B	0.20	0.19
X-TOP	2.71	2.59
X-BOT	23.95	23.75
OK-1	7.95	7.55
OK-2	33.09	31.59
IX	40.46	38.44
VIII	51.58	49.30
VII	2.17	2.06
VI-TOP	10.28	9.77
VI-MID	47.34	45.38
VI-BOT	1.42	1.35
V-TOP	3.23	3.12
V-MID	22.80	22.18
V-BOT	13.27	12.76
IV-TOP	38.75	36.44
IV-MID	57.85	54.96
IV-B	14.10	13.43
IV-BOT	17.11	16.33
III	11.34	10.77
II	26.91	25.56
<b>TOTAL</b>	<b>433.33</b>	<b>411.66</b>

### 3.2.1.3 PRODUCTION TARGET AND LIFE OF PROJECT

Considering the Pit geometry and total thickness of coal in the block, the production target has been kept same as 18.00 Mtpy proposed in the Mining Plan.

For the rated capacity of 18.00 Mtpy and considering the mineable reserve of 411.55 ktpa, the production life of Talaspalli mine is estimated to be 28 years.

### 3.2.1.4 MINING SEQUENCE AND SCHEDULE

The mining operation in Talaspalli block has been envisaged to be done through two entries. One entry will be in the north eastern side and other entry will be in the western side. As the physical possession of land is taken, equipment will be deployed to drive two access trench on either side to reach the bottommost seam and then this two pit viz. West Pit and East Pit will advance towards the dip side.

The west pit is proposed upto Seam VII and once the base seam is reached in 4<sup>th</sup> year of operation, it will advance towards the dip. The west pit is proposed only for 5 years since operating the west pit further beyond 5 years will lead to inadequate dumping space for external dump and thus it will become an impediment to continuity in coal production. The west pit will be utilised for backfilling OB from eastern pit after 5 years.

The east pit is proposed upto Seam III and is the main pit which will operate till end of the life. During 5<sup>th</sup> year of operation, coal production from both the pit will reach 18.00 Mtpy. After 5 years, the east pit will independently produce 18.00 Mtpy till 25<sup>th</sup> year of mine operation.

Internal dump will start once sufficient void is created in the pit. It has been proposed to start internal dumping in east pit from 6<sup>th</sup> year of mine operation. The external dump is



proposed to be done on the western side of the east pit and western external dump shall be merged with internal dump of the east pit after 10<sup>th</sup> year.

The mine parameters for the east and west pit is given below in table 3-6:

Table 3-6: Mine Parameters

Sl. No.	Parameters	Unit	Value	
			East Pit	West Pit
1	Maximum depth	M	350	110
2	Maximum strike length: along the Mine Floor	Km	3.60	1.10
	along the Mine Surface	Km	4.20	1.40
3	Minimum strike length: along the Mine Floor	Km	2.25	0.90
	along the Mine Surface	Km	2.90	1.05
4	Maximum dip rise length: on the Mine Floor	Km	2.40	0.30
	on the Mine Surface	Km	3.20	0.35
5	Minimum dip rise length: on the Mine Floor	Km	2.10	0.40
	on the Mine Surface	Km	3.10	0.83
6	Area: On the Mine Floor	ha	779.76	43.41
	On the Mine Surface	ha	1171.43	111.03

The calendar plan of mining operations has been formulated based on the adopted sequence of opencast minefield development, optimum conditions of mining operations for the entire life of the planned opencast mine.

The target capacity of 38.00 Mtpa of ROM coal has been proposed to be achieved in the 5<sup>th</sup> year of mine opening. The peak volume of OB excavation is 31.08 Mcum per annum. The production schedule is given in table 3-7 below:

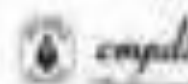


Table 3.7: Tentative Production Schedule

Year	Coal (Mtpa)			Cumm. Coal (Mtpa)	O <sub>2</sub> (Mtpm)			Cumm. O <sub>2</sub> (Mtpm)	Strip Ratio (Cum/tpa)	Cumm. SR (cum/tpa)
	East Ph	West Ph	Total		East Ph	West Ph	Total			
1	0.90	3.60	4.50	4.50	4.17	4.14	7.36	7.36	4.94	4.94
2	2.00	2.00	4.00	8.50	9.17	10.47	20.62	28.02	4.91	4.99
3	4.00	4.00	8.00	12.50	13.33	20.93	34.26	66.34	4.93	4.90
4	3.00	4.00	7.00	20.50	40.24	20.93	62.17	128.21	4.76	4.94
5	14.35	3.65	18.00	44.50	46.52	23.21	85.69	213.96	4.76	4.91
6	10.00		10.00	62.50	61.08		81.08	301.01	5.06	4.99
7	10.00		10.00	80.50	61.08		81.28	386.11	5.28	4.91
8	10.00		10.00	98.50	61.08		81.28	467.15	5.08	4.91
9	10.00		10.00	116.50	61.08		81.28	548.28	5.08	4.96
10	10.00		10.00	134.50	66.69		86.69	634.97	4.91	4.96
11	10.00		10.00	152.50	61.08		81.28	716.04	4.91	4.91
12	10.00		10.00	170.50	61.08		81.28	797.13	4.91	4.96
13	10.00		10.00	188.50	61.08		81.28	878.23	4.91	4.91
14	10.00		10.00	206.50	61.08		81.28	959.32	4.91	4.96
15	10.00		10.00	224.50	76.67		76.67	1040.00	4.91	4.91
16	10.00		10.00	242.50	71.00		71.00	1121.00	4.28	4.91
17	10.00		10.00	260.50	71.00		71.00	1202.00	4.28	4.96
18	10.00		10.00	278.50	71.00		71.00	1283.00	4.28	4.91
19	10.00		10.00	296.50	71.00		71.00	1364.00	4.28	4.96
20	10.00		10.00	314.50	86.25		86.25	1445.25	4.96	4.94
21	10.00		10.00	332.50	86.96		86.96	1526.24	4.96	4.91
22	10.00		10.00	350.50	86.96		86.96	1607.20	4.96	4.91
23	10.00		10.00	368.50	86.96		86.96	1688.16	4.96	4.91
24	10.00		10.00	386.50	86.96		86.96	1769.12	4.96	4.91
25	10.00		10.00	404.50	86.96		86.96	1850.08	4.96	4.96
26	7.16		7.16	411.66	22.73		22.73	1894.81	4.97	4.96
<b>Total</b>	<b>997.01</b>	<b>14.25</b>	<b>411.66</b>		<b>335.27</b>	<b>74.97</b>	<b>1894.81</b>		<b>4.98</b>	

### 3.2.1.5 MINING SYSTEM AND SYSTEM PARAMETERS

Elements of mining system have been determined in accordance with the parameters of excavation, transport equipment and parameters of drilling and blasting. However, the space constraint for dumping the OB has been the most important factor taken into consideration for designing the mining system, since the mining system plays an important role for determining the void created for internal dump.

With due consideration to geo-mining characteristics of the deposit and as envisaged in the Mining Plan, the mine is proposed to be worked by shovel-dumper combination as well as Surface Miner.

Design of mining system has been done considering safety guidelines of Directorate General of Mines Safety (DGMS). However, during mine operations, the safety rules, regulations and various circulars issued by DGMS should be strictly followed and adhered to.

The height of the shovel-benches in OB varies from inter-burden thickness to 10-12m. The width of the working benches has been considered as 40m and the width of non-working benches has been considered as 25m. Considering the flat dip ( $4^{\circ}$ - $8^{\circ}$ ) of the seams, it is proposed to excavate the OB from advancing benches by inclined layers parallel to seam floor. This eliminates the need to cut new horizons from the slope of seam roof and simplifies water drainage from the benches to central sump.

The slope of each bench is proposed as  $70^{\circ}$ . But the overall mining slope in working faces will be around  $20^{\circ}$ . The ultimate pit slope is varies between 33 deg to 42 deg.

Persistent bands of thickness more than 1 m present in coal seams are proposed to be mined separately.



Bench height of OB dumps formed by Drawl-Dumper system will be 30m and slope of individual dump benches will be 37° (equal to angle of natural repose of OB material). Width of berm between two adjacent benches will be 30 m.

Proposed System Parameters are tabulated and given below in table 3-8.

Table 3-8: System Parameters

Sl. No.	Particulars	Unit	Pit	Dump
1	Bench height	m	10-12	30
2	Working bench width	m	40	30
3	Nonworking bench width	m	25	30
4	Bench slope	Deg.	70	37

Above mentioned system parameters are indicative in nature. Referring to Regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020, it is imperative on part of the owner to carry out slope stability study to determine acceptable system parameters i.e. overall slopes of permanent dump and pit walls.

### 3.2.1.6 COAL AND OB TRANSPORTATION

OB will be transported through flank roads in both the pit to external OB dumps and internal OB dumps.

Coal in both the pit is proposed to be transported through ramps and flank roads. Coal from east pit will be transported to mobile crushing arrangement at the surface and thereafter to Coal dispatch center by surface conveyors. Coal from west pit shall be directly transported to coal dispatch center through trucks since the pit is proposed to be operated only for 5 years and providing conveyor for surface transport will make it redundant after 5 years.

The lead for OB shall vary from about 3.00-7.25 km over the life of the mine. For West Pit, the average lead for external dumping vary from 3.25-3.75 km. For East Pit, the average lead for internal dumping vary from 3.00-3.50 km while the average lead for external dumping vary from 6.75-7.25 km in initial 10 years and thereafter it vary from 6.00-6.50 km for next 5 years. The lead for external dumping after 15<sup>th</sup> year will be same as lead for internal dumping.

The lead for coal vary from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal vary from 4.50-5.00 km. For East Pit, the average lead for coal vary from 2.50-4.00 km.

The lead estimation is tentative and may be estimated each year in the yearly operation plan.

### 3.2.2 WASTE DISPOSAL STRATEGY

It is envisaged that initially for 5 years, all the OB generated will be dumped externally. The external dump is proposed to be isolated in the western side of the west pit leaving 100m distance from east pit boundary. Once sufficient void is created after 5 years of operation, internal dumping will start and some OB will be dumped in the de-coaled area.

Initially the OB from both the east and west pit will be dumped externally as shown in the 5<sup>th</sup> year stage plan. However, after 5 years, the west pit will cease to operate and thereafter it will be backfilled with the OB generated by the east pit. This is necessary to create adequate dumping space for continuity of mine operation.

The external dumping will continue till 15<sup>th</sup> year and thereafter only tiny amount of OB of around ~1 Mcum per year will be dumped externally in the region between external dump toe and east pit boundary.

The Approved Mining Plan has proposed re-handling of OB back into the void but there is no space within the pit for re-handling and so re-handling has not been envisaged.

Out of the total OB of 1894.85 Mcum, it is estimated that 510.05 Mcum (~27%) will be required to be dumped externally and rest 1384.80 Mcum (~73%) will be dumped internally. The final height of the external dump is proposed to be around 120m above ground level upto an RL of +410m and final height of the internal dump is around 90m above ground level upto an RL of +375m. This will ensure optimization of the life of the mine to extract maximum recoverable coal. However, a slope stability study will be imperative to determine final dump height and final dump slope as per regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2020.

Shovel-dumper spoil dumps will be formed in benches of 30m and slope of individual dump bench will be 37° (equal to angle of natural repose of OB material). The width of berm between two adjacent benches will be 30 m. Overall slope of dump works out to be 22°-24°. Top soil wherever available will be stacked separately which will be used up for spreading over the completed OB dumps. For the formation of dumps and leveling of dumps, dozers will be used.

During mining operation, OB dump stability, high-wall slope stability for OB bench parameters, and maximum OB dump height should be adopted and modified as per the scientific study and DGMS permission.

Final stage dump plan, as well as stage plans also show the location of external/internal dumps showing RL as well as volume of dump.

The year wise dumping schedule is provided in table 3-0 below:

Table 3-0: Timewise Dump Schedule

Year	External Dump		Internal Dump		Total OB	
	Annual	Cummulative	Annual	Cummulative	Annual	Cummulative
1	7.26	7.26	0.00	0.00	7.26	7.26
2	19.63	26.89	0.00	0.00	19.63	26.89
3	39.26	66.15	0.00	0.00	39.26	66.15
4	62.17	128.32	0.00	0.00	62.17	128.32
5	85.48	213.80	0.00	0.00	85.48	213.80
6	34.21	248.01	56.87	56.87	91.08	305.01



Year	External Dump		Internal Dump		Total OD	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
7	38.21	382.38	56.87	113.73	95.08	496.11
8	38.21	316.59	56.87	170.60	95.08	487.19
9	38.21	250.80	56.87	227.48	95.08	578.26
10	38.21	385.01	56.87	284.35	95.08	669.34
11	22.40	407.41	56.70	340.63	81.10	748.04
12	22.40	429.81	56.70	396.91	81.10	839.14
13	22.40	452.21	56.70	453.20	81.10	930.23
14	22.40	474.61	56.70	509.47	81.10	991.32
15	22.40	497.01	56.27	571.98	78.67	1076.80
16	1.63	498.64	75.82	648.58	77.00	1147.80
17	1.63	500.27	75.40	723.98	77.00	1224.81
18	1.63	501.91	75.40	799.38	77.00	1301.81
19	1.63	503.54	75.40	874.61	77.00	1378.82
20	1.63	505.17	76.34	953.25	80.36	1458.36
21	8.84	506.85	80.34	1033.20	80.88	1539.24
22	8.84	508.69	80.34	1113.55	80.88	1620.12
23	8.84	507.53	80.34	1193.87	80.88	1700.90
24	8.84	508.37	80.34	1274.21	80.88	1781.78
25	8.84	509.21	80.34	1354.45	80.88	1862.66
26	8.84	510.05	11.33	1364.80	52.19	1894.85

### 3.3 CDAL HANDLING AND DISPATCH ARRANGEMENT

The mine is proposed to work through two quarries: East Pit and West pit. Talaspalli mine is planned for the production of 18.0 Mtpa of ROM coal from mine. As proposed in the Approved Mining Plan, coal will be produced through shovel dumper and surface miner (100 mm size). Therefore, crushing of coal will also be required for handling and dispatch. Total coal produced from Talaspalli Project will be loaded into railway wagon at nearby new proposed railway siding through silo and BLS for final dispatch. A railway siding has been proposed in the south-western part of the block for coal loading and dispatch.

Coal handling plant is proposed to cater entire production of coal from OCP and accordingly facilities of receiving, required crushing system, conveying, reclamation of coal from stockpile with conveying through belt conveyors to silo and loading into rail wagon through rapid load out system.

#### **EASTERN QUARRY:**

The proposed coal handling system includes receiving of ROM coal at surface. ROM coal from eastern quarry will be transported at surface through dumpers/trucks which will be received in receiving hoppers for conveying of coal through belt conveyors.

Suitable receiving arrangement for coal produced through shovel/dumper /surface miner (-100 mm size) in Truck receiving station has been proposed for receiving of these coal at surface near the quarry mouth of the mine. These receiving arrangement for coal have been proposed near mine quarry mouth to minimize the truck/dumper movements. The receiving pit/ station may be shifted as per the mine advancement and requirement during mine operation.

At this stage, truck receiving hoppers are considered, however, suitable alternative receiving arrangement either through Reclaim feeder/ Over feeder/Truck receiving station may also be considered at later stage according to mine condition and space availability at receiving pits.

ROM blasted coal produced and transported through dumper shall also be received at surface in receiving hopper of crusher. These coal will be crushed up to (-) 100 mm size with suitable capacity of crushers/ coars and it will also be fed to conveyors for further transportation through belt conveyors.

The above proposed receiving and crushing station have been proposed for eastern quarry and at the southern side of the mine at a suitable location. It shall be shifted as per the mine advancement of eastern quarry. The location plan shown for receiving/

crushing stations and other system of coal handling in Stage Plans are tentative and it may change as per requirement.

Coal from receiving station and crushers shall be conveyed through suitable capacity belt conveyors at surface through series of conveyors. Further this coal will be conveyed and stored into stockpile through stacker conveyors. The stockpile may be placed near proposed silo in the space provided for infrastructures.

#### **Western quarry:**

Coal produced from western quarry shall be transported by truck/ dumpers at surface and received in a hopper of crusher for crushing coal up to (-)100 mm size. This crushing station for coal will be placed at a suitable location near proposed stockpile for Silo loading arrangement. This crushed coal shall also be reclaimed into suitable capacity belt conveyor and fed to proposed stockpile. The life of this quarry is about five years only as such coal crushing and handling/ conveying set up may be provided accordingly.

#### **Loading & Despatch:**

Coal from stockpile will be reclaimed through suitable capacity feeders/reclaimers and fed to proposed silos through suitable capacity of belt conveyors. The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading silo. Two nos. silo will be placed on two different rail lines of proposed railway siding for loading of coal into railway wagons. Both the silos are connected with the bridge conveyors for feeding of coal into silos to ensure feasibility in loading.

## CHAPTER 4

### CONCLUSION AND RECOMMENDATIONS

#### 4.1 KEY FINDINGS AND RECOMMENDATIONS

In light of the review of the Approved Mining Plan and technical feasibility study done in the earlier chapter, some of the key findings are summarized below:

- The mine operation as per Approved Mining Plan is not feasible and if executed, will cease to operate in 5<sup>th</sup> year and beyond. This is because of the fact that designated dumping space in the Mining Plan for temporary external dump is not adequate and there would be no space left for dumping OB in 5<sup>th</sup> year of operation.
- It is also evident that even if the entire land within the lease area is made available for dumping and external dump height is increased to 120m above ground level as opposed to 60m in the Mining Plan, the mine will still not able to operate beyond 14<sup>th</sup> year when the mining sequence of the Approved Mining Plan is followed.
- The mineable reserve for opencast mining as per Approved Mining Plan is 343.68 Mts at an average strip ratio of 4.43 cum/te for a life of 52 years. This mine cannot operate for 52 years attributable to the lack of land available within the block for accommodating OB. Also, while examining the pit design of the Mining Plan, it was found that the total mineable coal with opencast mining would be ~790.80 Mts at an average strip ratio of ~5.07 cum/te, assuming there is no dumping space constraint and the mine operation is feasible for the entire projectized area in the Mining Plan.



- The Approved Mining Plan envisages total coal production of 404.50 Mts of coal at an average strip ratio of 4.30 cum/te for first 25 years, which is the contract period of MOG appointed by NTPC. Although mining till 25<sup>th</sup> year as per design of Mining Plan is impractical, the average strip ratio to deliver 404.50 Mts of coal in accordance with the sequence of the Mining Plan would be around ~5.04 cum/te assuming there is no dumping space constraint and mine operation is feasible till 25<sup>th</sup> year.
- A feasible option has been prepared after detailed analysis of the geo-mining parameters of the block and it has been ascertained that the total mineable coal from opencast mining would be around ~411.65 Mts at an average strip ratio of 4.60 cum/te as opposed to 341.64 Mts at an average strip ratio of 4.48 cum/te given in the Mining Plan. This is due to inadequate space available within the block for accommodation of OB. Additionally, the life of the mine would be around 26 years as opposed to 52 years in the Mining Plan.
- Pit boundary, mining sequence, external dump location and final height of the external dump is proposed to be changed to ensure continuity of mine operation and to extract maximum coal from opencast mining.
- Mine system parameters is proposed to be modified to ensure optimization of dump generation and creation of void. The change in bench parameters would necessitate review of equipment configuration proposed in the Approved Mining Plan.
- Two pit operation has been envisaged for 3 years and thereafter only west pit can continue since continuance of west pit will become a hindrance to coal production in subsequent years due to inadequate dumping space.





- Re-handling of OS has not been envisaged as there is no space within the pit for accommodating re-handled external dump.
- Since the west pit will operate only for 5 years, it is prudent to use conveyor transport only for east pit and coal from west pit (~14.25 Mtpa) shall be directly transported to the coal dispatch centre through trucks for 5 years.
- The lead for OS shall vary from about 1.00 - 2.25 km and the lead for coal vary from about 2.50 - 5.00 km over the life of the mine. The lead may be estimated each year in the year-wise operation plan.

In view of the above findings, it is evident that the current Mining Plan appears to be impractical. Therefore it is imminent to modify the Mining Plan and get the competent approval considering the proposed alternate feasible option since all the crucial parameters viz. opencast-able mineable reserves, strip ratio, opencast mine boundary, calendar programme of excavation, opencast mine life, dumping location and dump schedule, lead distance, system parameters etc. would significantly change from the Approved Mining Plan.



## ANNEXURES

## ANNEXURE 4: Letter from NTPC requesting CMPDI to be Independent Consultant



Ref No: NTPC/CM/2021/0000040

01.08.2021

 To  
 Sh. A K Saha  
 Director (Technical)  
 Planning & Design,  
 CMPDI,  
 Khatia Road,  
 Ranchi.

Sub: Consultancy for review of Mining Plan of Talaspali Coal Block as Independent Consultant.

Dear Sir,

Talaspali coal block, located in West Singhbhum district, Chhattisgarh, was initially allocated by Ministry of Coal on 25.01.2008. At the time of allotment, the block was reportedly explored. NTPC engaged MS, MCO to detailed exploration and preparation of Geological Report (GR) on 14.07.2008. Upon completion of about 100 boreholes (26000 to 75 m, of drilling in about 20 sq km block area, GR was finalized on 20.08.2008.

After receipt of the GR, NTPC appointed Anandee Coal Management & Marketing Pvt. Ltd (ACMM) as consultant for preparation of Mining Plan on 24.08.2008. Mining Plan prepared by ACMM was approved by Ministry of Coal for a rated capacity of 16.88 MTPA on 31.03.2010. Subsequently, all necessary clearances were obtained on the basis of the approved Mining Plan.

Key features of approved Mining Plan are given in table:

Sr	Mineral Reserves (MMT)	Overburden (M Cum.)	Stripping Ratio (Cum: T)	Life of the Mine (Yrs)
1	641.08	2171.37	3.40	21
2	424.32	1740.99	4.10	20

Subsequent to the cancellation of allotment of Talaspali coal block (as a part of new CR issued by Hon'ble Supreme Court of India on Sep. 14, the block was re-allocated to NTPC on 08.03.2016.

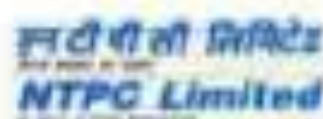
NTPC appointed MS. Thruval Earthmover Private Limited (TEMP) as Mine Development-Contractor (MDC) on 26.08.2020 for development and operation of Talaspali Coal Block. During the contract period TEMP has to extract 424.32 Million tonnes of coal at an average intensive Stripping Ratio of 4.30 Cum: T for 20 years including re-handling of 264 M Cum. of CR dumped in numerous external dump.

TEMP, after the period of contract, through various correspondence and in meetings, claimed that as per their calculations 424 MMt of coal can't be extracted at a stripping ratio of 4.30 Cum: T as specified in the approved Mining Plan. As per their estimation by various pit designs, stripping ratio is varying between 4.00 to 5.25 Cum: T. Further, TEMP, claims that excess CR generated cannot be accommodated in the designated dump as per the approved Mining Plan and 100% of backfilling of CR is also necessary. TEMP, also stated that use of operations is not feasible at the stripping ratio and mine operations would become stranded after 5 years of operations if they follow the approved Mining Plan.

(Signature)

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NTPC had a series of discussions with TEMPL for the past 3 months and every time, it was communicated to them to start the mining operations as per the approved Mining Plan. It was also specified to them that Mining Plan may be revised after 3 years of operations, after obtaining sufficient additional information.

In the meantime, when discussions with TEMPL were under progress for finding feasible solution, in contrary, M/s TEMPL, chose to proceed the Project Agreement through their writs dated 04.05.2021 and filed a Commercial Civil Suit before Hon'ble Delhi Court. When the writs were for hearing on 10.05.2021 before Hon'ble Delhi Court, counsel of TEMPL, sought the information of NTPC's earlier approach to CMPDC, into the notice of Hon'ble Delhi High Court. Accordingly, Hon'ble Delhi High Court in order dated 21.05.2021 has made the following observation:

"C. Mr. Manoj Khosla, learned senior counsel for the plaintiff submits that the plaintiff's complaint has been referred to Central Mine Planning and Design Institute Limited (CMPDC) and the report of the said authority would be relevant for settlement. Mr. Tulika Mittal, learned Senior Counsel submits that he shall verify the agreements made by the plaintiff and communicate the same to the plaintiff."

Subsequently, as per the direction of Delhi High Court, Mutual Discussions for amicable resolution of the issue were held between NTPC and TEMPL on 14.05.2021 and 21.05.2021 and where in TEMPL, requested for appointment of Independent Expert for review of the Mining plan of Talaspalli coal mining project.

In the meantime, NTPC, in a meeting with Secretary, Ministry of Coal held on 10.05.2021 and with the Ministerial Authority & Addl. Secretary, Ministry of Coal held on 03.05.2021 apprised about the issue reported as regarding approved Mining Plan of Talaspalli mine.

M/s TEMPL, vide writs dated 21.05.2021, submitted its consent to NTPC for appointment of CMPDC as an Independent Consultant for reviewer in the above respects related to the approved Mining Plan and also requested for sharing of the cost of the assignment/fee of CMPDC, equally with NTPC.

Since, CMPDC, is the premier Government organization in the field of mining plan & design in India, and also as per the observation made by Hon'ble Delhi Court, we, on behalf of both NTPC Ltd. and Talaspalli Earthmovers Private Ltd, hereby request you to take up this consultancy assignment as an Independent Consultant for detailed study and for amicable resolution of the issues. Cost of the assignment/fee of CMPDC, in this regard, shall be equally shared by NTPC and TEMPL.

In this regard, a brief scope of work is placed below:

- i) Review of the Mining Plan of Talaspalli coal mining project for both 20 years and the life of mine (22 years) with emphasis on calendar plan of production (Coal & Ore, mining rate), mining schedule on pit, material and re-handling, feasibility of two pit system, etc.
- ii) Review of submissions/ writings / schemes being indicated by M/s TEMPL.
- iii) Yearly strip plans for the first 20 years clearly showing positions of the pit, external banks, and re-pit/pond/dump.
- iv) If any discrepancies/irregularity is approved mining plan, at that time alternate feasible solution may be provided along with the design parameters used and assumptions made therein.

*(Signature)*

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NTPC Limited

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- ii. A detailed report to be submitted indicating the findings of the review work covering all the points above.

You are requested to kindly take up this consultancy assignment on urgent basis. Cost of the assignment/fee of CMPTI shall be taken care of separately. In this regard, we would also like to inform you that the next date of hearing in the Delhi High Court is scheduled to be held on 27/12/2021.

Thanking you

Yours faithfully,

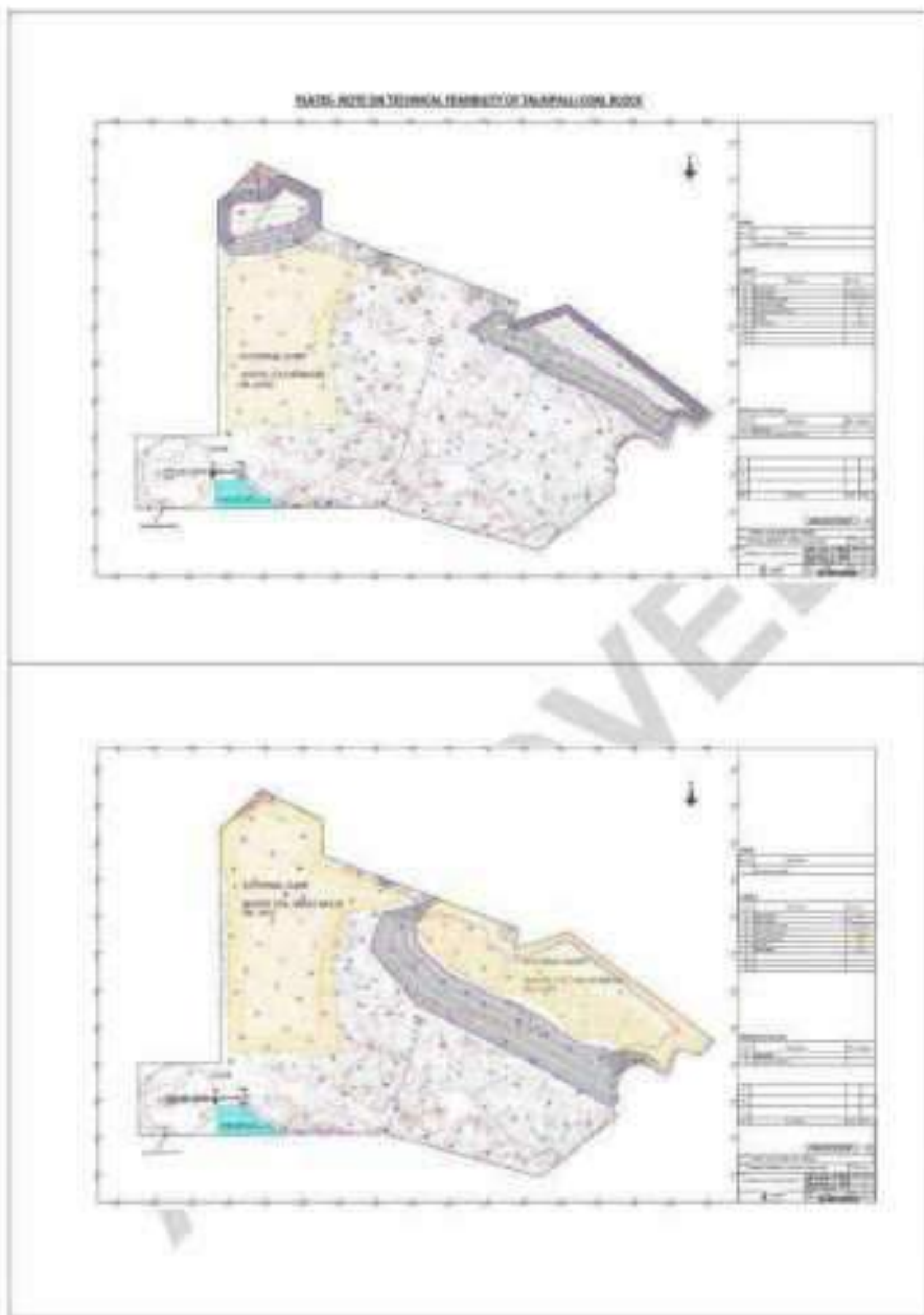
  
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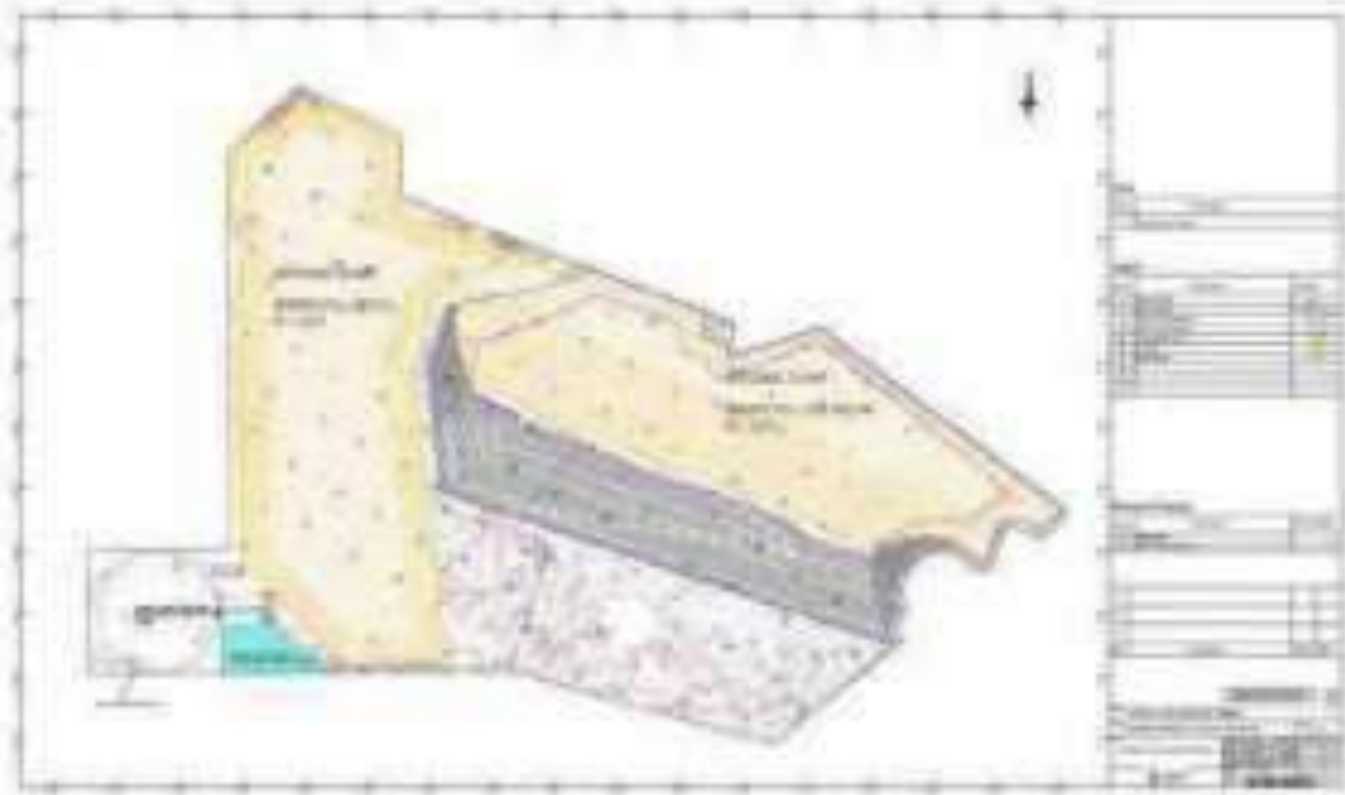
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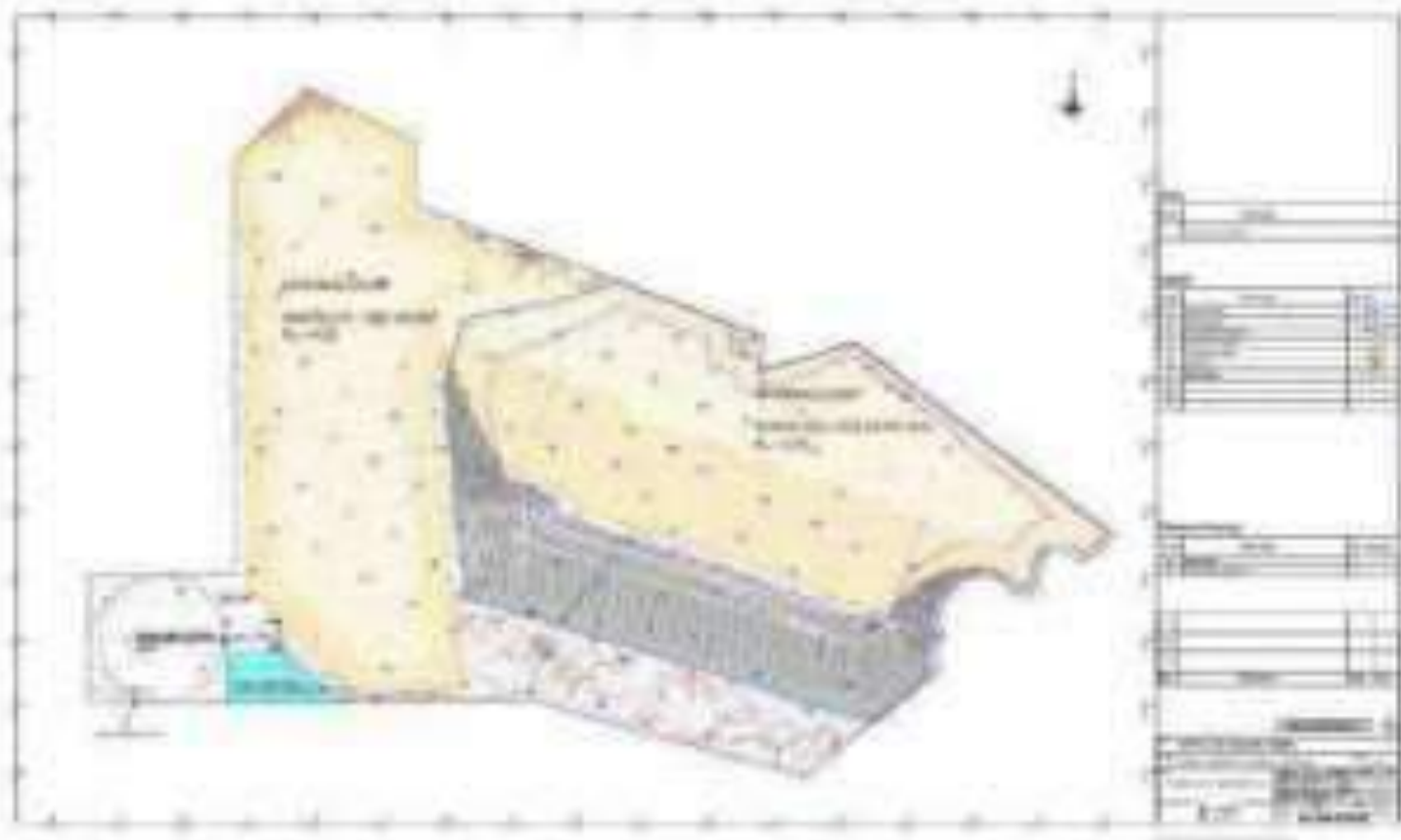
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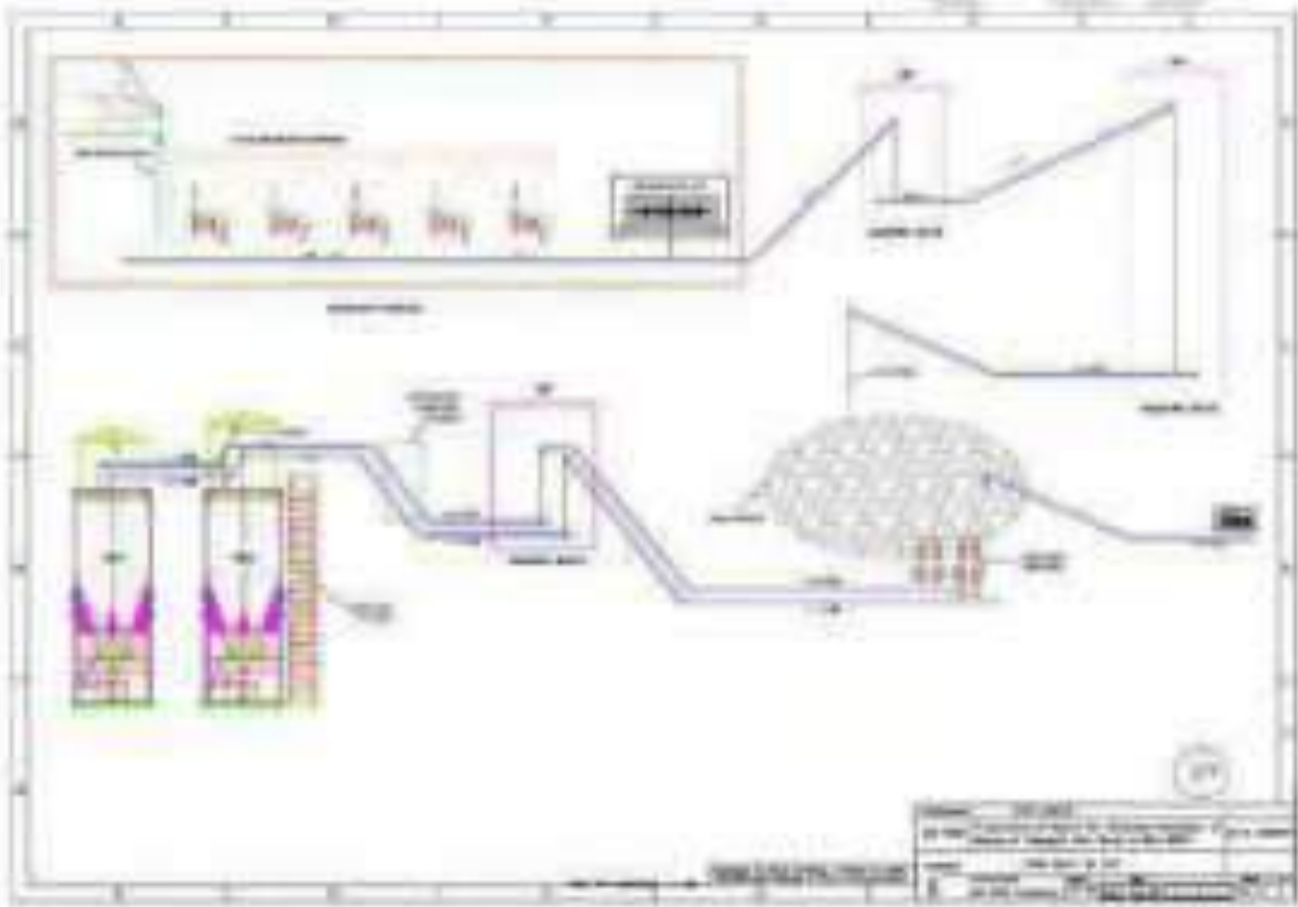
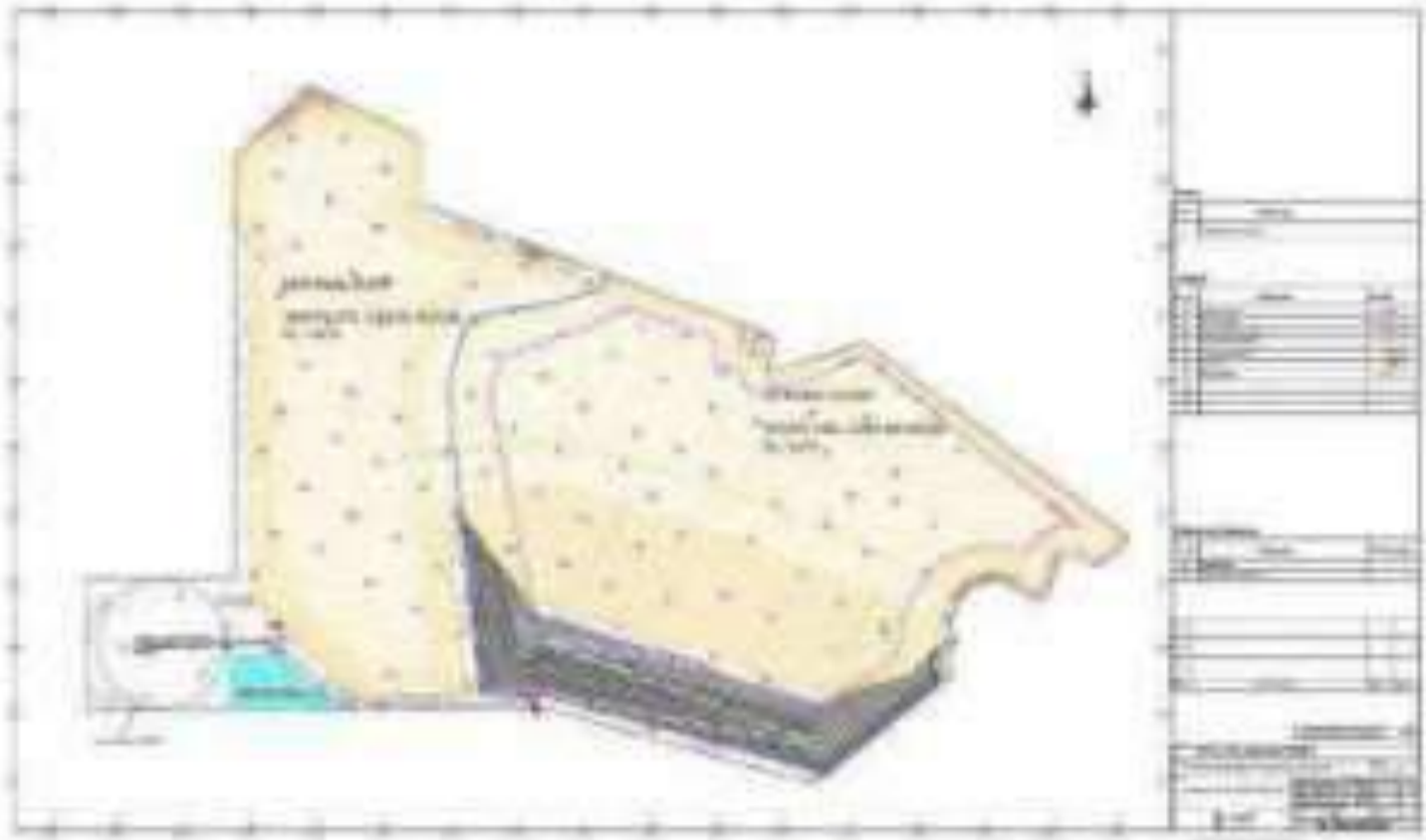




APPROVED







## Additional Annexure-24



Expert Advice and Technical Vetting of  
Technical Feasibility Note of Talaipalli Coal  
Block prepared by CMPDIL



December 2021



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APPROVED



**List of Abbreviations**

<b>Mt</b>	Million metric tons
<b>Mbcm</b>	Million bank cubic meter
<b>AMP</b>	Approved Mining Plan
<b>MECL</b>	Mineral Exploration Corporation Limited
<b>CMPDIL</b>	Central Mine Planning and Design Institute Limited
<b>RoM</b>	Run of Mine
<b>TEMPL</b>	Therxes Earth Movers Private Limited
<b>Mty</b>	Million metric tons per year



## DISCLAIMER

Given the mandate and the timeline of the work, this report is a high-level review of Approved Mining Plan of Talaiyalli Coal Mine (AMP), TEMPL's findings of the AMP, and the Technical Feasibility Note of Talaiyalli Coal Block prepared by CMPDI.

All the data and plans provided with the CMPDI's technical note has been relied upon and interpreted for the technical suggestions and the vetting of the report or developing any new insights about the mining strategy and sustainability of the operation.

III-ISM has not reviewed the MINEX Resource Model of Talaiyalli coal mine for any volume calculations. However, validations of overburden volumes have been performed on the mine stage plans (AutoCad drawings) provided by NTPC as part of the Technical Feasibility Note of CMPDI. The level of accuracy of volume calculation would be in the range of  $\pm 10\%$ .

Further, this report is for the NTPC's own use and not for the use of any third party.

## CHAPTER 1

### Background

#### 1.1. Introduction

BIT-ISM has been approached by NTPC for an Expert Advice and Technical Verifying of Technical Feasibility Note of Talaspalli Coal Block prepared by CMPDIL.

Talaspalli coal block is located in the eastern part of Masud-Rajgarh Coalfield in the state of Chhattisgarh. The coal block has been allotted to NTPC by Ministry of Coal (MoC), vide letter no. 19018/25/2003-CA-1, dated 25.01.2006, for meeting coal requirement of proposed 8000MW Lara Integrated Power Project, approximately 60 km. away from the coal block.

Mining plan of Talaspalli coal block was prepared by Advanced Coal Management & Marketing Pvt. Ltd (ACMM), New Delhi on behalf of NTPC in 2008 and got approval by Ministry of Coal for a total capacity of 18 MMTPA, on 31.03.2010. Subsequently, the various statutory clearances were obtained on the basis of this approved Mining Plan to develop and operate the mine (Table 1.1).

Table 1.1. List of Statutory Clearances.

Description	Date of Clearance
Approval of mining plan	31.03.2010
Environment Clearance (EC)	02.01.13/13.11.15 (Rev.)
Forest Clearance (FC)	Stage I: 08.11.12; Stage II: 29.01.14; 22.05.17(Rev.)
Consent to Establish (CTE)	06.01.13
Consent to Operate (CTO)	17.03.16
Tripartite Escrow Agreement (Barbar, CCO & NTPC)	15.05.14 & 04.08.17
DGNS Permission	10.01.18
Coal Controller's Permission	31.01.18

Based on the approved mine plan and the subsequent approvals (Table 1.1), NTPC appointed M/s. Thiruvai Earthmovers Private Limited (TEMPL or the Contractor) as MDO on 24.08.2020 for

development and operation of Talaspalli coal mine. TEMPL disputed the technical viability of the mining plan and filed a Commercial Civil Suit before Hon'ble Delhi High Court. Later on, at the direction of the Hon'ble Delhi High Court, NTPC and TEMPL agreed to engage CMPDIL as the Independent Consultant for reviewing the approved Mining Plan and the workings of TEMPL, and to suggest a feasible solution for working of the mine. CMPDIL took up this assignment and submitted its Technical Feasibility Note on 07.09.2021.

NTPC has approached IIT-ISM for the expert advice and technical vetting of CMPDIL's Technical Feasibility Report (hereinafter referred as CMPDIL Report or Report) along with a high level review of the approved mine plan (AMP) and the Findings of TEMPL, and has engaged IIT-ISM for the said services vide purchase order no. 5500010097-108-1074, dated, 29.11.2021.

### 1.2. Scope of Work

The scope of as proposed by IIT-ISM through its proposal dated, 14.11.2021, has agreed for the following scope of work:

- Technical review of Technical Feasibility Note prepared by CMPDIL.
- Technical review of Approved Mining Plan and Findings of TEMPL, and
- Suggestions/Expert advice for modification for sustainable mine

### 1.3. Exclusions

The Scope of Work for this work does not include the followings:

- Review, development and / or modification of Mines resource model.
- Modification of the quarry plan. Any modification in the mine plan suggested / recommended by IIT-ISM shall be undertaken by NTPC. Should NTPC require any alteration in the mining plan, IIT-ISM would be able to do it under a separate agreement beyond the scope of work of this proposal.
- Any environment impact assessment study. Should NTPC require any assistance in completing the environment impact assessment study, IIT-ISM would be able to do under a separate agreement beyond the scope of work of this proposal.



## CHAPTER 2

### Review of Approved Mining Plan

#### 2.1. Geological Parameters of the coal mine

Talaspalli Coal Block ("Coal Block") is located in the eastern part of Mand-Rajgarh Coalfield. The area of the block is approximately 20 sq. km. Major part of the block is covered by Barakar rock formations. As per the geological plan provided by NTPC, the Barren measure rocks occur in the southern part of the block. A small patch of Barren Measure rock is also noticed in the north western part of the block (Figure 2.1). Geological succession of rocks is shown in Table 2.1.



Fig. 2.1. Geological Plan of Talaspalli Coal Block.

Table 2.1. Geological Succession of Lithologies

Formation	Thickness (m)	Lithology
Basin	0.50 – 18.00	Sand, alluvium
Barren Measures	18.90 – 143.00	Shale, fine to medium grained sandstone, and intercalation of shale and sandstone, carbonaceous shale and thin coal beds
Basal Rocks	30 – 5% <sup>6</sup>	Fine, medium and coarse grained felspathic, grey sandstone, micaceous and laminated at places. Grey shale, fire clay, intercalation of shale and sandstone and carbonaceous shales with coal seams
Talchir Rocks	1.00 – 14.10	Khales, greenish shale & mudstone, occasional pebbly
Basement		Metamorphic rock

#### 2.1.1. Structure of the coal formation

As shown in the geological plan (Figure 2.1), the general strike direction of coal seams in the coal block is NW-SE in the major part of the block which swings to almost east – west in the north-western and western part of the block. As reported from the approved mine plans, the dip of the coal seams varied from 4° to 8° towards south-west (Figure 2.1).

A total of 12 numbers of faults have been reported in the coal block as per the approved mine plan. The details are provided in Table 2.2.

**Table 2.2. Details of Faults**

<b>Fault No.</b>	<b>Location</b>	<b>Trend</b>	<b>Fault Type</b>	<b>Throw</b>
F1-F1	Northern part passing near BH No. MNRT-24, 27, 22 & 35	East-West to ENE, NE-SW dipping northerly	Dip fault	20 – 35m
F2-F2	Northern part passing through MNRT-30	Essentially east-west dipping northerly	Dip fault	0 – 10m
F3-F3	Northern part passing through MNRT-22	Curvilinear dipping northerly	Dip fault	20 – 35m
F4-F4	Northern part near BH MNRT-31, 24, 43 & 42	East-West dipping northerly	Dip fault	30 – 150m
F5-F5	Northern western part through BH MNRT-42	East-West	Strike fault	35m
F6-F6	Northern part passing through MNRT-31	WNE-1SE dipping westerly	Oblique fault	15 – 25m
F7-F7	Northern part passing through MNRT-11	NW - SE	Oblique fault	20m
F8-F8	Northern part passing through MNRT-11 & 5	NW-SE	Oblique fault	60-105m
F9-F9	Northern part passing through MNRT-101 RT-4 & MNRT-11	East - West to curvilinear	Strike / Oblique Fault	25m
F10-F10	Northern part passing through RT-7	NE-SW	Oblique / Curvilinear	0 - 10m
F11-F11	Southern part	NW-SE	Curvilinear	0 – 10m
F12-F12	Southern part	NW-SE	Oblique	25 m

Most of the faults are restricted to the southern part of the block. Faults F1, F4 and F8 are major faults with larger throws.

### 2.1.2 Coal Seams

There are 27 coal seams / horizons in the coal block namely, XLA, XLB, X TOP, X BOT, IXL2, XLI, IX, VIII, VII, VI TOP, VIMID, VIBOT, V TOP, V MID, V BOT, IV TOP, IV MID, IV L, IV BOT, III L, III, III2, II L2, II L1, II, II L & I. The sequence of coal seams along with inter-burdens are shown in Table 2.3.

Table 2.3. Sequence of Coal Seams & Inter-burdens / Partings

S. No.	Coal Seam	Thickness of Coal Seam (m)		Thickness of Parting (m)		Dominant Thickness (m)
		Minimum	Maximum	Minimum	Maximum	
1	XLA	0.20	1.00			0.50-0.90
	Parting			3.41	11.90	6.0-9.5
2	XLB	0.30	1.28			0.50-0.90
	Parting			3.37	14.89	4.0-6.0
3	X Top	0.40	1.60			1.00-1.15
	Parting			0.70	3.00	1.0-2.0
4	X Bot	1.0	4.1			1.5-6.0
	Parting			2.3	20.15	2.5-10.5
5	IXL2	1.2	2.43			1.1-2.0
	Parting			13.59	21.54	17.0-28.5
6	IXL1	0.30	1.83			1.2-2.0
	Parting			1.65	11.87	6.0-8.0
7	IX	0.56	6.56			1.1-6.0
	Parting			6.33	16.15	9.0-12.0
8	VIII	2.06	6.64			4.0-6.5
	Parting			17.68	42.01	20.0-25.0
9	VII	0.10	3.00			0.50-1.0
	Parting			1.08	17.44	4.0-14.0
10	VI Top	0.37	3.42			1.2-3.0
	Parting			0.56	3.25	0.3-1.5
11	VIMid	1.09	10.01			5.0-6.0
	Parting			0.83	5.98	1.0-2.0

12	VI Bot	0.48	1.73			0.50-1.0
	Paving			2.80	21.45	14.0-21.0
13	V Top	0.50	3.09			0.50-1.50
	Paving			9.09	18.94	11.5-18.5
14	V Mid	0.15	1.71			0.50-2.50
	Paving			4.55	15.95	0.50-12.0
15	V Bot	0.20	5.40			0.50-2.0
	Paving			15.16	30.14	17.0-23.0
16	IV Top	0.54	5.78			2.5-5.0
	Paving			6.30	20.11	6.0-10.0
17	IV Mid	0.09	7.24			3.5-7.0
	Paving			0.75	6.95	3.5-5.5
18	IV L	0.22	4.99			0.50-2.0
	Paving			0.70	4.55	0.50-2.0
19	IV Bot	0.55	4.67			1.5-3.5
	Paving			8.05	21.54	14.0-17.0
20	III L	0.10	3.25			0.50-1.5
	Paving			24.57	44.55	21.0-29.0
21	III	0.66	8.97			2.0-5.5
	Paving			31.1	55.98	31.0-51.0
22	II L3	0.50	3.09			-0.00
	Paving			13.39	40.9	28.0-38.0
23	II L2	0.07	2.68			-0.00
	Paving			5.0	60.39	35.0
24	II L1	0.07	1.54			-0.00
	Paving			1.27	20.54	2.0-14.0
25	II	0.13	5.92			1.5-2.5
	Paving			0.37	3.89	0.50-2.0
26	II L	0.05	2.45			-0.00
	Paving			Amount		
27	I	0.21	6.55			2.7

## 2.2. Mining parameters

As per the approved mining plan, the proposed mining method is open cast mining with shovel-dumper-surface mine equipment systems. Open cast mining is proposed up to the floor coal seam III. Final stage quarry plan and quarry parameters are shown in Figure 2.2 and Table 2.4.

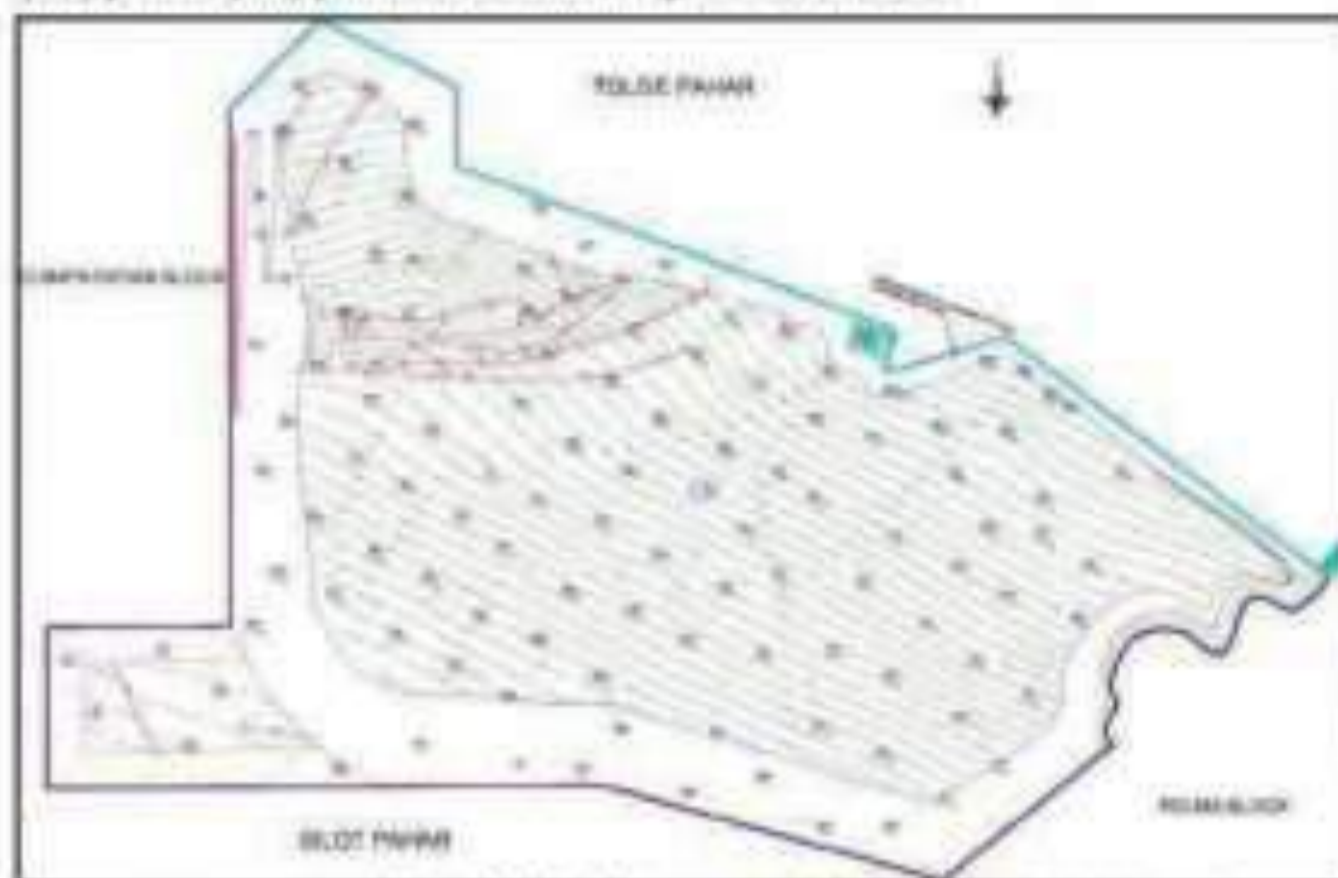


Figure 2.2. Final stage quarry plan of AMP

Table 2.4. Mining parameters

Sl. No.	Description of Mining Parameters	Values
1	Project Details	Area - 21.13 km <sup>2</sup>
2	Reserves (MT)	Gross Geological Reserves (MT) 1400.58 Net Geological Reserves (MT) 1200.52 Mineable Reserves* Extractable: OC 841.08 UG 17.57 Coal blasted in barrier & bottom 338.60 Mining Losses Considered (@ 7%) 44.40
3	Pit Parameters (m)	Max. depth of OC mine 404

		Strike lengths (m)	
		Max.	6000
		Min	1270
		Dip-rise lengths (m)	
		Max	4760
		Min	3000
4	Annual Coal Target Output (MT)	OC	18.0
		UG	0.72
5	Life of the Mine (LOM) (Years)	OC	2 <sup>*</sup> + 12 = 34
	( <sup>*</sup> Mine construction period)	UG	4 <sup>*</sup> + 26 = 30
6	Average Specific gravity of coal		1.65
7	Equipment Systems Proposed for Mining	OC: Shovel - Dumper for Overburden, and a combination of Shovel / Loader - Dumper and Surface Miner for Coal	
		UG: Continuous Miner & Shuttle Car Combination	
8	Average load for Coal and Overburden (km)		2-3
9	Overall coal quality Grade - "I" Non-coking		
		G.I.V (K.Cal./Kg.)	
		Min - 1310	Max. 5892
		Ash %	
		Min 17.50	Max. 45.00
		Moisture %	
		Min 1.20	Max. 11.00

\* Construction period

### 2.3. Mine development strategy:

Mine development strategy envisaged in approved mine plan has left a barrier of 7.5m on the surface from the adjoining coal block boundaries and 60m barrier from Kalo river on the eastern side of the Talapalli coal block. Infrastructure facilities of the project such as MGR, workshop, store, sub-station, office etc. are proposed in the S-W corner of the property. These infrastructure facilities have blocked the coal which have been proposed to be extracted towards the end of the mine life when these infrastructures would be dismantled completely.

Given a large annual capacity (18.0 MTPA) of the mine and a high stripping ratio (4.30), high-capacity mining equipment have been proposed for coal extraction, overburden removal and the auxiliary

operations of the mine. Approved mining plan envisaged two pit mining operations at eastern & western extremities respectively of the coal block with respective east and west pit external dumps for overburden dumping in the initial years (Figure 2.3).



Figure 2.3. Two-pit mining operation at the end of 1<sup>st</sup> year operation of AMP

#### 2.3.1. Calendar program of excavation and dumping schedule:

Both east and west pit advance towards the dip direction and finally merge to become a single pit at the end of 20 years of mining operation. Internal dumping / backfilling is envisaged to begin in the 5<sup>th</sup> year of mining operation once sufficient void is created within the pit. In the absence of land available for external dumping beyond the leasehold boundary / coal bearing area, initial overburden produced up to 4<sup>th</sup> year of quarry operation (115.94 million m<sup>3</sup>) is to be put away as an external dump on the lease hold (herein after referred as "External" or "On - Pit Dump") (Figure 2.3) on the dip side. In the 5<sup>th</sup> year of mining operation, the



majority of the OB is dumped externally, only 12.29 million  $m^3$  is accommodated internally (Table 2.7). Year wise coal extraction and overburden removal program of east and west pits for initial five year are shown in Table 2.5.

Table 2.5. Coal production and overburden removal program of east and west pit

Years	Coal (Mt)		OB (Mcum)		Total Coal (Mt)	Total OB (Mcum)
	East	West	East	West		
1	0.49	1.05	2.45	5.2	1.3	7.65
2	1.03	2.97	3.18	13.80	4	19.04
3	1.68	6.32	7.06	26.94	8	34
4	2.13	10.87	8.93	40.32	13	55.25
5	5.48	12.52	23.04	53.46	18	76.5

Note: Calendar program of excavation for east and west pit after 7<sup>th</sup> year till the merge of the pit is not provided.

From 5<sup>th</sup> year to 8<sup>th</sup> year, due to the lack of space available for internal dumping, the total overburden quantity of 306 million  $m^3$  is split into external dump (148.58 million  $m^3$ ) to be placed on the on-pit dump and external dump (157.42 million  $m^3$ ). From 9<sup>th</sup> year onward, no external dumping is proposed as the entire overburden quantity is accommodated in the internal dump for the balance period of the mine life. The entire external dump (total quantity - 204.52 million  $m^3$ ) is re-handled back to within the quarry from 9<sup>th</sup> year until 20<sup>th</sup> year. The two quarries will finally merge in the 20<sup>th</sup> year of mining operation. 25 years calendar program of excavation and dumping are shown in Table 2.6 and 2.7 respectively.

Overall height of OB dump is 450 m from the deepest point of the mine floor, out of which only 80m is above the general quarry surface up to an RL. value of +300m. Each tier of OB dump bench is of 30m height and bench width 30m, resulting into an ultimate dump slope is 22 degree.

Table 24. Calendar Program of coal production and overburden removal

Year	Coal	Expans. and	Volume of overburden (Natural)				Volume of Overburden (Adjusted)			
			Current		Average		Current		Average	
			08	10	08	08	08	08	08	08
	Mt	Mt	Mcum	Mcum	Ccum?	Ccum?	Mcum	Mcum	Ccum?	Ccum?
1	1.01	1.51	6.06	6.06	4.01	4.06	7.03	7.03	2.01	2.10
2	4.01	5.01	11.06	21.06	4.01	4.06	11.04	26.04	6.76	4.87
3	6.01	11.01	17.06	31.07	4.01	4.06	14.06	36.09	6.13	4.90
4	11.01	26.01	31.07	103.04	4.01	4.06	11.11	113.04	6.13	4.94
5	16.01	41.01	71.06	177.06	4.01	4.06	16.10	192.44	6.13	4.92
6	16.01	42.01	71.06	193.01	4.01	4.06	16.10	208.34	6.13	4.90
7	16.01	46.01	71.47	325.27	3.97	3.96	16.10	345.41	6.13	4.87
8	16.01	46.01	71.47	352.14	3.97	3.96	16.10	411.91	6.13	4.88
9	16.01	106.01	71.47	464.23	3.97	3.96	16.10	496.41	6.13	4.88
10	16.01	134.01	71.47	535.07	3.97	3.96	16.10	574.34	6.13	4.87
11	16.01	132.01	70.01	648.32	3.80	3.97	16.10	681.44	6.13	4.87
12	16.01	171.01	69.86	671.39	3.80	3.96	16.10	727.04	6.13	4.87
13	16.01	188.01	69.86	763.44	3.80	3.95	16.10	804.44	6.13	4.87
14	16.01	246.01	69.86	843.36	3.80	3.95	16.10	880.94	6.13	4.87
15	16.01	233.01	69.86	881.36	3.80	3.94	16.10	937.44	6.13	4.86
16	16.01	242.01	69.86	973.02	3.80	3.94	16.10	1003.94	6.13	4.86
17	16.01	261.01	71.95	1090.12	4.01	4.06	16.10	1112.34	6.13	4.87

18

18	16.01	274.01	70.91	1107.24	4.27	4.06	16.10	1181.04	6.13	4.87
19	16.01	296.01	70.91	1184.15	4.27	4.05	16.10	1268.84	6.13	4.88
20	16.01	313.01	70.91	1261.66	4.27	4.01	16.10	1347.14	6.13	4.86
21	16.01	312.01	70.91	1337.98	4.27	4.01	16.10	1425.44	6.13	4.85
22	16.01	391.01	70.91	1444.89	4.27	4.04	16.10	1503.74	6.13	4.85
23	16.01	398.01	70.91	1491.80	4.21	4.05	16.10	1582.04	6.13	4.85
24	16.01	398.01	70.91	1589.72	4.27	4.06	16.10	1660.34	6.13	4.86
25	16.01	464.01	70.91	1645.63	4.27	4.07	16.10	1758.64	6.13	4.86
26	16.01	422.01	70.91	1722.34	4.27	4.06	16.10	1816.94	6.13	4.86
27	16.01	441.01	74.91	1797.45	4.11	4.06	16.10	1847.64	6.43	4.81
28	16.01	498.01	74.91	1872.36	4.09	4.06	16.10	1997.14	6.43	4.81
29	16.01	476.01	74.91	1947.26	4.10	4.06	16.10	2007.34	6.43	4.81
30	16.01	499.01	74.91	2022.16	4.10	4.06	16.10	2107.34	6.43	4.81
31	16.01	512.01	74.91	2097.06	4.09	4.05	16.10	2277.44	6.43	4.85
32	16.01	541.01	79.91	2176.68	4.42	4.10	16.10	2377.34	6.43	4.81
33	16.01	548.01	82.29	2296.02	4.97	4.12	16.10	2377.64	6.43	4.81
34	16.01	595.01	82.29	2341.20	4.97	4.13	16.10	2407.74	6.43	4.84
35	16.01	594.01	82.29	2427.48	4.97	4.13	16.10	2377.84	6.43	4.84
36	16.01	642.01	82.29	2502.78	4.87	4.11	16.10	2617.94	6.43	4.81
37	16.01	631.01	84.07	2589.84	4.87	4.17	16.10	2696.64	6.43	4.81
38	16.01	648.01	87.91	2677.18	4.80	4.19	16.10	2785.88	6.86	4.86
39	16.01	661.01	87.91	2764.32	4.80	4.21	16.10	2875.12	6.86	4.86
40	16.01	674.01	87.91	2851.87	4.80	4.21	16.10	2964.36	6.86	4.85

20

41	18.00	492.50	87.50	2099.22	4.80	4.20	87.84	5009.45	4.00	4.40
42	18.00	751.50	86.54	3025.70	4.80	4.20	87.84	5017.34	4.00	4.40
43	18.00	729.50	81.00	3111.27	4.70	4.20	87.84	5125.00	4.00	4.40
44	18.00	740.50	80.00	3195.07	4.50	4.20	87.84	5312.82	4.00	4.40
45	18.00	764.50	80.00	3281.57	4.30	4.20	87.84	5481.30	4.00	4.40
46	18.00	782.50	82.50	3365.11	4.20	4.20	87.84	5646.60	4.00	4.40
47	18.00	800.50	77.00	3456.07	4.10	4.20	87.84	5811.44	4.00	4.40
48	18.00	817.50	81.33	3544.80	4.10	4.20	75.20	5980.64	4.00	4.40
49	18.00	835.50	81.00	3641.32	4.10	4.20	88.00	6157.44	4.00	4.40
50	7.00	852.50	86.33	3736.04	3.70	4.20	72.41	6341.00	4.00	4.40
51	6.00	869.50	74.50	3712.90	3.42	4.40	20.90	6536.00	4.10	4.40
52	5.00	887.00	69.81	3777.07	3.43	4.40	21.04	6737.07	4.00	4.40
<b>Total</b>	<b>843.00</b>		<b>2771.85</b>				<b>3775.87</b>			

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Table 17. Overburden dumping schedule up to 20<sup>th</sup> year of operation

Year	External Dump		Internal Dump		Rehandling		Total O/B (Mcum)	
	Annual	Cum.	Annual	Cum.	Annual	Cum.	Annual	Cum.
1	7.66	7.66	0	0	0	0	7.66	7.66
2	10.04	17.70	0	0	0	0	10.04	17.70
3	34	51.74	7	7	0	0	34	51.74
4	35.25	86.99	0	0	0	0	35.25	86.99
5	44.21	131.20	12.29	12.29	0	0	56.5	131.20
6	45.38	176.58	31.12	43.41	0	0	76.5	176.58
7	25.17	201.7	44.91	88.34	0	0	70.2	201.7
8	17.82	219.52	58.04	146.38	0	0	75.8	219.52
9	0	219.52	76.1	222.00	8.12	8.12	76.8	222.00
10	0	219.52	76.1	298.12	16.15	24.27	76.8	298.12
11	0	219.52	76.1	374.22	16.15	40.42	76.8	374.22
12	0	219.52	76.1	450.32	16.15	56.57	76.8	450.32
13	0	219.52	76.1	526.42	21.42	77.99	76.8	526.42
14	0	219.52	76.1	602.52	21.42	99.41	76.8	602.52
15	0	219.52	76.1	678.62	21.42	120.83	76.8	678.62
16	0	219.52	76.1	754.72	21.42	142.25	76.8	754.72
17	0	219.52	76.1	830.82	21.42	163.67	76.8	830.82
18	0	219.52	76.1	906.92	21.42	185.09	76.8	906.92
19	0	219.52	76.1	983.02	21.42	206.51	76.8	983.02
20	0	219.52	76.1	1059.12	21.42	227.93	76.8	1059.12

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18	0	24.00	78.1	1864.00	25.40	213.90	78.1	1193.54
19	0	24.00	78.1	1864.00	25.40	180.48	78.1	1208.54
20	0	24.00	78.1	1862.00	24.07	204.30	78.1	1217.14
21	0	24.00	78.1	1860.00		204.30	78.1	1225.44
22	0	24.00	78.1	1858.00		204.30	78.1	1233.54
23	0	24.00	78.1	1856.00		204.30	78.1	1241.44
24	0	24.00	78.1	1854.00		204.30	78.1	1249.14
25	0	24.00	78.1	1852.00		204.30	78.1	1256.44

APPROVED

### 2.3.2. Equipment Configurations and deployment Schedule

Following equipment configurations for overburden removal, coal extraction and various auxiliary operations of the mine have been proposed in the approved mine plan (Table 2.8.)

Table 2.8. Equipment Configuration and Phasing

Sl. No.	Equipment	Size	Nos.	Year of Operation				
				1	2	3	4	5
<b>A. Overburden Removal</b>								
1	Electric Shovel	35 Cum	4				2	4
2	Electric Hydraulic Shovel	20 Cum	8	1	2	3	7	8
3	Electric Hydraulic Shovel	4.5 Cum	11	2	8	8	8	11
4	Rear Dumper	240T	41				21	41
5	Rear Dumper	190T	76	8	18	43	67	76
6	Rear Dumper	30 T	92	21	61	61	67	92
7	Electric Drill	111 mm	3				1	3
8	Elec. Drill	250 mm	11	2	4	8	11	11
9	Diesel Drill	160 mm	9	2	3	5	7	9
10	Dozer	450 HP	6	2	5	6	6	6
11	Dozer with ripper	850 HP	3	1	2	3	4	5
<b>B. Coal Extraction</b>								
1	Diesel Hydraulic Shovel	12 Cum	1			1	1	1
2	Diesel Hydraulic Shovel	4.5 Cum	3	1	2	2	3	3
3	Surface Mixer	1200	4				1	4
4	Front end loader	4.5 cum	4				2	4
5	Rear Dumper	15 T	18				19	18
6	Rear Dumper	120T	10			10	10	10
7	Rear Dumper	30 T	26	8	16	18	26	26
8	Elec. Drill	250 mm	2			1	2	2
9	Diesel Drill	160 mm	3	1	2	3	3	3
10	Dozer	450 HP	3	1	1	2	3	3
11	Dozer with ripper	850 HP	3			1	3	3
<b>C. Common (Auxiliary Operations)</b>								

1	Grader	180 HP	8	2	4	6	7	8
2	Hydraulic Shovel	6.5 Cum	2		1	2	2	2
3	Crane	100 T	4	1	2	3	3	4
4	Crane	30 T	4		1	2	2	4
5	Crane	8 T	6	1	2	2	4	6
6	Crane	1 T	4		1	2	3	4
7	Diesel Backhoe	1.0 Cum	6	2	3	4	5	6
8	FE Loader	3-4 Cum	3	1	2	2	3	3

The top overburden is proposed to be mined by 35.0 m<sup>3</sup> Rope Shovel and 240 T Rear Dump (RD) Truck combination, thick intervening partings / inter-burdens are proposed to be mined by 20.0 m<sup>3</sup> Rope Shovel and 190 T RD Truck combination, and the thin partings / inter-burdens are proposed to be mined by 4.5 m<sup>3</sup> hydraulic shovels and 35 - 50 T RD Trucks.

For coal extraction, 12.0 m<sup>3</sup> hydraulic shovels and RD 120 T trucks are proposed for thick coal seams, 4.5 m<sup>3</sup> hydraulic back-hoes and 35 - 50 T RD Trucks for thin seams. In addition, Surface Miner in combination with 4.50 m<sup>3</sup> Front End Loaders (FELs) and 18 T RD Trucks have been proposed to extract up to 40% of the coal.

BIT-ISM is of the view that it is difficult comment on the fleet size and the deployment schedule of various equipment configurations proposed for overburden / inter-burdens, mineral and coal production in the mining plan, as the mineral program of estimation in the approved mining plan does not provide the year wise break-ups of Top Ore, Thick Partings / Inter-burdens and Thin Partings / Inter-burdens, and also the seams wise production details. The details of estimation of productivities for various equipment configurations are also not provided in the mining plan.

While detailed production planning is not within the scope of the present work, BIT - ISM is happy to provide the estimate of productivities of various equipment systems proposed for Tallapally coal mine (Table 2.9 to 2.15). These estimates can be used by NTPC for estimating the fleet sizes of various equipment systems to be deployed in the mine.

Table 2.9. Estimation of Productivity and Fleet of 35.0 cum. Shovel - RD 240 T Dumpers

		Particulars	Value	Unit
Assumptions		Swell Factor	0.74	#
		Bucket Fill factor of Shovel	90%	#
		Bucket Capacity of Shovel	35	cum
		Volumetric Capacity of Dumper (Struck Capacity)	130	cum
		Bucket Cycle Time	0.6	min. <sup>*</sup>
		Spotting time of dumper	0.6	min. <sup>*</sup>
		Factors Allowed for Travelling, Positioning etc.	0.85	#
		Annual working hours of shovel	6000	hrs.
		Av. Speed of Dumper	30	kmph <sup>*</sup>
		Load	2.5	km <sup>3</sup>
		Dumper Spotting, Unloading & Waiting Time	2	min. <sup>*</sup>
		Working Dumper Availability	80%	#
	1	Average standard hourly output of 35.5 m <sup>3</sup> shovel	1954.3	cum
2	Annual output of 35.0 m <sup>3</sup> Shovel	9510480	cum	
3	240 T dumpers fleet size for one shovel	6	#	
4	Annual output of 240 T RD Trucks	1585080	cum	
5	Average hourly output of RD Trucks	110.8	cum	

Table 2.10. Estimation of Productivity and Fleet of 20.0 cum. Shovel - RD 190 T Dumpers

		Particulars	Value	Unit
Assumptions		Swell Factor	0.74	#
		Bucket Fill factor of Shovel	90%	#
		Bucket Capacity of Shovel	20	cum
		Volumetric Capacity of 190 T Dumpers	101	cum
		Bucket Cycle Time	0.6	min. <sup>*</sup>
		Spotting time of dumper	0.6	min. <sup>*</sup>
		Factors Allowed for Travelling, Positioning etc.	0.85	#
		Annual working hours of shovel	6000	hrs.

	Av. Speed of Dumper	30	kmph <sup>a</sup>
	Load	2.5	km <sup>3</sup>
	Dumper Spitting, Unloading & Waiting Time	2	min <sup>a</sup>
	Working Dumper Availability	80%	%
1	Average standard hourly output of 20.0 m <sup>3</sup> shovel	1141.754286	cum.
2	Annual output of 20.0 m <sup>3</sup> Shovel	5822742.857	cum.
3	190 T dumpers fleet size for one shovel	5	#
4	Annual output of 190 T RD Trucks	1164548.571	cum.
5	Average hourly output of 190 T RD Trucks	228.3428571	cum.

Table 2.11, Estimation of Productivity and Fleet of 12.0 cum. Hyd. Shovel – RD 120 T Dumpers

		Particulars	Value	Unit.
Assumptions		Swell Factor	0.74	#
		Bucket Fill factor of Shovel	90%	%
		Bucket Capacity of Shovel	12	cum
		Volumetric Capacity of 120 T Dumpers	70	cum.
		Bucket Cycle Time	0.45	min <sup>a</sup>
		Spitting time of dumper	0.6	min <sup>a</sup>
		Factors Allowed for Traveling, Positioning etc.	0.85	#
		Annual working hours of shovel	6000	hrs.
		Av. Speed of Dumper	30	kmph <sup>a</sup>
		Load	2.5	km <sup>3</sup>
		Dumper Spitting, Unloading & Waiting Time	2	min <sup>a</sup>
		Working Dumper Availability	80%	%
	1	Average standard hourly output of 12.0 m <sup>3</sup> shovel	871.85	cum.
	2	Annual output of 12.0 m <sup>3</sup> Shovel	446454.18	cum.
	3	120 T dumpers fleet size for one shovel	6	#
4	Annual output of 120 T RD Trucks	741076.36	cum.	
5	Average hourly output of 120 T RD Trucks	145.31	cum.	



Table 2.12. Estimation of Productivity and Fleet of 4.5 cum. Hyd. Backhoe – RD 25 T Dumpers

Assumptions	Particulars	Value	Unit.
	Swell Factor	0.74	#
	Bucket Fill factor of Shovel	80%	#
	Bucket Capacity of Shovel	4.5	cum
	Volometric Capacity of 150 T Dumpers	36	cum
	Bucket Cycle Time	0.4	min*
	Spotting time of dumper	0.4	min*
	Factors Allowed for Travelling, Positioning etc	0.85	#
	Annual working hours of shovel	1600	hrs
	Av. Speed of Dumper	25	kmph*
	Load	2.5	km*
	Dumper Spotting, Unloading & Waiting Time	1.5	min*
	Working Dumper Availability	80%	#
	1 Average standard hourly output of 4.5 m <sup>3</sup> shovel	319.68	cum
	2 Annual output of 4.5 m <sup>3</sup> Shovel	1630368	cum
3 15 T dumpers fleet size for one shovel	10	#	
4 Annual output of 15 T RD Trucks	163036.8	cum	
5 Average hourly output of 15 T RD Trucks	31.97	cum	

Table 2.13 (a). Estimation of Productivity of Surface Mixer (SM 2200)

Particulars	Value	Units
Sg. Gravity (Coal)*	1.3	#
B (Cutting Width)*	2.2	meter
T (Cutting Depth)*	0.2	meter
V (SM Speed)*	20	meter / minutes
Q (B*T*V*60) (Productivity)	528	cum / hour
Factor for manufacturing etc.*	75%	%

Hourly productivity	316	cum/ hour
	594	cum/ hour
Working hours	5000	hours
Annual productivity	2970000	cum
	1960000	cum

\*: Assumptions

Table L.13 (b). Estimation of FEL-Track Fleet for each Surface Miner.

	Particulars	Value	Unit	
Assumptions	Swell Factor	0.74	#	
	Bucket Fill factor of FEL	80%	#	
	Bucket Capacity of FEL	4.5	cum	
	Volumetric Capacity of 35-T Truck	10	cum	
	Bucket Cycle Time	1	min <sup>h</sup>	
	Truck Spotting Time	0.5	min <sup>h</sup>	
	Factors for Travelling, Positioning etc. of FEL	85%	#	
	Annual working hours of FEL	6000	hrs	
	Avg. Speed of Truck	20	kmph <sup>h</sup>	
	Lead	2.5	km <sup>h</sup>	
	Truck Spotting, Unloading & Waiting Time at Delivery	1.5	min <sup>h</sup>	
	Working Trucks Availability	75%	#	
	1	Average standard hourly output of 4.5 m <sup>3</sup> shovel	142.08	cum
	2	Annual output of 4.5 m <sup>3</sup> Shovel	724608	cum
3	35 T dumpers fleet size for one shovel	6	#	
4	Annual output of 35 T RD Trucks	120768	cum	
5	Average hourly output of 35 T RD Trucks	25.04	cum	
6	Number of FEL per Surface Miner	3	#	
7	Number of Trucks per Surface Miner	18	#	

### 2.3.3. Mining Benches

Benches are the most distinguishing feature of a surface mine and one of the busiest areas of operation. Benches are crucial for surface mining operations as they have to accommodate all the major mining activities such as blasting, excavation, loading, hauling etc. Mining operations take place in multiple benches. To access the different benches a road or ramp are created. The width and steepness of the road and ramp depends upon the type and size of the equipment to be accommodated. Depending upon the operating requirements and the push back design, the mining benches can be classified into working benches and non-working (inactive) benches.

Stable slopes to the benches are extremely important for safe mining operations. At the same time slope angle is an important geometric consideration which has significant economic impacts. Normally bench should be as steep as possible within the reasonable factor of safety to ensure better economic returns. A typical initial design value of 70° bench slope angle may be considered. A thorough bench slope stability analysis may be essential to maximize the economic gain and strike a balance between safety and economy of operation. IIT - ISM recommends the following bench geometries for safe and efficient operations of various equipment systems / configuration of Talaspalli coal mine:

Table 2.14. Mining benches geometry

Sl. No.	Equipment Configuration	Bench Height (m)	Bench Width (m)		Length of Bench (m)	Bench Slope (°)
			Working Bench	Non-working Bench		
1	35.0 cum. Shovel - 240 T Dumpers	20.00	30.00	30.00	300-400	65-70°
2	20.0 cum. Shovel - 190 T Dumpers	15.00	30.00	30.00	300-400	65-70°
3	12.0 cum. Shovel - 120 T Dumpers	15.00	40.00	25.00	300-400	65-70°
4	4.5 cum. Shovel - 15 T Dumpers	3.0-6.0	30.00	25.00	200-300	65-70°
5	Surface Miners - HBL - 25 T	4.5 cum.	100-120	-	500	60-65°

Above mentioned system parameters are indicative in nature based on equipment configuration, working efficiency and safety requirements of mining operations. However, the requirements

according to the DGMS Regulation no. 106, CMR 2017, and Circular no. 3, 2020 must be carried out for slope stability study to determine acceptable system parameters (i.e. overall slopes of permanent dump and pit walls).



## CHAPTER 3

### Review of Findings of TEMPL

M/s TEMPL, the appointed MDO of Tallapalli coal mine by NTPC, has diagnosed the approved mining plan strategy on four potential grounds - i) TEMPL observed that 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 envisaged by 25<sup>th</sup> year of mine operation as specified in the approved Mining Plan (AMP), ii) there would be an excess OB quantity than envisaged in the AMP which would not be able to be accommodated in the designated internal and external dump areas, iii) 100% backfilling by re-handling of temporary external dump / pit dump as envisaged in the AMP is not feasible, iv) TEMPL observed that production will stop after 30 year if the two pit approach as proposed in the AMP is followed, and v) TEMPL claimed that the average lead overburden transportation will be 2 to 3 kms more than the average lead indicated in the AMP.

#### 3.1. TEMPL's observations about excess overburden quantity till 25<sup>th</sup> year mining operation

M/S TEMPL, has prepared its own estimate of reasonable coal reserve and stripping ratio (Table 3.1) based on the approved 25<sup>th</sup> year mine plan (Figure 3.1).

Table 3.1. TEMPL Reserve Statement on the basis of 25<sup>th</sup> year approved mine plan.

Description	CoM	Values (TEMPL)	Value (AMP <sup>1</sup> )	Variation
Coal Reserve (by open cast mining method)	Million Tonn	409.70	404.50	+ 5.20
Waste Adjusted	Million BCM	2141.00	1738.64	+ 404.36
Strip Ratio	BCM / Ton	5.23	4.30	+ 0.93



Figure 3.1. 25<sup>th</sup> year approved mining plan

TEMPL estimated the total cost quantity of 400.70 Mt against the AMP estimated quantity of 404.50 Mt up to 25<sup>th</sup> years. Likewise, total overburden quantity has been estimated as 2143.06 million tons against the approved mine plan overburden quantity of 1718.64 (adjusted) and 1645.63 million tons (natural) up to 25<sup>th</sup> year. This resulted into a revised stripping ratio of 5.23 as against the AMP stripping ratio of 4.30 (adjusted) and 4.07 (natural).

The above observations of TEMPL provides a significant deviation in the overburden quantity of the mine having a huge commercial impact during the life of the contract. However, TEMPL's claim is not substantiated by the detailed engineering drawing and the calculation sheets.

Further, TEMPL modified the mining sequence to arrive at a revised mining plan of 25<sup>th</sup> years (Figure 3.2) which provided a superior outcome than the approved mining plan from mining point of view (Table 3.2).

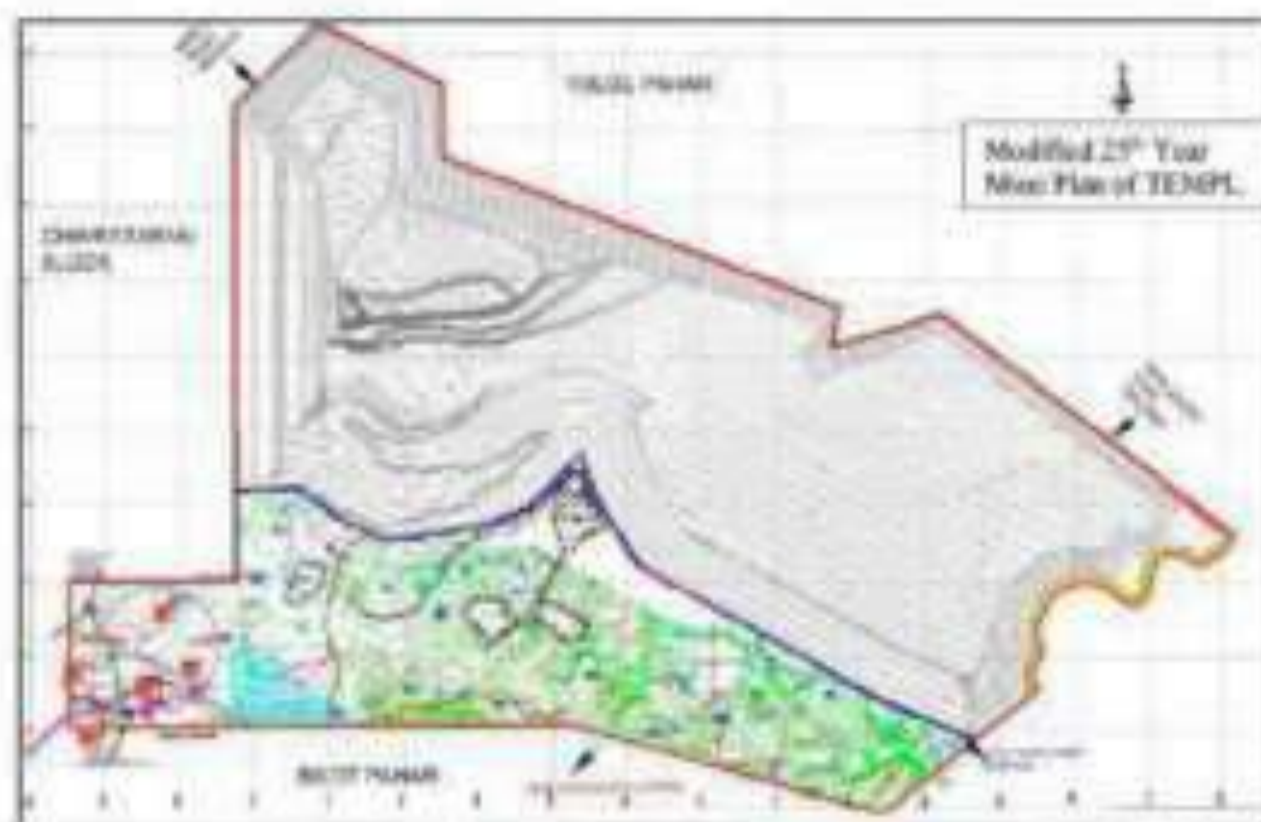


Figure 3.2. 25<sup>th</sup> year pit operation plan modified by TEMPL.

Table 3.2. TEMPL optimized Reserve Statement of 25 years operation.

Details	UoM	Value	Value (AMP <sup>2</sup> )	Variation
Coal Reserve (by open cast mining method)	Million Tonn	405.00	404.50	+ 0.50
Waste Adjusted	Million BCM	1802.00	1778.54	+ 23.46
Strip Ratio	BCM / Ton	4.92	4.30	+ 0.60

**Disclaimer by M/S. TEMPL:** The above designs are based on information provided and assumptions made. TEMPL is not responsible for the accuracy or validity of its sources.

In the modified 25<sup>th</sup> year mining plan of TEMPL, the estimated coal quantity was reduced to 404.50 (a minor reduction of 0.50 Mt), the estimated total overburden quantity got reduced to 1992.00 (still carrying a variation of over 14.50 % from approved mining plan), and the stripping ratio was also reduced to 4.92 (a variation of over 13.90% from the approved mine plan). However, the findings of TEMPL, is based on high-level assumptions and does not claim the accuracy of the results.

However, BIT-ISM is of the view that the revised mining plan does carry the merit, a much more detailed engineering plan may be sought from TEMPL, or an expert agency may be engaged to look into details of the mining plan to improve accuracy and engineering aspects of the mining plan from implementation point of view.

3.2. MS: TEMPL claims that there is less dumping space at the designated dumping area and there won't be the feasibility of 100% backfilling by re-handling of temporary external dump as per approved mining plan.

MS-TEMPL's claim, based on the study of the approved mining plan, shows a shortfall of dumping space by as high as 943 million tons up to 25<sup>th</sup> year of mining operation (Table 3.3.)

**Table 3.3 Assessment of dumping space by TEMPL.**

Details	CoM	TEMPL Estimate	AMP Estimate
Waste mined up to 25 <sup>th</sup> years	Million tons	2143.00	1719.60
In-situ dump capacity	Million tons	1200.00	NA
No. space for dumping	Million tons	943.00	NA

However, after modification of the mining plan which brings an improvement (Figure 3.2), the short fall in the dumping space is reduced to 342 million tons (Table 3.4.)



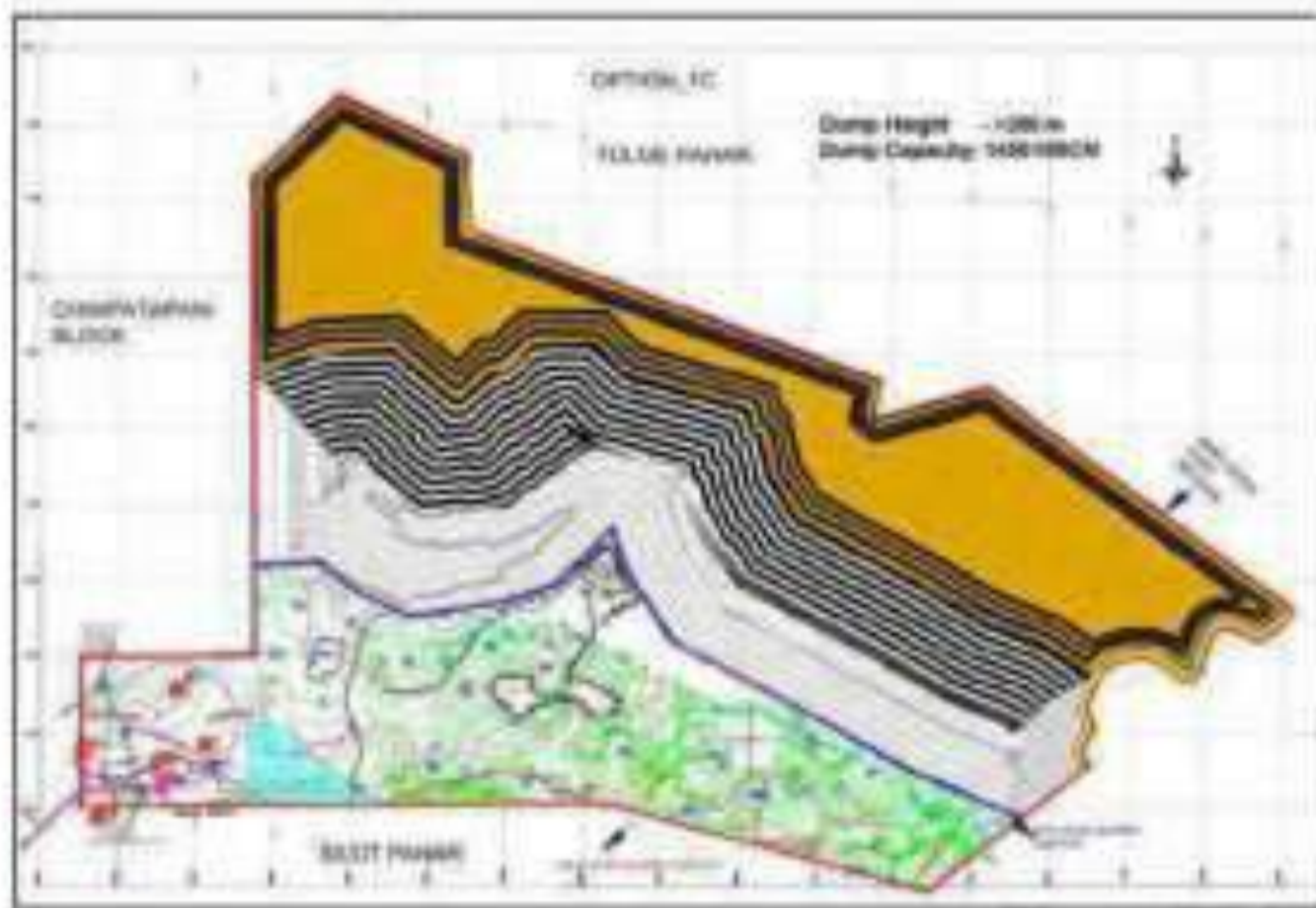


Figure 3.3. 25<sup>th</sup> year mine plan showing OB dumps.

Table 3.4. TEMPL Dumping Scenarios as per optimized 25<sup>th</sup> Year Mine Plan.

Details	Unit	Modified Mining Plan Estimate	AMP Estimate
Waste Mine (25 <sup>th</sup> Year)	Million ton	1902.00	1718.00
In-pit dump capacity	Million ton	1450.00	NA
No. space for dumping (Swell Factor - 22%)	Million ton	542.00	NA

Though, the TEMPL's claim is on the basis of a high-level indicative diagram (Figure 3.3) which certainly carry a merit, but in absence of a detailed engineering (drawings and calculations), IIT-ISM is not in position ascertain the accuracy of TEMPL's claim. An expert agency may be engaged to look into detailed engineering aspects of the mining plan to ascertain the accuracy and implementability of

the mining plan. No justification is provided for swell factor calculations which has been assumed as 21%. IIT-ISM does not take cognizance of SRK mine plan as it is not a key stakeholder in this case.

3.3. TENPL claims that production will stop after 10 years if Double Pit approach is followed. Whereas, with Single Pit approach the production continues till the 25th year.

Approved mining plan envisages two pit operations at eastern & western extremities respectively of the coal block. Two access trenches and box runs have been opened (Figure 2.2). Both east and west pit advance towards the dip direction and finally merge at the end of 20 years of mining operation. Internal dump will begin once sufficient void is created within the pit in the 3<sup>rd</sup> year of mining operation. In absence of land outside the leasehold, all the overburden generated up to 4<sup>th</sup> year and thereafter part overburden up to 9<sup>th</sup> year of quarry operation is proposed outside the quarry operation on the dip side within the lease hold area to be re-handled back from 10<sup>th</sup> year of operation.

TENPL has opposed this mining strategy saying that with two pit operation strategy, the coal production from the mine will stop in the 10<sup>th</sup> years as both pit operations would be hosted by the on pit / external dump (Figure 3.4. and Table 3.5).

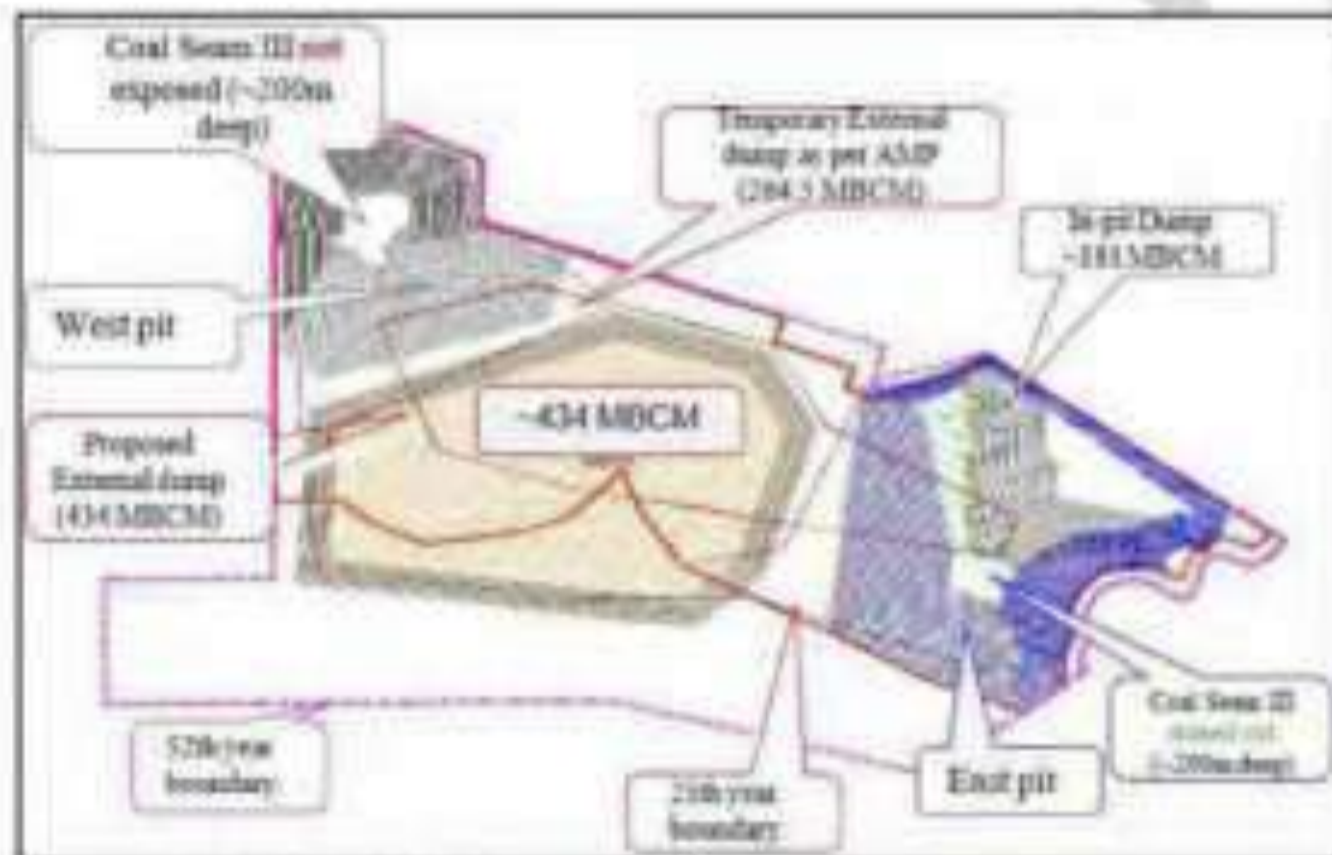
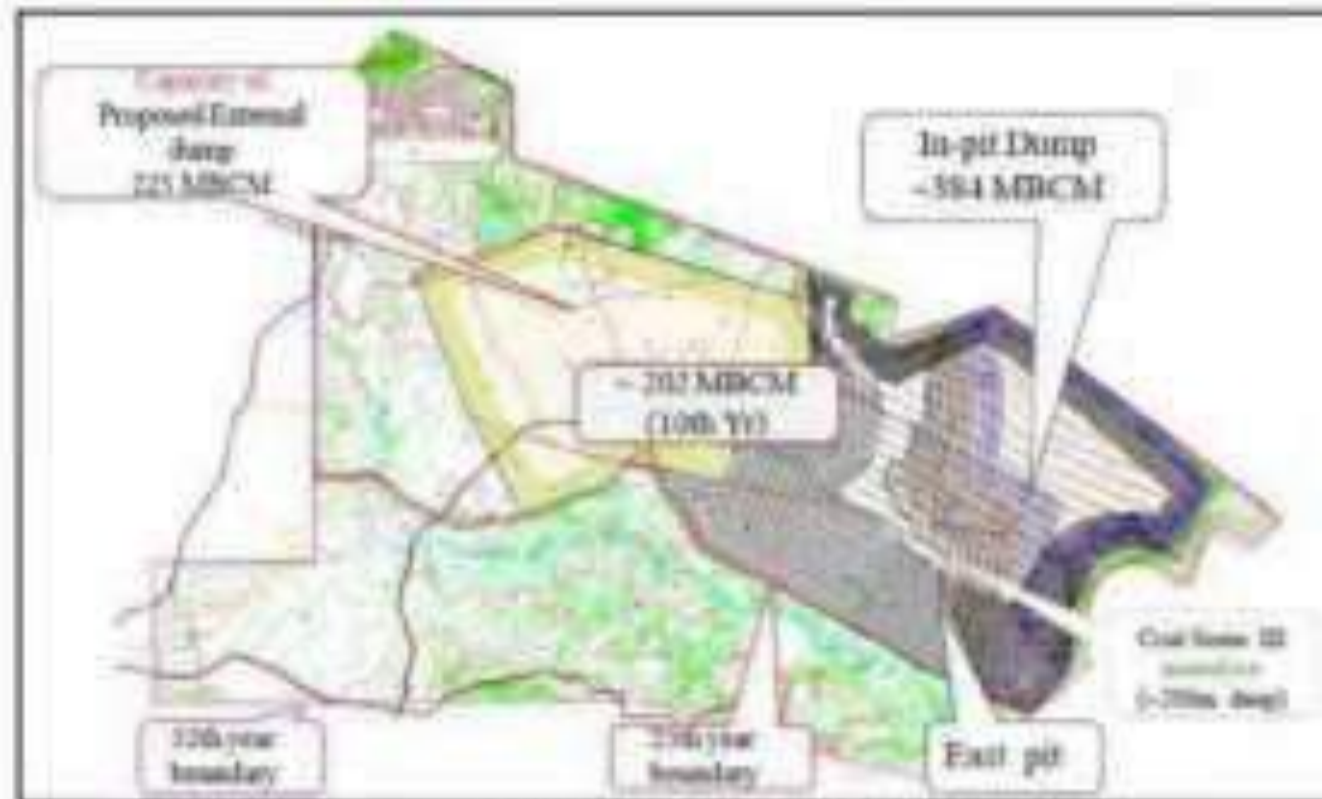


Figure 3.4. Two pit operation at the end of 10 years.

Table 3.5. Coal and Overburden Quantities in 10<sup>th</sup> Year of Operation

Details	UoM	Values
Coal extracted	Million tons	112.00
Waste generated	Million cum	562.00
In-pit dumping	Million cum	181.00

However, the single pit operation strategy starting with East pit proposed by TEMPL can continue the production till 25<sup>th</sup> year (Figure 3.5.)

Figure 3.5. Single pit operation in 10<sup>th</sup> year.Table 3.6. TEMPL Reserve Statement of Single Pit Operation in 10<sup>th</sup> Year.

Details	UoM	Values
Coal extracted	Million tons	112.00
Waste generated	Million cum	587.00

In-pit dumping	Million tons	384.00
----------------	--------------	--------

ITT-ISM does not completely agree with the observations of TEMPL. ITT-ISM is of the view that TEMPL has not provided enough information in terms of engineering drawings (year-wise operating plans), estimation of internal and external dump quantities (year-wise) and calendar progress of excavation showing the coal and overburden quantities (year-wise) from East and West respectively from 1<sup>st</sup> to 10<sup>th</sup> years of mining operations. In absence of these information, it is not possible to substantiate the TEMPL's claim that two pit operations would not be feasible after 10<sup>th</sup> year of operations. Rather, in a single pit operation, there is a high risk of the mining operation to be bound by the external dump which can stop the mining operation.

Prima-facie from Figure 3.4, it still seems possible to accommodate extra quantities of overburden in the external dump by increasing its height the dump due to the availability of space and thus continuing the two-pit operation in the 10<sup>th</sup> year. From 10<sup>th</sup> to 20<sup>th</sup> year of mining operation, a detailed study in terms of developing engineering plans and designs to ascertain that the operation does not stop as the intensity of operation increase due to re-handling of external dump.

**3.4. MS, TEMPL claimed that the lead distance will be increased by 2 to 3 kms compared to the average lead indicated in the approved mining plan.**

ITT - ISM is of the view that there is a need to calculate average lead distance for overburden dumping at least at 5 years intervals to ascertain the claim. In absence this data TEMPL's claim does not exist.

## CHAPTER 4

**Review of Technical Feasibility Note of Talaiwalli Coal Block prepared by CMPDIL.**

CMPDIL technical Note of Talaiwalli Coal Block broadly contained two parts: i) Review of opencast mining strategy of AMP with reference to mineable reserves, overburden quantities, average stripping ratio and waste disposal schedule, and ii) an alternate mining plan strategy of Talaiwalli Coal Block to optimize coal extraction and the coal evacuation strategy, if the AMP is not found to be workable.

Approved Mining Plan (AMP) was examined by CMPDIL with volumetric calculations of coal and overburden quantities using MINEX RDM model prepared by MECL. AMP mentioned only the 1<sup>st</sup> to 5<sup>th</sup> years, and 25<sup>th</sup> years and Final stage (52<sup>nd</sup> mining plan, 10<sup>th</sup> year, 13<sup>th</sup> year and 20<sup>th</sup> year mining plan was missing). Therefore, CMPDIL reviewed these mining plans as per the mining sequence proposed in the AMP for the reserves and overburden quantities (Table 4.1 and 4.2).

**Table 4.1. Comparison of Mineable Reserves, OB volume and Stripping Ratio**

Year	As per Approved Mining Plan (AMP)			As per CMPDIL based on AMP Design		
	Coal (Mt.)	OB (Mbcm)	Stripping Ratio (ton/te)	Coal (Mt.)	OB (Mbcm)	Stripping Ratio (ton/te)
5	44.3	192.44	4.32	36.08	165.07	4.58
25	404.5	1738.64	4.3	430.5	2169.60	5.04
52 (Final)	843.69	3777.07	4.48	790.81	4008.5	5.07

\*Not Workable according to design of Approved Mining Plan as discussed later

**Table 4.2. Variation of Reserve, OB volume and Stripping Ratio**

Year	Variations (%)		
	OB (Mbcm)	Coal (Mt.)	Stripping Ratio (ton/te)
5	-14%	-17%	6%
25	25%	6%	17%
52 (Final)	6%	-6%	13%

Till the 5<sup>th</sup> year mine plan of AMP, while there was a decrease in the coal reserve as per CMPDIL estimate by 19% (from 44.30 Mt in the AMP to 36.08 Mt in the CMPDIL estimate), the decrease in overburden quantity is also 14% (from 192.44 Mbcum to 165.07 Mbcum) leading to a net increase in the stripping ratio by 6%. IIT-ISM is of the view that these variations are well within the expected accuracy level of the

In the 25<sup>th</sup> year mine plan, there is a marginal increase in the coal reserve of CMPDIL estimate by 6% (from 404.50 Mt to 430.5 Mt), the increase in overburden quantity is quite high at 25% (from 1738.64 Mbcum to 2169 Mbcum) leading to an increase in the stripping ratio by 17%. In the final year (52<sup>nd</sup> year) mining plan there has been a decrease in the coal reserve of CMPDIL estimate by 6% (from 843.69 Mt to 790.81.5 Mt), and an increase in overburden quantity is by 6% (from 3777.07 Mbcum to 4003.8 Mbcum) leading to an increase in the stripping ratio by 13%.

It is pertinent to note that a similar study carried out by TEMPL on the 25<sup>th</sup> year mining plan showed a variation of 5.30 Mt in coal (from 404.30 Mt to 409.70 Mt) and + 404.30 Mbcum in overburden (from 1738.64 Mbcum to 2143.00 Mbcum) leading to a net increase in stripping ratio from 4.30 to 5.30 (Table 1.1). However, TEMPL workings were not based on detailed engineering as CMPDIL's. Therefore, IIT-ISM considers the CMPDIL's study more authentic and accepts the outcomes.

#### 4.1. Waste Disposal and Overburden Dumping Plan

AMP has proposed to dump 264.52 Mbcum overburden (from 1<sup>st</sup> year to 9<sup>th</sup> Year) in the external dump and re-handle the same back to the internal dump from 10<sup>th</sup> year to 20<sup>th</sup> year in a systematic manner as the two pit operations advanced and finally merge together in the 20<sup>th</sup> year. The temporary external dump is 60m above the ground level with maximum RL of +360m. A particular area in the dip side within the block has been designated for temporary external dump (Figure 3.4).

CMPDIL reviewed the dump plan and concluded that the maximum OBI that can be accommodated in the proposed temporary external dump area is 178 Mbcum at a swell factor of 1.2 (The "swell factor" is defined as the ratio of the bulk to true weight densities of excavating material). Therefore, 264.52 Mbcum of OBI cannot be accommodated in the temporary external dump as envisaged in the AMP. IIT-ISM is of the view that this is a serious bottle neck to carry out the mining operation beyond 10<sup>th</sup> year.

Further, CMPDIL has estimated that to deliver 44.50 Mt. of coal till the 5<sup>th</sup> year of operation, total overburden to be removed will be approximately ~204 Mbcms instead of 192.44 Mbcms as proposed in the AMP, an additional ~11 Mbcms with a variation in the excavation area (CMPDIL estimated only 36.08 Mt coal and 165.87 Mbcms of overburden from the same excavation area proposed until 5<sup>th</sup> year of the AMP) (Table 4.1). Further, it has been estimated that at the end of 5<sup>th</sup> year of mining operation, the total internal dump capacity created in the mine void is 11.00 Mbcms as against 12.29 Mbcms estimated in the AMP (a variation of approximately 11.7%) (Table 4.3). There will be shortage of space to accommodate approximately 15.0 Mbcms of overburden which is ~7% variation together in external and internal dumps. IIT-ISM is of the view that a variation of ~7% is well within the acceptable limits and there would not be a problem in continuing with the operation until the 5<sup>th</sup> year as per the AMP.

**Table 4.3. Estimation of OB produced and its accommodation in the designated dump at the end of 5 year**

Year	Estimated OB (Mbcms)	Total OB accommodated (Mbcms)			Remarks
		External	Internal	Total	
5	204	178	11	189	Shortage of space for ~15 Mbcms of OB

Prima-facie from Figure 3.4, it will seem possible to accommodate extra quantities of overburden in the external dump by increasing its height the dump due to the availability of space and thus continuing the two-pit operation in the 10<sup>th</sup> year. From 10<sup>th</sup> to 20<sup>th</sup> year of mining operation, a detailed analysis with proper engineering design and the plant was required to ascertain that the operation does not stop as the intensity of operation increase due to re-handling of external dump.

Accordingly, CMPDIL carried out this exercise by increasing the height of temporary external dump to 90m above the ground level up-to a RL of +300m, the maximum overburden quantity in the revised external dump would increase to ~251 Mbcms from 178 Mbcms in the dump up to +300m level. Thus following the natural excavation plan (249 Mbcms - un-adjusted), the mining operation is going to be feasible till 6<sup>th</sup> year. However, if the advance stripping is continued till the 5<sup>th</sup> year stage, total OB generated would be ~268 Mbcms and total OB accommodation in internal dump would be short by ~25

Mbcm. So, the mine operation will stop in 6<sup>th</sup> year, even if the height of the dump is increased.

Further, to ensure progression of the mine beyond 5<sup>th</sup> year, CMPDIL evaluated the dumping options considering the entire land within the lease area is available for dumping and thus external dumping was to be done in the southern extremities of the block.

CMPDIL estimated that to deliver 404.50 Mt of coal till 25<sup>th</sup> year of mining operation, a total of ~2040 Mbcm of overburden will be generated following the mining sequence proposed in the AMP. CMPDIL has analyzed the availability of space for internal and external dumping for 5<sup>th</sup>, 10<sup>th</sup> and 15<sup>th</sup> years of mining operation up to the RL of +300m as shown in Table 4.4.

**Table 4.4 Stage-Wise Estimation of OB generated and Dumping Space**

Year of Operation	Coal (Mt.)	Estimated OB (Mbcm)	Total Dump accommodation up-to RL of +300m (Mbcm)			Remarks
			External	Internal	Total	
5	44.50	204	688	11	689	Dumping space adequate
10	134.51	675	544	209	753	Dumping space adequate
15	224.51	1160	403	507	910	Dumping space inadequate

Further, CMPDIL estimated that up to 25<sup>th</sup> year of mining operation, the total internal dumping space created would be ~1173 Mbcm (up-to RL of +300m) of OB while the Mining Plan envisaged to re-handle and backfill the entire OB (1738.64 Mbcm) generated as per the AMP till 25<sup>th</sup> year of mining operation. Evidently, the accommodation of total OB internally would not be feasible and hence the mining operation would not happen till 25<sup>th</sup> year of operation.

CMPDIL further explored the possibilities to accommodate more overburden dumps by increasing the dump high level to +390m (4 decks of 30m each). CMPDIL estimated that even with an increase in the final dump height to +390m, total designed space for overburden dump would be ~1070 Mbcm, thus making the mining operation not feasible beyond 14<sup>th</sup> year.

In the 25<sup>th</sup> year of mining operation, CMPDIL estimated the total external dump space beyond 25<sup>th</sup>



year pit boundary is ~ 175 Mcum up to an RL of +300m. Therefore, even after utilizing the entire land available for external dump, the total dump accommodation in 25<sup>th</sup> year would be 1350 Mcum (External + Internal) while the total OB generated would be ~2000 Mcum. It is clear that there is no space for dumping available for ~600 Mcum of OB.

Therefore, the examination of the Mining Plan has led to the conclusion that overall, this Mining Plan does not seem to be practical and workable for 25 years as a lot of errors are there in the estimation of internal and external dump quantities. Mineable coal and mining life given in mining plan is not feasible. Also dump accommodation as suggested in mining plan is not feasible. There is calculation error in stripping ratio as well.

UI-ISM agrees with the estimation of overburden dumps within the lease hold area at different years of mining operations and endorses the view of CMPDIL that it would be difficult to carry out the mining operation beyond 17<sup>th</sup> years due to serious issues associated with excavation and dumping schedule.

#### **4.A Alternative Mine Plan Option of CMPDIL**

In the light of the above findings of the AMP, CMPDIL thoroughly reviewed the mining strategy of Tallapali coal mine. CMPDIL suggested an alternative mining strategy based on the maximization of coal extraction, optimum overburden removal and dumping schedule, still meeting the coal production requirements of 18.0 Mt.

The alternative mining plan maximized the coal extraction with less surface area up to Seam III so that more overburden can be accommodated in external and internal dump. The alternative mining plan still followed two - pit operation - one on the north eastern side and the other on the western side. However, due to lack of adequate dumping space, the western quarry is terminated 5<sup>th</sup> year of mining operation after mining coal up to seam VI to a maximum depth of 110m (Figure 4.1), so that the void and the space thus created could be utilized for additional quantities of overburden generated from eastern

pit in the subsequent years.



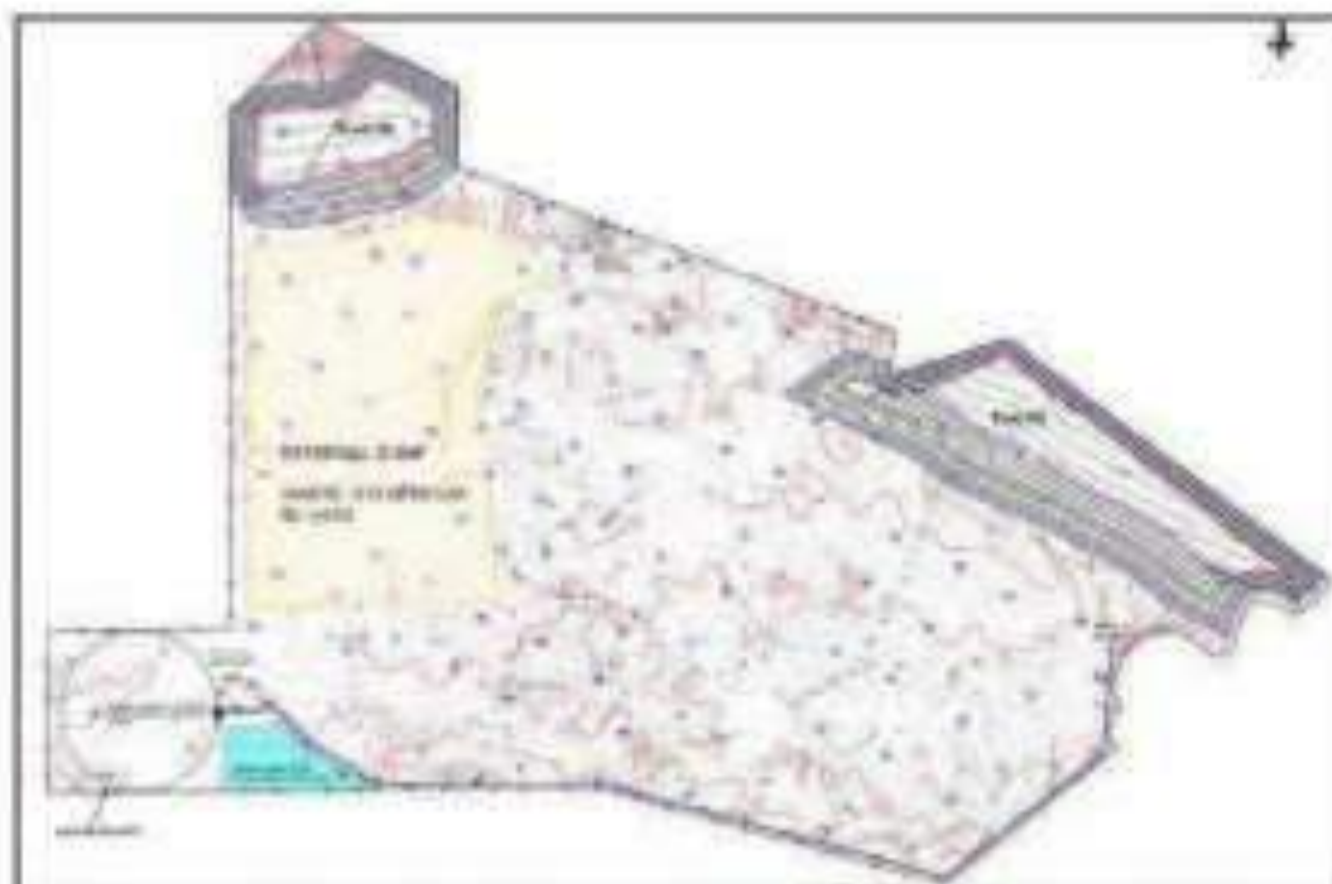


Figure 4.1. Mining plan at the end of 5<sup>th</sup> year of operation

A tentative calendar programme of excavation and O&M disposal schedule of the alternative mining plan is shown in Table 4.5.

As

Table 45. Calendar Program of Excavation of Alternatives / Modified Mining Plan

Year	Coal (MT)		Cement Coal (MT)		OB (MMt)		Cement OB (MMt)	Strip Ratio (Cumul)	Cement OB (MMt)
	2011	2012	2013	2014	2015	2016			
1	0.0	0.0	1.1	1.1	6.22	1.14	7.36	7.36	4.94
2	7	7	4	4.4	6.77	10.47	17.24	34.60	4.94
3	4	4	6	6.6	10.73	30.99	41.72	76.32	4.94
4	9	4	15	16.5	41.24	50.99	92.23	126.55	4.94
5	14.75	10	18	19.5	46.32	38.11	84.43	210.98	4.94
6	18	18	18	19.5	46.32	41.08	87.40	298.38	4.94
7	18	18	18	19.5	46.32	44.05	90.45	386.83	4.94
8	18	18	18	19.5	46.32	47.02	93.47	475.30	4.94
9	18	18	18	19.5	46.32	50.00	96.47	563.77	4.94
10	18	18	18	19.5	46.32	52.97	99.44	652.24	4.94
11	18	18	18	19.5	46.32	55.94	102.41	740.71	4.94
12	18	18	18	19.5	46.32	58.91	105.38	829.18	4.94
13	18	18	18	19.5	46.32	61.88	108.35	917.65	4.94
14	18	18	18	19.5	46.32	64.85	111.32	1006.12	4.94
15	18	18	18	19.5	46.32	67.82	114.29	1094.59	4.94
16	18	18	18	19.5	46.32	70.79	117.26	1183.06	4.94
17	18	18	18	19.5	46.32	73.76	120.23	1271.53	4.94
18	18	18	18	19.5	46.32	76.73	123.20	1360.00	4.94
19	18	18	18	19.5	46.32	79.70	126.17	1448.47	4.94
20	18	18	18	19.5	46.32	82.67	129.14	1536.94	4.94
21	18	18	18	19.5	46.32	85.64	132.11	1625.41	4.94
22	18	18	18	19.5	46.32	88.61	135.08	1713.88	4.94
23	18	18	18	19.5	46.32	91.58	138.05	1802.35	4.94
24	18	18	18	19.5	46.32	94.55	141.02	1890.82	4.94
25	18	18	18	19.5	46.32	97.52	143.99	1979.29	4.94
26	18	18	18	19.5	46.32	100.49	146.96	2067.76	4.94
27	18	18	18	19.5	46.32	103.46	149.93	2156.23	4.94
28	18	18	18	19.5	46.32	106.43	152.90	2244.70	4.94
29	18	18	18	19.5	46.32	109.40	155.87	2333.17	4.94
30	18	18	18	19.5	46.32	112.37	158.84	2421.64	4.94
31	18	18	18	19.5	46.32	115.34	161.81	2510.11	4.94
32	18	18	18	19.5	46.32	118.31	164.78	2598.58	4.94
33	18	18	18	19.5	46.32	121.28	167.75	2687.05	4.94
34	18	18	18	19.5	46.32	124.25	170.72	2775.52	4.94
35	18	18	18	19.5	46.32	127.22	173.69	2863.99	4.94
36	18	18	18	19.5	46.32	130.19	176.66	2952.46	4.94
37	18	18	18	19.5	46.32	133.16	179.63	3040.93	4.94
38	18	18	18	19.5	46.32	136.13	182.60	3129.40	4.94
39	18	18	18	19.5	46.32	139.10	185.57	3217.87	4.94
40	18	18	18	19.5	46.32	142.07	188.54	3306.34	4.94
41	18	18	18	19.5	46.32	145.04	191.51	3394.81	4.94
42	18	18	18	19.5	46.32	148.01	194.48	3483.28	4.94
43	18	18	18	19.5	46.32	150.98	197.45	3571.75	4.94
44	18	18	18	19.5	46.32	153.95	200.42	3660.22	4.94
45	18	18	18	19.5	46.32	156.92	203.39	3748.69	4.94
46	18	18	18	19.5	46.32	159.89	206.36	3837.16	4.94
47	18	18	18	19.5	46.32	162.86	209.33	3925.63	4.94
48	18	18	18	19.5	46.32	165.83	212.30	4014.10	4.94
49	18	18	18	19.5	46.32	168.80	215.27	4102.57	4.94
50	18	18	18	19.5	46.32	171.77	218.24	4191.04	4.94
51	18	18	18	19.5	46.32	174.74	221.21	4279.51	4.94
52	18	18	18	19.5	46.32	177.71	224.18	4367.98	4.94
53	18	18	18	19.5	46.32	180.68	227.15	4456.45	4.94
54	18	18	18	19.5	46.32	183.65	230.12	4544.92	4.94
55	18	18	18	19.5	46.32	186.62	233.09	4633.39	4.94
56	18	18	18	19.5	46.32	189.59	236.06	4721.86	4.94
57	18	18	18	19.5	46.32	192.56	239.03	4810.33	4.94
58	18	18	18	19.5	46.32	195.53	242.00	4898.80	4.94
59	18	18	18	19.5	46.32	198.50	244.97	4987.27	4.94
60	18	18	18	19.5	46.32	201.47	247.94	5075.74	4.94
61	18	18	18	19.5	46.32	204.44	250.91	5164.21	4.94
62	18	18	18	19.5	46.32	207.41	253.88	5252.68	4.94
63	18	18	18	19.5	46.32	210.38	256.85	5341.15	4.94
64	18	18	18	19.5	46.32	213.35	259.82	5429.62	4.94
65	18	18	18	19.5	46.32	216.32	262.79	5518.09	4.94
66	18	18	18	19.5	46.32	219.29	265.76	5606.56	4.94
67	18	18	18	19.5	46.32	222.26	268.73	5695.03	4.94
68	18	18	18	19.5	46.32	225.23	271.70	5783.50	4.94
69	18	18	18	19.5	46.32	228.20	274.67	5871.97	4.94
70	18	18	18	19.5	46.32	231.17	277.64	5960.44	4.94
71	18	18	18	19.5	46.32	234.14	280.61	6048.91	4.94
72	18	18	18	19.5	46.32	237.11	283.58	6137.38	4.94
73	18	18	18	19.5	46.32	240.08	286.55	6225.85	4.94
74	18	18	18	19.5	46.32	243.05	289.52	6314.32	4.94
75	18	18	18	19.5	46.32	246.02	292.49	6402.79	4.94
76	18	18	18	19.5	46.32	248.99	295.46	6491.26	4.94
77	18	18	18	19.5	46.32	251.96	298.43	6579.73	4.94
78	18	18	18	19.5	46.32	254.93	301.40	6668.20	4.94
79	18	18	18	19.5	46.32	257.90	304.37	6756.67	4.94
80	18	18	18	19.5	46.32	260.87	307.34	6845.14	4.94
81	18	18	18	19.5	46.32	263.84	310.31	6933.61	4.94
82	18	18	18	19.5	46.32	266.81	313.28	7022.08	4.94
83	18	18	18	19.5	46.32	269.78	316.25	7110.55	4.94
84	18	18	18	19.5	46.32	272.75	319.22	7199.02	4.94
85	18	18	18	19.5	46.32	275.72	322.19	7287.49	4.94
86	18	18	18	19.5	46.32	278.69	325.16	7375.96	4.94
87	18	18	18	19.5	46.32	281.66	328.13	7464.43	4.94
88	18	18	18	19.5	46.32	284.63	331.10	7552.90	4.94
89	18	18	18	19.5	46.32	287.60	334.07	7641.37	4.94
90	18	18	18	19.5	46.32	290.57	337.04	7729.84	4.94
91	18	18	18	19.5	46.32	293.54	340.01	7818.31	4.94
92	18	18	18	19.5	46.32	296.51	342.98	7906.78	4.94
93	18	18	18	19.5	46.32	299.48	345.95	7995.25	4.94
94	18	18	18	19.5	46.32	302.45	348.92	8083.72	4.94
95	18	18	18	19.5	46.32	305.42	351.89	8172.19	4.94
96	18	18	18	19.5	46.32	308.39	354.86	8260.66	4.94
97	18	18	18	19.5	46.32	311.36	357.83	8349.13	4.94
98	18	18	18	19.5	46.32	314.33	360.80	8437.60	4.94
99	18	18	18	19.5	46.32	317.30	363.77	8526.07	4.94
100	18	18	18	19.5	46.32	320.27	366.74	8614.54	4.94
101	18	18	18	19.5	46.32	323.24	369.71	8703.01	4.94
102	18	18	18	19.5	46.32	326.21	372.68	8791.48	4.94
103	18	18	18	19.5	46.32	329.18	375.65	8879.95	4.94
104	18	18	18	19.5	46.32	332.15	378.62	8968.42	4.94
105	18	18	18	19.5	46.32	335.12	381.59	9056.89	4.94
106	18	18	18	19.5	46.32	338.09	384.56	9145.36	4.94
107	18	18	18	19.5	46.32	341.06	387.53	9233.83	4.94
108	18	18	18	19.5	46.32	344.03	390.50	9322.30	4.94
109	18	18	18	19.5	46.32	347.00	393.47	9410.77	4.94
110	18	18	18	19.5	46.32	350.97	396.44	9499.24	4.94
111	18	18	18	19.5	46.32	353.94	399.41	9587.71	4.94
112	18	18	18	19.5	46.32	356.91	402.38	9676.18	4.94
113	18	18	18	19.5	46.32	359.88	405.35	9764.65	4.94
114	18	18	18	19.5	46.32	362.85	408.32	9853.12	4.94
115	18	18	18	19.5	46.32	365.82	411.29	9941.59	4.94
116	18	18	18	19.5	46.32	368.79	414.26	10030.06	4.94
117	18	18	18	19.5	46.32	371.76	417.23	10118.53	4.94
118	18	18	18	19.5	46.32	374.73	420.20	10207.00	4.94
119	18	18	18	19.5	46.32	377.70	423.17	10295.47	4.94
120	18	18	18	19.5	46.32	380.67	426.14	10383.94	4.94
121	18	18	18	19.5	46.32	383.64	429.11	10472.41	4.94
122	18	18	18	19.5	46.32	386.61	432.08	10560.88	4.94
123	18	18	18	19.5	46.32	389.58	435.05	10649.35	4.94
124	18	18	18	19.5	46.32	392.55	438.02	10737.82	4.94
125	18	18	18	19.5	46.32	395.52	440.99	10826.29	4.94
126	18	18	18	19.5	46.32	398.49	443.96	10914.76	4.94
127	18	18	18	19.5	46.32	401.46	446.93	11003.23	4.94
128	18	18	18	19.5	46.32				

Mining plans of 10<sup>th</sup> year, 15<sup>th</sup> year and 20<sup>th</sup> year developed by CMPDIL are shown in Annexure I.

#### 4.3.1. Mine Boundary

The mine boundary for the western and eastern quarry was fixed taking into consideration block boundary, surface features, strip ratio and external dump space required for continuity of mining.

**West Pit:** The west pit was designed up-to Seam VII at a maximum depth of 110m to be operated in the initial 5 years. This was required in order to create more space for dumping of overburden needed in the subsequent years for the overburden of the East Pit (Table 4.4). The coal extraction was limited to seam VI because it was not possible to reach seam III (at a depth of 250m in 5<sup>th</sup> year) in the constrained geological conditions considering the dumping requirements. The West pit boundary is determined by the following conditions:

<b>Northern Boundary</b>	: Foot of the hill in northwest and 7.5m from the block boundary
<b>Southern Boundary</b>	: Extent of the pit up-to 5 <sup>th</sup> year of operation
<b>Eastern Boundary</b>	: 7.5m from the block and extent of the pit upto 5 year of operation
<b>Western Boundary</b>	: 7.5m from the block boundary

**East Pit:** The East pit is proposed up-to Seam III. The major considerations for the fixing of Eastern Pit boundary were the requirements of space for external dumping within the block boundary and minimization of overburden quantity still meeting the coal production requirements. The East pit boundary was determined by the following conditions:

<b>Northern Boundary</b>	: 7.5m from the block boundary
<b>Southern Boundary</b>	: 100m from the block for conveyor corridor and magazine
<b>Eastern Boundary</b>	: 60m from Kaku cover and 7.5m from block boundary
<b>Western Boundary</b>	: Fault F1 and an arbitrary line considering low strip ratio zone and having sufficient external dump space in the western side.

The East pit will operate till end of the life. Till 1<sup>st</sup> year of operation, coal production from both the pit will reach 18.00 Mtpy. Internal dump will start once sufficient void is created in the pit. After 3 years, the east pit will independently produce 18.00 Mtpy till 25<sup>th</sup> year of mine operation by open cast mining (Table 4.4). It has been proposed to start internal dumping in east pit from 6<sup>th</sup> year of

mining operation when the sufficient void is created within the pit. At the same time the backfilling will also be done in the West pit from 6<sup>th</sup> year. By 10<sup>th</sup> year of mining operation (Figure 4.2), the West pit will be completely filled and merged with the external dump, and the external dump will also begin merging with the internal dump of East pit.

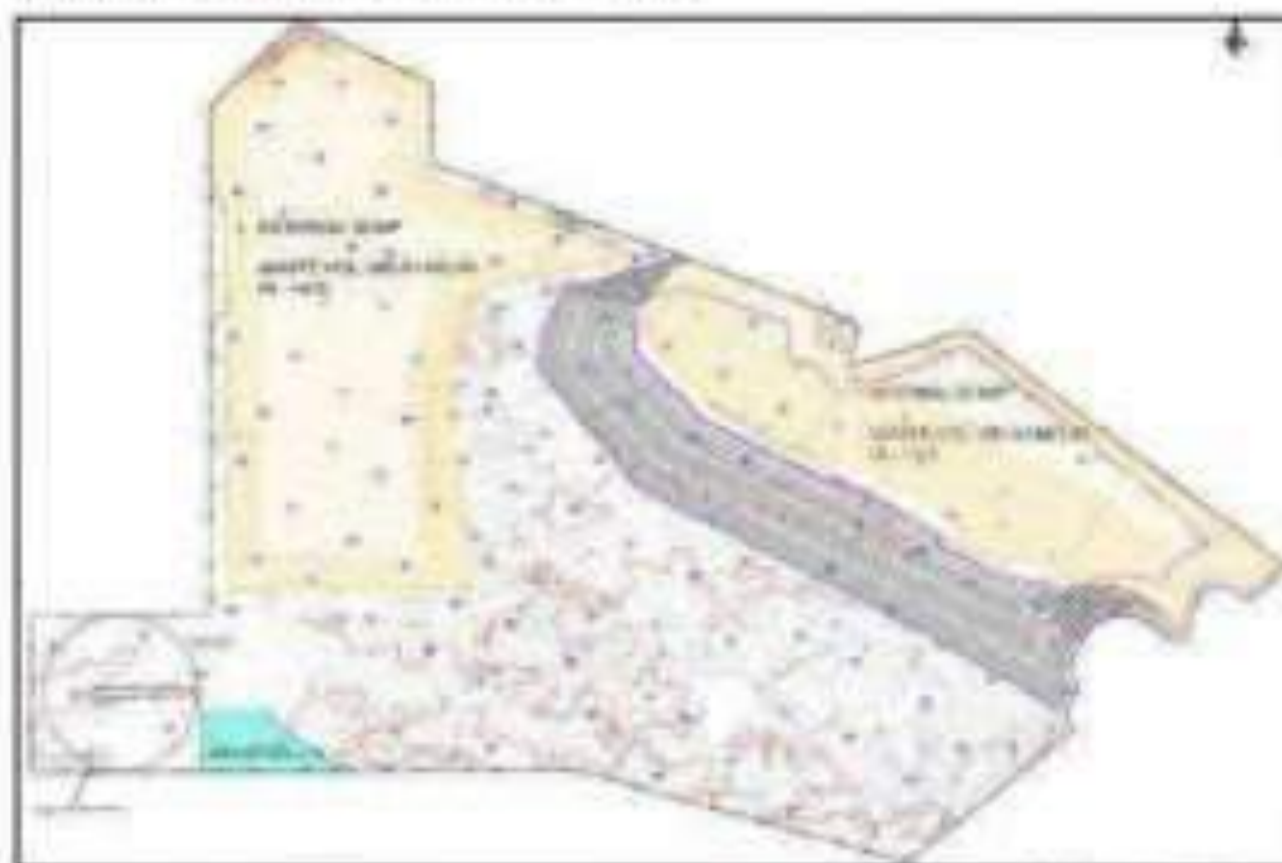


Figure 4.2. 10<sup>th</sup> year mining operation showing external and internal dumps.

Overburden removal from East pit peaks in the 6<sup>th</sup> year of operation at 91.08 Mtons and continues till the 9<sup>th</sup> year before it tapers down to 88.68m in the 10<sup>th</sup> year and 81.10 Mtons from 11<sup>th</sup> to 14<sup>th</sup> year.

#### 4.3.3. Reserve Statement

Statement of reserve as per the revised pit design is shown in Table 4.6.

Table 4.6. Resource and Reserve Statement of Alternative Mining Plan

Particulars	Value in Mt
Net Geological Reserve as per GR	1267.15

Net Geological Reserve by Open Cast Mining Method	575.78
Net Geological Reserve blocked in barrier	142.45
Available Net Geological Reserve for Opencast Mining	433.33
Less: Mining Loss @ 5%	21.67
Mineable Reserve for Opencast Mining	411.66

Net Geological Reserve is arrived considering a geological loss of 30 % from Gross Geological Reserve (Resource) and mining loss of 5 % leading to a final total reserve of 411.66 Mt at a stripping ratio of 4.60 cum/t. Seam-wise resource (geological reserve) and reserve (mineable reserve) statements are shown in Table 4.7.

**Table 4.7. Seam-Wise Resource and Reserve Statement**

Seam	Net Geological Reserve (Mt)	Mineable Reserve (Mt)
X-LA	0.00	0.00
X-LB	0.20	0.19
X-TOP	2.73	2.59
X-BOT	21.95	21.78
IX-L2	7.05	7.55
IX-L1	10.09	9.89
IX	40.40	38.44
VIII	51.58	49.00
VII	2.17	2.06
VI-TOP	10.28	9.77
VI-MID	67.34	63.98
VI-BOT	1.42	1.35
V-TOP	1.10	1.11
V-MID	12.80	12.16
V-BOT	18.27	17.36
IV-TOP	38.75	36.44
IV-MID	57.85	54.96

IV-L	14.13	13.43
IV-BOT	32.11	30.51
III-L	11.34	10.77
III	25.91	25.54
<b>TOTAL</b>	<b>433.33</b>	<b>411.86</b>

Table 4.3. Final pit design parameters

Sl. No.	Parameters	Unit	Value	
			East Pit	West Pit
1	Maximum depth	Meter	250	110
2	Maximum strike length	Km		
	Mine Floor		3.60	1.10
	Mine Surface		4.20	1.40
3	Minimum strike length	Km		
	Mine Floor		2.25	0.90
	Mine Surface		2.90	1.05
4	Maximum dip-rise length	Km		
	Mine Floor		2.40	0.50
	Mine Surface		3.20	0.95
5	Minimum dip-rise length	Km		
	Mine Floor		2.10	0.40
	Mine Surface		3.10	0.80
6	Area	Hectare		
	Mine Floor		775.70	43.43
	Mine Surface		1171.45	111.93

#### 4.4. Overburden dumping strategy

Alternative mining plan envisaged that in the initial 5 years, all the OB generated from east and west pit will be dumped externally (Figure 4.1). The external dump will be located in the western side of the east pit leaving 100m distance from east pit boundary. Once sufficient void is created after 5 years of operation, internal dumping will start in the east pit in the de-coaled area. However, after 5 years, the west pit will cease to exist and the void of the west pit will be utilized to place the overburden generated in the west pit. 665.96 (74.59%). By 10<sup>th</sup> year the west pit will be completely filled and merged with the external dump carrying ~ 665.96 Mton of overburden generated from mining operation (Table 4.8). The external dumping will be continuing till 15<sup>th</sup> year and thereafter only tiny amount of OB of around ~11.04 Mton will be dumped till 20<sup>th</sup> year of operation. No re-handling of external dump back to the east pit is proposed, thus saving huge amount of money for the project. However, based on the environmental impact assessment study, the final void may be left to serve as the water storage for ground water recharging or may be completely reclaimed by flushing external and internal dumps, followed by development of an environment friendly land use for the neighboring society.

Out of the total overburden of 1884.85 Mton, ~510.05 Mton (~27%) will be dumped externally and the balance 1384.80 Mton (~73%) will be dumped internally. The final height of the external dump is will be be ~120m above ground level up-to an RL. of +40m. The final height of the internal dump will be around 90m above ground level up-to an RL. of +37.5m. The dumps will be formed in benches with individual bench heights of 30m each and a bench width of 30m. To ensure the safety of dump, scientific slope stability study will be required for the final dump design under the regulation no. 106, CMR 2017, and DGMS Circular no. 3, 2028 to ensure the safety of operation. The year-wise dumping schedule is provided in Table 4.9 below:

Table 4.9. Tentative Dumping Schedule

Year	External Dump		Internal Dump		Total OB	
	Annual	Cumulative	Annual	Cumulative	Annual	Cumulative
1	7.26	7.26	0.00	0.00	7.26	7.26
2	19.63	26.89	0.00	0.00	19.63	26.89
3	39.26	66.15	0.00	0.00	39.26	66.15
4	62.17	128.33	0.00	0.00	62.17	128.33



3	85.63	213.96		0.00	85.63	213.96
6	34.21	348.17	56.87	56.87	91.08	305.03
7	34.21	282.38	56.87	113.73	91.08	396.11
8	34.21	316.59	56.87	170.60	91.08	487.19
9	34.21	350.80	56.87	227.46	91.08	578.26
10	34.21	385.01	54.47	284.33	88.68	669.34
11	22.40	407.41	58.70	340.65	81.30	748.04
12	22.40	429.81	58.70	396.97	81.30	829.13
13	22.40	452.21	58.70	453.30	81.30	910.23
14	22.40	474.61	58.70	509.62	81.30	991.32
15	22.40	497.01	56.27	572.99	78.87	1070.00
16	1.60	498.61	75.40	648.39	77.00	1147.00
17	1.60	500.21	75.40	723.80	77.00	1224.00
18	1.60	501.81	75.40	799.20	77.00	1301.00
19	1.60	503.41	75.40	874.61	77.00	1378.02
20	1.60	505.01	78.04	951.25	80.38	1458.20
21	0.84	505.85	80.04	1027.29	80.88	1539.14
22	0.84	506.69	80.04	1103.33	80.88	1620.02
23	0.84	507.53	80.04	1179.37	80.88	1700.90
24	0.84	508.37	80.04	1255.41	80.88	1781.78
25	0.84	509.21	80.04	1331.45	80.88	1862.66
26	0.84	510.05	21.35	1384.80	82.39	1894.81

CMPCIL has estimated the lead overburden varying from about 3.00-3.25 km over the life of the mine. For west pit, the average lead for external dumping is estimated to vary from 3.25-3.75 km. For east pit, the average lead of internal dumping is estimated to vary from 3.00-3.50 km. The average lead for external dumping from east pit is estimated to vary from 6.75-7.25 km in initial 30 years and thereafter from 6.00-6.50 km for next 5 years. The lead for external dumping after 18<sup>th</sup> year is estimated to be 3.0 - 3.50 km. IIT-ISM is of the view that there is an opportunity to optimize haulage network of overburden transport on a year-to-year basis on the basis of annual operating plan which has the potential to reduce the lead distance of overburden transport.

#### 4.5. Coal handling and dispatch arrangements

Coal from both the pit is proposed to be transported to surface by the trucks which would then be fed into a mobile crushing arrangement and thereafter to coal dispatch center by surface conveyors. Coal from west pit shall be directly transported to coal dispatch center, as the pit will be operational only for 3 years, therefore, any capital investment for conveyor system would not be a viable option.

As per the Approved Mining Plan, coal will be produced through a shovel/dumper and surface miner equipment systems. Surface miner equipment system is expected to produce ~40% of the coal, i.e., ~7.2 Mtpa (100 mm size). Therefore, crushing of coal will also be required for handling and dispatch. The entire coal produced from Tataipalli Project (18.0 Mtpa) will be transported / dispatched through railways. Loading into the rail wagon at the railway siding will be through Siles and Rapid Loading System (R.L.S). Therefore, a railway siding is proposed in the south-western part of the block for coal loading and dispatch.

As the coal handling plant (CHP) is proposed to cater entire production of coal, accordingly facilities of receiving station, crushing & conveying system up to the site will be established for R.L.S into the railway wagons. The lead for coal varies from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal varies from 4.30-5.00 km.

##### 4.5.1. Coal handling system of East Pit:

East quarry will have a separate receiving station for ROM coal at the mine mouth before it is crushed and conveyed to the annual dispatch arrangement. The proposed coal handling system includes receiving of ROM coal at surface. The receiving pit / surface and the mobile crusher unit will be shifted as the mine advances during the operation. The proposed receiving and crushing stations are proposed at the southern side of the mine at a suitable location.

For East Pit, the average lead for coal varies from 2.50-4.00 km. The lead estimation is tentative and may be estimated each year in the yearly operation plan.

##### 4.5.2. Coal handling system for west pit:

Coal produced from western quarry shall be transported by truck/ dumpers at surface and received in a

hopper of crusher for crushing coal up to (-100) mm size. This crushing station for coal will be placed at a suitable location near proposed stockpile for S/O loading arrangement. The coal up to the crushing station shall be transported from the mine via trucks.

#### 4.5.3. Loading & Dispatch Arrangements

The coal will be loaded in to railway wagons through Rapid load out system having suitable capacity pre-weigh hoppers with loading S/O. Two nos. of silos are proposed with two different rail lines of at the railway siding for loading of coal into railway wagons. Both the silos will be connected with the bridge conveyors for feeding of coal into silos to ensure flexibility in loading.

## CHAPTER 5

### Technical Verifying of CMPDIL Report and Suggestions to Improve Sustainability of Tallaipalli Coal Mine

BIT-ISM examined the approved mine plan (AMP) of Tallaipalli coal block, findings of TEMPL, and technical report of Tallaipalli coal mine prepared by CMPDIL with the following observations:

While prima-facie the overall mining strategy of NTPC's approved mining plan looked sound, the variations in year wise estimated quantities of coal and overburden, estimated quantity of internal and external dump to accommodate overburden volume produced as per the AMP was questioned by both Therent Earthmovers Private Limited (TEMPL) and the CMPDIL report. TEMPL raised four potential problems in the AMP - i) TEMPL observed that 404.5 MT of coal can't be extracted at a stripping ratio of 4.30 cum/cum by 2<sup>nd</sup> year of mine operation as specified in the approved Mining Plan (AMP), ii) there would be an excess OB quantity than envisaged in the AMP which would not be able to be accommodated in the designated internal and external dump areas, iii) 100% backfilling by re-handling of temporary external dump / on pit dump as envisaged in the AMP is not feasible, iv) TEMPL observed that production will stop after 10 year if the two pit approach as proposed in the AMP is followed, and v) TEMPL claimed that the average haul overburden transportation will be 2 to 3 kms more than the average haul indicated in the AMP.

CMPDIL examined the AMP to validate the volumetric calculations of coal and overburden quantities. CMPDIL used MINEX RGM model prepared by MECL for volume calculations. As the AMP contained only the 1<sup>st</sup> to 5<sup>th</sup> years, 25<sup>th</sup> years and Final stage (52<sup>nd</sup> year) mining plans (10<sup>th</sup> year, 15<sup>th</sup> year and 20<sup>th</sup> year mining plan was missing), CMPDIL reviewed these mining plans as per the mining sequence of AMP for estimation of reserves, overburden quantities and stripping strategy. The key findings of CMPDIL and BIT-ISM's comments are as below,

- Till the 5<sup>th</sup> year mine plan of AMP, while there is a decrease in the coal reserve as per CMPDIL estimates by 19% (from 44.50 Mt in the AMP to 36.08 Mt in the CMPDIL estimate), the decrease in overburden quantity is also 14% (from 192.44 Mton to 165.07 Mton) leading to a net increase in the stripping ratio by 6%. As the validation of RGM model was not in the scope of BIT-ISM's

work, therefore, these figures were accepted / relied upon by IIT-ISM. The variations in the stripping ratios are well within the expected level of accuracy +/- 10% of the report. IIT-ISM sees a possibility of errors in estimation of coal reserve and overburden quantity in the approved mining plan.

- Further, CMPDIL estimated that to deliver 44.50 Mt. of coal till the 5<sup>th</sup> year of operation, total overburden to be removed will be approximately ~204 Mbcm instead of 192.44 Mbcm as proposed in the AMP, an additional ~11 Mbcm with a variation in the area of excavation (CMPDIL estimated only 36.08 Mt coal and 165.07 Mbcm of overburden in the same excavation area proposed until 5<sup>th</sup> year by the AMP). Further, it has been estimated that at the end of 5<sup>th</sup> year of mining operation, the total internal dump capacity created in the mine void is 11.00 Mbcm as against 12.29 Mbcm estimated in the AMP (a variation of approximately 1.29 Mbcm). There will be shortage of space to accommodate approximately 15.0 Mbcm of overburden which is ~7% variation together in external and internal dumps. IIT-ISM is of the view that there is a possibility to accommodate this extra volume with a mine modification in the year wise operational plan. Therefore, there should not be a problem in continuing with the operation until the 5<sup>th</sup> year as per the AMP.
- CMPDIL analyzed the availability of space for internal and external dumping for 3<sup>rd</sup>, 10<sup>th</sup> and 15<sup>th</sup> years of mining operation up to the RL. of ~300m, it was observed that the mining operation would stop before the year 15 as there will be a shortfall for dumping space to accommodate ~200 Mbcm extra overburden generated during the operation.

CMPDIL further explored the possibilities to accommodate more overburden dumps by increasing the dump height level to ~390m. CMPDIL estimated that even with an increase in the final dump height to ~390m, total designed space for overburden dump would be ~1070 Mbcm as against the total dumping requirements of 1160<sup>th</sup> Mbcm in the 15<sup>th</sup> year. IIT-ISM does not quite agree with CMPDIL's observation that the mine will not be able to move beyond 14<sup>th</sup> year, the shortfall in the quantity is less than 10% and there would be a possibility to further increase the height at least 5-10m which can accommodate the shortfall in the quantity of dumping space in the 15<sup>th</sup> year.

CMPDIL has not provided any estimate of overburden removal and space for dumping beyond 11<sup>th</sup> years and up to 24<sup>th</sup> year. Therefore, to conclude that the mine will not progress beyond 15<sup>th</sup> year may be premature. In absence of detailed drawings and data submitted by CMPDIL in support their calculations, IIT-ISM has only relied on CMPDIL's estimations and tried to extrapolate few

estimations based on its professional experience and subject matter expertise. CMPDIL has also not provided the estimates for 25<sup>th</sup> year as that IIT-ISM could review the scenarios between 15<sup>th</sup> and 20<sup>th</sup> year.

In the 25<sup>th</sup> year mine plan, there is a marginal increase in the coal reserve of CMPDIL estimates, by 6% (from 404.50 Mt to 400.5 Mt), the increase in overburden quantity is quite high at 25% (from 1738.64 Mbcmt to 2143 Mbcmt) leading to an increase in the stripping ratio by 17%. It was pertinent to note that a similar study carried out by TEMPL in the 25<sup>th</sup> year mining plan showed a variation of 5.30 Mt in coal (from 404.50 Mt to 400.70 Mt) and + 404.36 Mbcmt in overburden (from 1738.64 Mbcmt to 2143.00 Mbcmt) leading to a net increase in stripping ratio from 4.30 to 5.30 (Table 3.1). However, TEMPL workings were not based on detailed engineering as CMPDIL's. Since the review of MINEX ROM model was not in the scope of IIT-ISM's work, IIT-ISM considers the CMPDIL's analysis and accepted these outcomes.

- According to the CMPDIL's calculations, to deliver 404.50 Mt of coal till 25<sup>th</sup> year of mining operation of the AMP, a total of ~ 2040 Mbcmt of overburden will be generated following the mining sequences proposed in the AMP. In the 25<sup>th</sup> year of mining operations, CMPDIL estimated the total external dump space beyond 25<sup>th</sup> year pit boundary is ~ 175 Mbcmt up to an RL of +300m. Therefore, even after utilizing the entire space for dumping, the total accommodation of dump in the 25<sup>th</sup> year would be 1350 Mbcmt (External + Internal) while the total OB generated would be ~2040 Mbcmt. It is clear that there is no space for dumping available for ~690 Mbcmt of OB. CMPDIL has not estimated nor provided the detailed drawings and information in support of its calculation for 25<sup>th</sup> year of mining operations of the approved mining plan. CMPDIL has also not estimated the dumping space beyond +300m level as it has done so in the alternative mining plan.
- The examination of the AMP by CMPDIL has, thus led to the conclusion that overall AMP's mining plan strategies are not workable unless it is further modified / optimized from excavation and dumping point of view. The errors have been found in the estimation of coal and overburden quantities, internal and external dump quantities etc. which can make the implementation of AMP un-feasible. IIT-ISM agrees with the findings of CMPDIL report that there will be a bottleneck in implementing the AMP unless the AMP is modified to address the above issues (Figure i and v of Annexure B).

Accordingly, CMPDIL suggested modifications in the mining plan in order to improve excavation and the dumping strategy of Talapalli coal mine. IIT-ISM has reviewed the modified mining plan

proposed by CMPDIL with following observations:

- CMPDIL analysed the geo-mining conditions / parameters of Talaspalli coal block to ascertain mining of coal takes place for at least for a minimum period of 25 years. In the alternate / modified mining plan, CMPDIL has estimated total mineable coal by open cast mining method to be ~411.88 Mt at an average strip ratio of 4.60 (m<sup>3</sup>/m<sup>3</sup>) for a period of 20 years at an annual production rate of 18Mtpa from 5<sup>th</sup> year of mining operation. Beyond this limit, open cast mining method is not proposed because of the dumping space bottleneck as the operation becomes bound by the external dump. The modified mining plan will follow the two pit operations as proposed in the AMP – one on the north eastern (East Pit) side and the other on the western side (West Pit). However, due to lack of adequate dumping space, the western quarry is terminated in the 7<sup>th</sup> year of mining operation after mining roof up to seam VI up to a maximum depth of 110m, so that the mine void and the space thus created could be utilized for additional quantities of overburden generated from eastern pit in the subsequent years. The East pit will operate till end of the life up to seam III, and up to a maximum depth of ~350m. There is a scope to increase the internal dump height with proper dump slope study by 20 – 30m thus increasing the capacity of internal dump and reducing the external dump quantity, thus de-bottle necking the mining operation beyond 20 years. An expert professional agency may be engaged to carry this study.
- Till 5<sup>th</sup> year of operation, coal production from both the pit will reach 18.00 Mtpa. Internal dump will start once sufficient void is created in the pit. After 5 years, the east pit will independently produce 18.00 Mtpa till 25<sup>th</sup> year of mining operation. It has been proposed to start internal dumping in east pit from 6<sup>th</sup> year of mining operation when the sufficient void is created within the pit. At the same time the complete backfilling will also be done of the West pit from 6<sup>th</sup> year. By 10<sup>th</sup> year of operation, the West pit will be completely filled and merged with the external dump, and the external dump will also begin merging with the internal dump of keeping a barrier of 100m between the excavation of the east pit and the dumping area. IIT-ISM does not find any bottleneck in continuing the operation till 30<sup>th</sup> year (Figure 1) and viii of Annexure I).
- IIT-ISM has also analysed the dumping scenario in the 17<sup>th</sup> and 20<sup>th</sup> year (Figure ix and figure x of Annexure II) and finds a scope of increasing the total dump quantity by 3 to 5% in the existing dump plan.
- Out of the total overburden of 1894.85 Mton, ~410.05 Mton (~22%) is proposed to be dumped externally and the balance 1384.80 Mton (~73%) internally. The final height of the external dump

is will be ~120m above ground level up-to an RL of +410m. The final height of the internal dump will be around 90m above ground level up-to an RL of +375m. IIT-ISM reviewed the available dumping space (Internal + External + West Pit Void) and finds an scope to increase the overburden dump quantity by 3 – 5%, up to 2000 Mtpa (Figure 3). Further, the dumps will be formed in benches with individual bench heights of 30m each and a bench width of 30m. IIT-ISM is of the view that there exists a scope to increase the height internal dump by another 20-30m thus de-bottle necking and continuing the operation beyond 20<sup>th</sup> years and making available additional coal reserve.

- IIT-ISM has carried out a high-level study of the average overburden transportation lead in the 5<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup>, 20<sup>th</sup> and 25<sup>th</sup> year of operation (Table 5.1).

**Table 5.1. Approximate Average Lead for Overburden Transportation**

Years of Operation	Average Lead (km)	
	Internal Dump	External Dump
5th Year	-	4.50
10th Year	4.2	5.10
15th Year	4.8	-
20th Year	4.8	-
25th Year	4.5	-

- As the life of the west pit is only 3 years, a truck transport is proposed for coal transportation up to the railway siding instead of a conveyor transport which could eventually have a larger environmental foot print than the truck transport considering its installation and dis-mantling in a 3 years' timeframe, in addition to its economic viability. For the east pit, conveyor transport is proposed from the mouth of the pit until the railway siding.
- CMPPDIL has estimated the lead overburden varying from about 3.00-7.25 km over the life of the mine. For west pit, the average lead for external dumping is estimated to vary from 3.25-3.75 km. For east pit, the average lead of internal dumping is estimated to vary from 3.00-3.50 km. The average lead for external dumping from east pit is estimated to vary from 6.75-7.25 km in initial 10 years and thereafter from 6.50-6.50 km for next 5 years. The lead for external dumping after 15<sup>th</sup> year is estimated to be 3.0 – 3.50 km.
- The entire coal produced from Talaspail Project (18.0 Mt) will be transported / dispatched through railways. Loading into the rail wagon at the railway siding will be through Slow and Rapid Loading System (RLS).



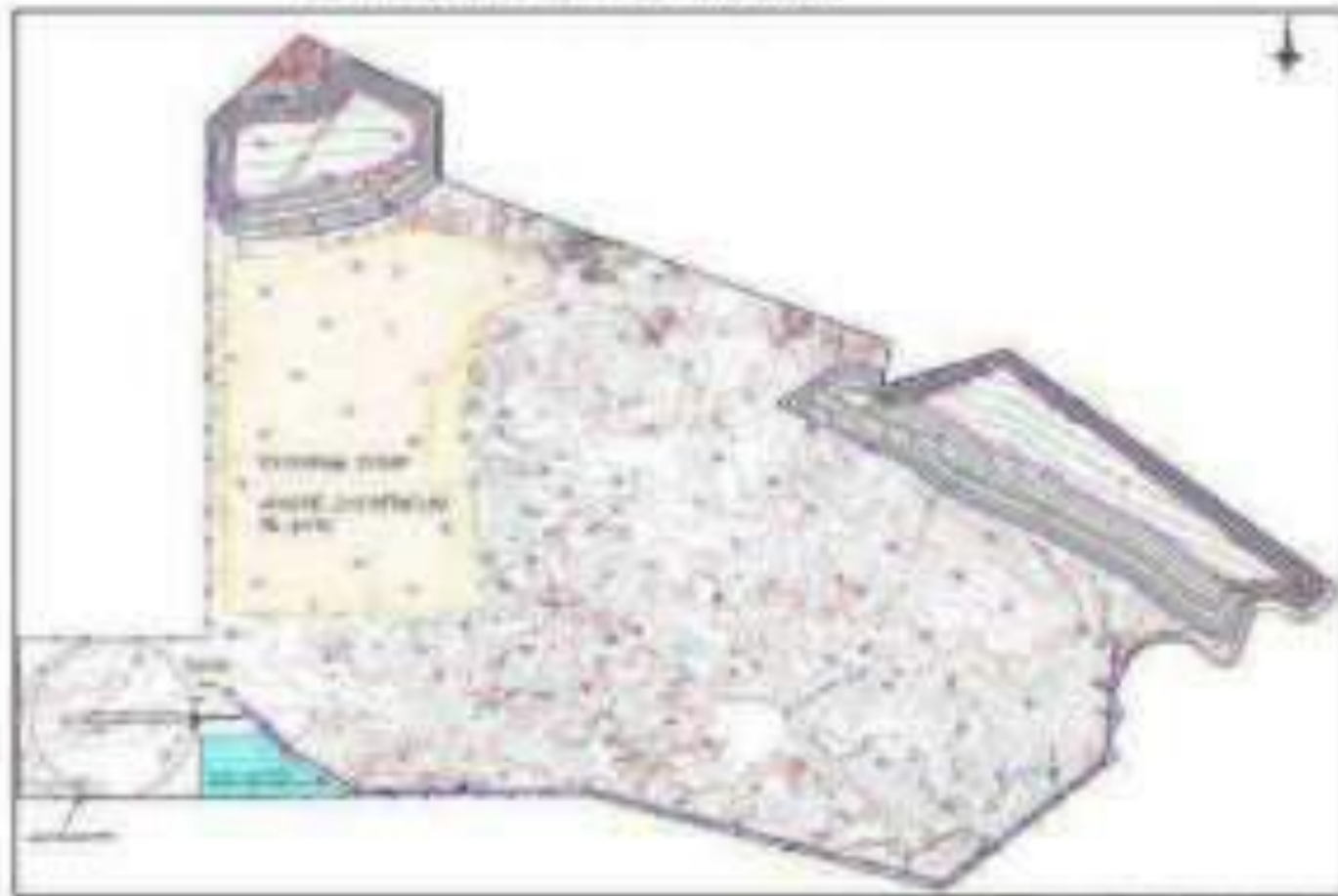
- The lead for coal varies from about 2.50 – 5.00 km over the life of the mine. For west Pit, the average lead for coal will vary from 4.25-5.00 km.

Following suggestions of IIT-ISM may be considered which may have the bearing on the sustainability and viability of the alternative / modified mining plan of CMPDIL.

- As proposed by CMPDIL, the dumps (both internal and external) will be formed in benches with individual bench heights of 30m each and a bench width 30m. However, while reviewing the 25<sup>th</sup> year plan, it is found the individual bench width is 40m instead of 30m as suggested in the text. This could have a significant impact on the quantities of internal dump and consequently delimiting the mining operation at 25<sup>th</sup> year as proposed by CMPDIL. A representative cross section extracted from 25<sup>th</sup> year mining plan is shown in (Figure x, Annexure E).
- Alternative / modified mining plan involves large quantity of coal to be mine by open cast mining method. The new mining plan extracts only ~ 411.00 Mt of coal for a period of 20 years as against the total mineable coal reserve of 841.00 Mt for a period of 32 years because no re-handling of external dump is proposed. This aspect may be looked into with detailed mine planning with an objective to further optimize the mining sequence.
- As per the alternative / modified mining plan, open cast mining starts in the 20<sup>th</sup> year (becomes bound by the external dump). In case this alternative mining plan of CMPDIL is adopted, NTPC should explore possibilities of High Wall Mining on the final high wall faces of the open cast mine to maximize the extraction of coal.
- IIT-ISM suggests flushing of internal and external dump for the reclamation of final void of the cast pit to develop a land form for a better land use and minimize environmental impacts of mining. While doing so IIT-ISM proposes to take into confidence the community around for sustainable land usage post mining.
- Both the AMP and CMPDIL report suggest application of Surface Mines in the windrowing options to mine ~40%, i.e., ~7.2 Mt of coal. IIT-ISM is of the view that as the mine has the provisions of crushing and conveying the entire coal produced from the Tallapalli coal mine, and there is no requirement of selective coal mining, a cost benefit analysis of surface mine equipment system (Surface Mine + BEL + Trucks) vis-a-vis the shovel dumper equipment system (Shovel + Truck + Blasting) should be performed.
- IIT-ISM is of the view that there is an opportunity to optimize haulage network of overburden

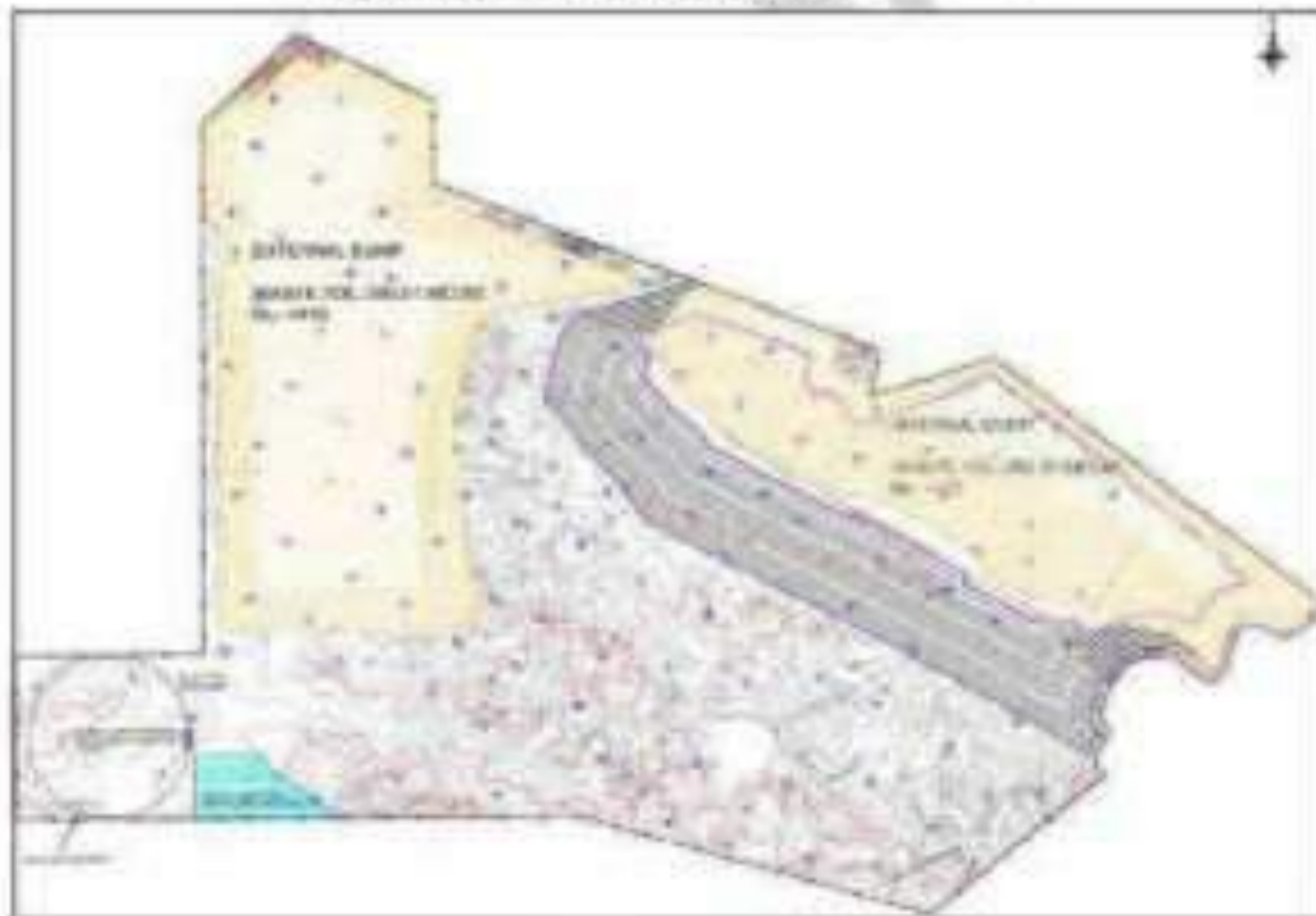
transport on a year-to-year basis on the basis of annual operating plan which has the potential to reduce the lead distance of overburden transport.

Annexure 1  
Figure 1. 10<sup>th</sup> year modified mining plan of CMPDIL.



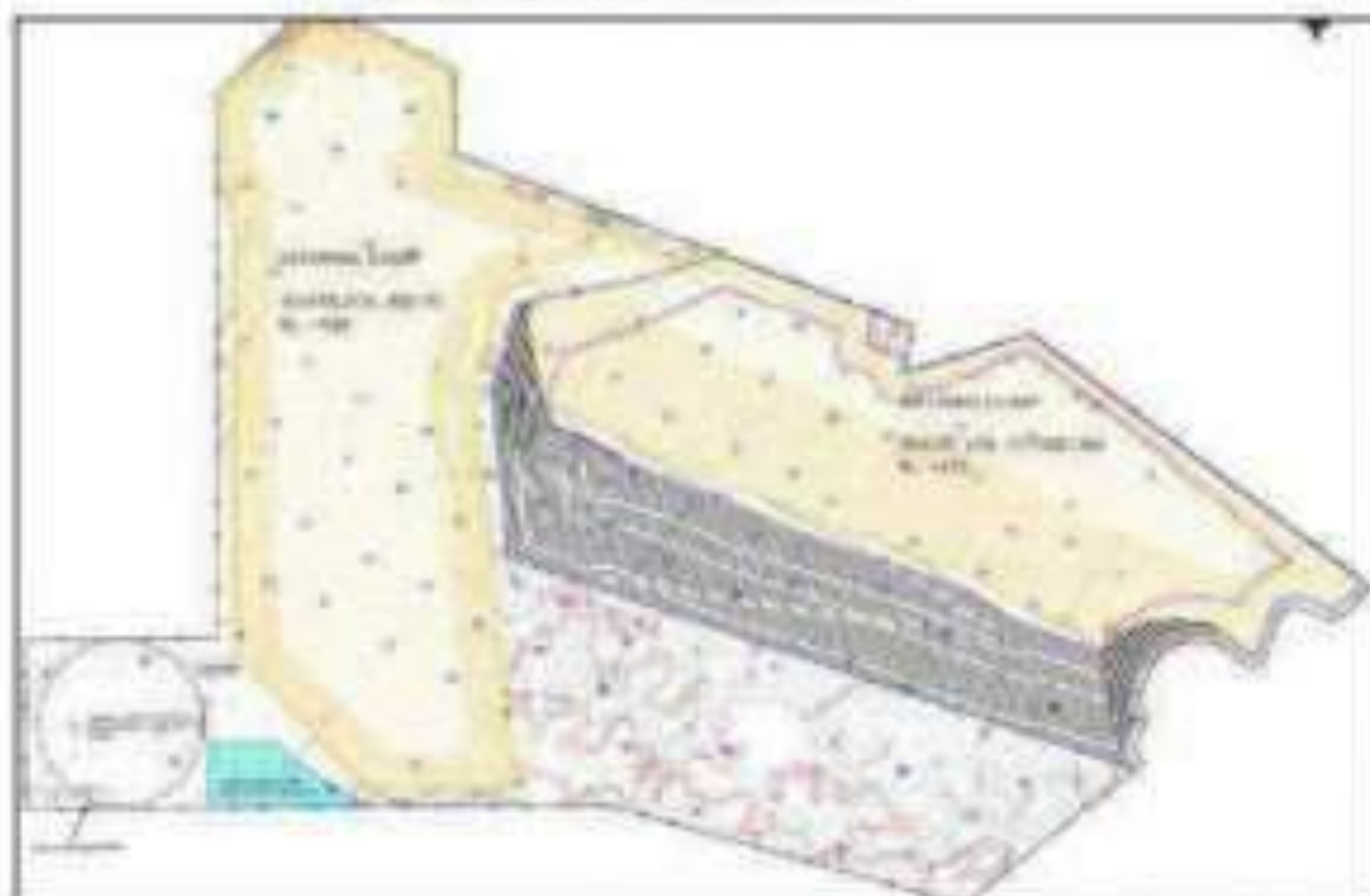
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Figure 2. 10<sup>th</sup> year modified mining plan of CMPDIL.

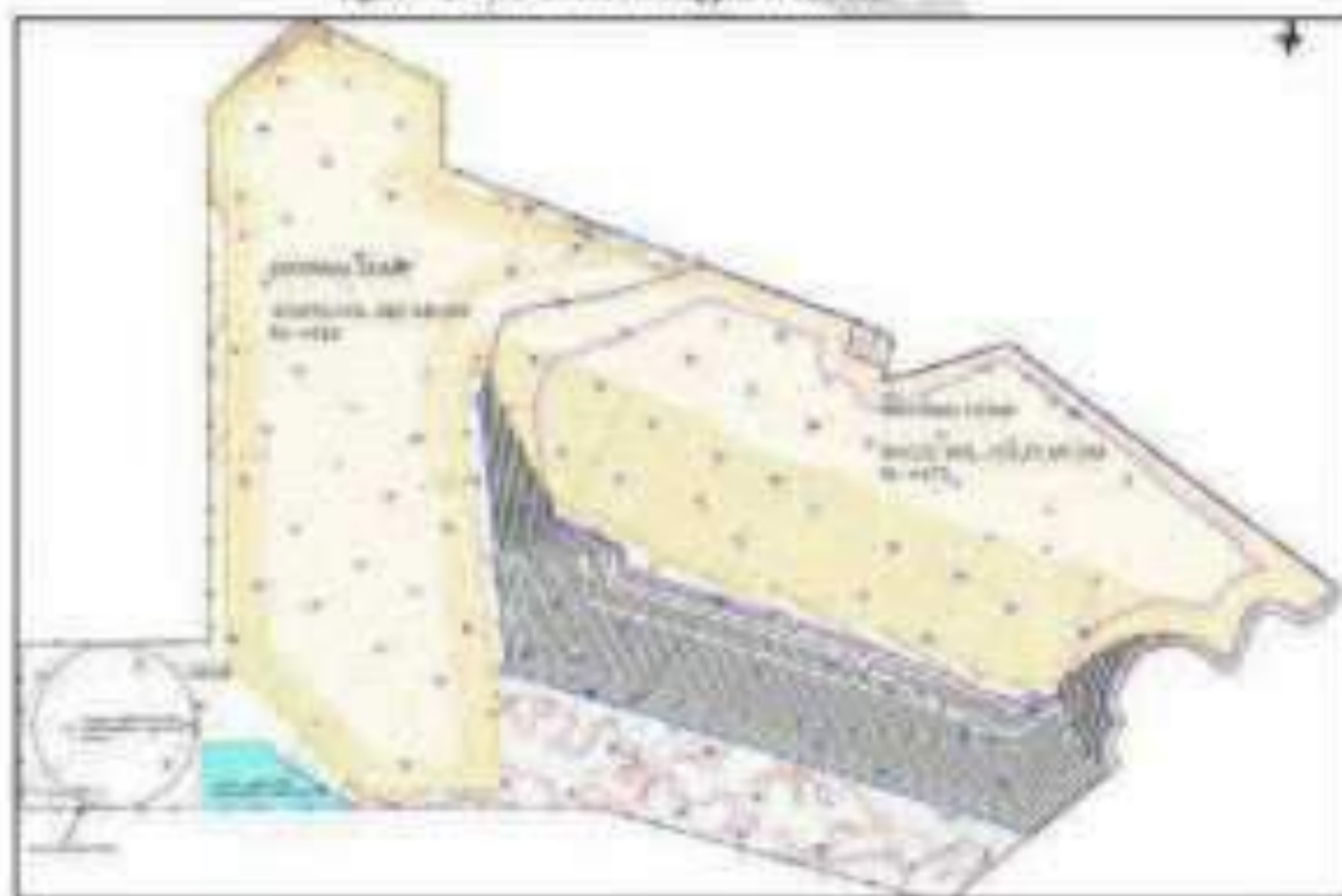


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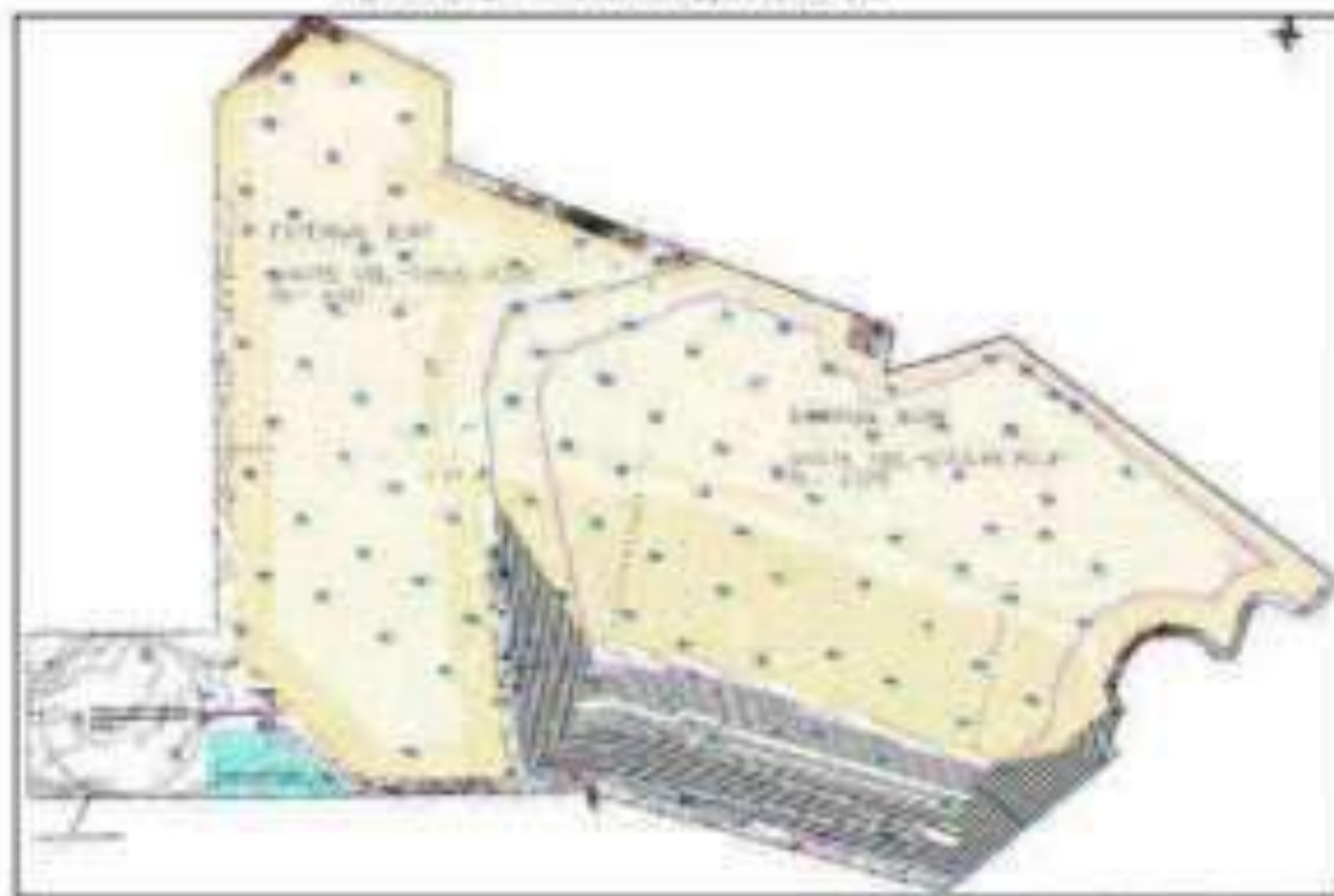
Figure 86. 15<sup>th</sup> year modified mining plan of CMPDL.

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Figure 87. 20<sup>th</sup> year modified mining plan of CMPDL.

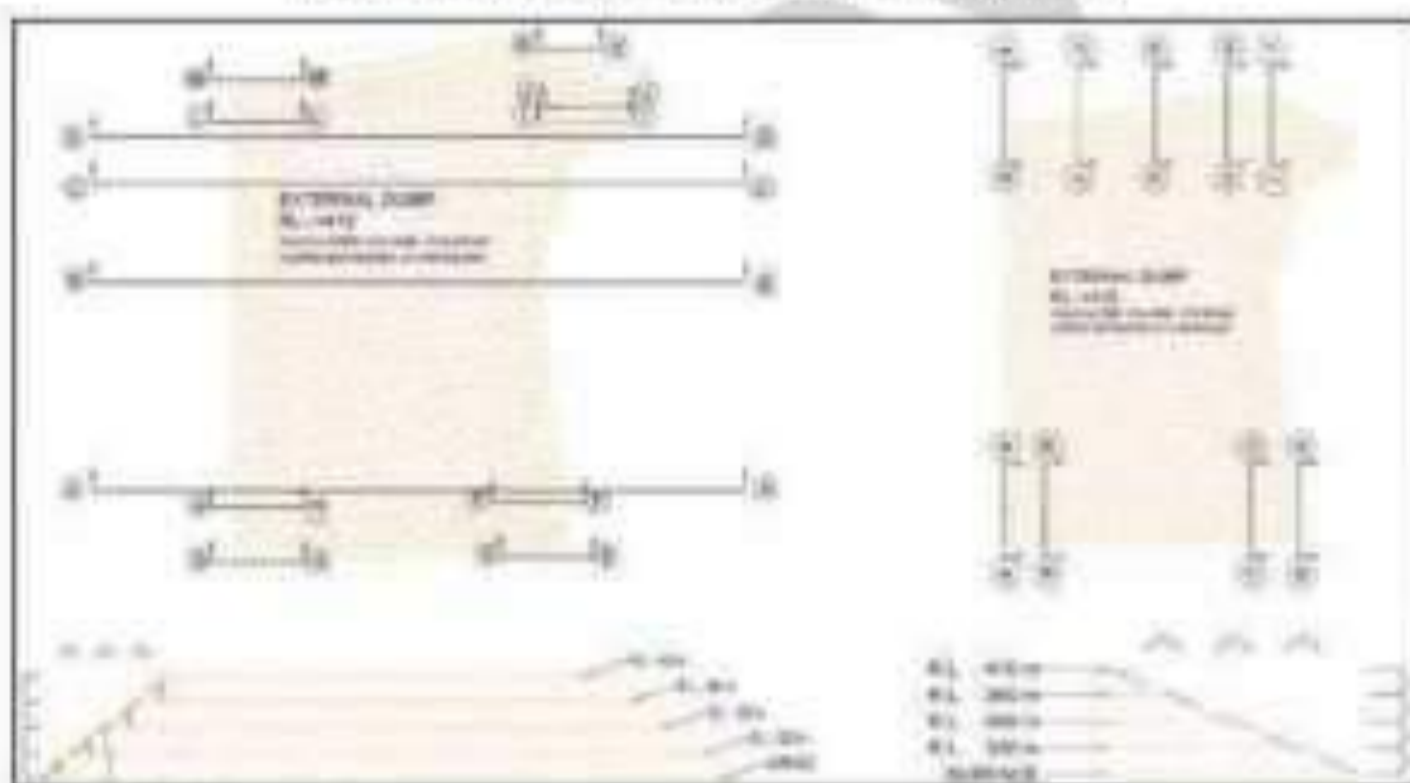
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Figure 5. 25<sup>th</sup> year modified mining plan of CMPPDL



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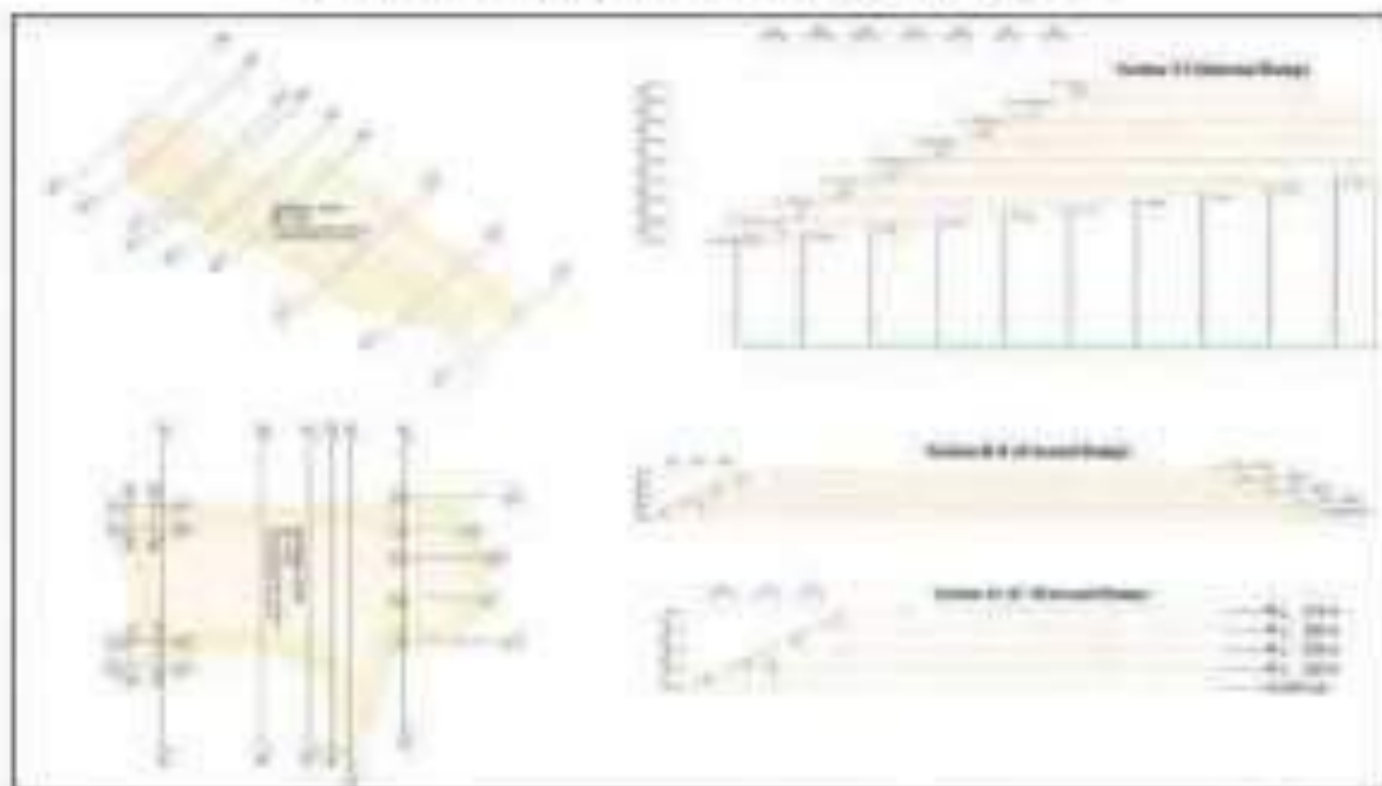
Figure 6. Estimated Dump Quantities to the 25<sup>th</sup> Year of Mining Operation



Estimated Dump Quantities 25 <sup>th</sup> Year (Mcum)		
External Dump	Internal Dump	Total
~210	~60	~270

47

Figure 14. Estimated Dump Quantities in the 10<sup>th</sup> Year of Mining Operation.



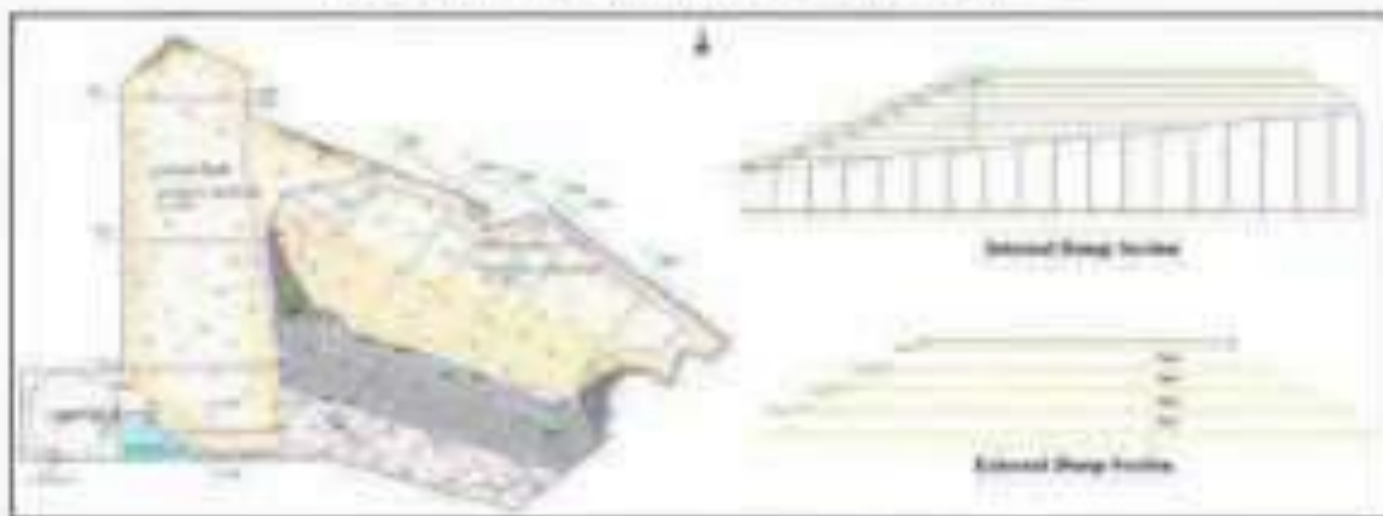
Estimated Dump Quantities of 10th Year (Mcu)			
External Dump	Internal Dump		Total
Year 10	Year 10	Year 10	Year 10
400,000	200,000	200,000	600,000

Figure 15. Estimated Dump Quantities in the 10<sup>th</sup> Year of Mining Operation.



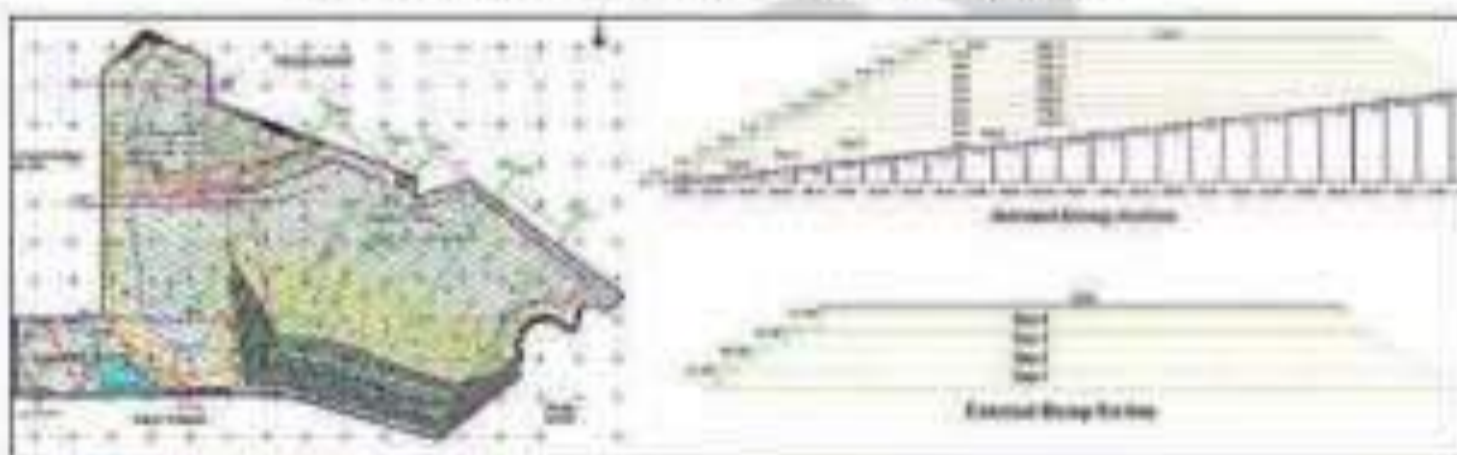
Estimated Dump Quantities of 10th Year (Mcu)			
External Dump	Internal Dump		Total
Year 10	Year 10	Year 10	Year 10
400,000	200,000	200,000	600,000

Figure 14. Estimated Dump Quantities in the 20<sup>th</sup> Year of Mining Operation



Estimated Dump Quantities of 20th Year (Million)			
External Dump	Internal Dump		Total
-120	Coal Pit	Waste Pit	-140
	-60	-80	

Figure 15. Estimated Dump Quantities in the 15<sup>th</sup> Year of Mining Operation



Estimated Dump Quantities of 15th Year (Million)			
External Dump	Internal Dump		Total
-40	Coal Pit	Waste Pit	-200
	-140	-20	

## Additional Annexure-25

**PERSONNEL ASSOCIATED WITH PREPARATION OF MINING PLAN AND MINE CLOSURE PLAN (1<sup>ST</sup> MODIFICATION) OF TALAIPALLI COAL BLOCK, M/S NTPC LTD.**

Sl. No	Name of Expert	Particulars
1	Rakesh Chandra Dutta	Project Coordinator
2	Ranish Chingra	Project Coordinator (for UG only)
3	Vaht Priyesh	Technical Area Expert
4	Murali Prasad	Technical Area Expert
5	Ashish Agrawal	Technical Area Expert
6	Armitanshu	Technical Area Expert
7	Sagar Das	Technical Area Expert
8	Farah Nawaz	Technical Area Expert
9	Navin Kumar	Technical Area Expert
10	Vinod Kumar Pandey	Technical Area Expert

APPROVED



**Additional Annexure-26****ANNEXURE 26****TO WHOM IT MAY CONCERN**

The Mining Plan & Mine Closure Plan (1<sup>st</sup> modification) of Talaipally Coal Mine of NTPC Limited formulated by CMPDIL, Ranchi (Certificate No: NABET/APA-MPPA/IA/010) was sent for Expert Review to Mining Plan preparing Agency-MECON Limited (Certificate No: NABET/APA-MPPA/IA/013).

The Mine Plan & Mine Closure Plan of Talaipally Coal Mine has been reviewed from Technical & Administrative angle and observations were forwarded to the project proponent for further compliance at their end. Subsequently, the project proponent has submitted the compliance report incorporating all our observations on Draft Mining Plan & Mine Closure Plan (1<sup>st</sup> modification) of Talaipally Coal Mine. The Compliance Report has been reviewed & found in line with the Guidelines for Preparation, Formulation, Submission, Processing, Scrutiny, Approval and Revision of Mining Plan circulated vide Office Memorandum dated 29<sup>th</sup> May 2020.

Henceforth, the subject Mining Plan is recommended for consideration of the Approving Authority for Approval.

Sincerely,

For MECON Limited, Ranchi

Digital Signature

Name of the Authorizing Officer: S. R. VIRSEN

Date: 17/03/2023

## Additional Annexure-27

COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MNDIE ACT 1967 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN (1<sup>st</sup> MODIFICATION) OF TALAPALLI COAL BLOCK, M/V NTPC LTD HELD ON 23/09/2022 THROUGH VIDEO CONFERENCING

Sl. No.	Observation	Compliance
1	A part of area in the north west part of the geological block has not been proposed to be acquired. This shall be suitably corrected.	There is a steep hill in the north west part of the block with elevation difference of 70 m. The top width of the drain to take care of the surface runoff in that region will be about 150 m in order to achieve the required bed level. The excavation of such drain will be huge and hence a minimum safe distance of 50 m is proposed between the drain and the open cast mine to prevent danger of inundation of the mine during rainy season. In order to keep the drain inside block boundary and for the safe operation of the mine, the preliminary acquisition along the foothill is proposed in the Revised Mining Plan.
2	Para 14, Additional Annexure-10. The proposed production schedule for few years is inferior to that given in the approved mining plan. It is suitably corrected.	The production schedule as given in the proposed Revised Mining Plan is the most optimized one based on the geo-mining condition, temporary internal dump (mountain), concurrent backfilling and total accommodation of CB, etc. The approved Mining Plan is incorrect and operationally not feasible which is apparent from Technical Feasibility Note of Talapalli Coal Block (Annexure-22, 23 and 24). As the depth of the base seam i.e. Seam B in the western side is around 200m according to the approved Mining Plan, the production schedule for initial years and peak production capacity of 18 MTPA is not possible to achieve in the given span of 7 years as per the approved mining plan. However, the cumulative coal production for the first 7 years in both the approved Mining Plan and the proposed Revised Mining Plan is 50.50 Mt. From 7 <sup>th</sup> year onwards, the production in the Revised Mining Plan is 22 MTPA as against the production of 18 MTPA in the approved Mining Plan. The peak production in the Revised Mining Plan is increased to 25 MTPA which will be achieved in the 12 <sup>th</sup> year and will continue till 22 <sup>nd</sup> year. Hence, taking into consideration the above factors, the overall production schedule under the Revised Mining Plan is better than the approved Mining Plan.

3	Features, land boundaries etc. outside the project area and not a part of the mining plan shall be removed (refer Para 4, 5 etc.)	Complied
4	As the extractable reserves have reduced considerably compared to the approved MP, PE Optimization exercise shall be undertaken for maximum recovery of reserves.	PE optimization exercise has been done for maximization of coal recovery through optimized mining as given in Conceptual Report (Annexure-25). The approved Mining Plan, which envisaged 20C mining upto Seam B, is incorrect and operationally not feasible. Mining upto Seam B will result in less extraction of Coal due to large space constraint as given in Conceptual Report. Different PE options has been envisaged to maximize the recovery of coal and the proposed option in the Revised Mining Plan is found to be the most optimized for maximum recovery of coal.

## Additional Annexure-28

**COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MMDR ACT 1957 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN (1<sup>st</sup> MODIFICATION) OF TALAPPELLI COAL BLOCK, M/V NTPC LTD HELD ON 17/04/2022 THROUGH VIDEO CONFERENCING**

**Query 1:** Para 1.8.28 of mining plan. A Commercial Court suit has been stated to be filed regarding the mining plan. Is the matter sub-judice? Relevant documents to be furnished in support of the declaration in (a).

**Reply of ATIC:**

- a. The matter is not sub-judice
- b. The referred commercial suit has been dismissed as withdrawal. The relevant order of Hon'ble High Court of Delhi is enclosed as Annexure 28 to last submission of Internal Committee constituted under MMDR Act 1957 for approval of Mining Plan.

APPROVED

## Additional Annexure-29

S-33

\* **IN THE HIGH COURT OF DELHI AT NEW DELHI**  
 \* CS(COMM) 219/2021, LAs. 6177/2021, 6180/2021, 6181/2021,  
 3914/2022, 4551/2022 & 10541/2022

THRIVENI EARTHMOVERS PVT. LTD

Plaintiff

Through: Mr. Parag P. Tripathi, Sr. Adv. with  
 Mr. Abhimanyu Bhandari, Mr. Anand  
 Varma, Mr. Anirudh Bakhra,  
 Mr. Apoorva Pandey, Mr. Anirudh  
 Desai, Mr. Adyasha Nanda,  
 Mr. Apoorv Tripathi and Ms. Riya  
 Kalra, Advs.

versus

NTPC LTD

Defendant

Through: Mr. Chetan Sharma, ASG with  
 Mr. Puneet Taneja, Mr. R. Dubey,  
 Mr. Amit Gupta, Mr. Saurabh  
 Tripathi and Mr. Manmohan Singh  
 Narula, Advs.

**CORAM:**  
**HON'BLE MR. JUSTICE V. KAMESWAR RAO**

**ORDER**  
**07.09.2022**

%

**LA. 10541/2022**

1. This is an application filed by the plaintiff with the following prayers:

*"It is therefore humbly prayed that this Hon'ble Court be pleased to:*

- (i) Allow the present application and refer the present dispute for conciliation by the CCTE in accordance with the procedure set forth in the CCM issued by the Hon'ble Ministry of Power and New and Renewable Energy dated 29.12.2021;*
- (ii) Pass any other order as this Hon'ble Court may deem fit in the interests of justice."*



2. A reply to the application has been filed by the defendant wherein it is stated, as per the procedure provided in the OM dated December 29, 2021, the dispute can be referred to the conciliation committee with the consent of the parties and the party withdrawing the case. It is stated that the condition precedent for referring the dispute to CCIE is that the plaintiff needs to withdraw the case. It is also stated that keeping in view the procedure specifically provided in OM dated December 29, 2021 for reference of dispute to the Conciliation Committee in case dispute is pending before Court of Law, defendant vide its letter dated August 18, 2022 has informed the plaintiff that they are ready for referring the dispute provided, plaintiff complies with the procedure for reference in a matter pending before a Court of Law, which requires withdrawing the case before making reference.

3. I have heard Mr. Parag P. Tripathi, learned Senior Counsel appearing for the plaintiff and Mr. Chetan Sharma, learned Additional Solicitor General appearing for the defendant on this application, yesterday. During the course of hearing, Mr. Tripathi would submit that the plaintiff is inclined to go for conciliation with the defendant by withdrawing the suit provided that in the eventuality the conciliation proceedings fail or any grievance subsist, the plaintiff should be granted liberty to revive the present suit and such a prayer, should not be objected to by the defendant.

4. Mr. Sharma had taken time to take instructions from the defendant. Mr. Sharma has taken instructions. According to him, the OM dated December 29, 2021 on which reliance has been placed by Mr. Tripathi is very clear, inasmuch as if the conciliation fails, the plaintiff shall be at liberty to approach this Court for revival of the suit to which the defendant shall have no objection.



5. In view of the submission made by Mr. Sharma, the present suit and connected applications are dismissed as withdrawn. The defendant to refer the dispute to conciliation.

6. It is made clear that if the conciliation fails or any grievance subsist relating to the suit filed by the plaintiff, the plaintiff is at liberty to approach this Court for revival of the suit. If such a prayer is made, as stated by Mr. Sharma, the defendant shall not object to the same. It is made clear, all the rights and contentions of the parties are left open.

7. The application is disposed of.

**V. KAMESWAR RAO, J**

SEPTEMBER 7, 2022 *city*



APPROVED

## Additional Annexure-30

**COMPLIANCE TO OBSERVATIONS FROM MEETING OF THE INTERNAL COMMITTEE CONSTITUTED UNDER MMDR ACT-1957 FOR APPROVAL OF MINING PLAN AND MINE CLOSURE PLAN OF TALAPALLI (BBL BLOCK, M/S NTPC LTD) HELD ON 24/03/2023 THROUGH VIDEO CONFERENCING**

**Query:** Extractable reserves have decreased considerably as compared to the earlier approved mining plan. The decrease of extractable reserves (both open and closed) is compared to the earlier mining plan with explanation (if applicable).

**Reply:** The decrease in value of extractable reserves with respect to approved Mining Plan is tabulated below.

**TABLE 1: SUMMARY OF EXTRACTABLE RESERVES IN 2022 AS APPROVED MINING PLAN VS. A VIDEO CONFERENCE DECISION UNDER MMDR**

Name	Extractable Reserve in Earlier Approved MP (M)			Extractable Reserve in Proposed Revised MP (M)	Difference with Approved MP (M)	Reason for Difference in Proposed Revised MP w.r.t to Approved MP			
	OC	LC	Total			OC	Decrease due to Re-assignment** (M)	Due to completion of 10% of approved plan, under MP** (M)	Infrastructure area in South-West part** (M)
V-24	0.96		0.96	0.15	-0.81	0.96	0.96		
A-18	2.40		2.40	0.28	-2.12	0.98	2.33		
V-10P	4.27		4.27	0.80	-3.47	0.07	3.99	0.20	
A-80T	75.39		75.39	51.84	-23.55	4.72	22.79	1.05	
A-17	15.18		15.18	18.88	3.70	1.98	2.31	1.73	
A-11	17.07		17.07	16.70	-0.37	1.80	1.80	1.82	
T	117.0		117.0	98.37	-18.63	5.57	6.07	5.76	
TOT	130.18		130.18	87.38	-42.80	6.70	3.37	1.86	

Name	Extractable Reserve in Earlier Approved MP (M)			Extractable Reserve in Proposed Revised MP (M)	Difference with Approved MP (M)	Reason for Difference in Proposed Revised MP w.r.t to Approved MP			
	OC	LC	Total			OC	Decrease due to Re-assignment** (M)	Due to completion of 10% of approved plan, under MP** (M)	Infrastructure area in South-West part** (M)
W	4.25		4.25	3.17	-1.08	0.00	0.00		
V-10P	53.05		53.05	38.60	-14.45	1.42	1.59		
V-80T	122.03		122.03	120.28	-1.75	4.19	14.27		
V-80T	5.05		5.05	3.12	-1.93	0.18	1.82		
V-90P	4.51		4.51	1.05	-3.46	0.68	1.87		
V-80P	11.15		11.15	7.04	-4.11	1.41	4.76		
V-80T	16.10		16.10	12.23	-3.87	1.89	4.81		
W-10P	48.07		48.07	33.04	-15.03	4.83	13.20		
W-80P	93.20		93.20	41.08	-52.12	3.68	5.29		
TOT	117.50		117.50	74.64	-42.86	1.97	3.88		
W	12.17		12.17	10.50	-1.67				15.83
T	46.75		46.75	46.75	0.00				43.82
B-11		4.25	4.25		4.25				4.25
B-12		1.80	1.80		1.80				1.80
B-13		4.00	4.00		4.00				4.00
T		11.07	11.07		11.07				11.07

Name	Extractable Reserve in Earlier Approved MP (M)			Extractable Reserve in Proposed Revised MP (M)	Difference in Proposed MP (M)	Reason for Difference in Proposed Revised MP in L10 Approved MP			
	OC	UC	Total			Demerit Starts Re-approval** (M)	Other complete works, galvanized steel, road, lighting arrangement etc*** (M)	Infrastructure cost of Single-Start cut*** (M)	Items proposed to be removed by L10***
W			4.00		4.00				4.00
<b>Total</b>	<b>648.68</b>	<b>17.12</b>	<b>665.80</b>	<b>632.36</b>	<b>335.44</b>	<b>32.88</b>	<b>97.70</b>	<b>11.36</b>	<b>17.30</b>

\*\* The earlier approved Mining Plan is not correct under Paragraph 22, Table on Technical Feasibility of Tausell Coal Block. Further, assuming an ongoing open contract and the mining operation to be feasible for the entire proposed area as per the earlier approved Mining Plan, an arrangement for total extractable reserves by OC mining would be 790,00,000 and 620,00,000 as given in the earlier approved Mining Plan (Refer Fig. 44 of Annexure 22).

\*\*\* In earlier approved Mining Plan, having only 21 months lease term and 10 years term, the whole of remaining area i.e. 20% to be closed to be included by OC method. No area for conveyor system, galvanized steel, road, lighting arrangement, etc has been provided without which mining is not feasible. This has been corrected in the proposed Revised Mining Plan. A 45-50m width of area has been left around the block for conveyor system, road, galvanized steel, lighting arrangement, etc. Also 1000sqm of area left in the block will be provided for requirement structures like MCR, Workshop, Substation and a proposed Main road (Refer Annexure 22) due to which the total excavated area in the Revised MP is 665,236M.

\*\*\*\* Items added by L10 proposed to be removed: Infrastructure to cut backline correctly, 20 months lease term, 10 years term, 20% area for conveyor system, galvanized steel, road, lighting arrangement, etc. All these items are not included in the Revised MP. A Revised Mining Plan needs to be prepared after 25 years for OC mining of White Rock and 20 mining open lease cut in such sections area where infrastructure for proposed Open cut area included.

TABLE 2: SUMMARY CONTRACTABLE RESERVES IN EARLIER APPROVED MINING PLAN VS L10 PROPOSED REVISED MINING PLAN INCLUDING TENTATIVE CONTRACTABLE RESERVES BY LE MINING AND BY OC MINING IN SOUTH WEST PART ADVISED IN CONCEPTUAL MINE DEVELOPMENT

Name	Extractable Reserve in Earlier Approved MP (M)			Extractable Reserve in Proposed Revised MP (M)			Difference in Proposed MP (M)	Reason for Difference
	OC	UC	Total	OC	OC-SCARTH WESP*	UC*		
X-1A	0.00		0.00	0.00			0.00	0.00
X-1B	1.47		1.47	0.70			0.76	0.11
X-10F	0.17		0.17	0.00	0.1		0.00	0.17
X-201	75.73		75.73	71.85	3.88		76.00	0.26
X-11	15.14		15.14	14.64	0.50		15.00	0.16
X-12	11.60		11.60	11.75	0.00		11.75	0.15
X	90.50		90.50	88.91	1.59		91.27	0.77
Y-1	100.74		100.74	97.38	3.36		98.10	0.76
Y-2	4.75		4.75	3.37		1.38	3.36	0.00
Y-10F	12.80		12.80	12.49			12.49	0.31
Y-401	111.01		111.01	110.28		0.73	110.50	0.51
Y-501	5.80		5.80	4.11			4.11	1.69
Y-10F	0.71		0.71	1.00			1.00	0.29

\* The earlier approved Mining Plan is not correct (Refer Annexure 22, Table on Technical Feasibility of Tausell Coal Block). Further, assuming an ongoing open contract and the mining operation to be feasible for the entire proposed area as per the earlier approved Mining Plan, the total extractable reserves by OC mining would be 790,00,000 and 620,00,000 as given in the earlier approved Mining Plan (Refer Fig. 44 of Annexure 22).

\*\* In earlier approved Mining Plan, having only 21 months lease term and 10 years term, the whole of remaining area i.e. 20% to be closed to be included by OC method. No area for conveyor system, galvanized steel, road, lighting arrangement, etc has been provided without which mining is not feasible. This has been corrected in the proposed Revised Mining Plan. A 45-50m width of area has been left around the block for conveyor system, road, galvanized steel, lighting arrangement, etc. Also 1000sqm of area left in the block will be provided for requirement structures like MCR, Workshop, Substation and a proposed Main road (Refer Annexure 22) due to which the total excavated area in the Revised MP is 665,236M.



Rooms	Extractable Reserve in Earlier Approved MP (M)			Extractable Reserve in Proposed Revised MP (M)				Difference w.r.t approved Mining Plan	Reason for Difference
	OC	US	Total	OC	OC-SOUTH WEST*	US*	Total		
V-MP	11.11		11.11	11.44			11.44	0.33	arrangements, etc. due to shift the total extractable area in the Revised MP is 1819.25 ha. Considering the infrastructure area in the south west part which had to be ruled by U, method upto from V to earlier Conceptual Mine for US and South West OC mining (Refer Annexure 22) the total extractable area will increase to 1873.75 ha. In the proposed Revised MP, 100% of two areas has. The earlier Mining Plan is proposed to be executed for years 2 LR to 10 MY. Hence the difference.
V-MP	28.72		28.72	22.71		0.71	23.42	-6.30	
U-MP	48.95		48.95	31.24			31.24	-17.71	
U-MP	91.20		91.20	91.00		0.20	91.20	-0.00	
U-MP	25.55		25.55	25.81			25.81	-0.26	
U-MP	11.24		11.24	41.66			41.66	-30.42	
U-MP	10.87		10.87				0.00	10.87	

Rooms	Extractable Reserve in Earlier Approved MP (M)			Extractable Reserve in Proposed Revised MP (M)				Difference w.r.t approved Mining Plan	Reason for Difference
	OC	US	Total	OC	OC-SOUTH WEST*	US*	Total		
U-MP	48.75		48.75			14.75	14.75	-34.00	In the Proposed Revised MP, area U is not proposed to be executed by OC mining as it is not feasible due to steep slope condition. The area will be mined by US method (Refer Annexure 21) Conceptual Mine in US mining and South West part.
U-MP		4.25	4.25				0.00	4.25	Area U2 & Area U3 have allowed suitable thickness in North West and south west part of the coal block in very small areas. The area U2 and U3 have suitable area at a depth higher than 300m in the south western side. These areas have developed suitable thickness in a very small area in the North Western side at a depth higher than 300m. Accessing these areas from South U would involve the steep slope or straight of shaft. Hence, Area U2 and Area U3 are considered to be non-economic (Refer Annexure 21) Conceptual Mine in US mining and South West part.
U-MP		0.85	0.85				0.00	0.85	Not feasible due to poor development of the coal-bearing horizon.
U-MP			0.22				0.22	0.22	
U-MP		1.47	1.47			14.75	14.75	-13.28	Area U will be mined through US mining (Refer Annexure 21) Conceptual Mine in US mining and South West part.

Items	Extractable Reserve in Earlier Approved MP (MR)			Extractable Reserve in Proposed			Difference in Earlier Approved Mining Plan	Reason for Difference
	OC	UC	Total	OC	OC-AC/27th W/27*	UC*		
SL			0.00				0.00	Not Extractable due to poor development of the Colliery/Block
<b>Total</b>	<b>883.88</b>	<b>27.27</b>	<b>911.15</b>	<b>823.56</b>	<b>13.96</b>	<b>837.52</b>	<b>73.63</b>	

Note:  
 \* Reserve extractable reserve for OC mining of South West part and UC mining as given in Annexure 21 (CONSTRUCTION NOTE FOR ASSIGNMENT OF AN MINING POTENTIALITY OF TAMPRAI BLOCK & PRODUCTION OF COALS WEST AREA OF THE BLOCK). A Revised Mining Plan needs to be prepared after 15 years for UC mining of Block West and OC mining upto 15 years till in south western area where infrastructure for proposed Block West is not available.

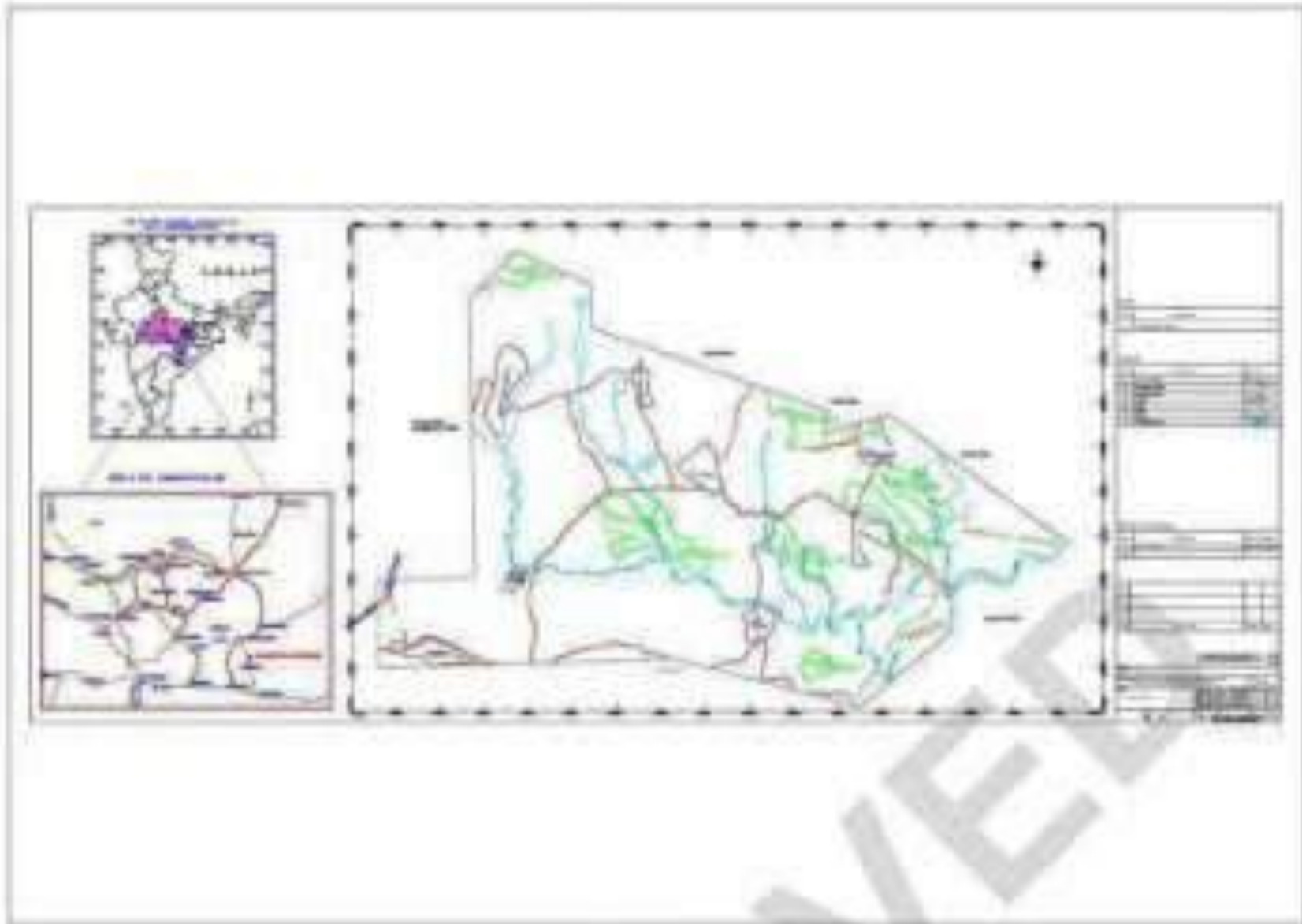
TABLE 3: SUMMARY OF EXTRACTABLE RESERVE (INCLUDING TENTATIVE RESERVE BY UC MINING AND OC MINING IN SOUTH WEST)

S. No.	Particulars	Extractable Reserve in Earlier Approved MP (MR)	Extractable Reserve in Proposed Revised MP	Remarks
1	Open cast 3-4A to 11-621	883.88	837.52	<ul style="list-style-type: none"> <li>Difference with respect to earlier approved Mining Plan 12304 MR. The difference is on account of following:                     <ul style="list-style-type: none"> <li>• Coal reserve in earlier approved Mining Plan (refer Fig. 44 of Annexure 21) - 18.40 MR</li> <li>• Due to area provided for common corridor, garden drain, roads, lighting arrangement, etc around the Block which was not provided in earlier approved Mining Plan and which will be mining operation is not feasible - 20.25 MR</li> </ul> </li> </ul>
2	Open UC in Block 10	44.50	44.50	Reserve in Colliery reserve before Open UC MR with amount to earlier approved Mining Plan.
<b>Total</b>		<b>928.38</b>	<b>882.02</b>	

\* ALLIED MR of Extractable Reserve includes MR of MR of resource projects in proposed Revised MP & 11 MR MR of tentative OC reserve and 17.50 MR of tentative UC reserve of South West area of MR as given in Annexure 21 (CONSTRUCTION NOTE FOR ASSIGNMENT OF AN MINING POTENTIALITY OF TAMPRAI BLOCK & PRODUCTION OF COALS WEST AREA OF THE BLOCK)

# Plan/Plates

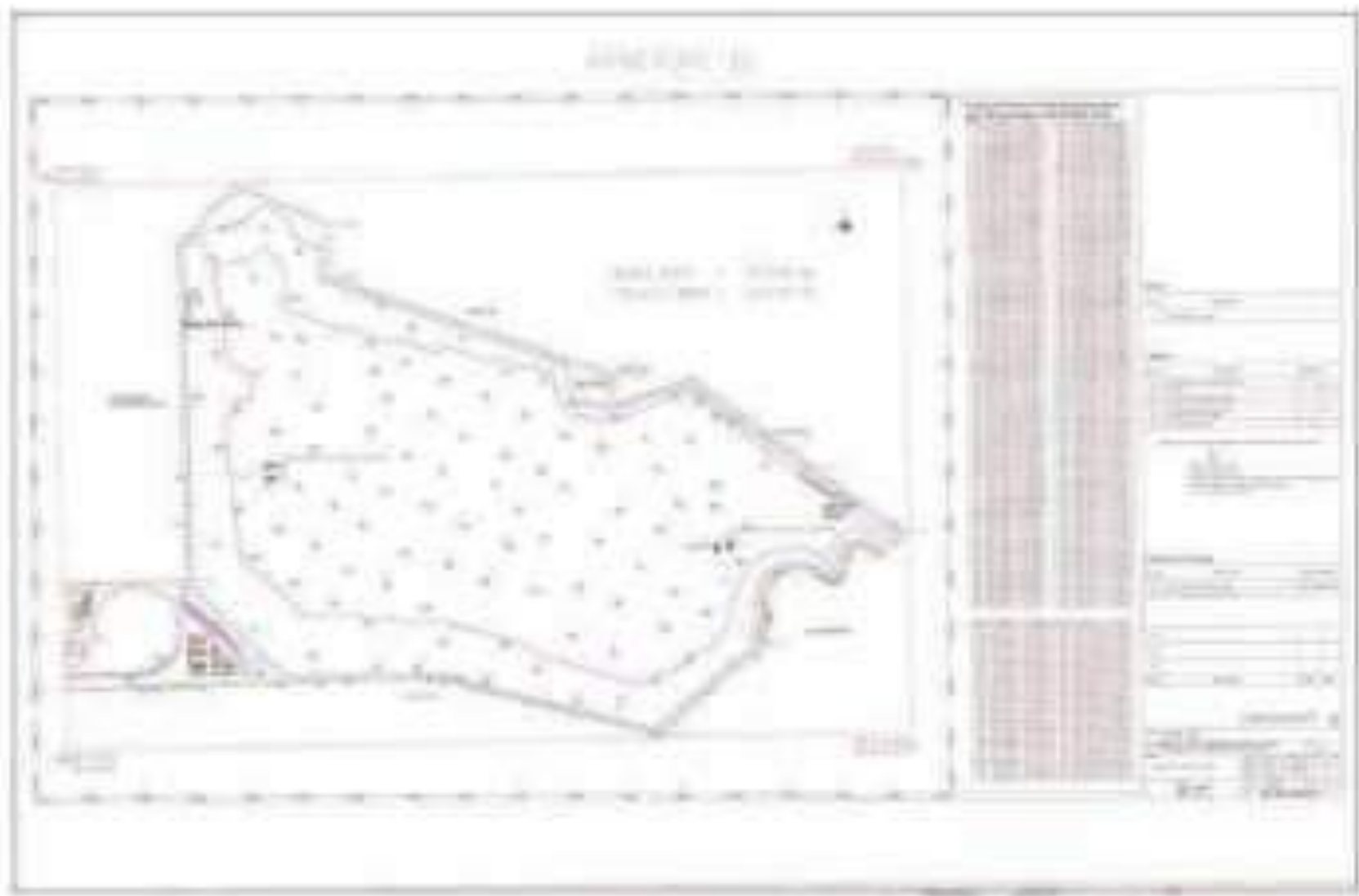
## Plate 1



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Plan / Plate 2A



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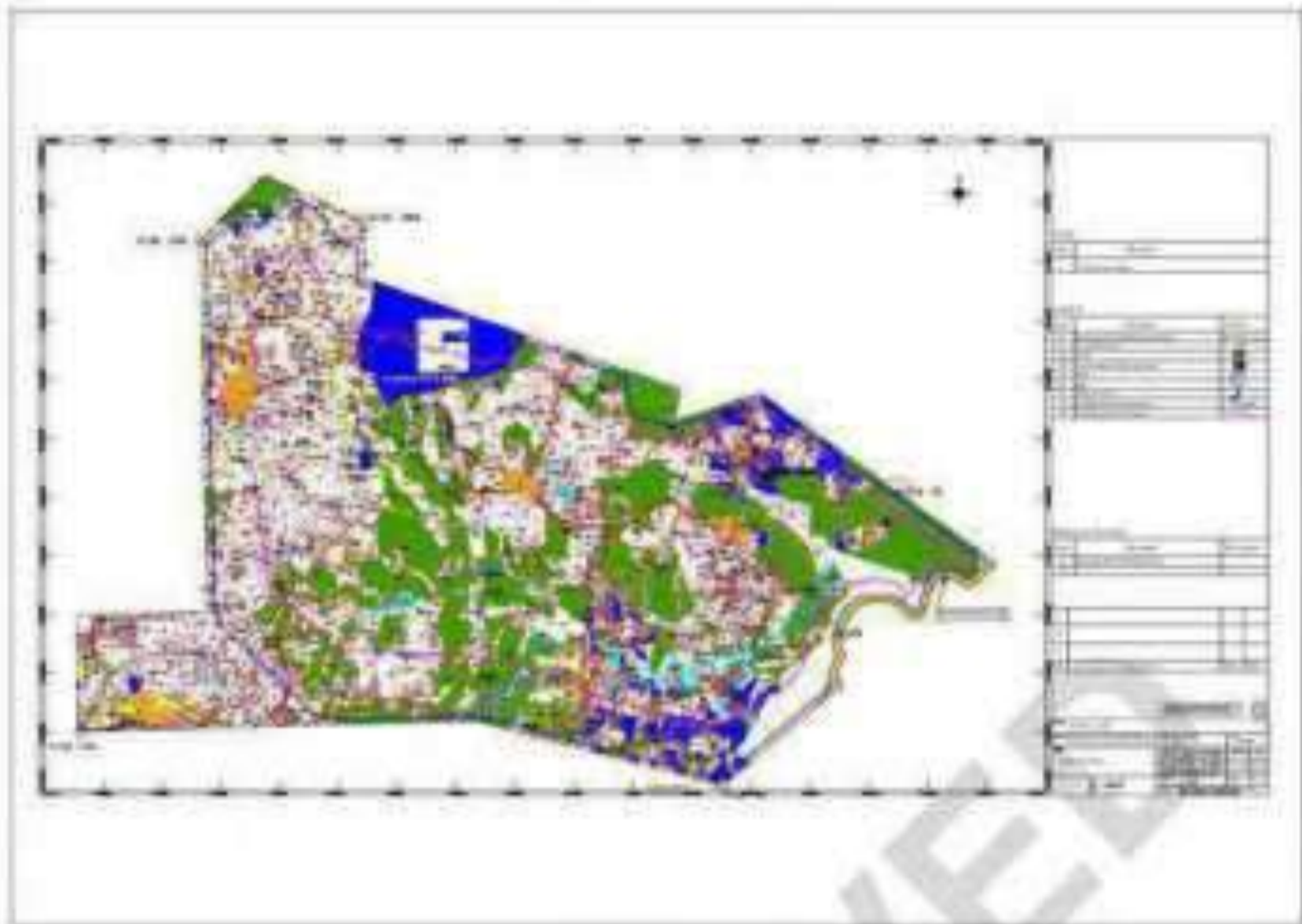








Plan / Plate 4

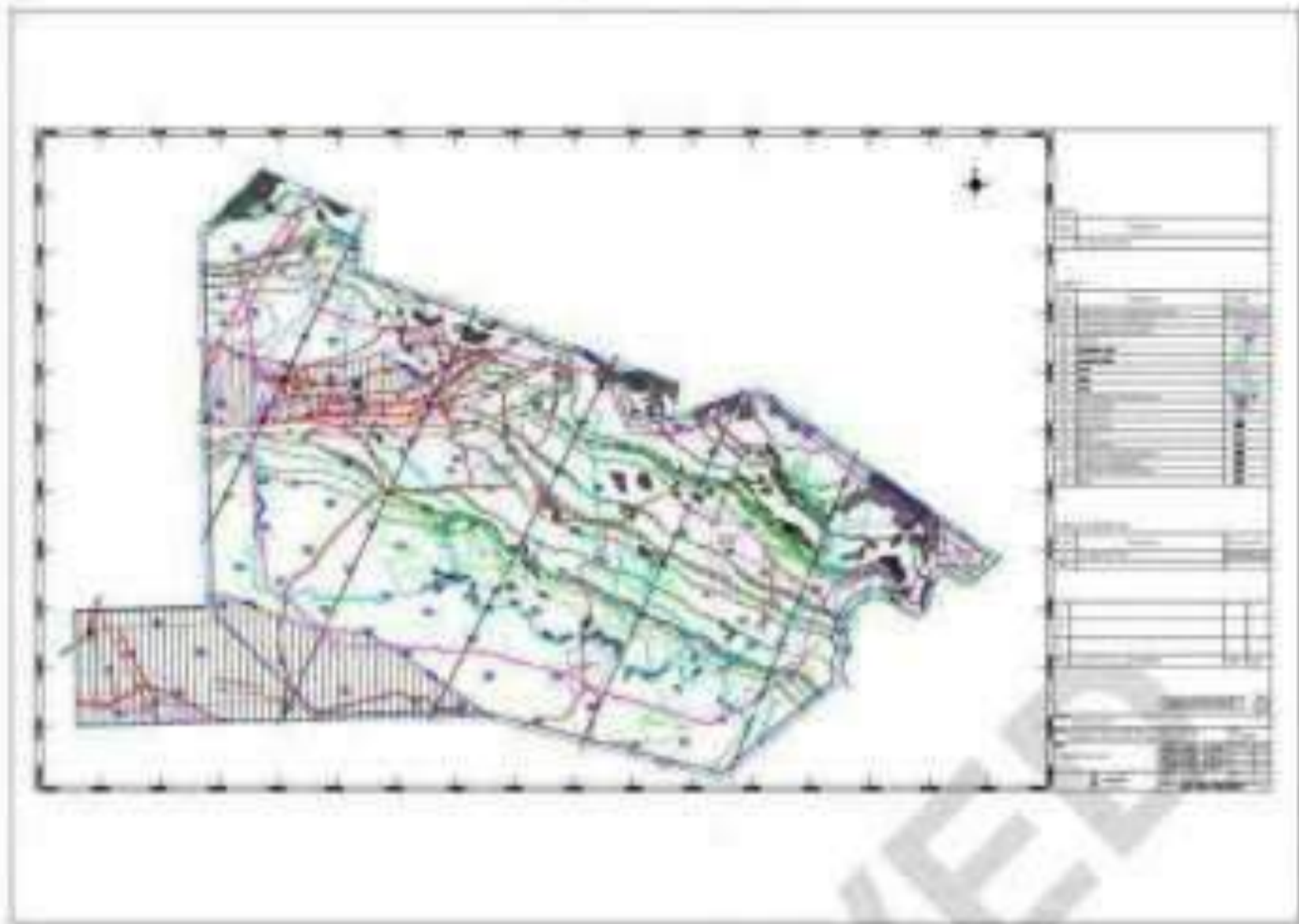


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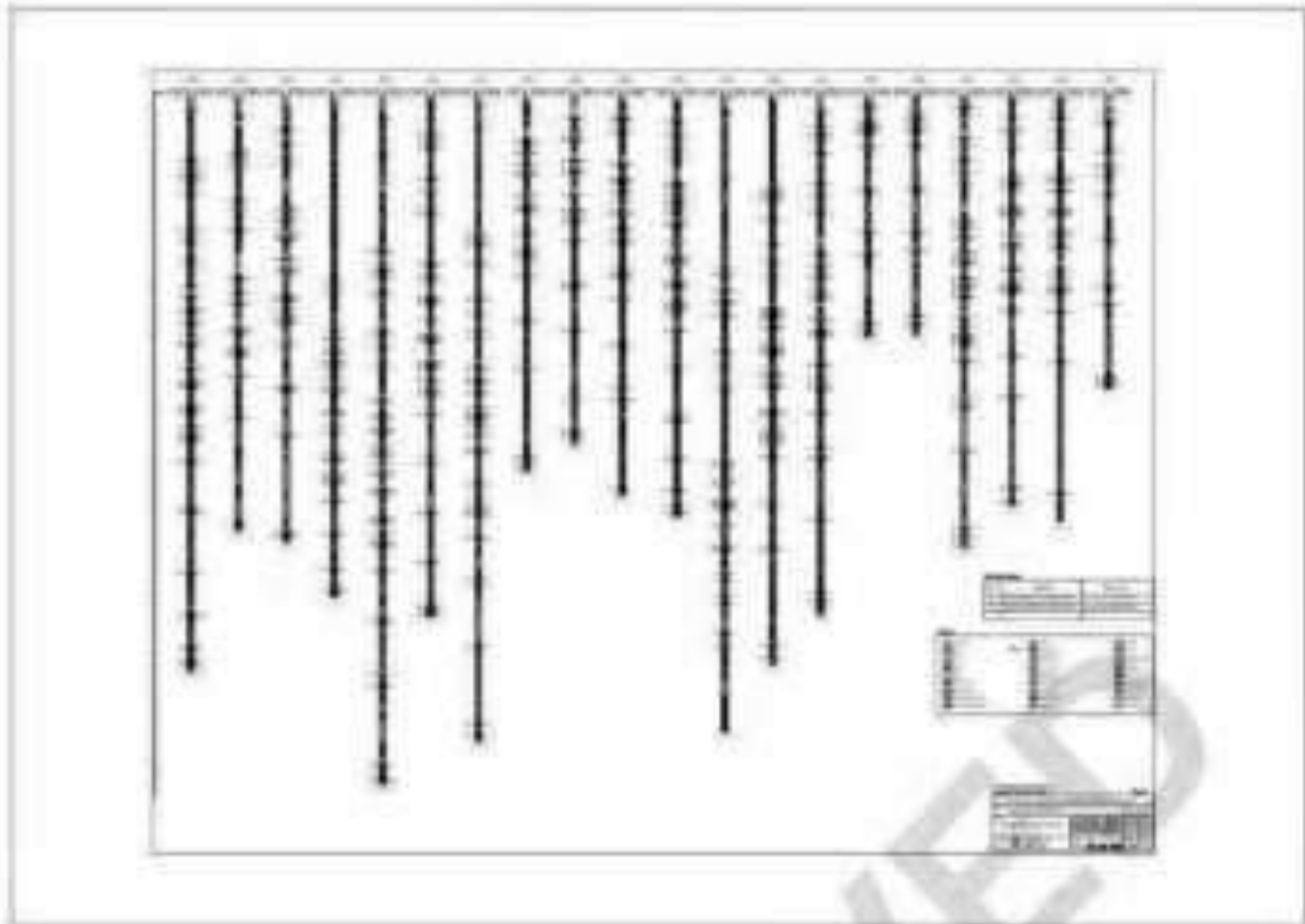
Plan / Plate 5A1



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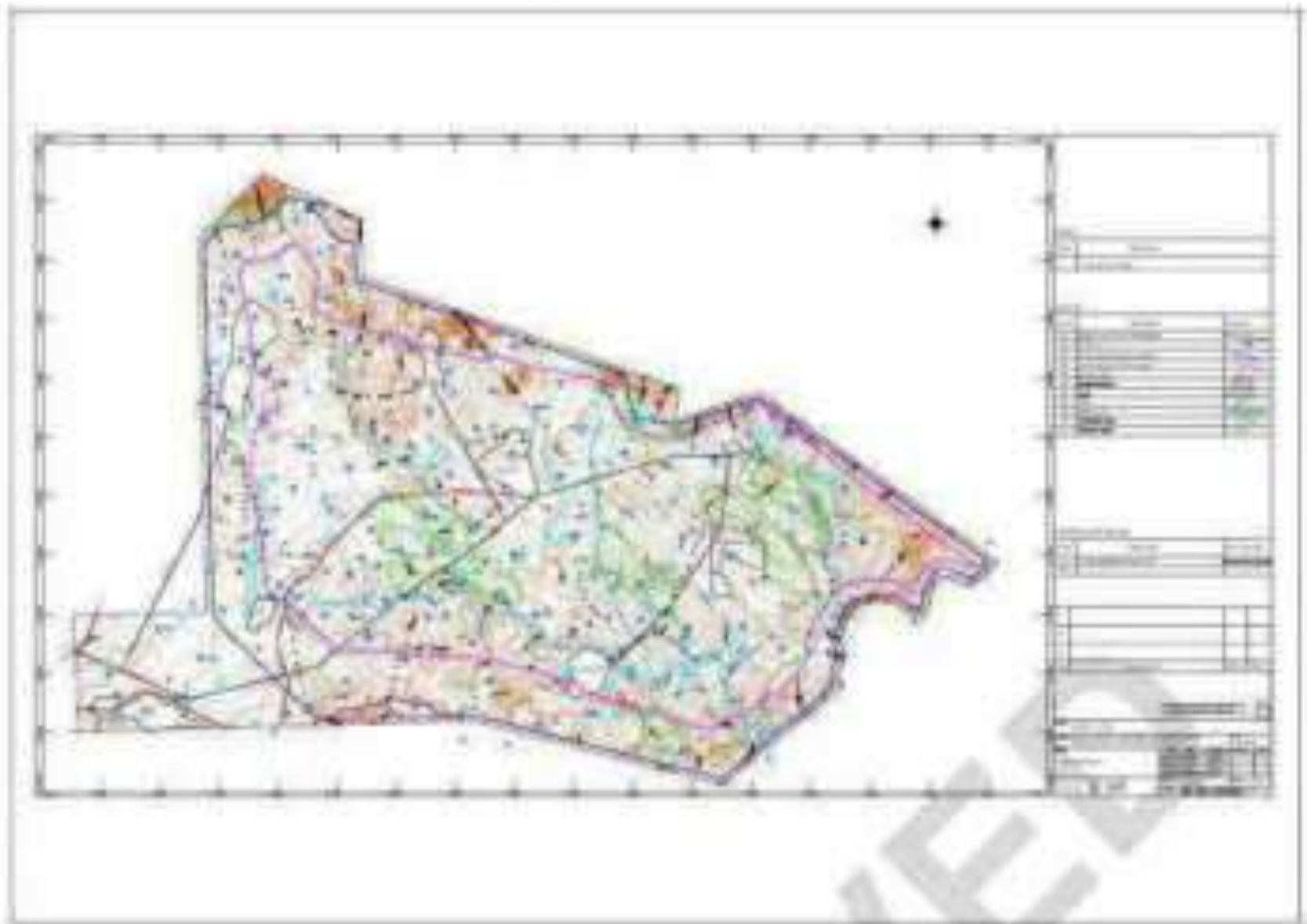
Plan / Plate 6A1



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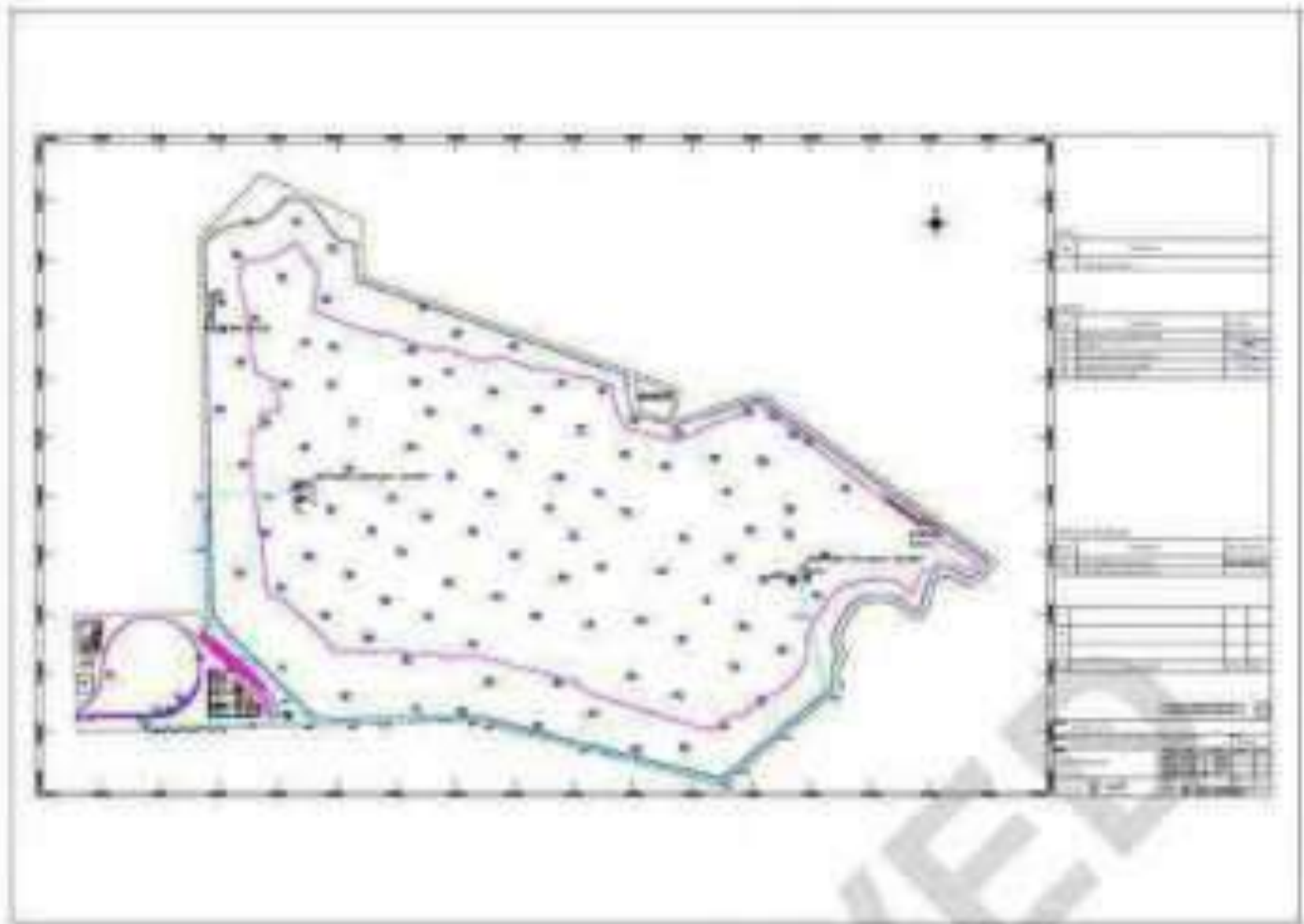


Plan / Plate 7

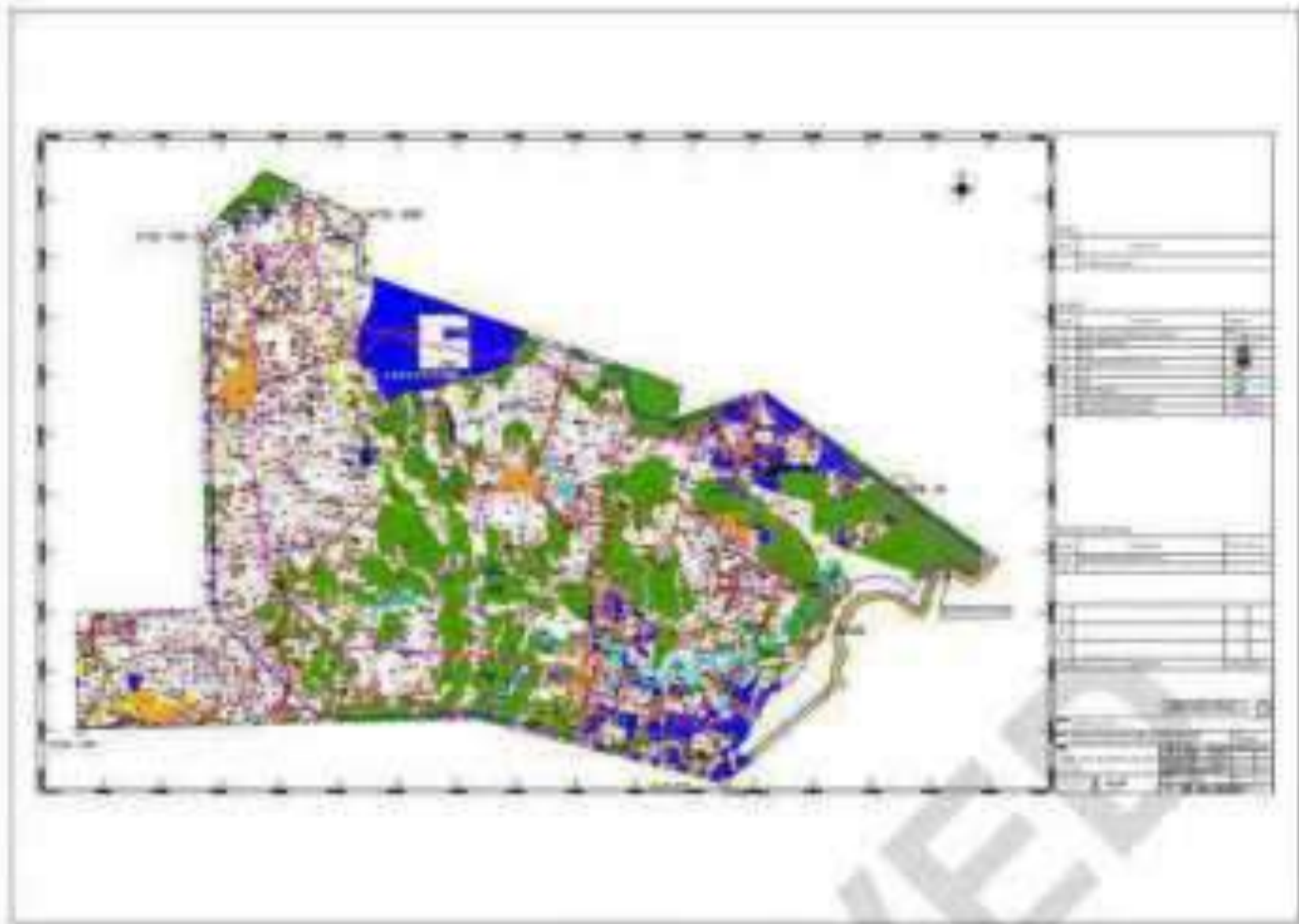


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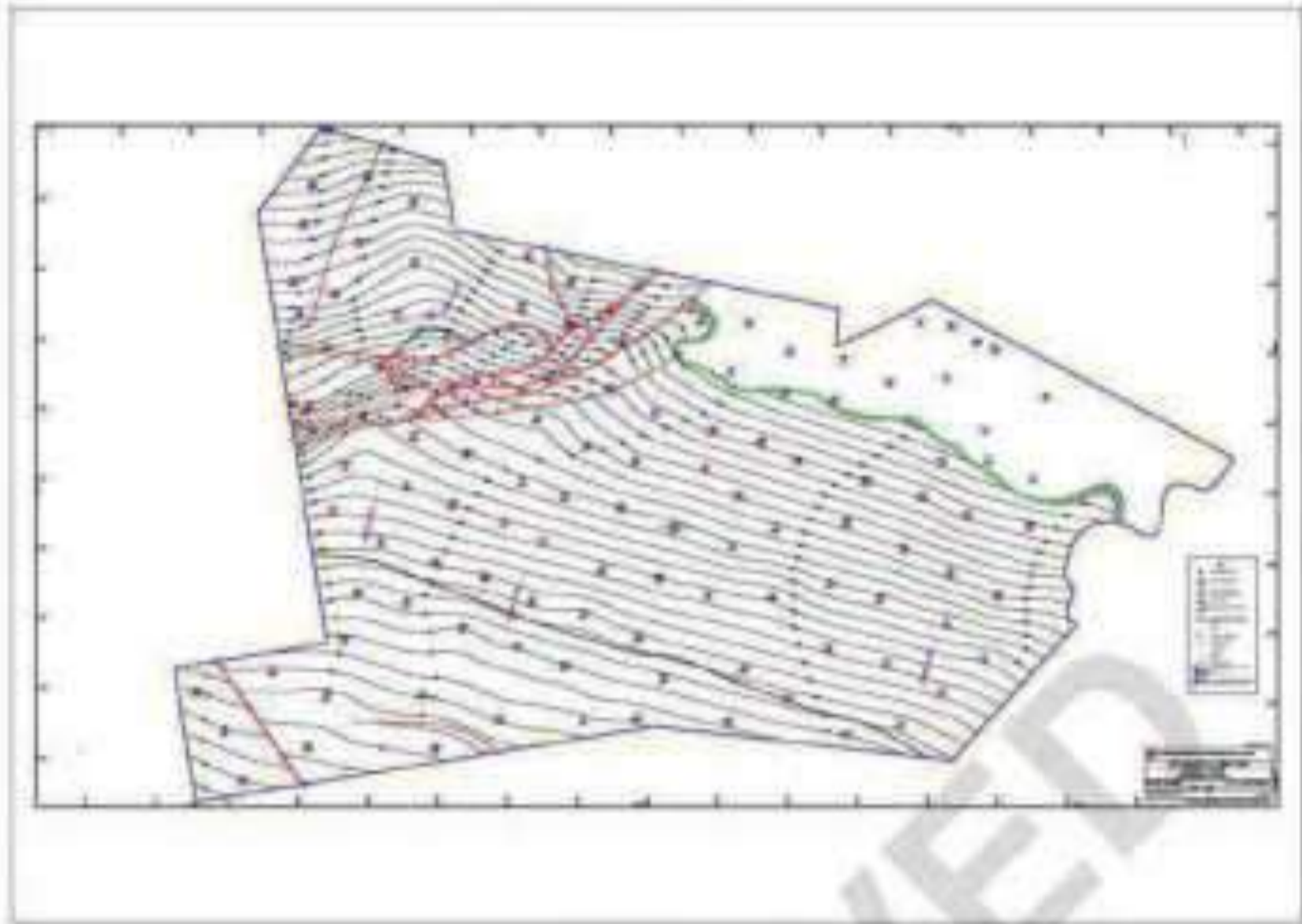
Plan / Plate 8



Plan / Plate 9



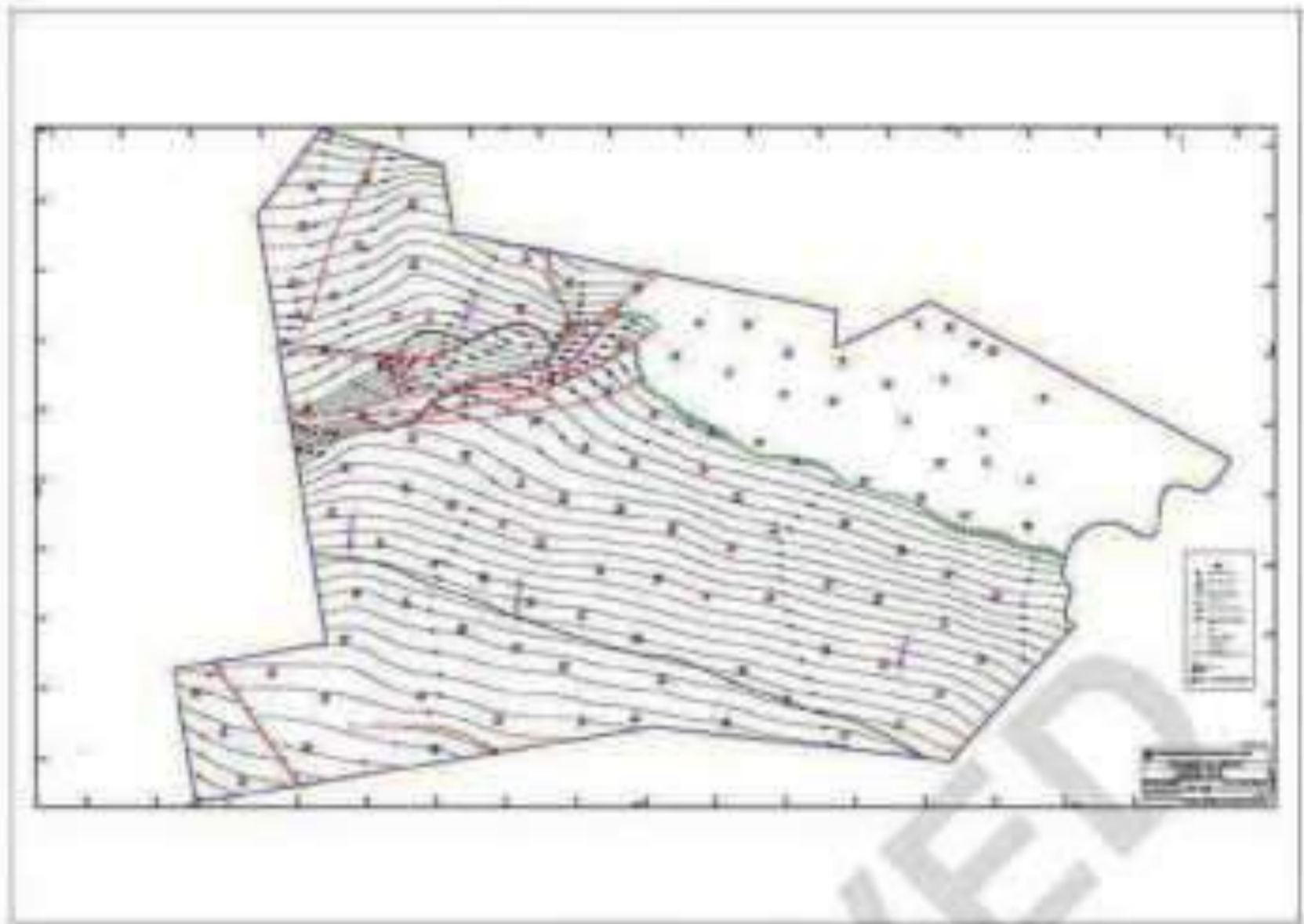
Plan / Plate 10A1



APPROVED



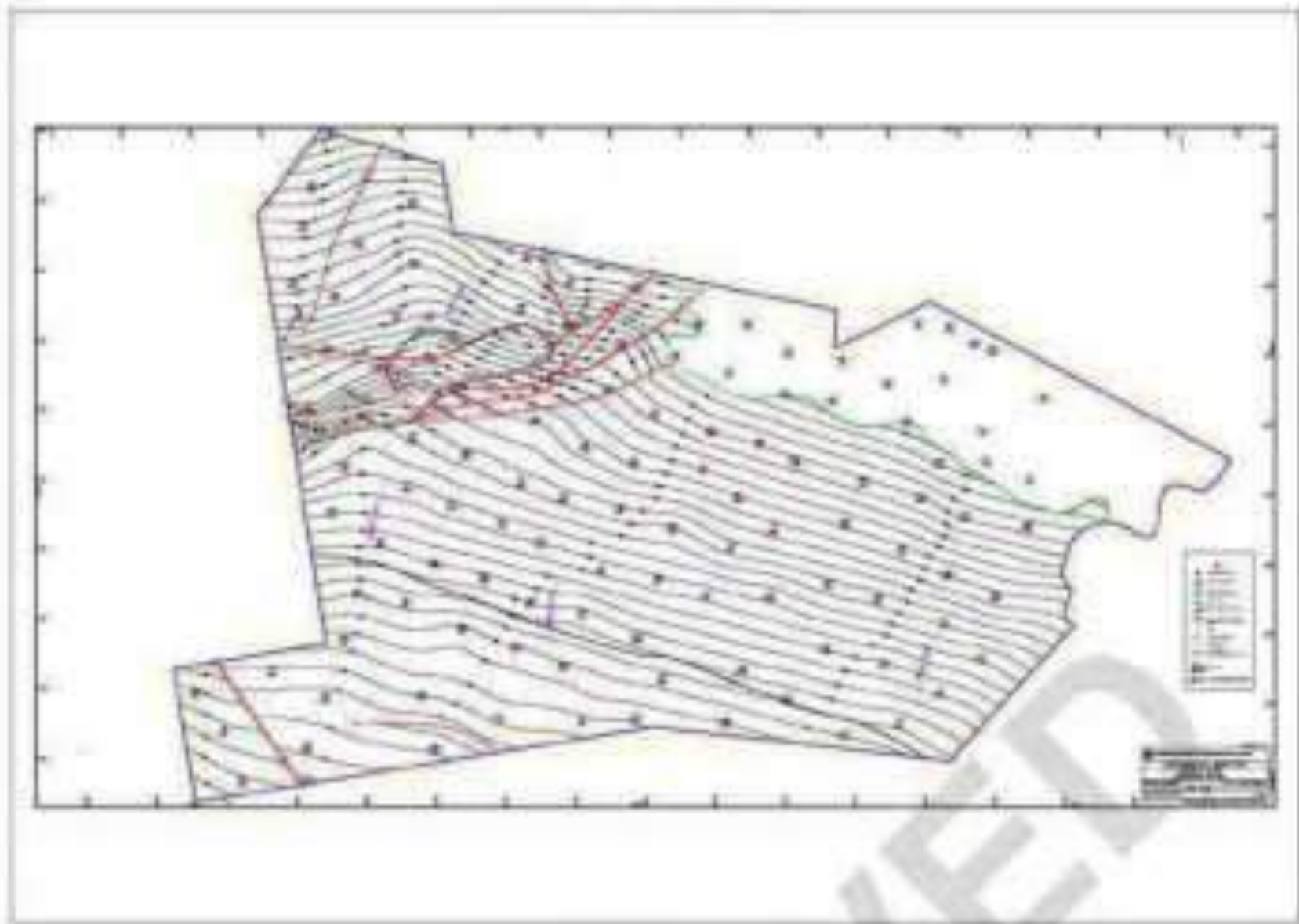
Plan / Plate 10A2



APPROVED



Plan / Plate 10A3

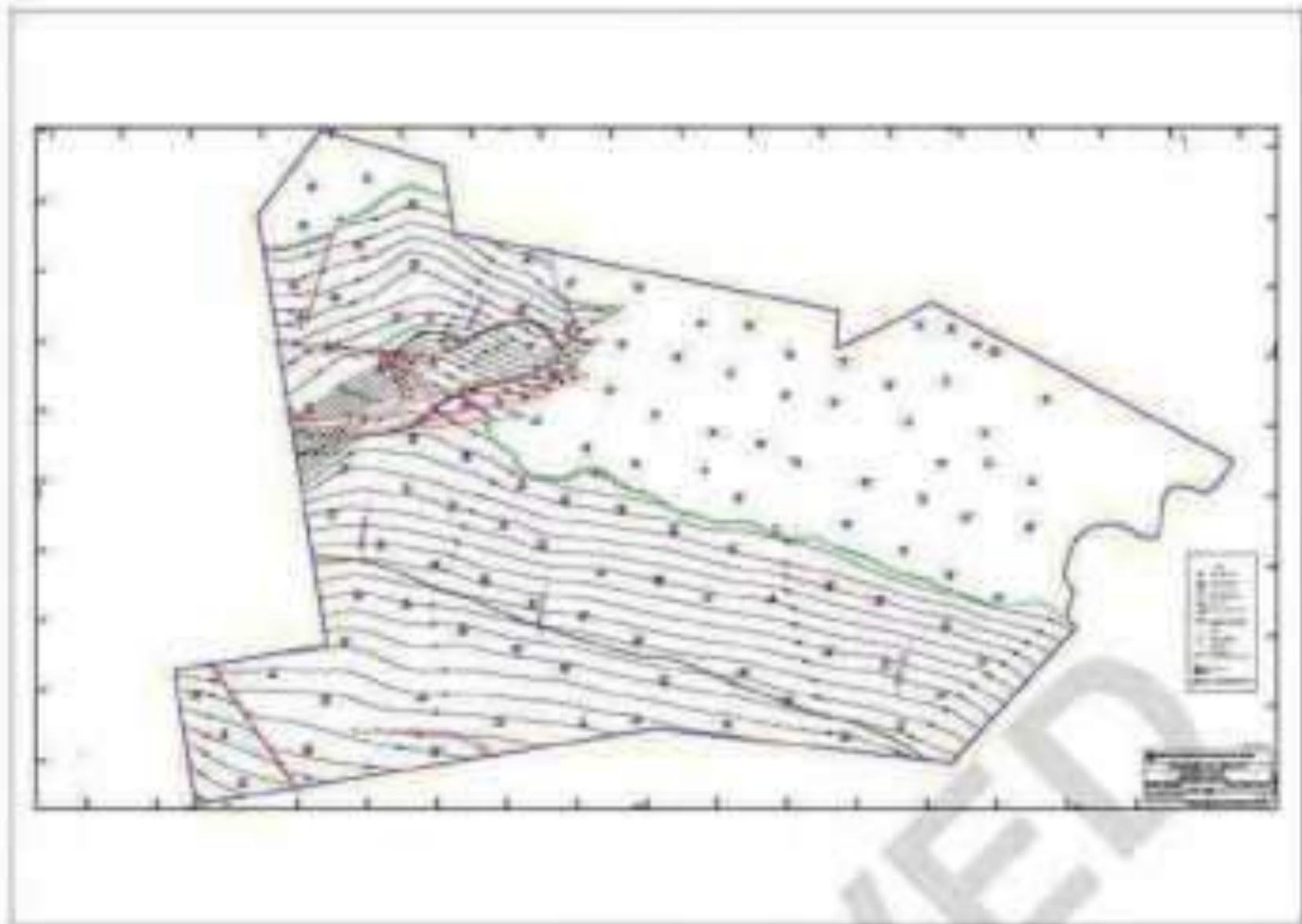


APPROVED

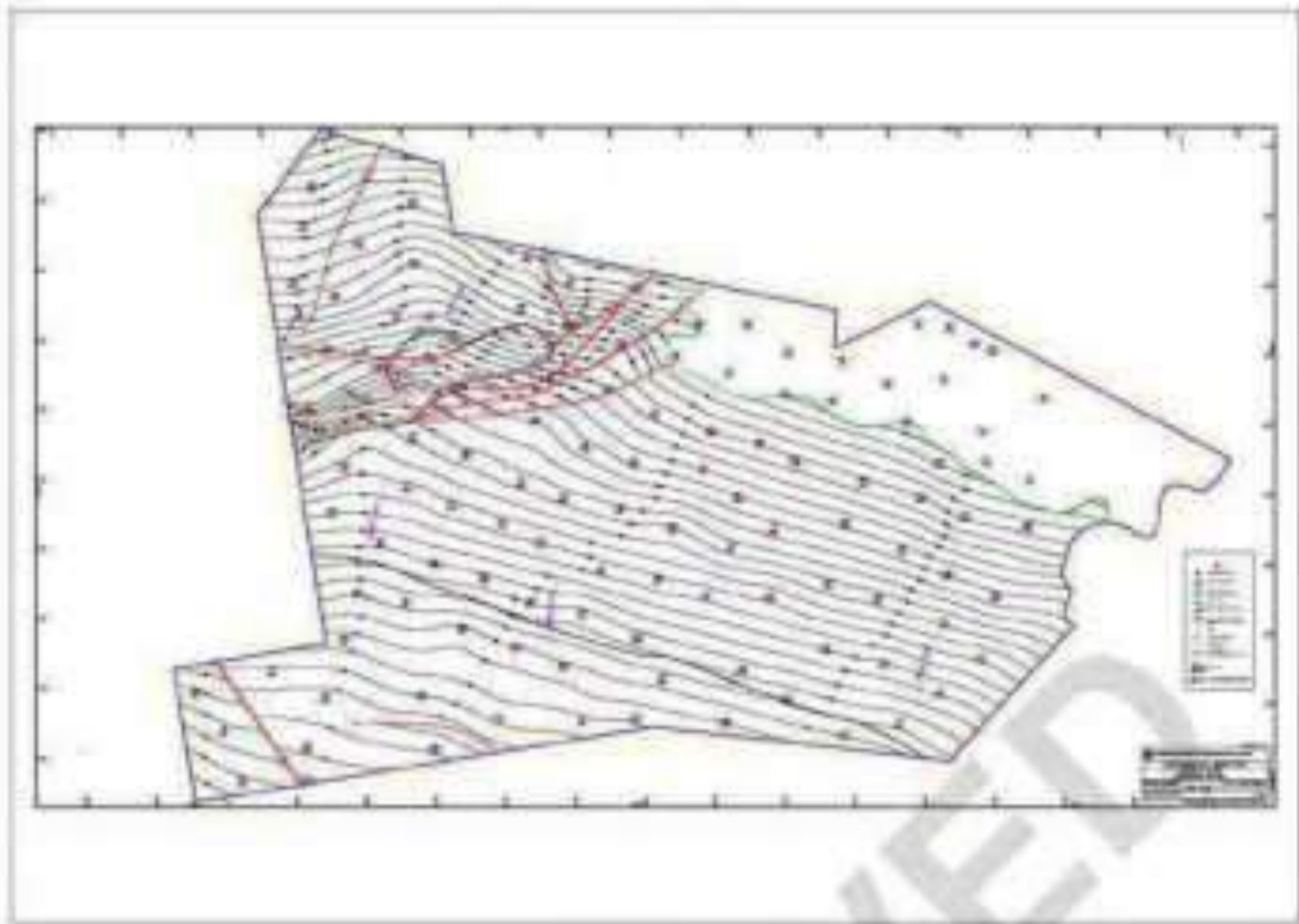




Plan / Plate 10A4

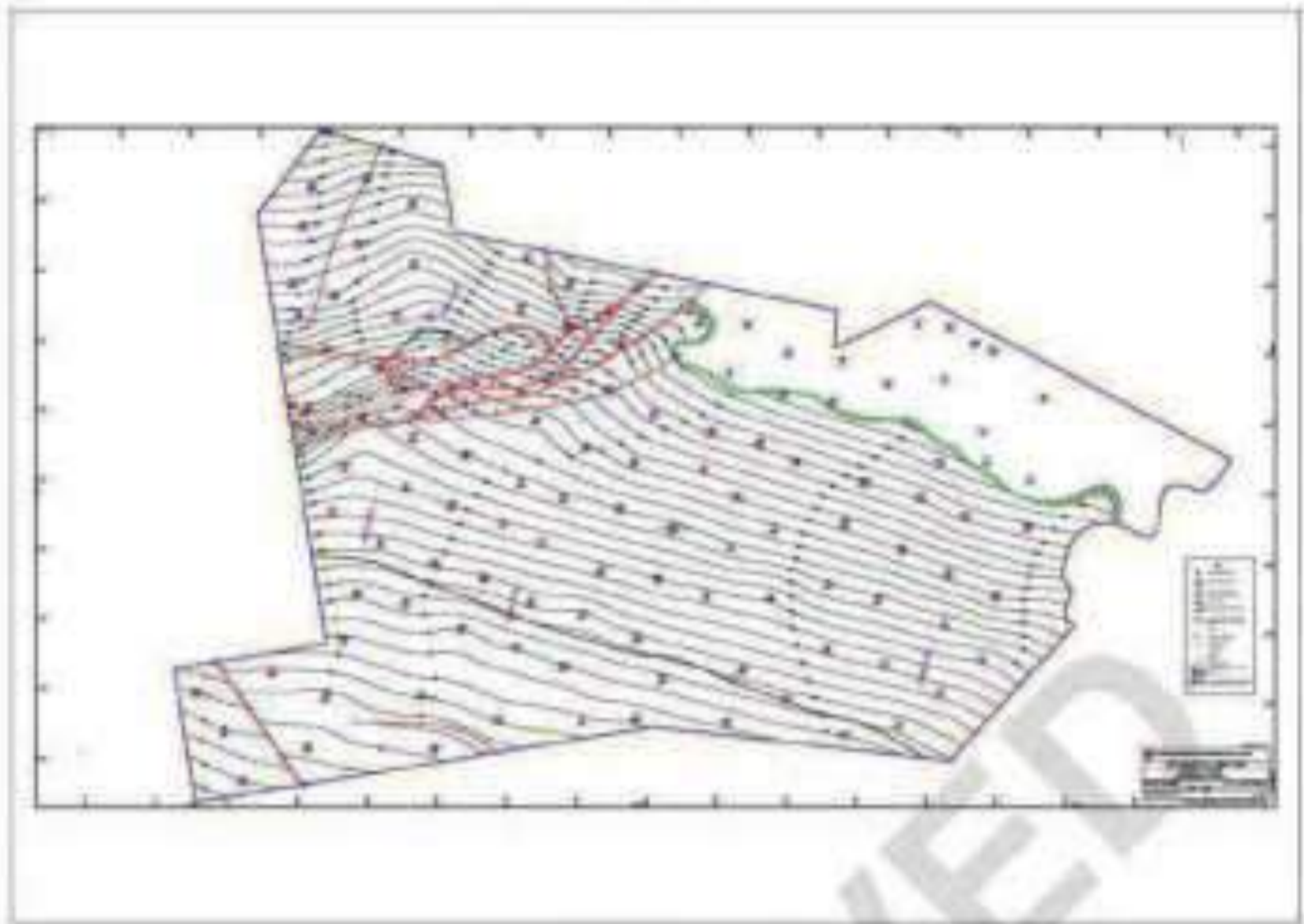


Plan / Plate 10A5



APPROVED

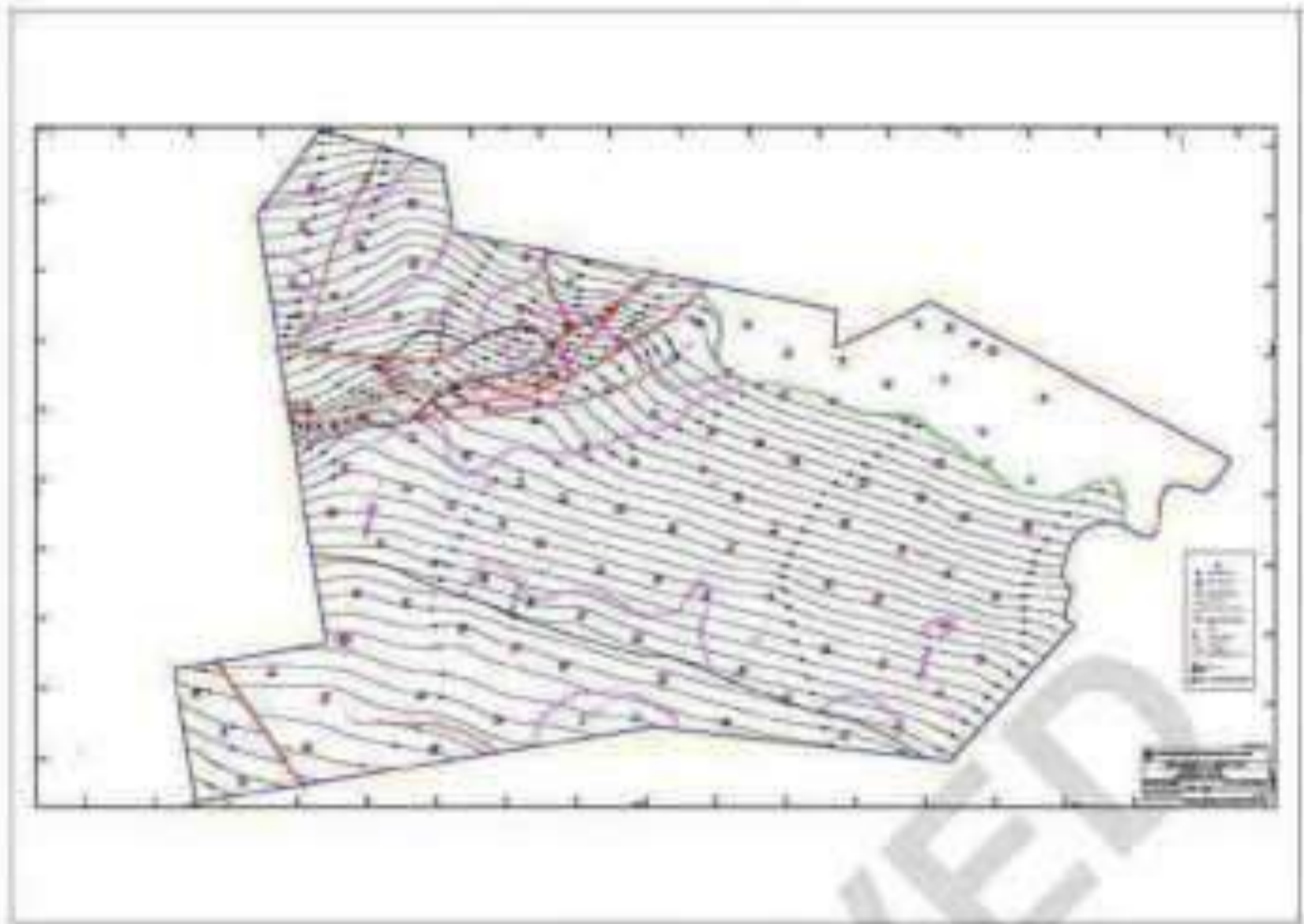
Plan / Plate 10A6



APPROVED

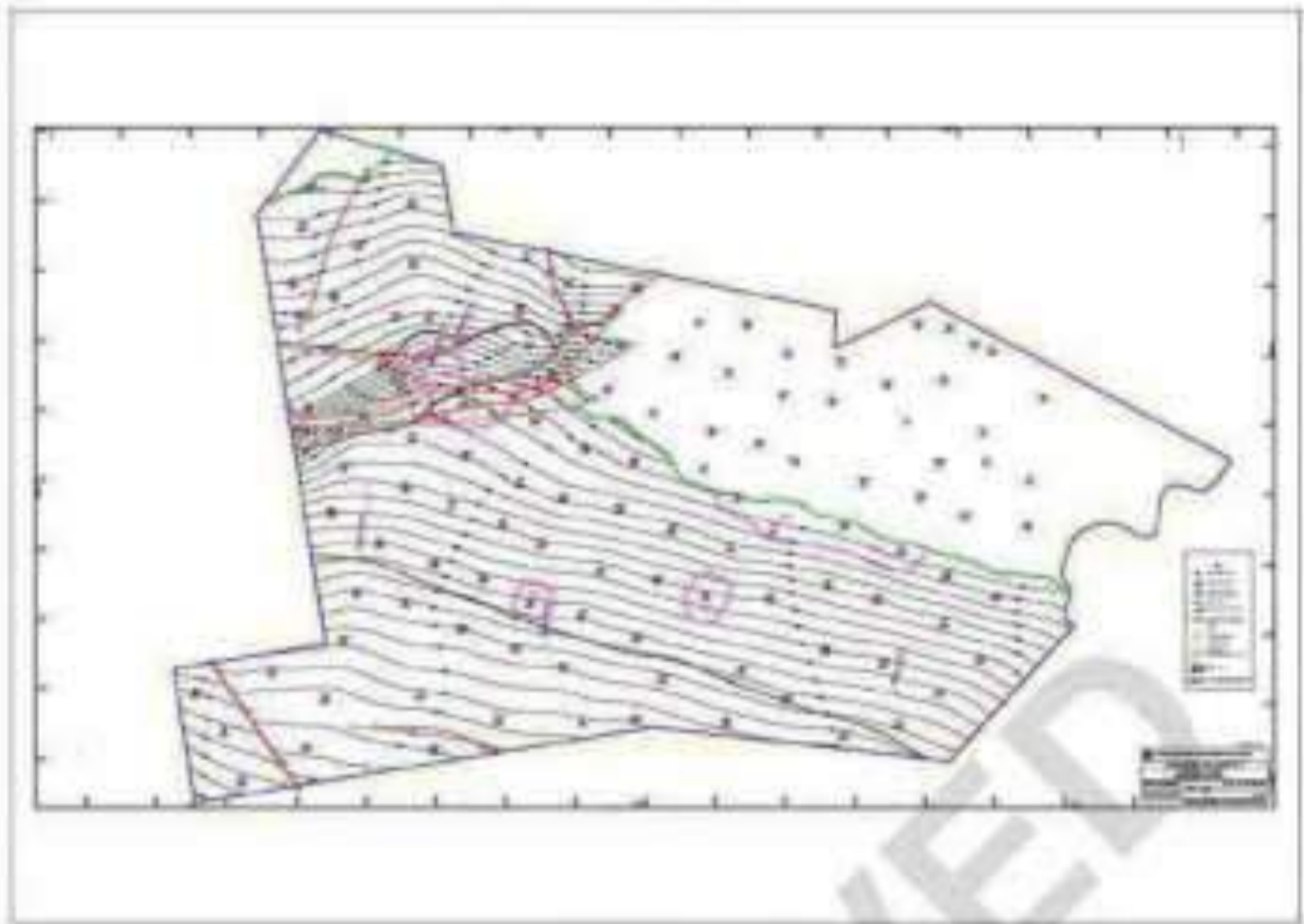


Plan / Plate 10A7



APPROVED

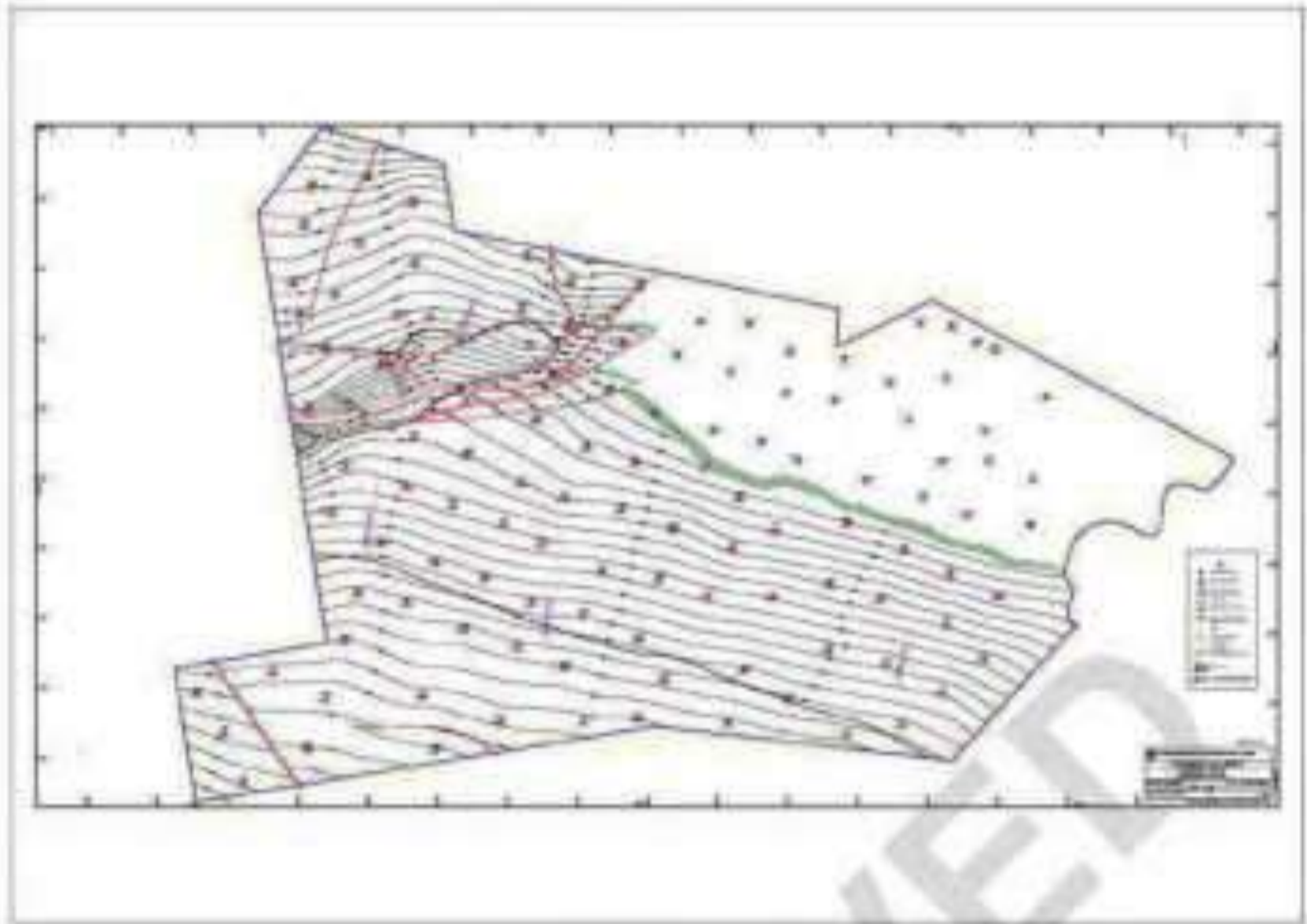
Plan / Plate 10A8



APPROVED

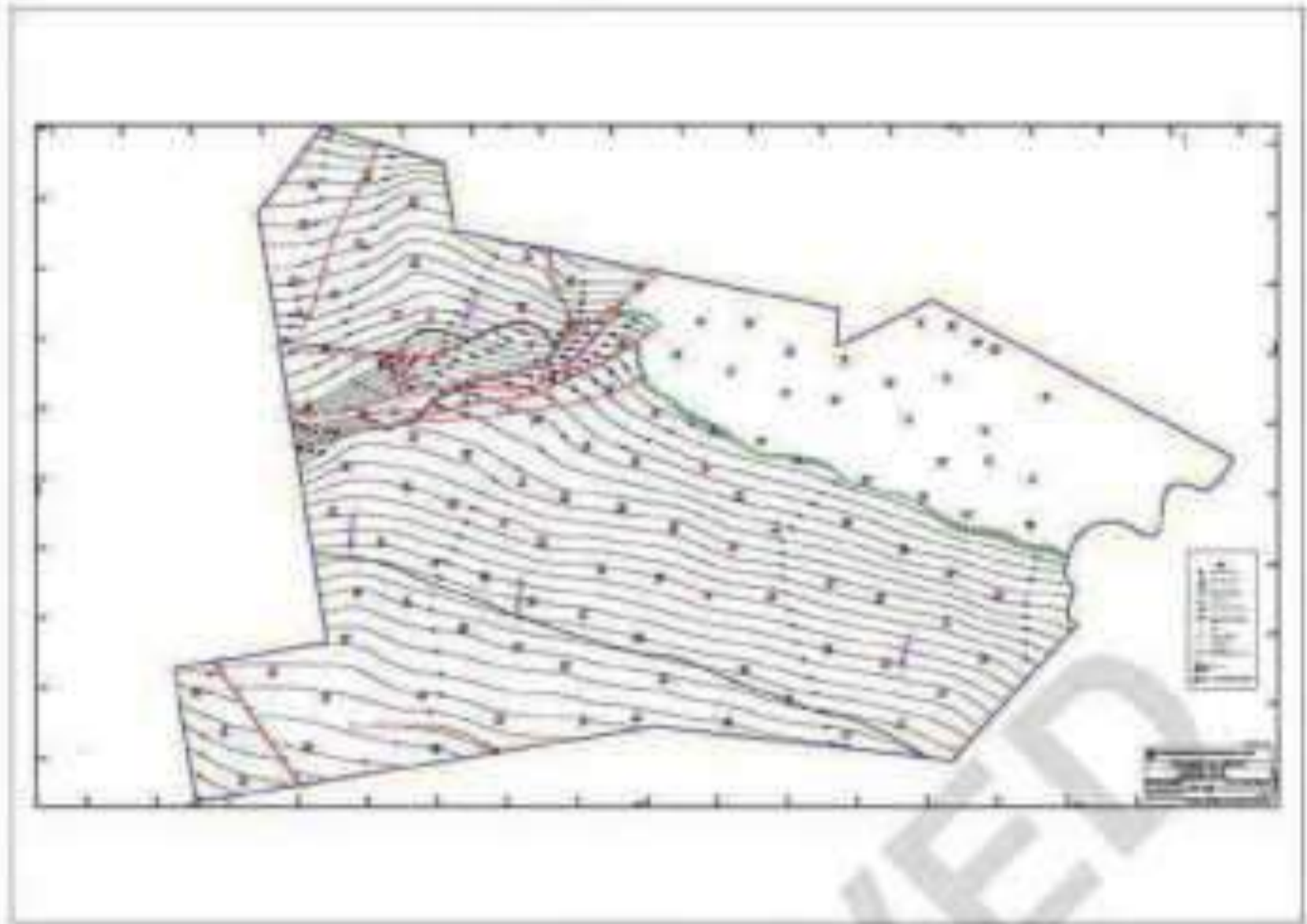


Plan / Plate 10A9

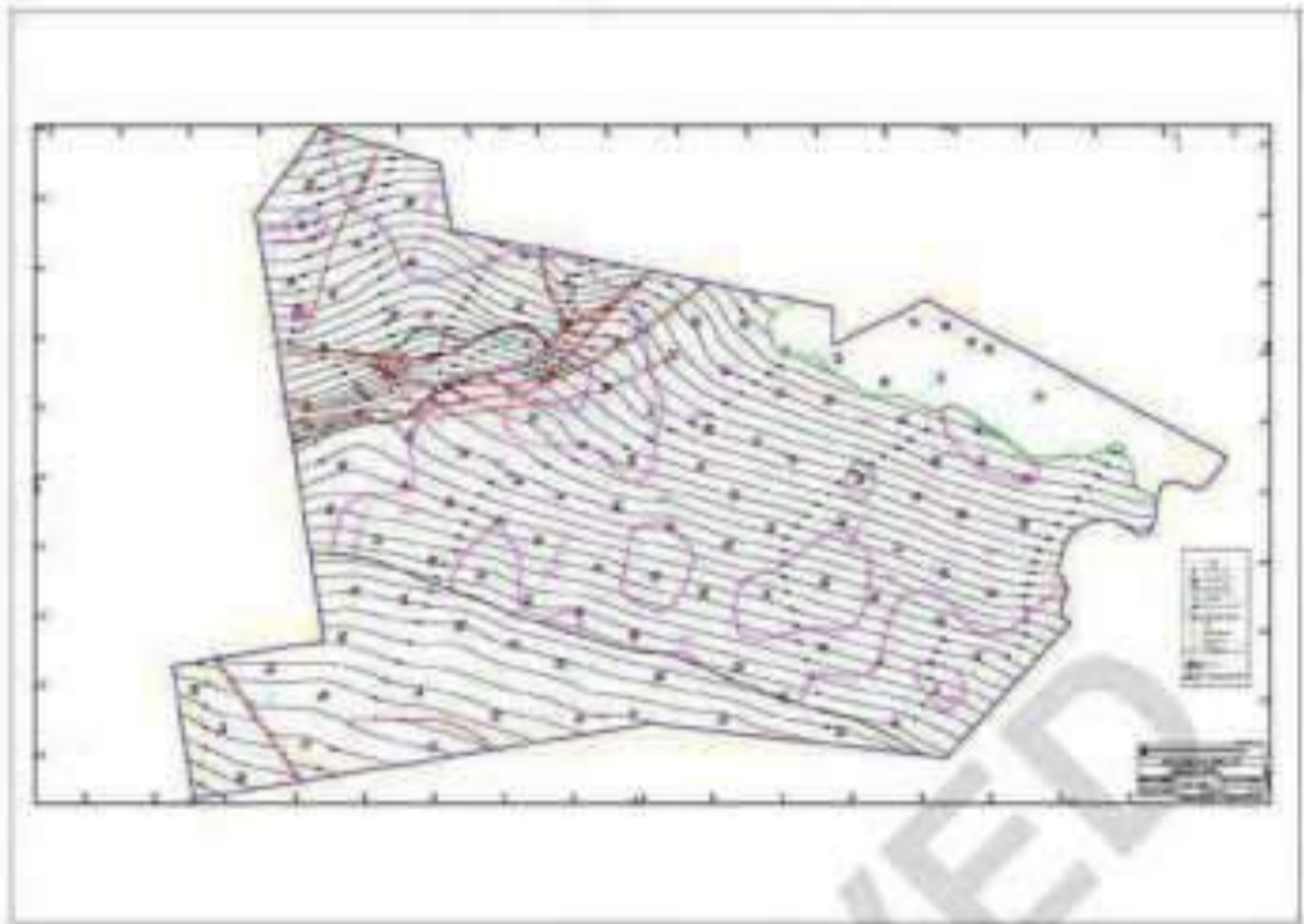


APPROVED

Plan / Plate 10A10



Plan / Plate 10A11

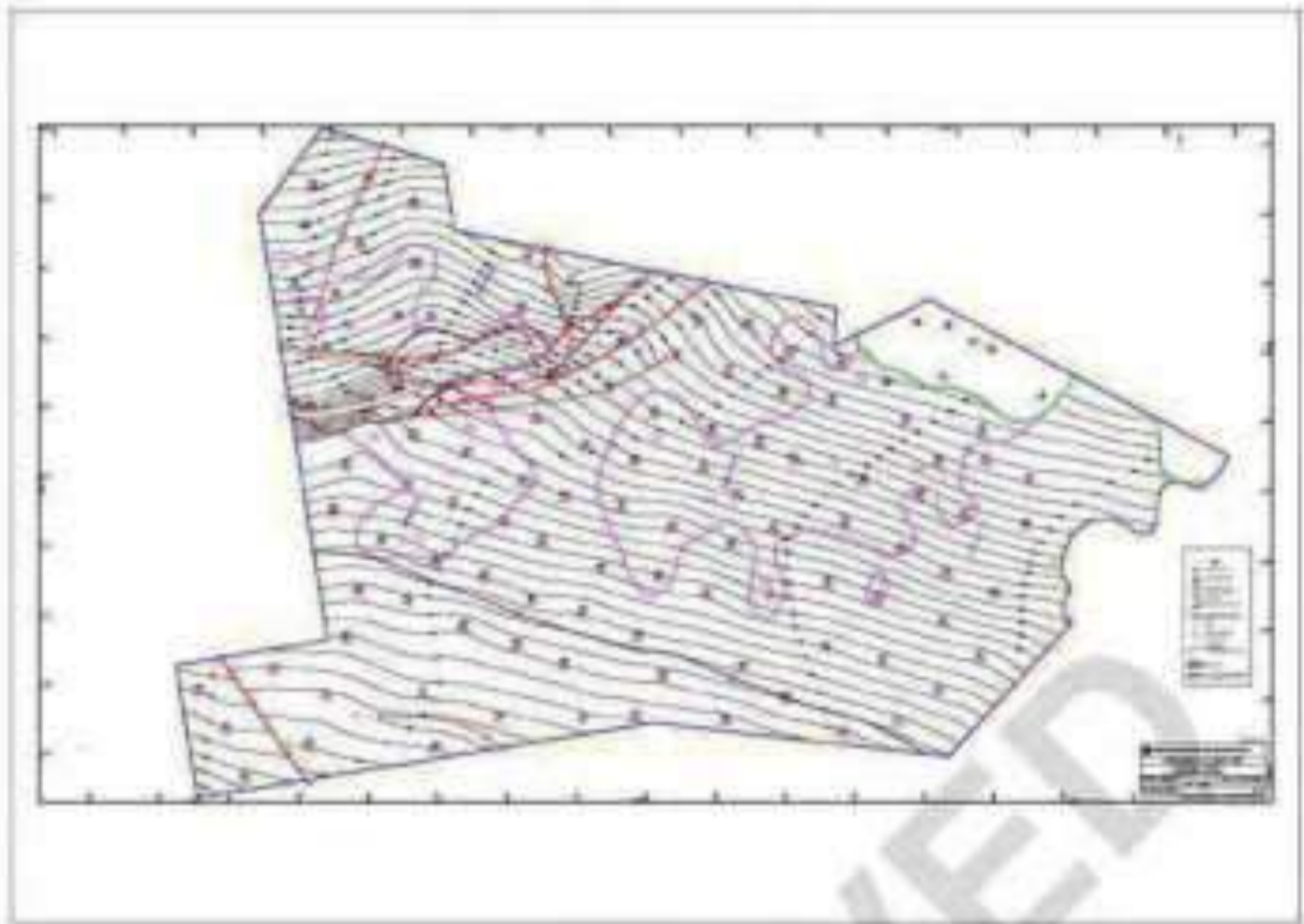


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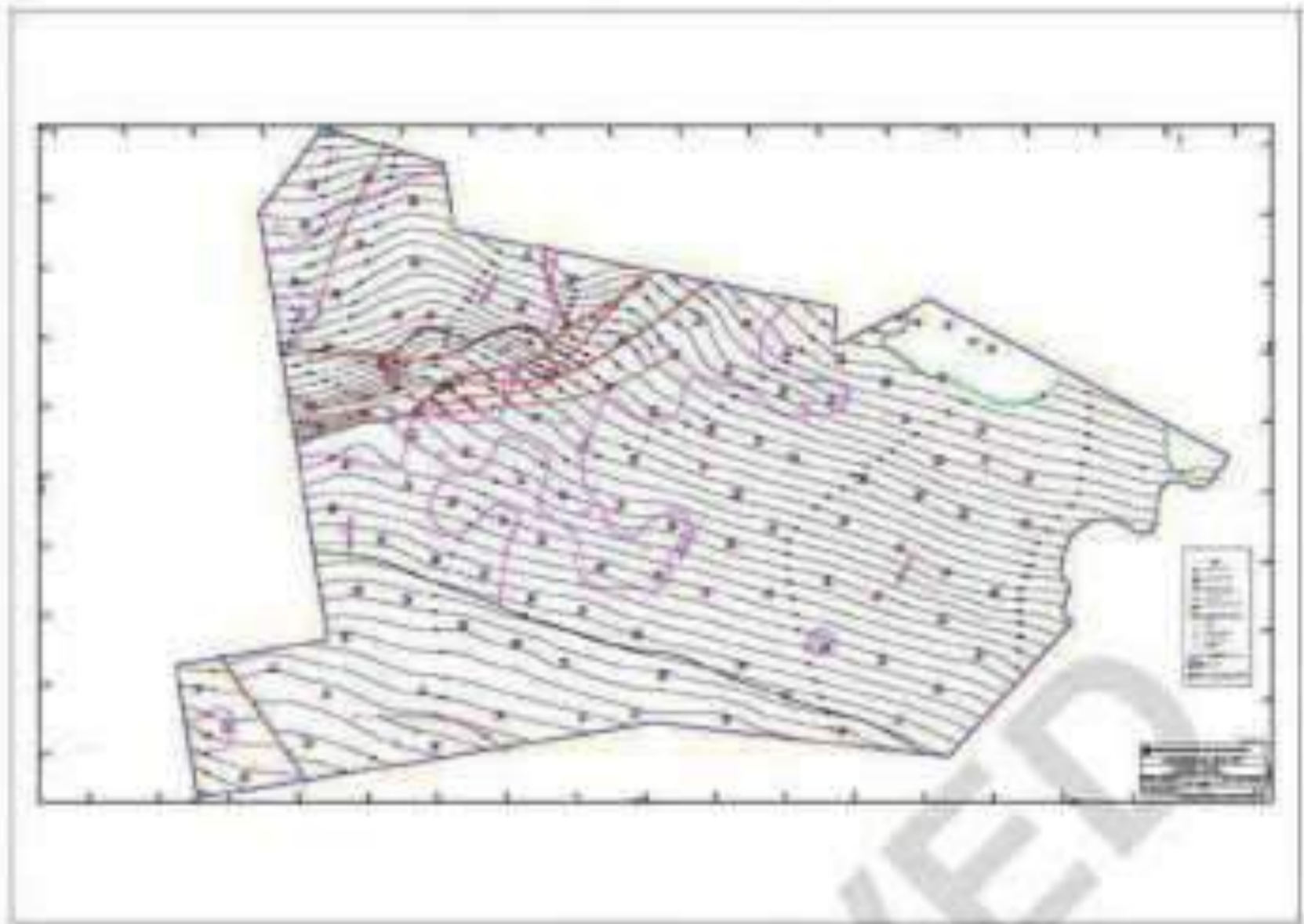
Plan / Plate 10A12



APPROVED



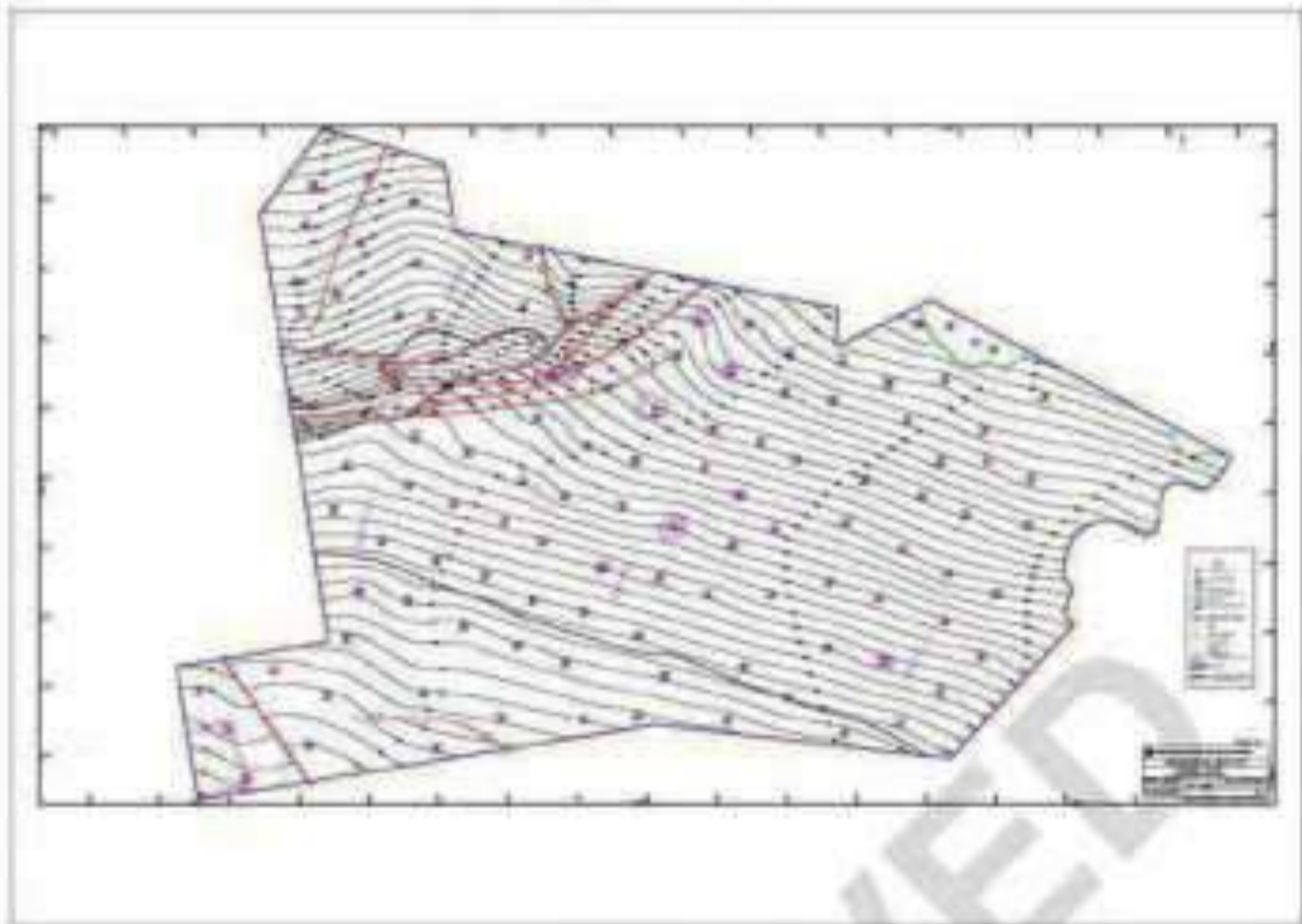
Plan / Plate 10A13



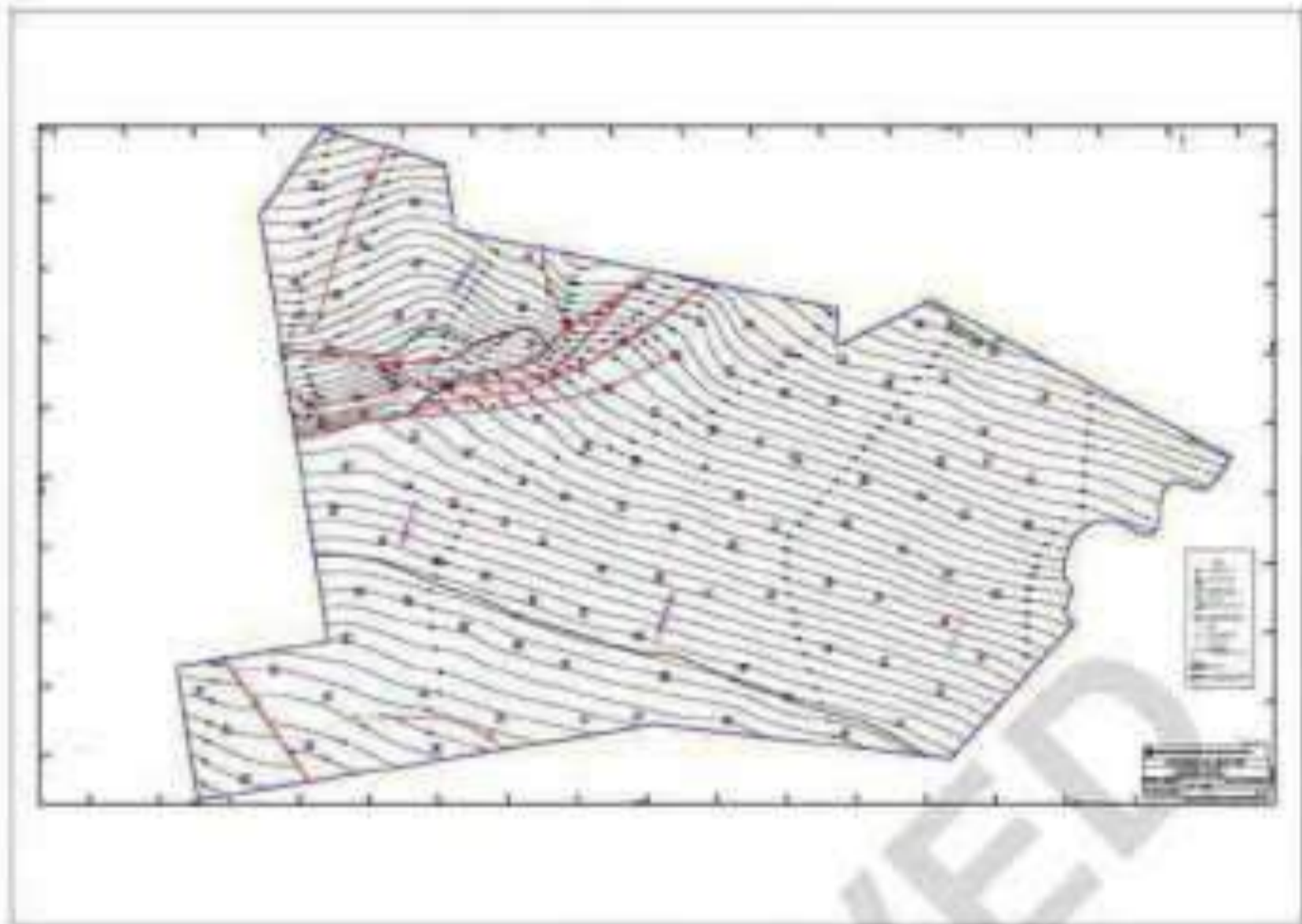
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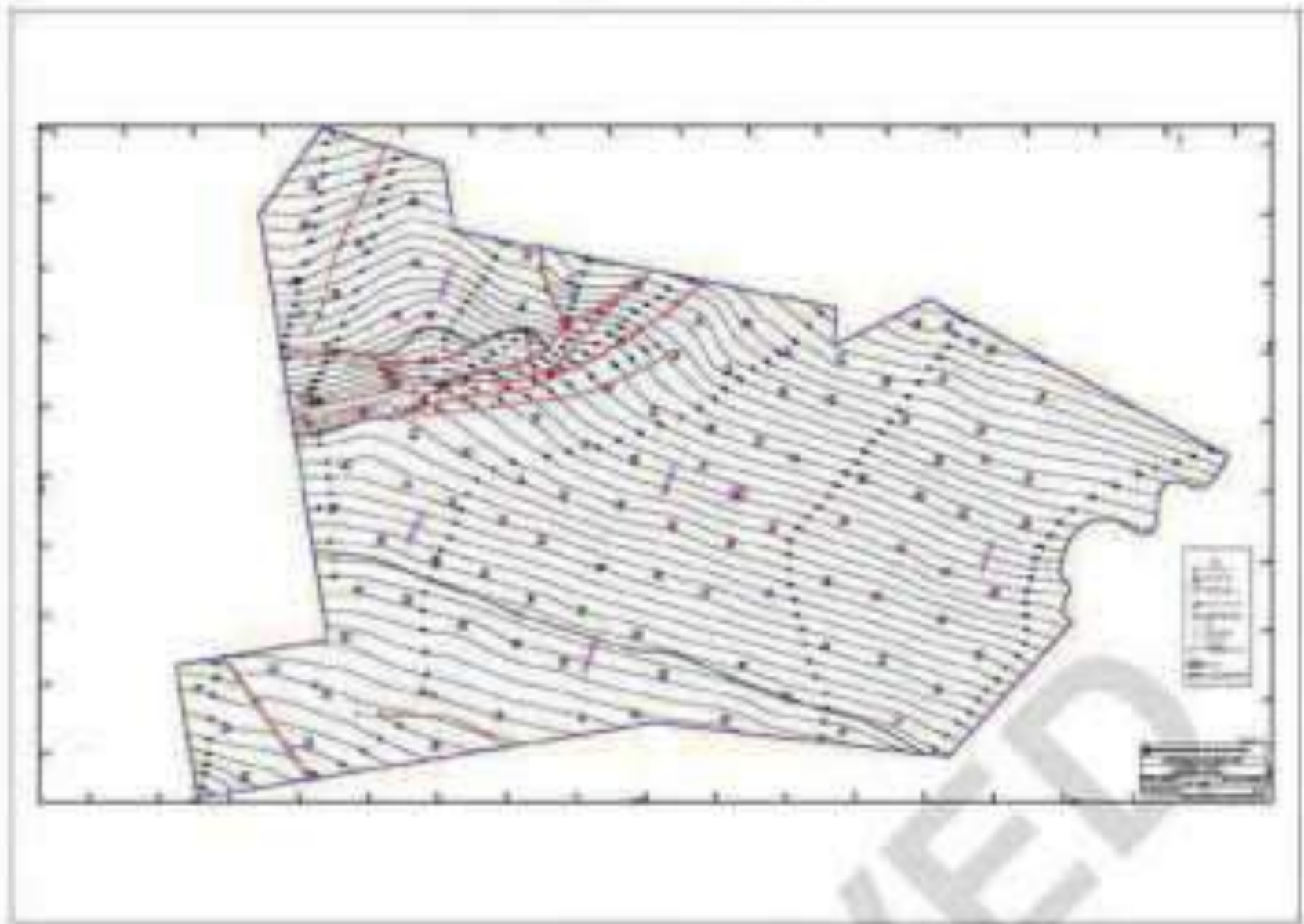
Plan / Plate 10A14



Plan / Plate 10A15



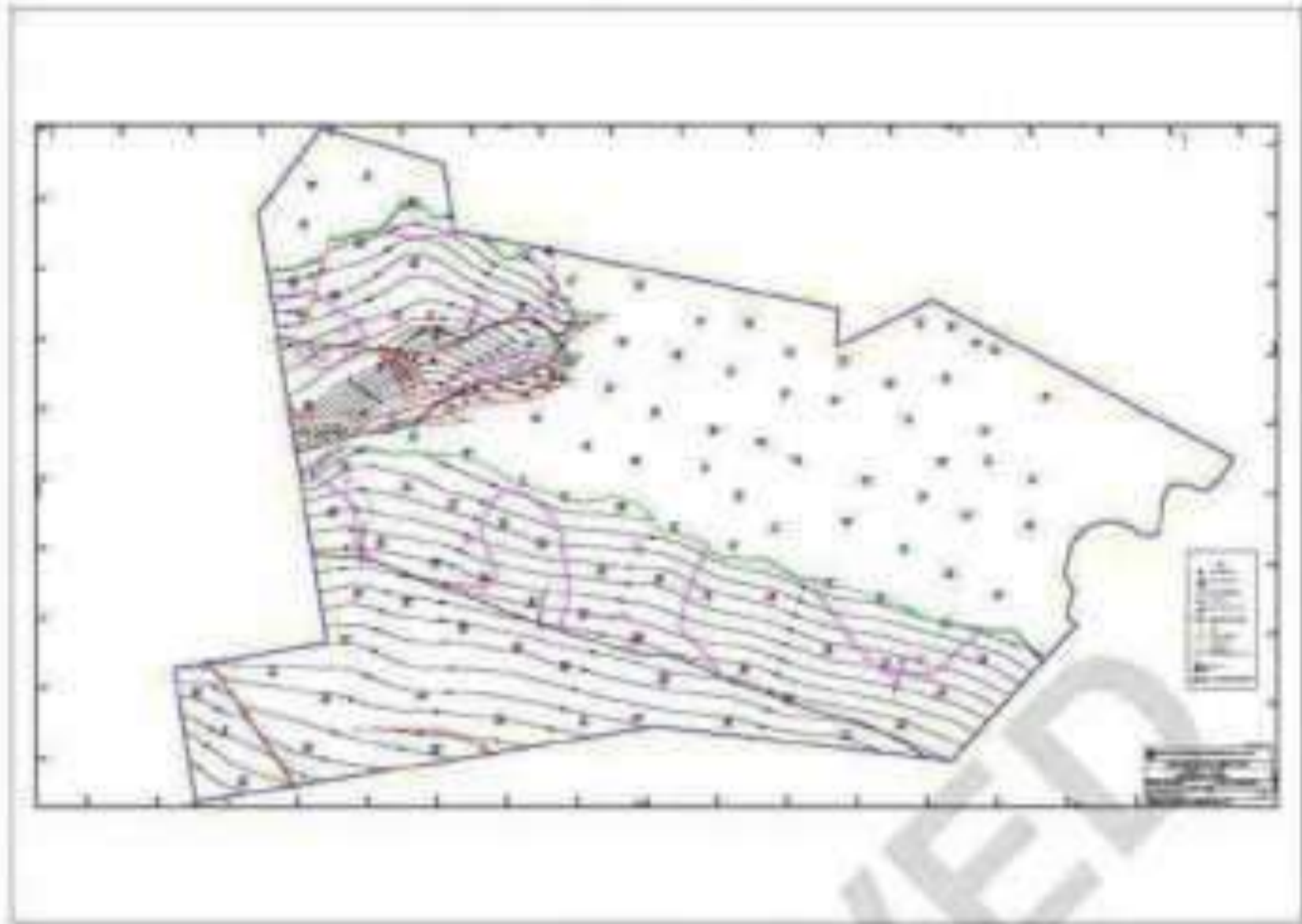
Plan / Plate 10A16



APPROVED



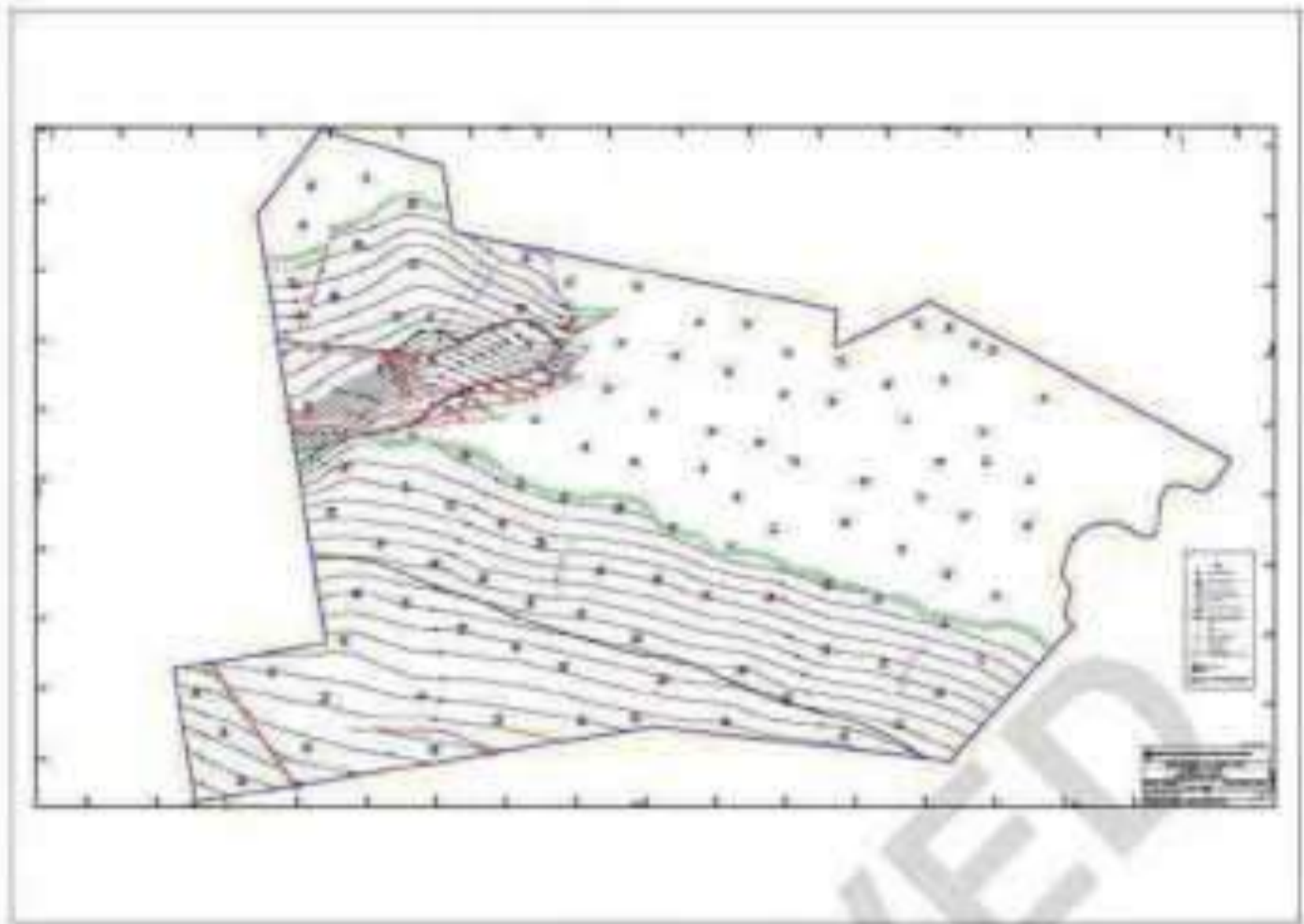
Plan / Plate 10A17



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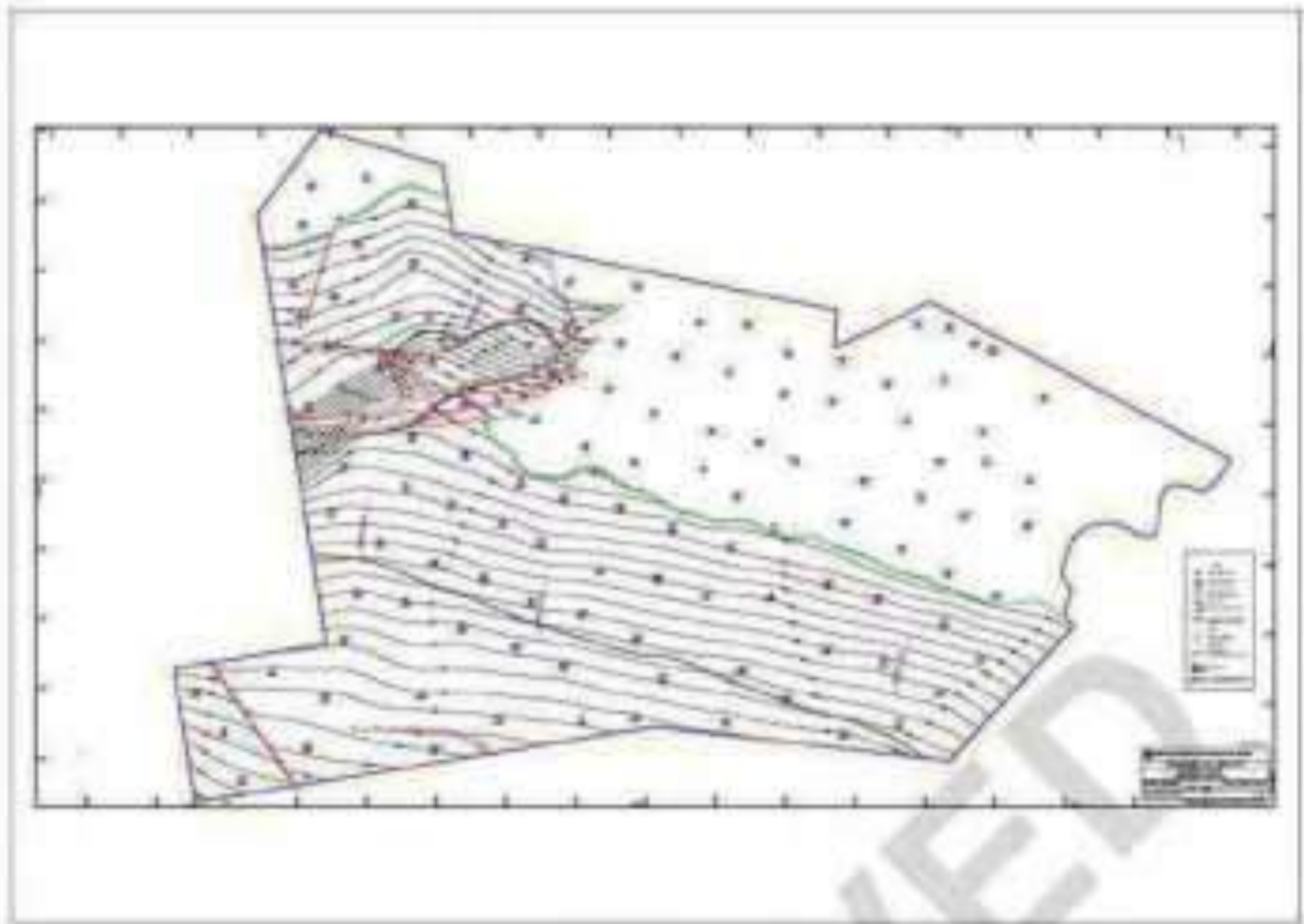
Plan / Plate 10A18



APPROVED

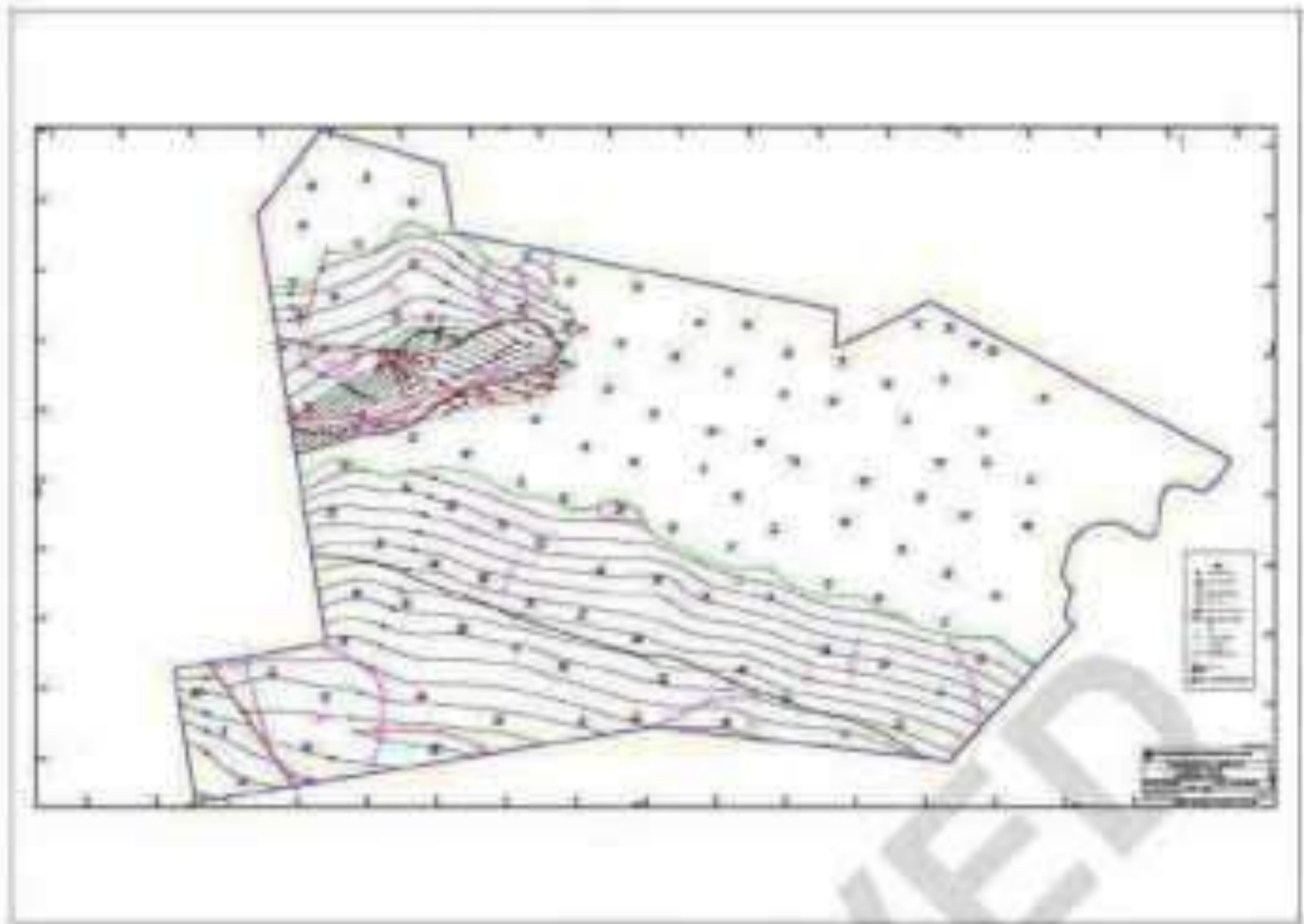


Plan / Plate 10A19





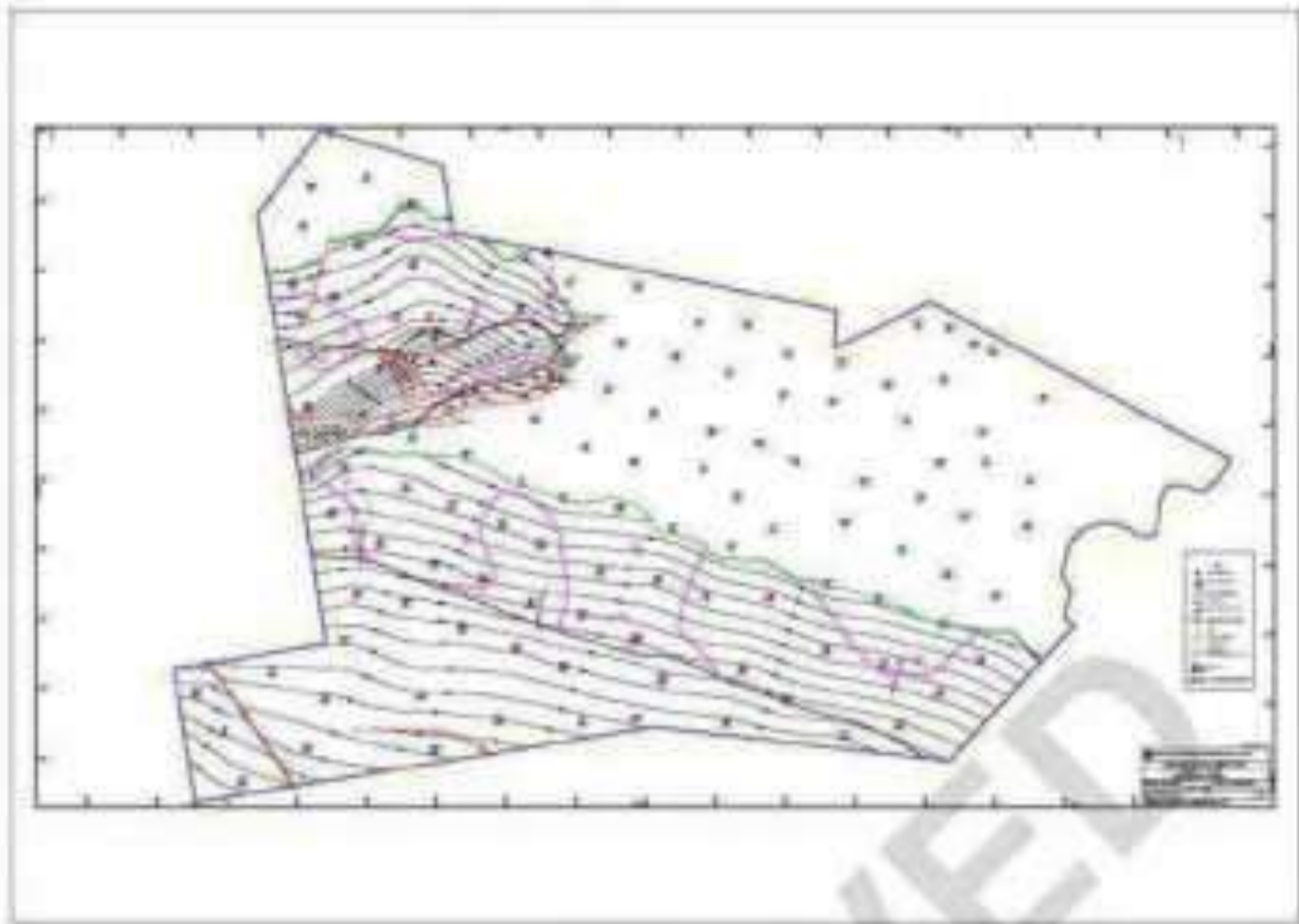
Plan / Plate 10A20



APPROVED



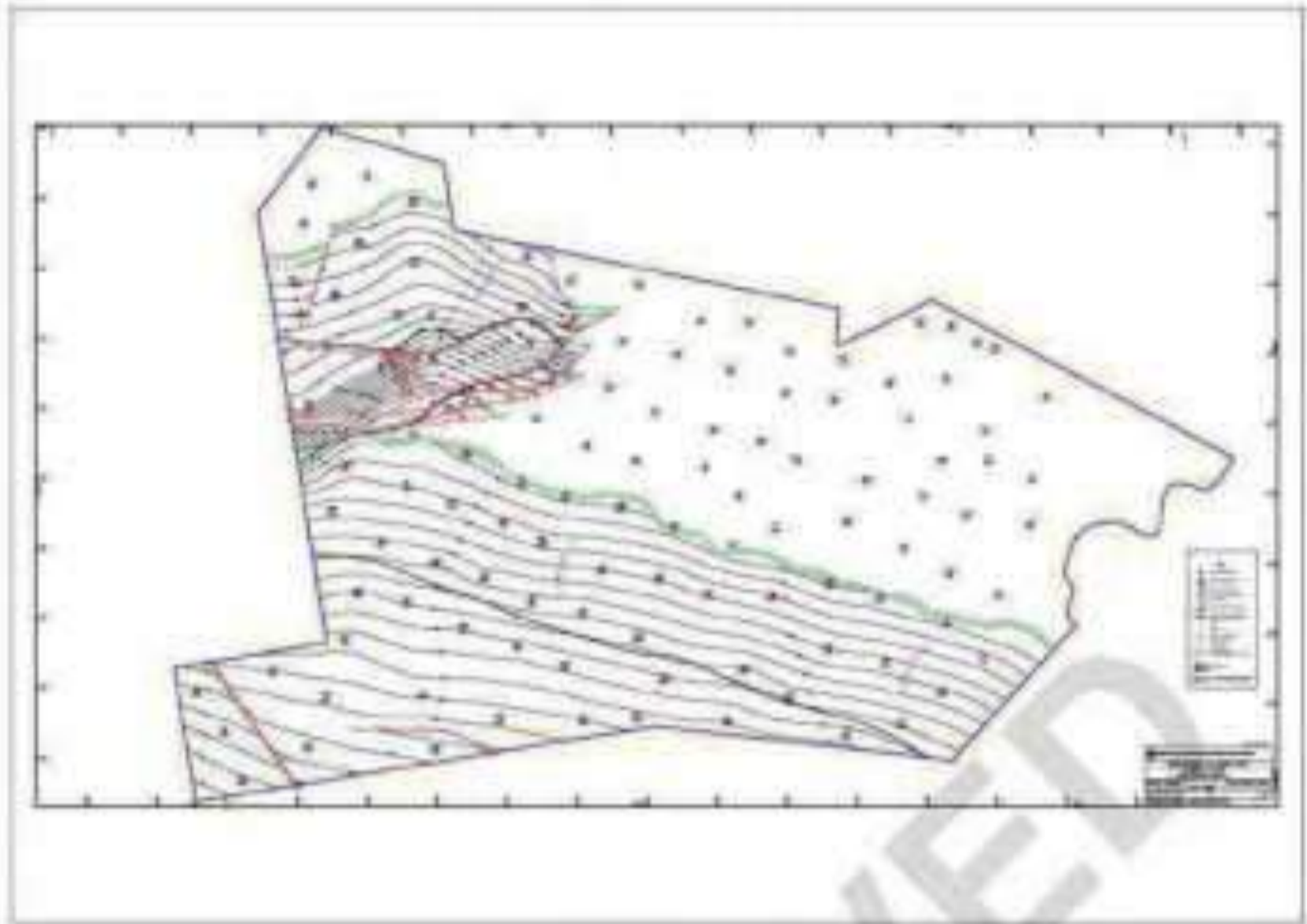
Plan / Plate 10A21



APPROVED

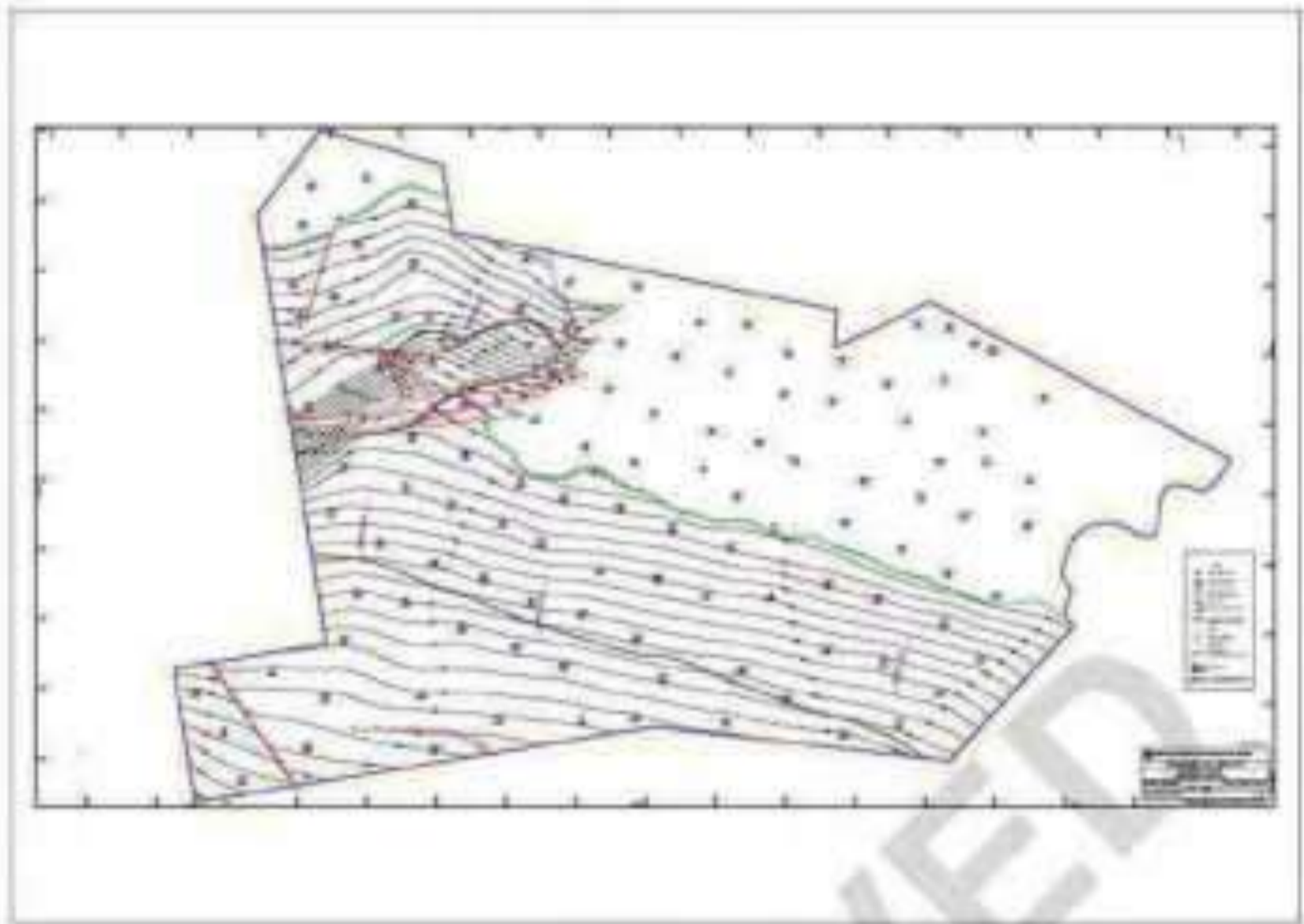


Plan / Plate 10A22

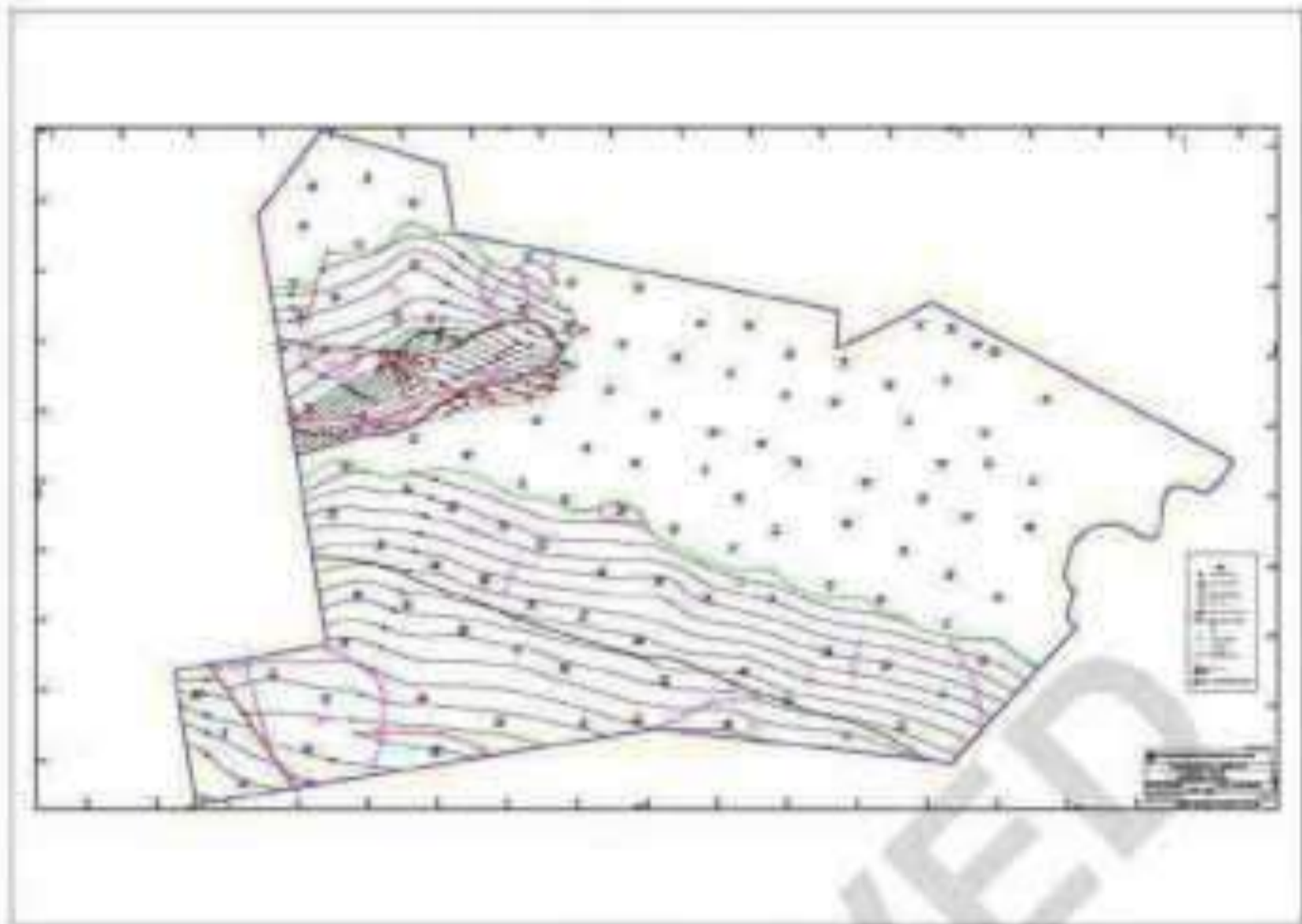


APPROVED

Plan / Plate 10A23



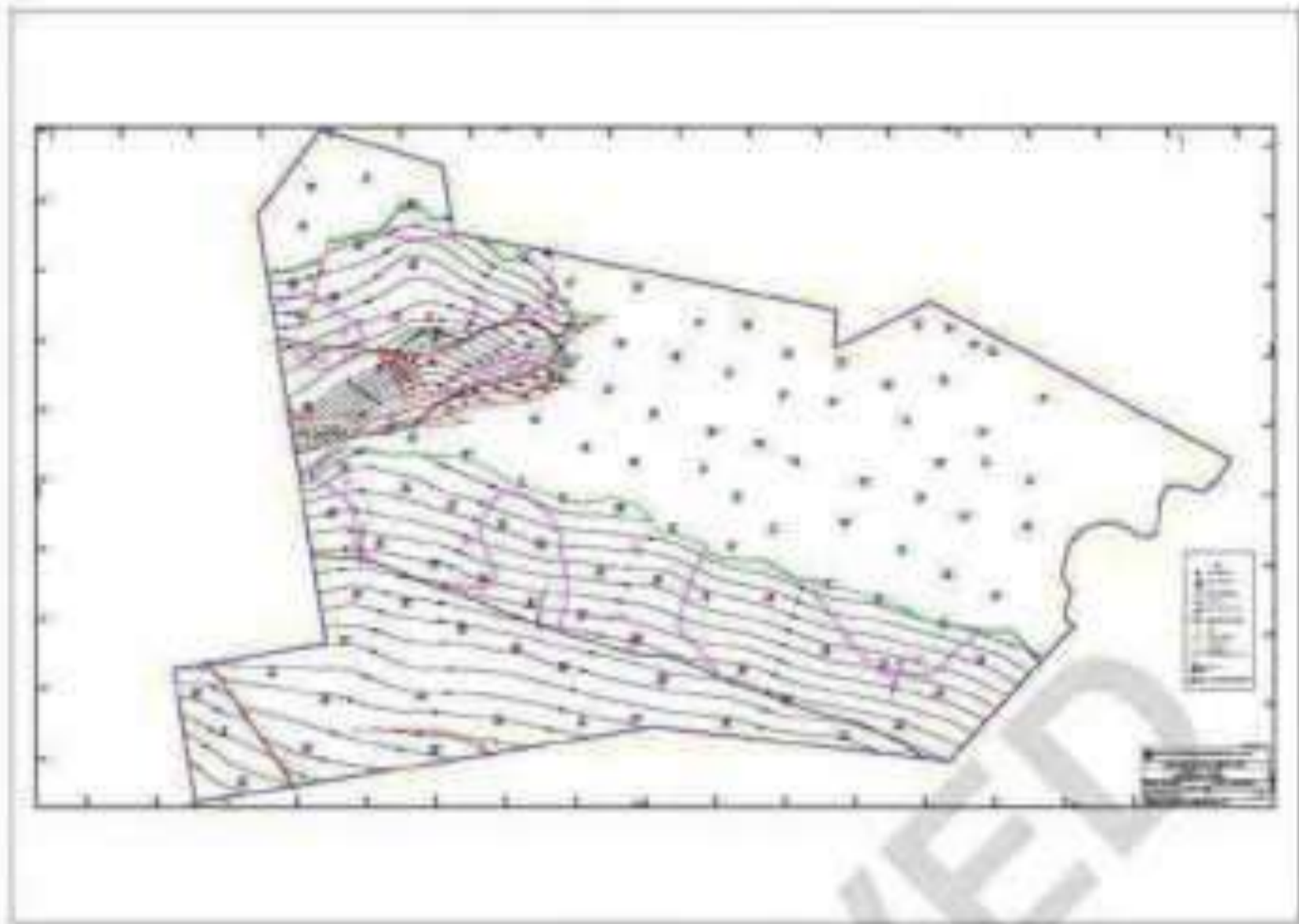
Plan / Plate 10A24



APPROVED



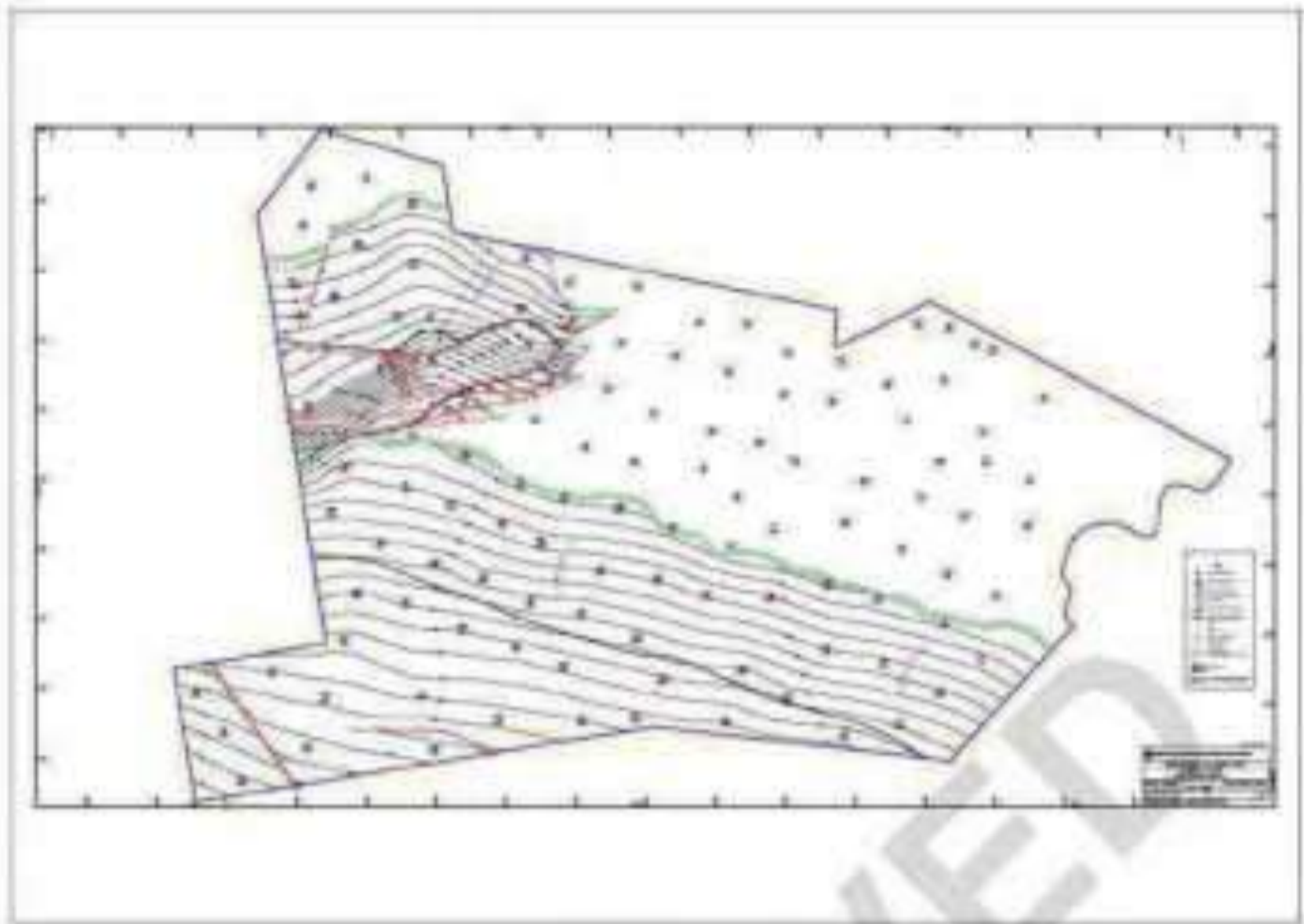
Plan / Plate 10A25



APPROVED

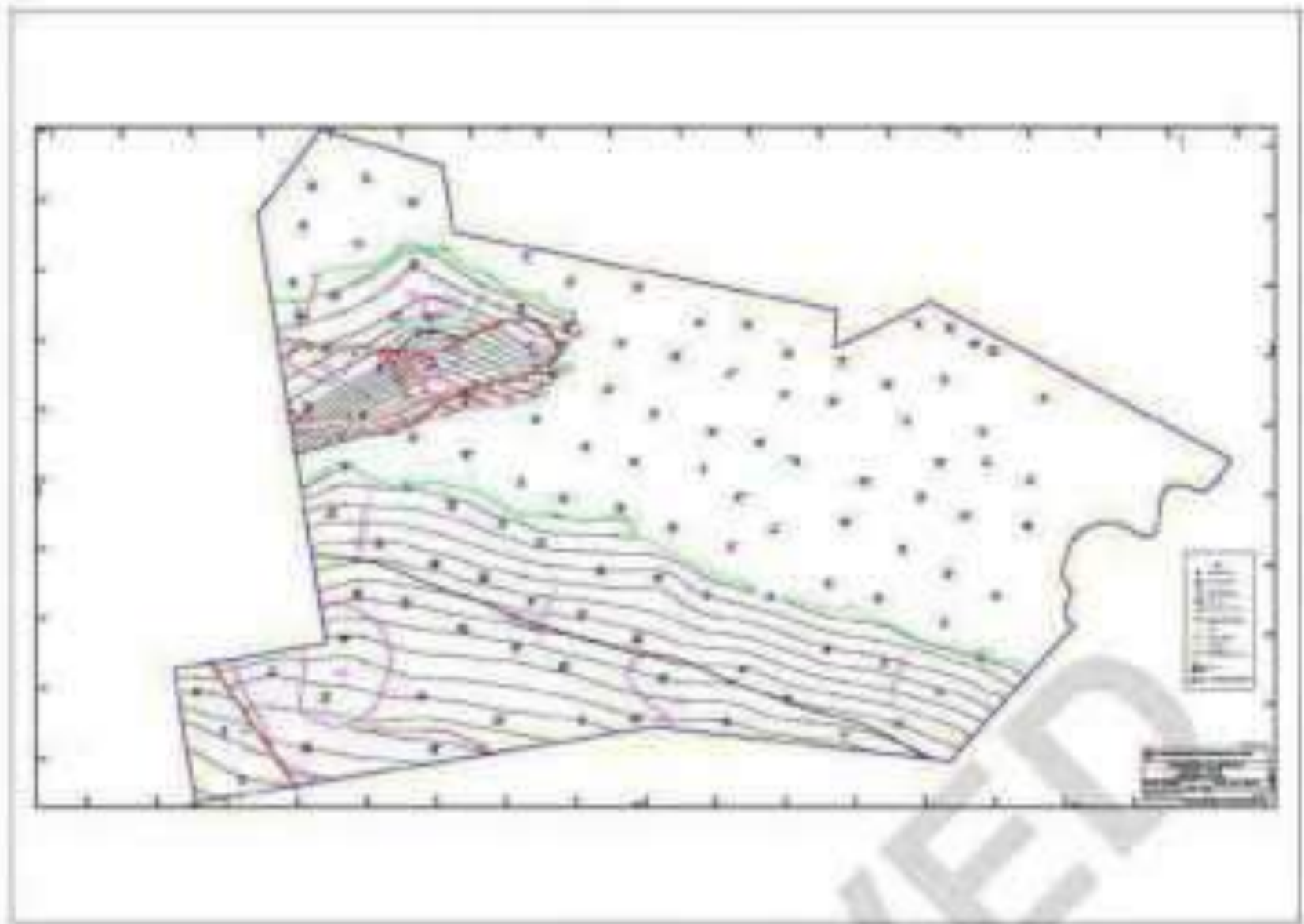


Plan / Plate 10A26



APPROVED

Plan / Plate 10A27

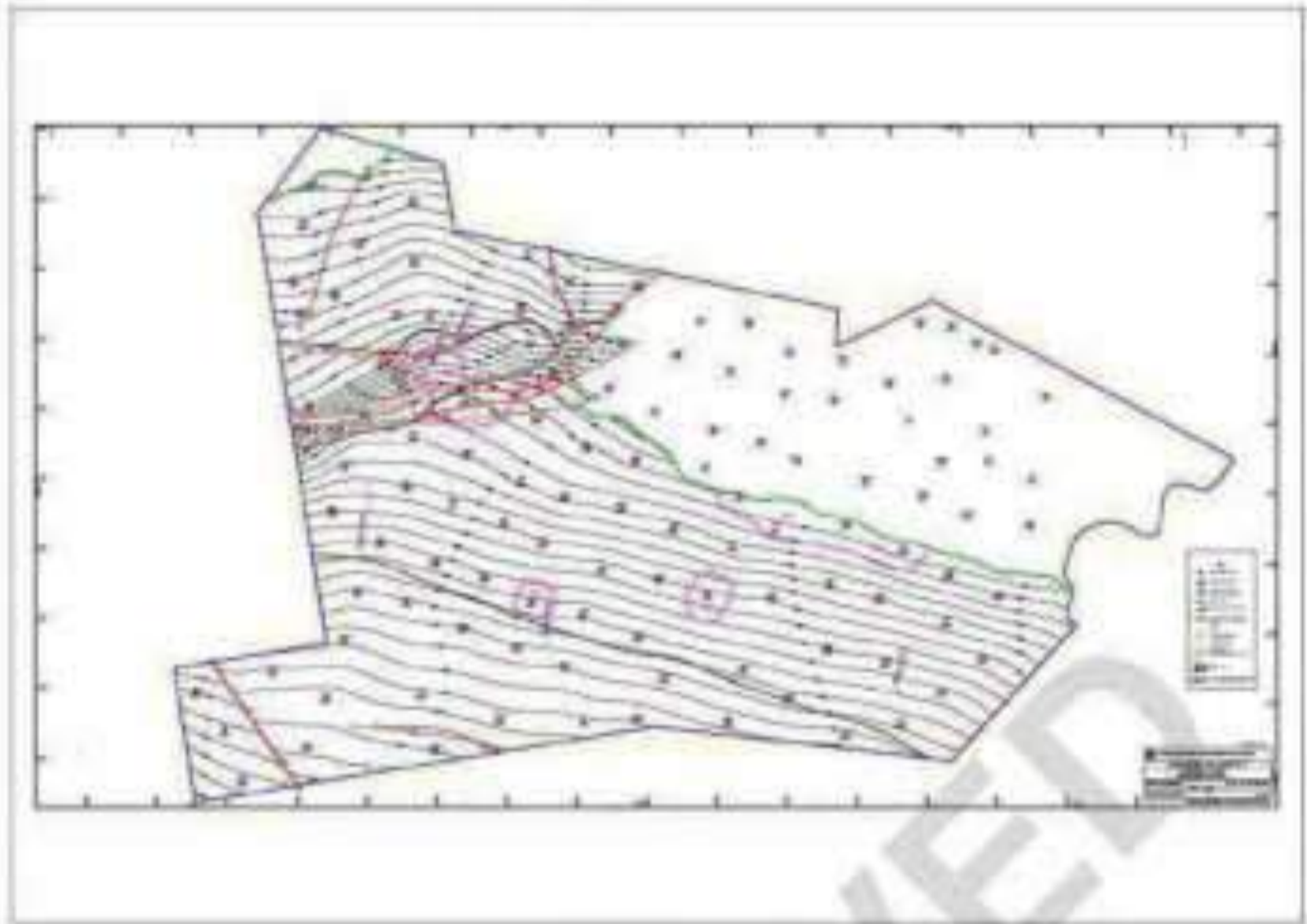


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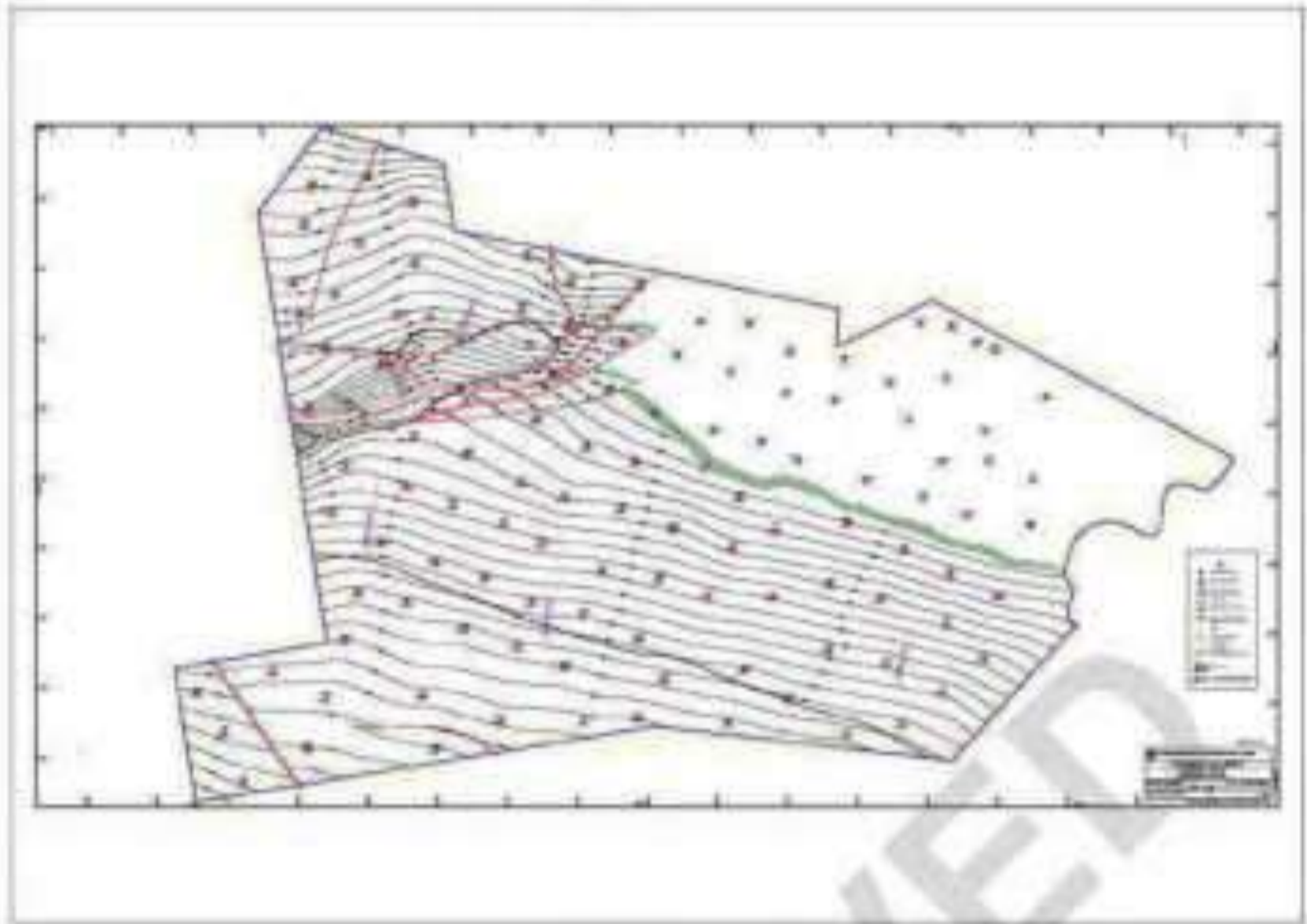




Plan / Plate 10A28



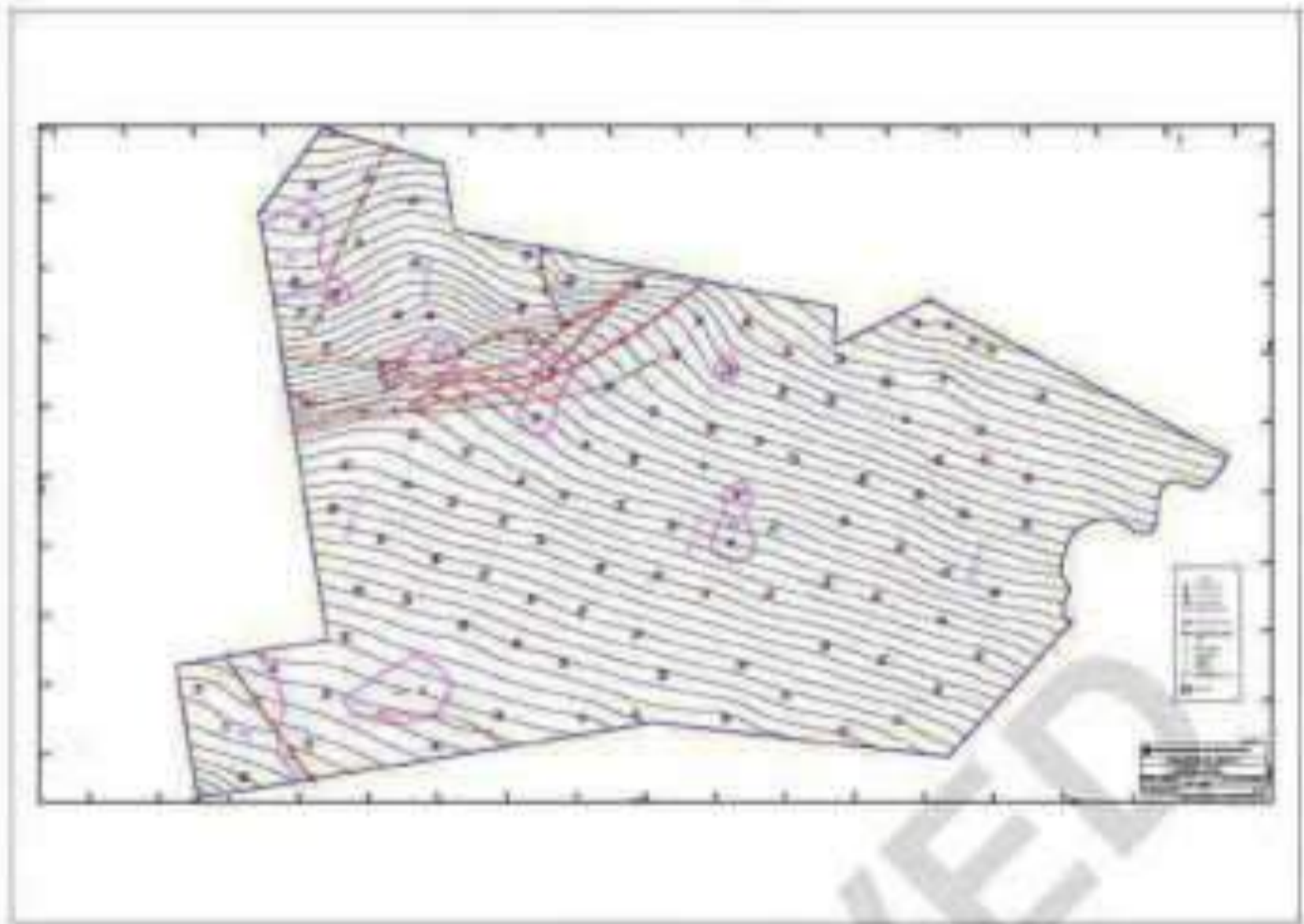
Plan / Plate 10A29



APPROVED



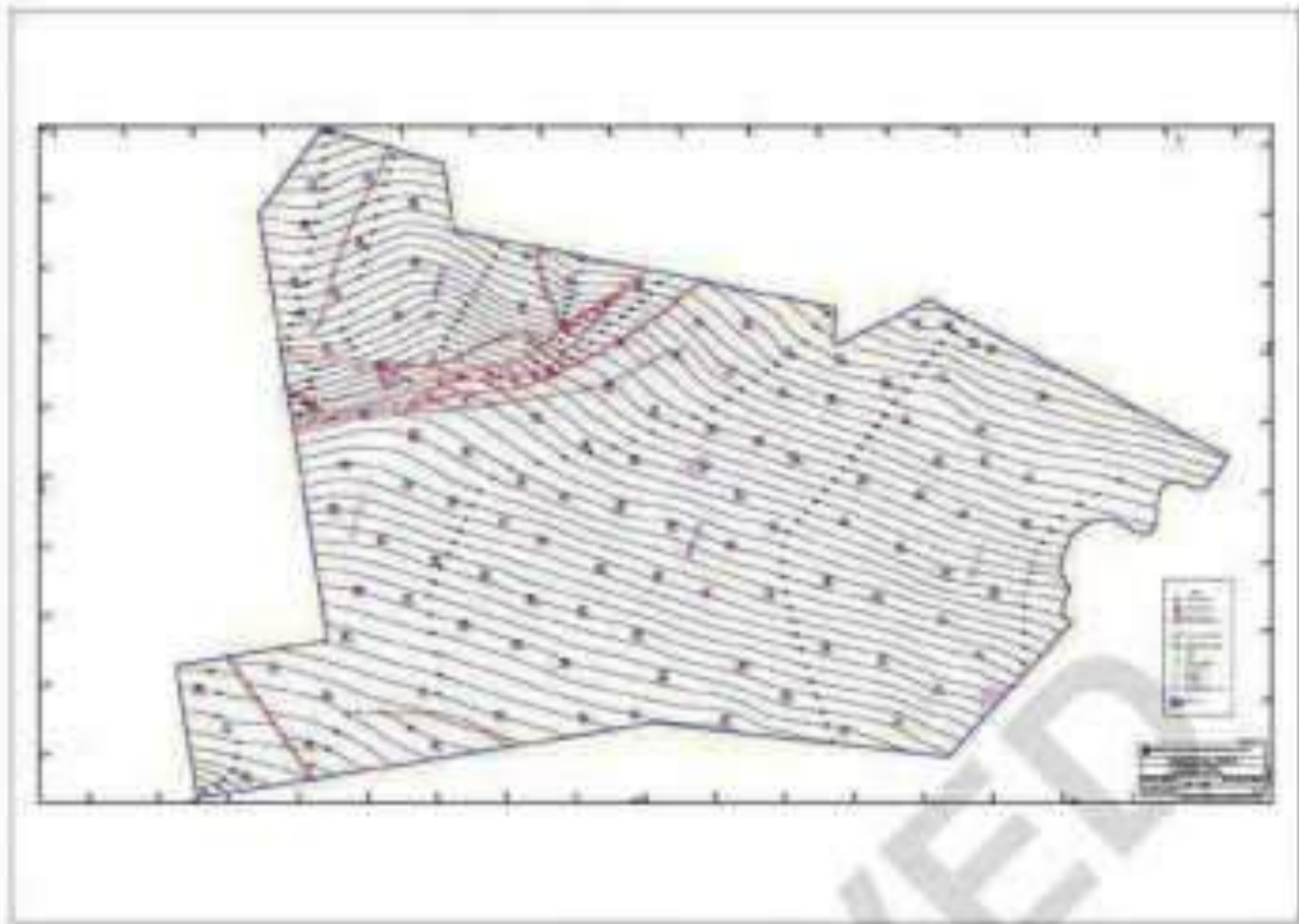
Plan / Plate 10A30



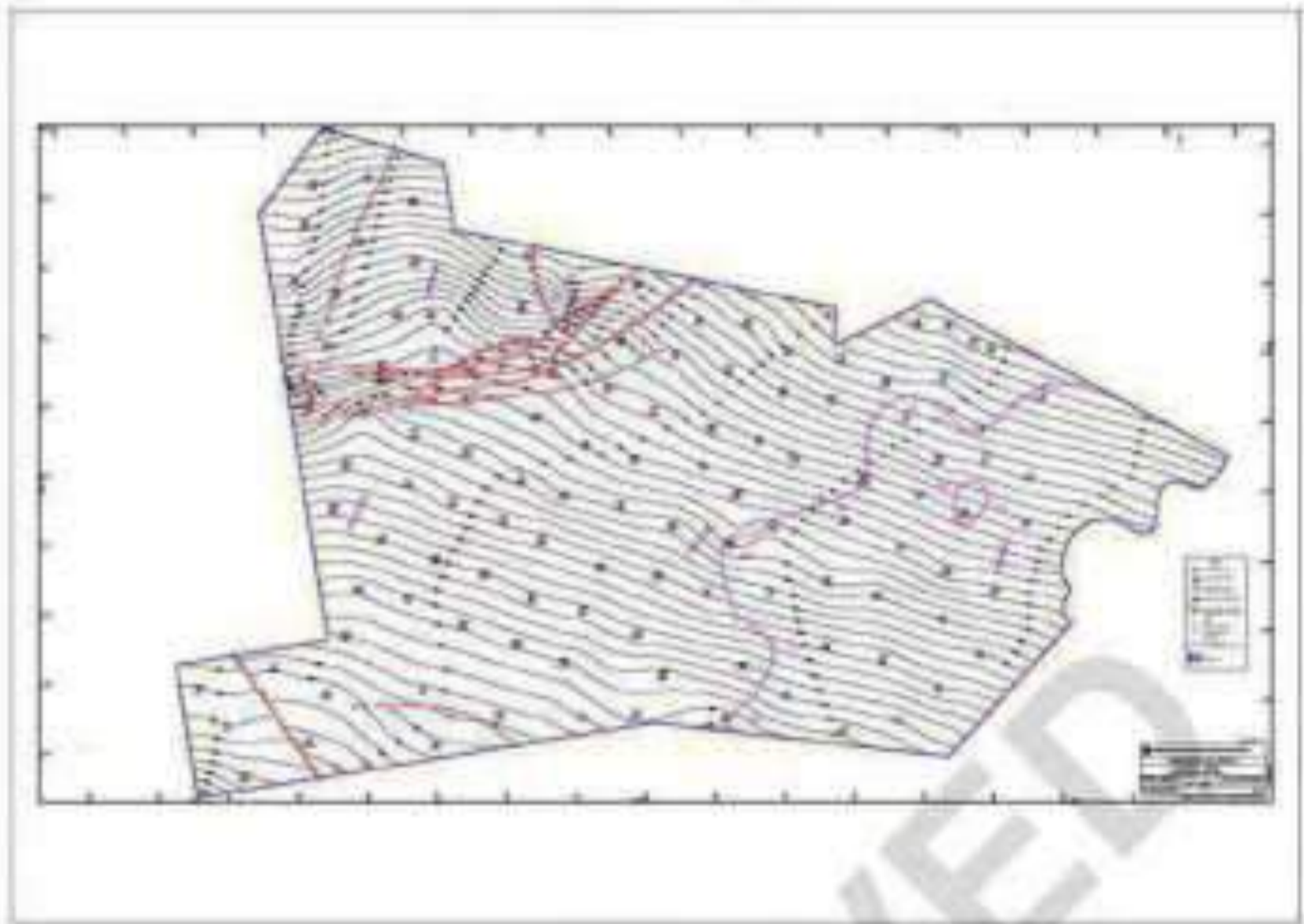
APPROVED



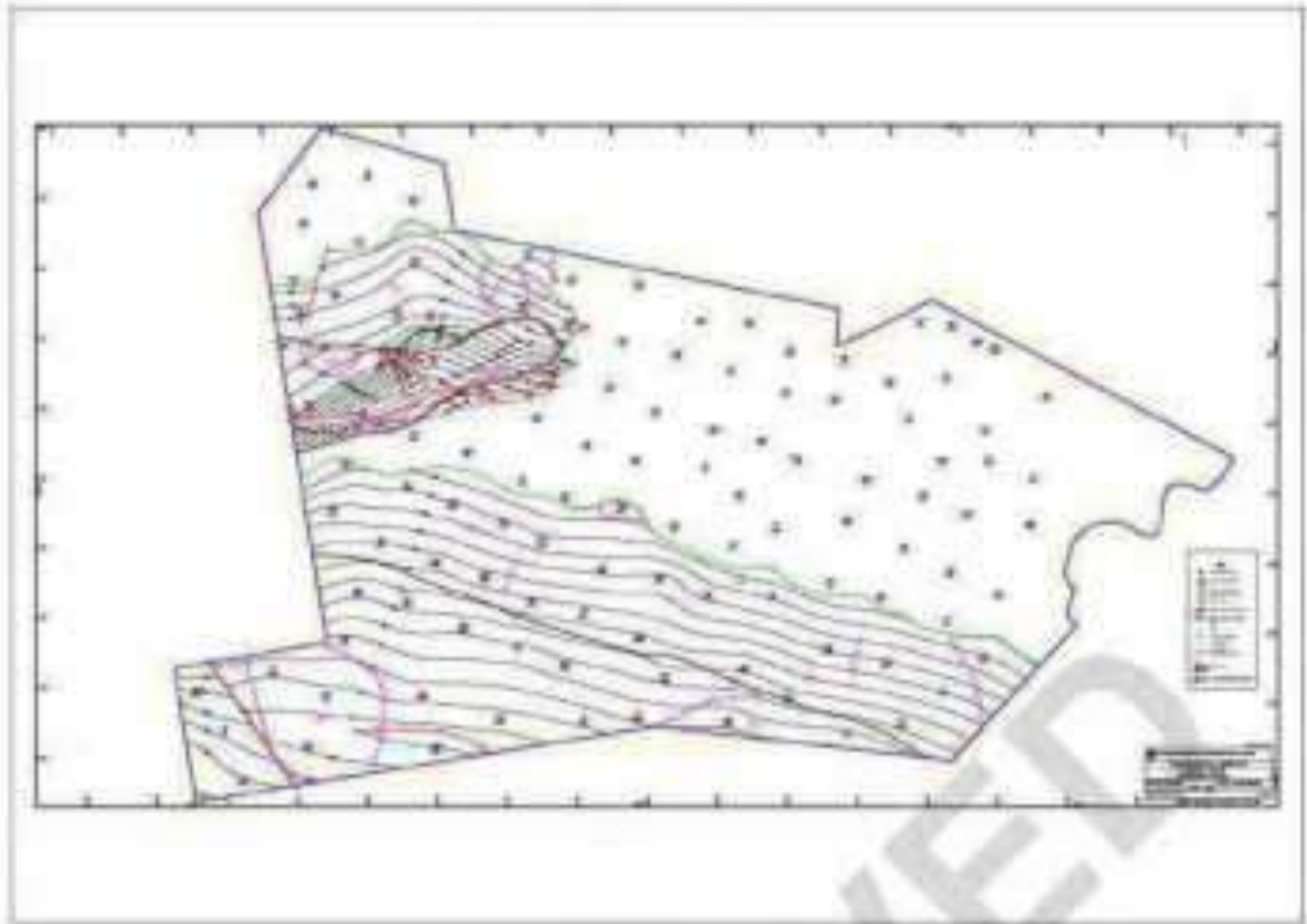
Plan / Plate 10A31



Plan / Plate 10A32



Plan / Plate 10A33



APPROVED

Plan / Plate 10B1



APPROVED

Plan / Plate 10B2

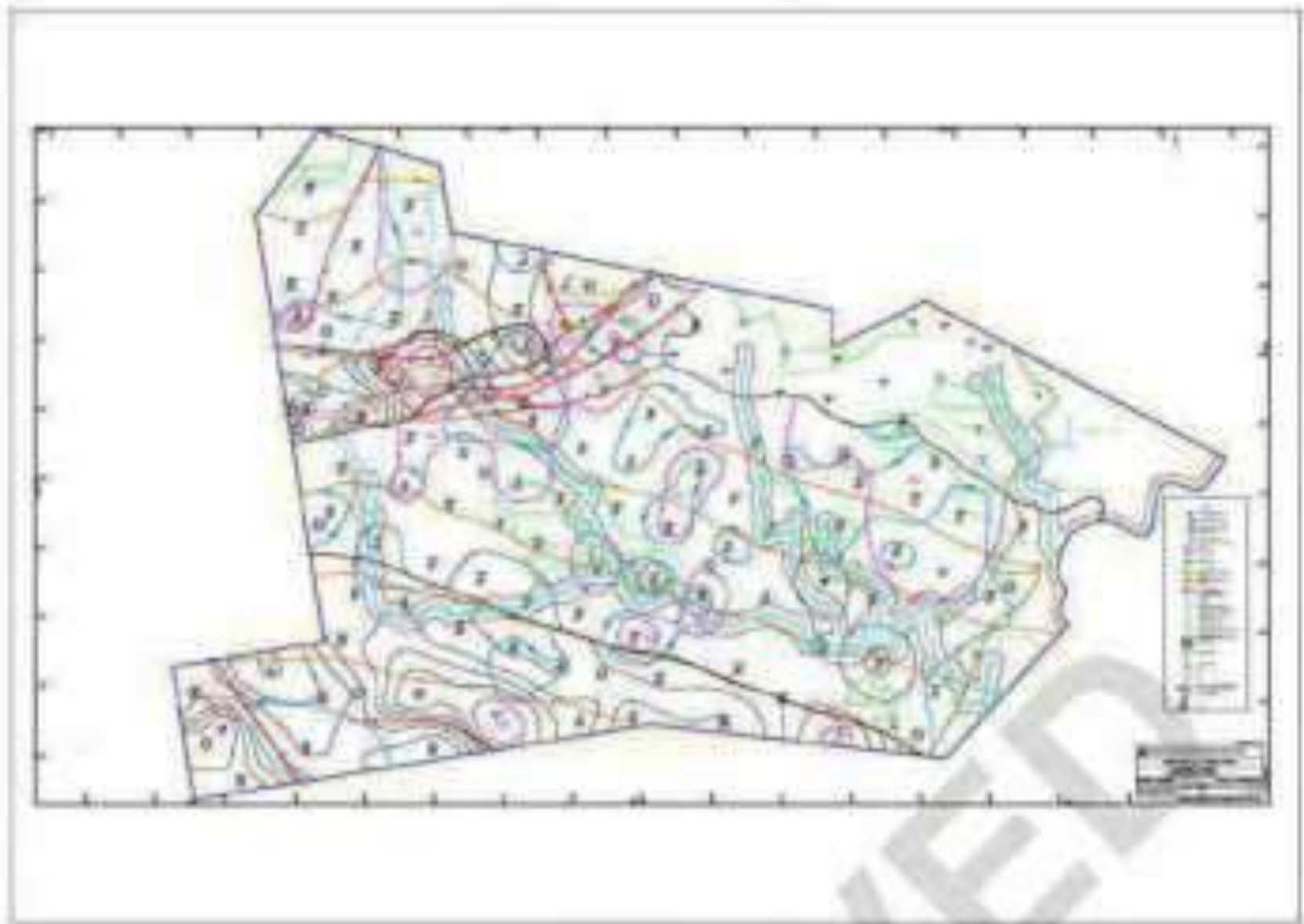


APPROVED





Plan / Plate 10B3



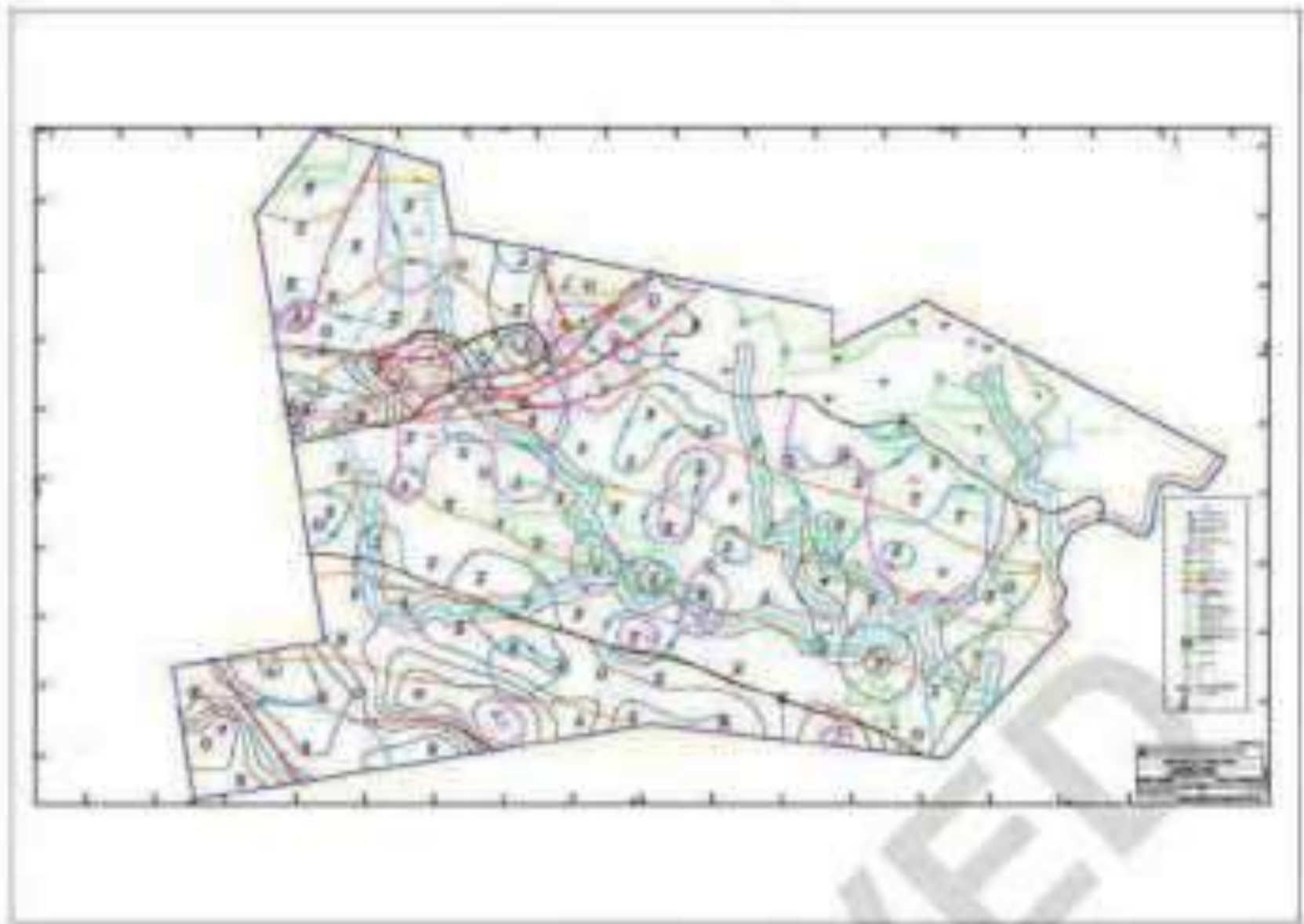
APPROVED

Plan / Plate 10B4



APPROVED

Plan / Plate 10B5



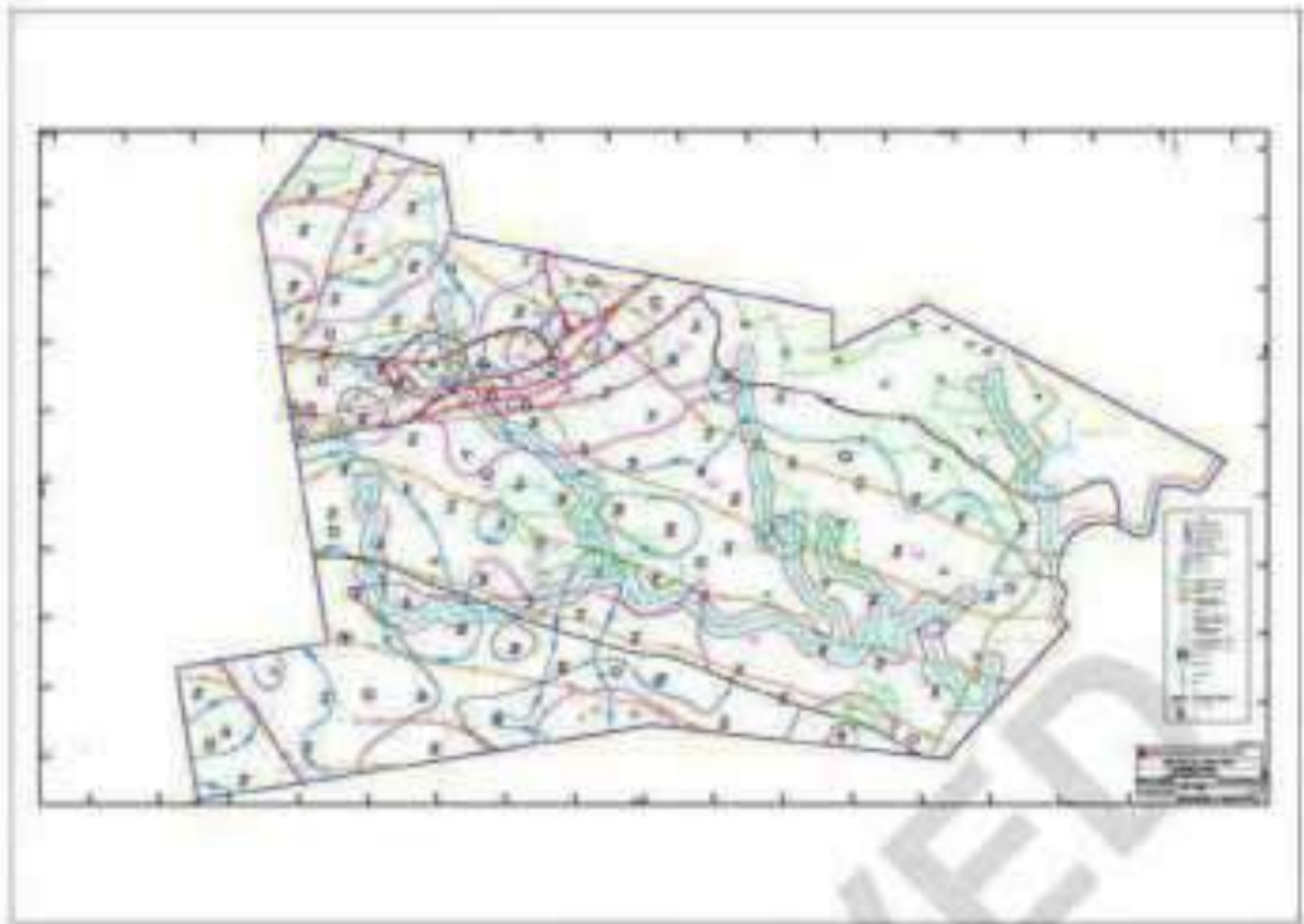
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Plan / Plate 10B6



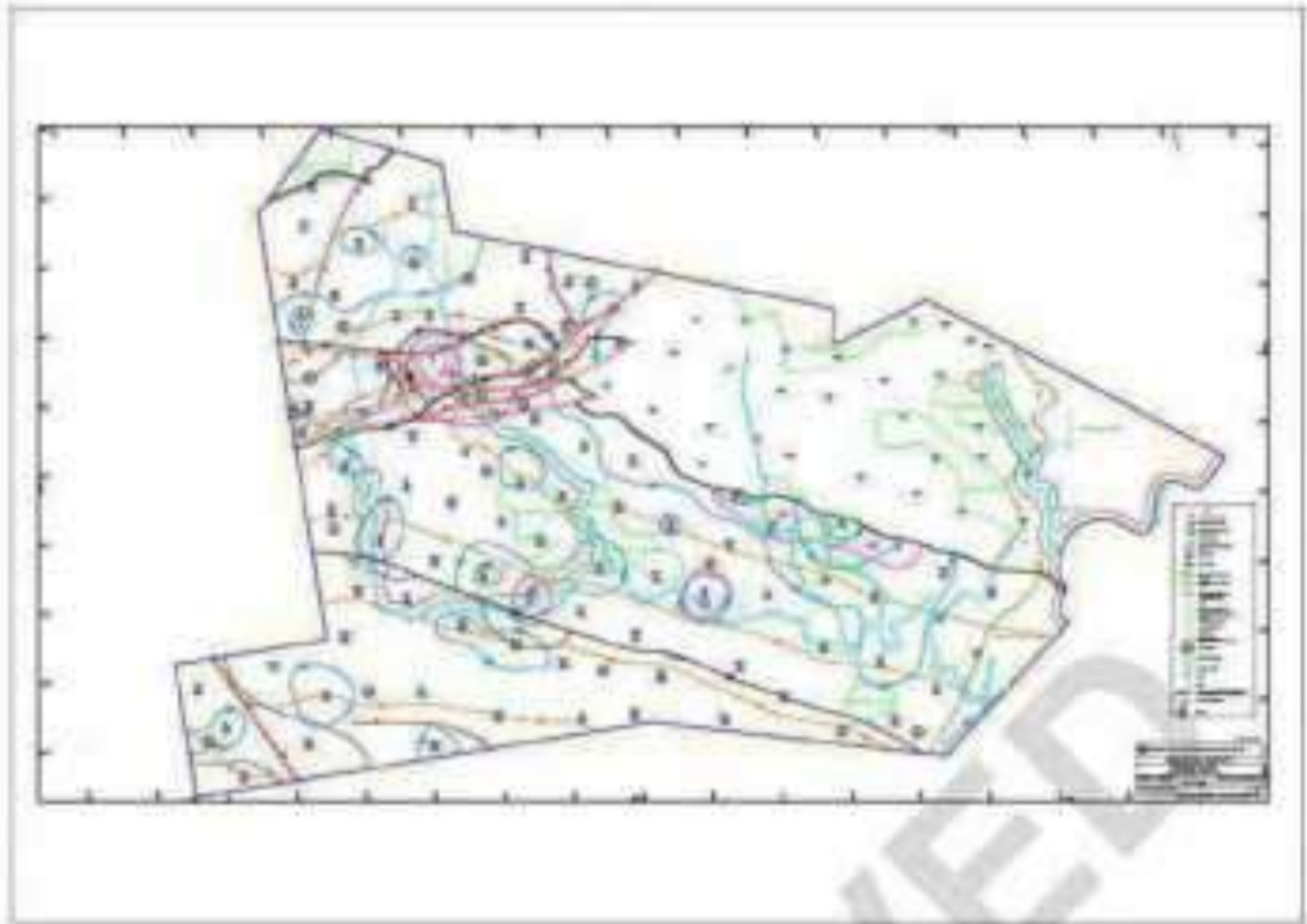
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Plan / Plate 10B7



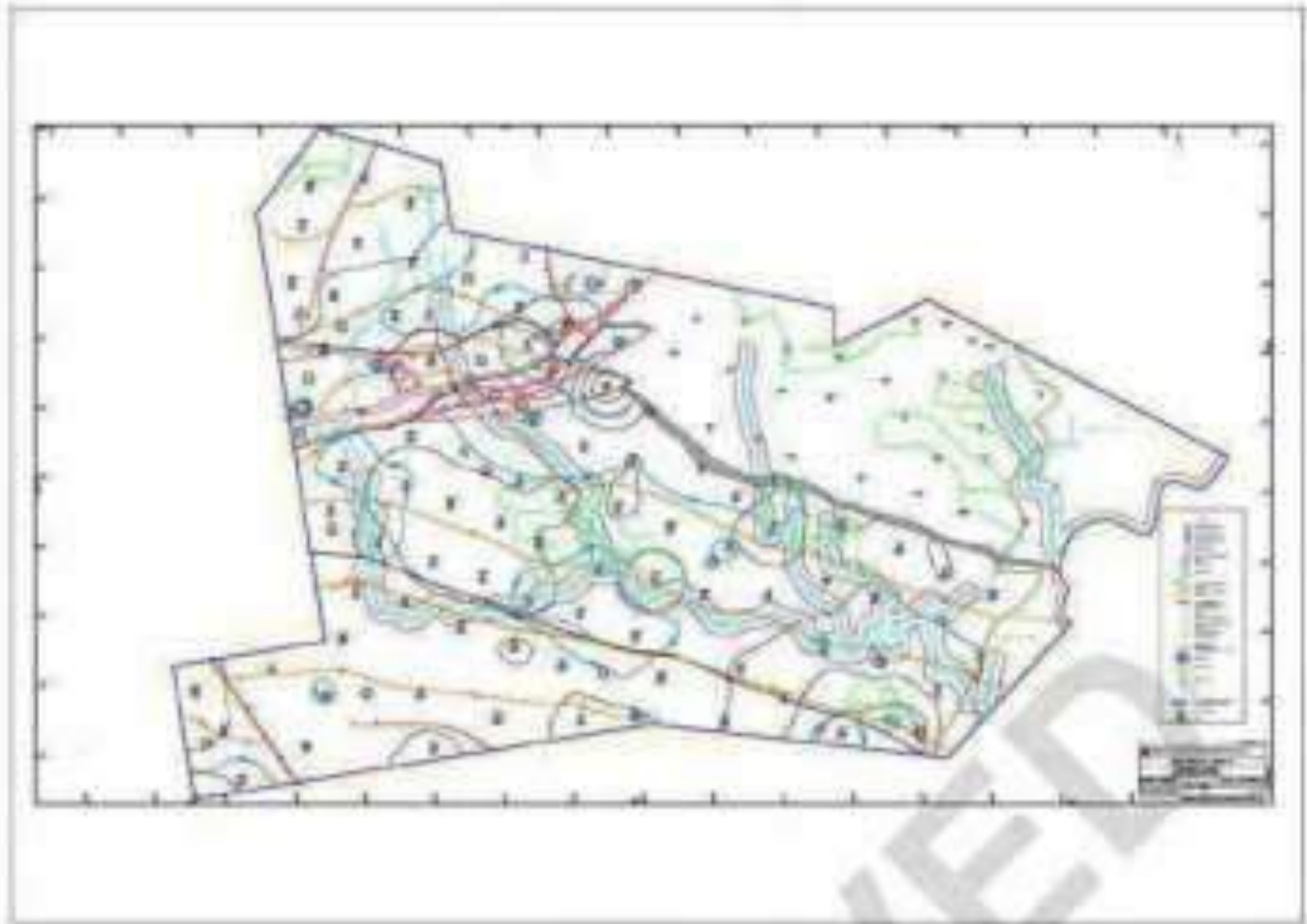
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Plan / Plate 10B8



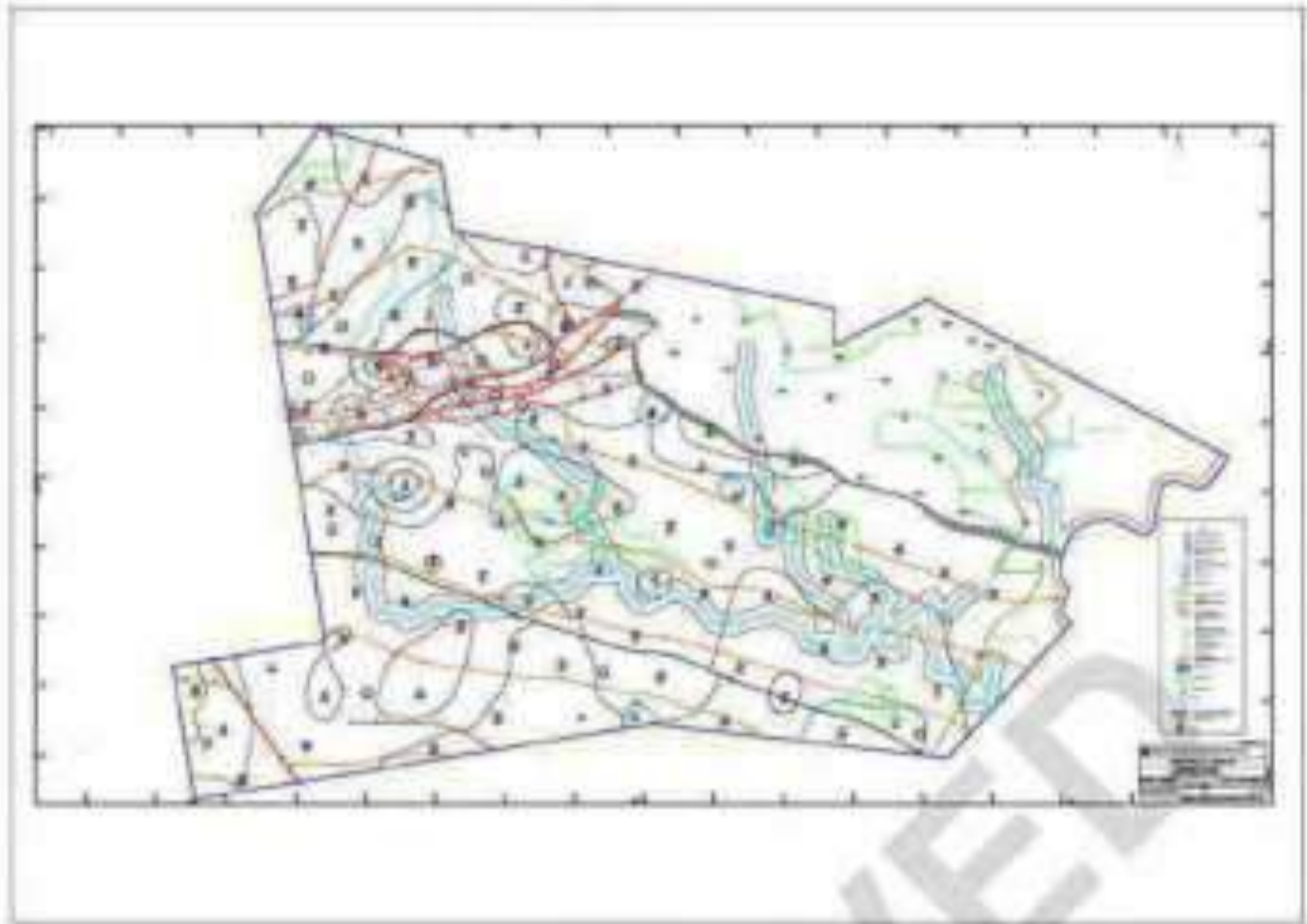
APPROVED

Plan / Plate 10B9



APPROVED

Plan / Plate 10B10



APPROVED





Plan / Plate 10B11



APPROVED



Plan / Plate 10B12



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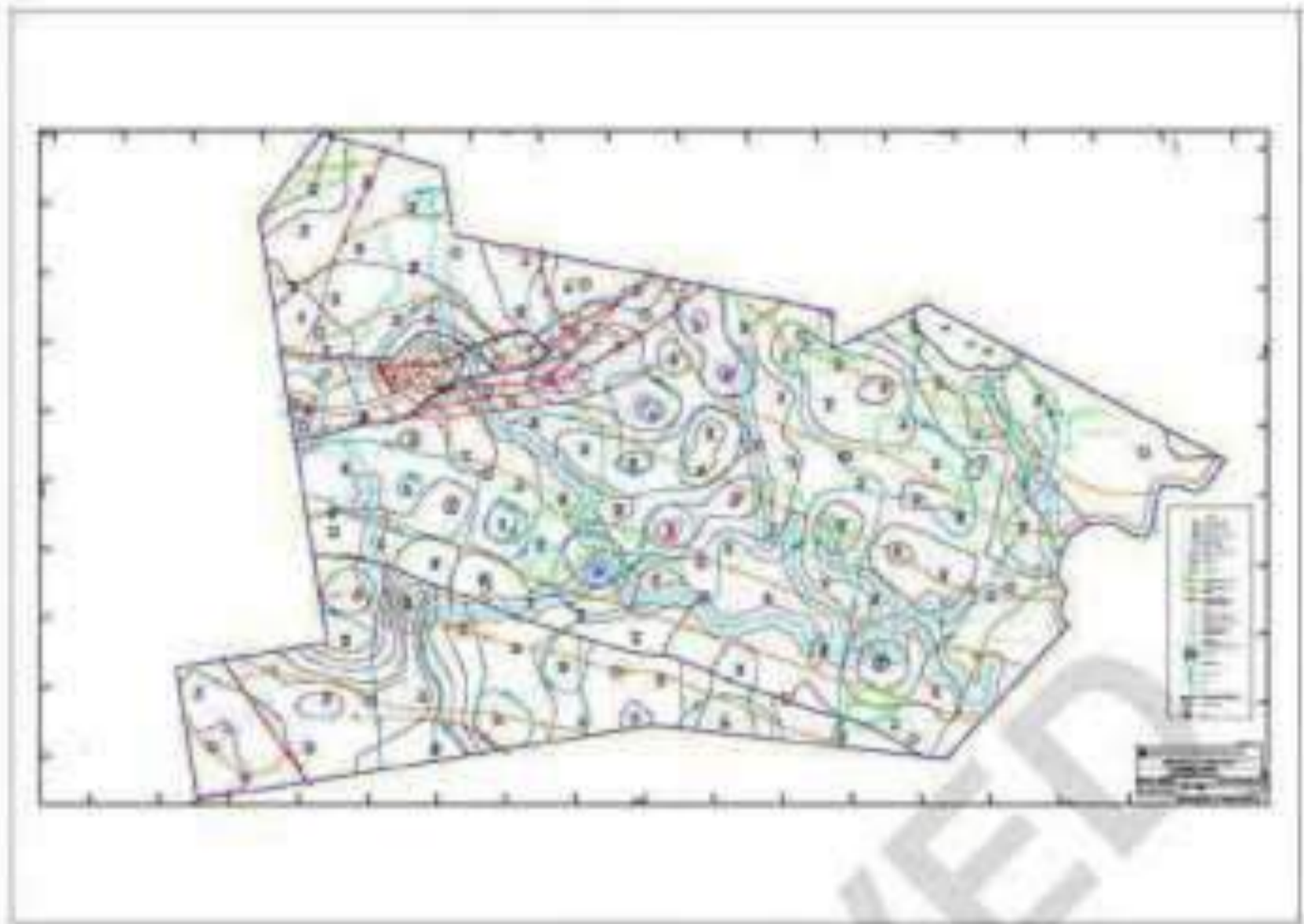
Plan / Plate 10B13



APPROVED



Plan / Plate 10B14



APPROVED

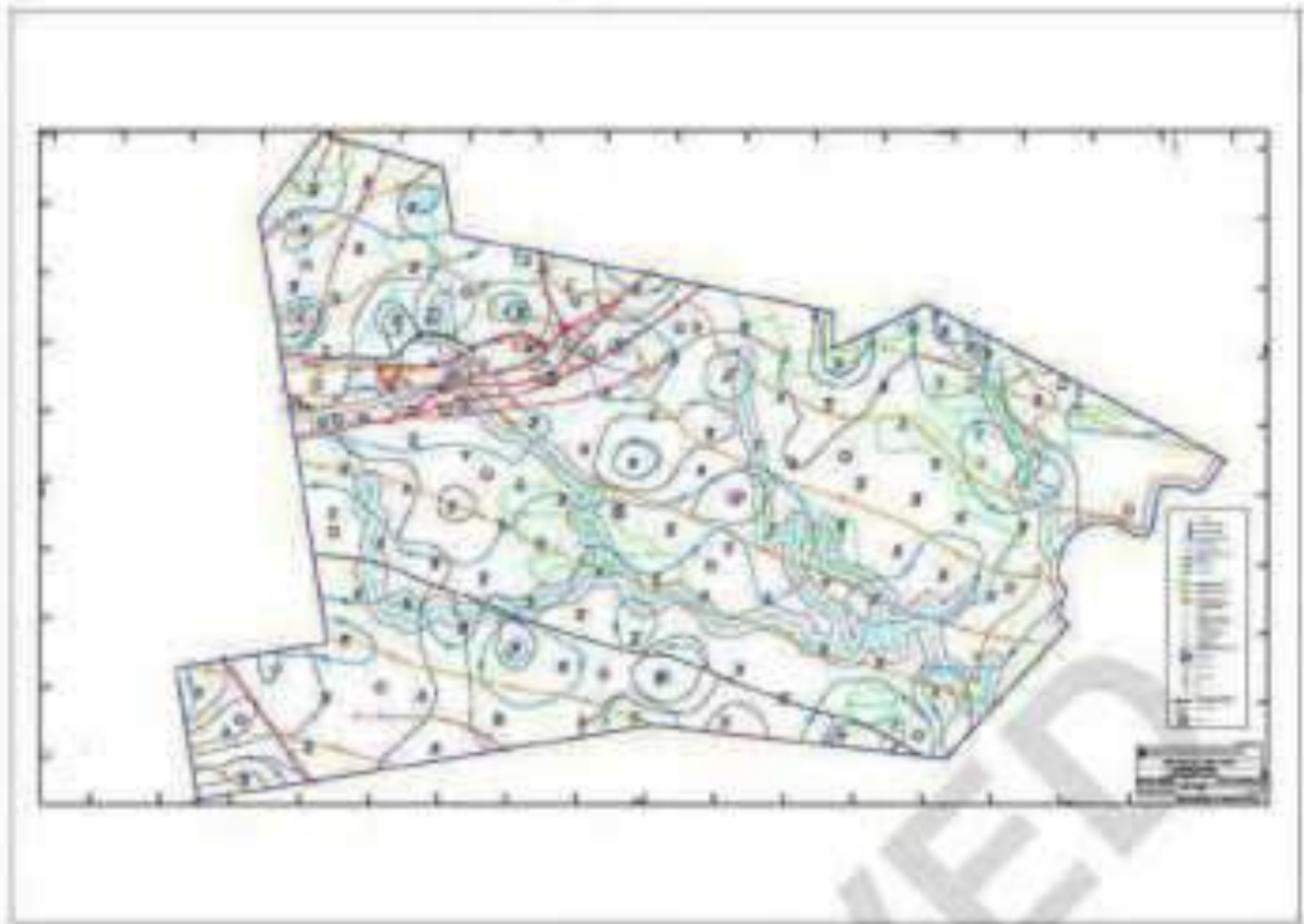
Plan / Plate 10B15



APPROVED

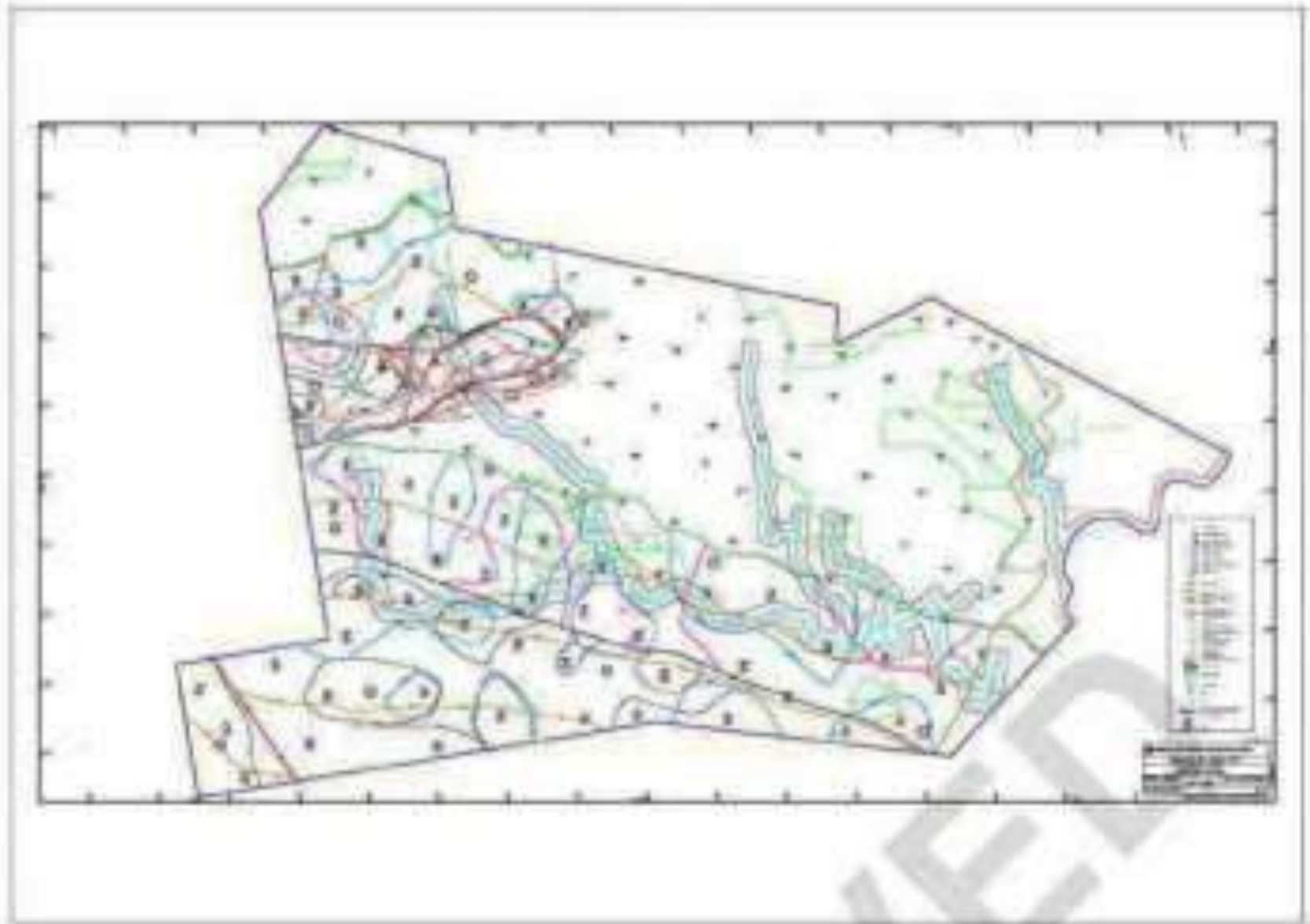


Plan / Plate 10B16



APPROVED

Plan / Plate 10B17



APPROVED



Plan / Plate 10B18



APPROVED



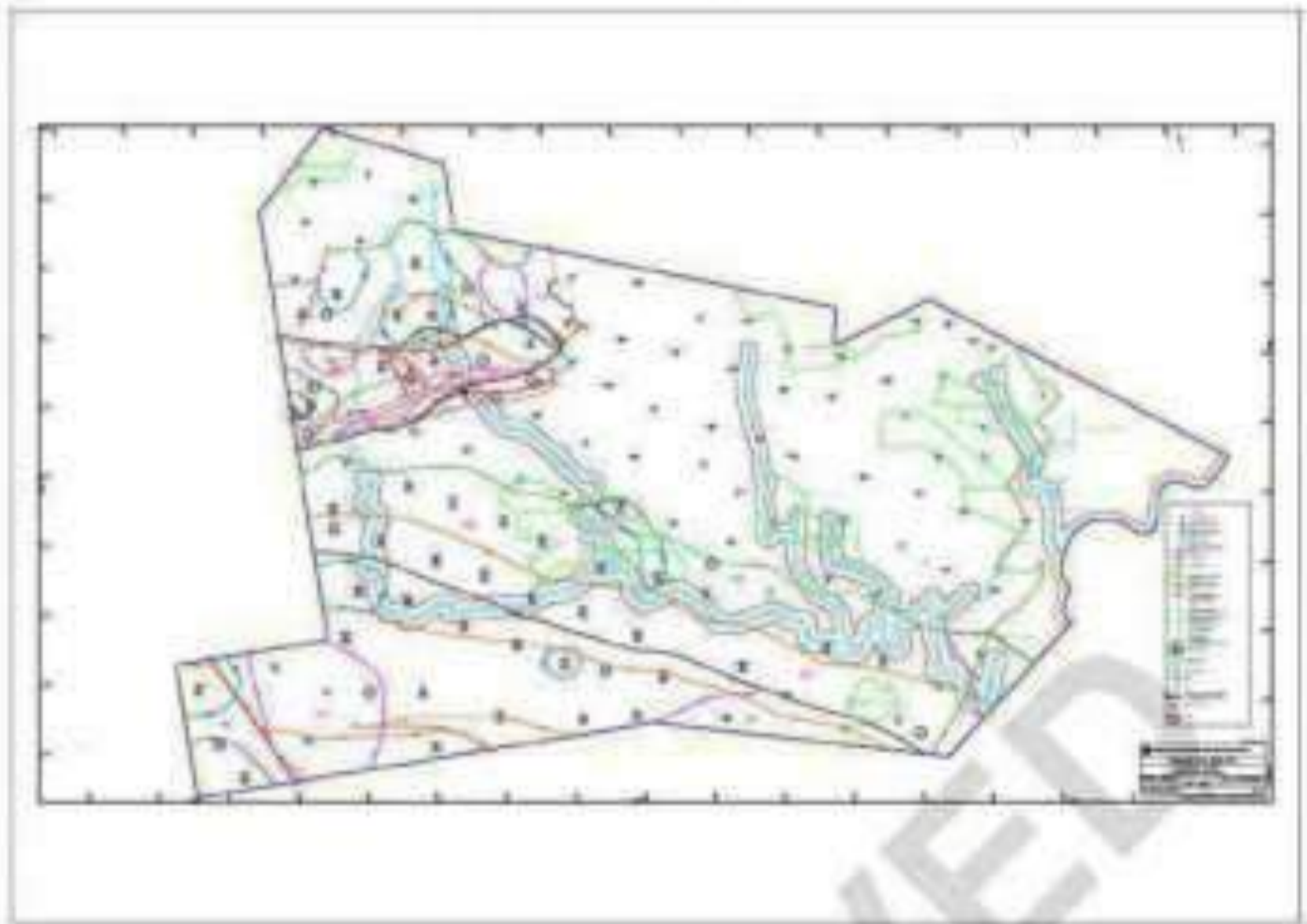


Plan / Plate 10B19



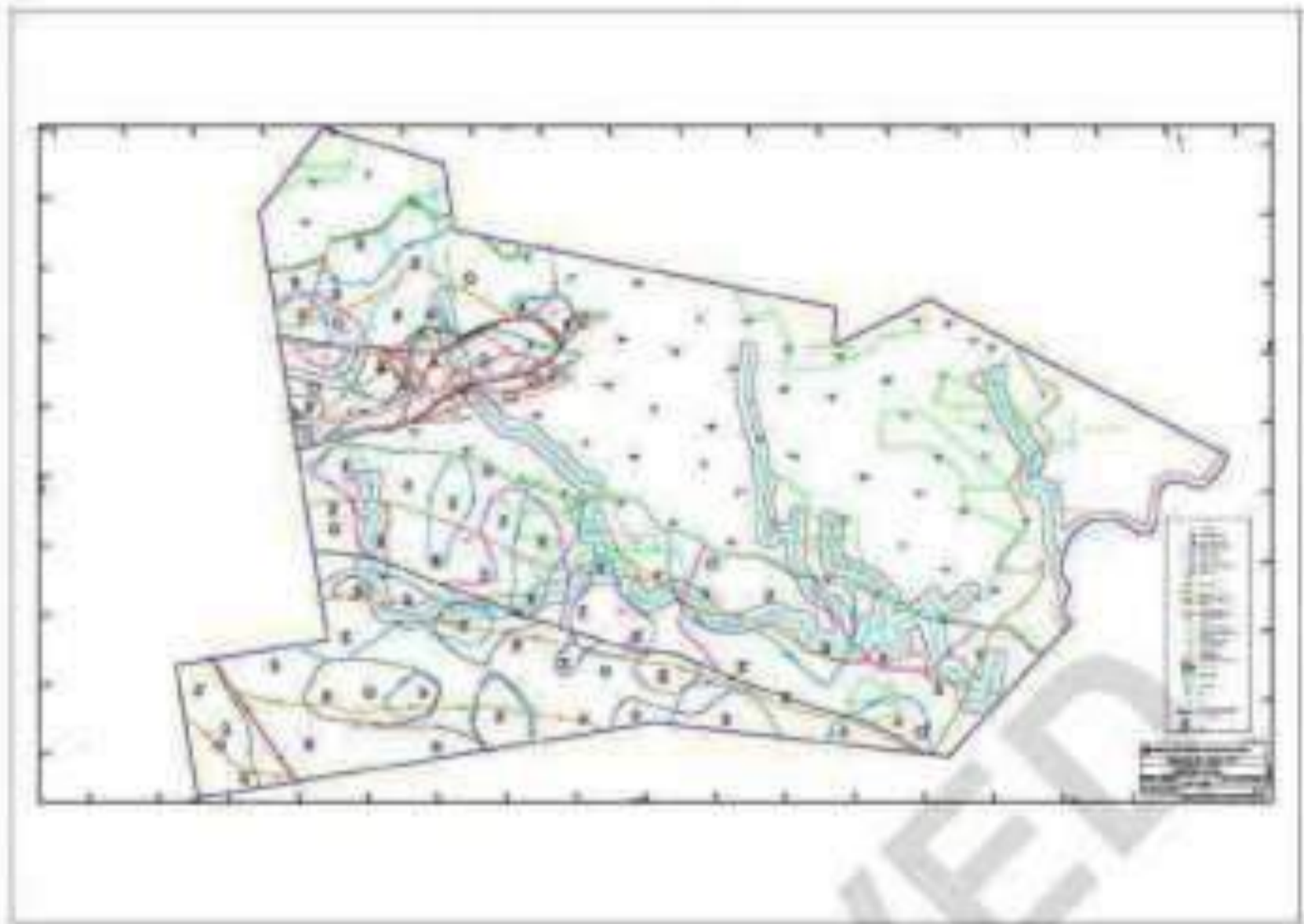
APPROVED

Plan / Plate 10B20



APPROVED

Plan / Plate 10B21



APPROVED

Plan / Plate 10B22



APPROVED

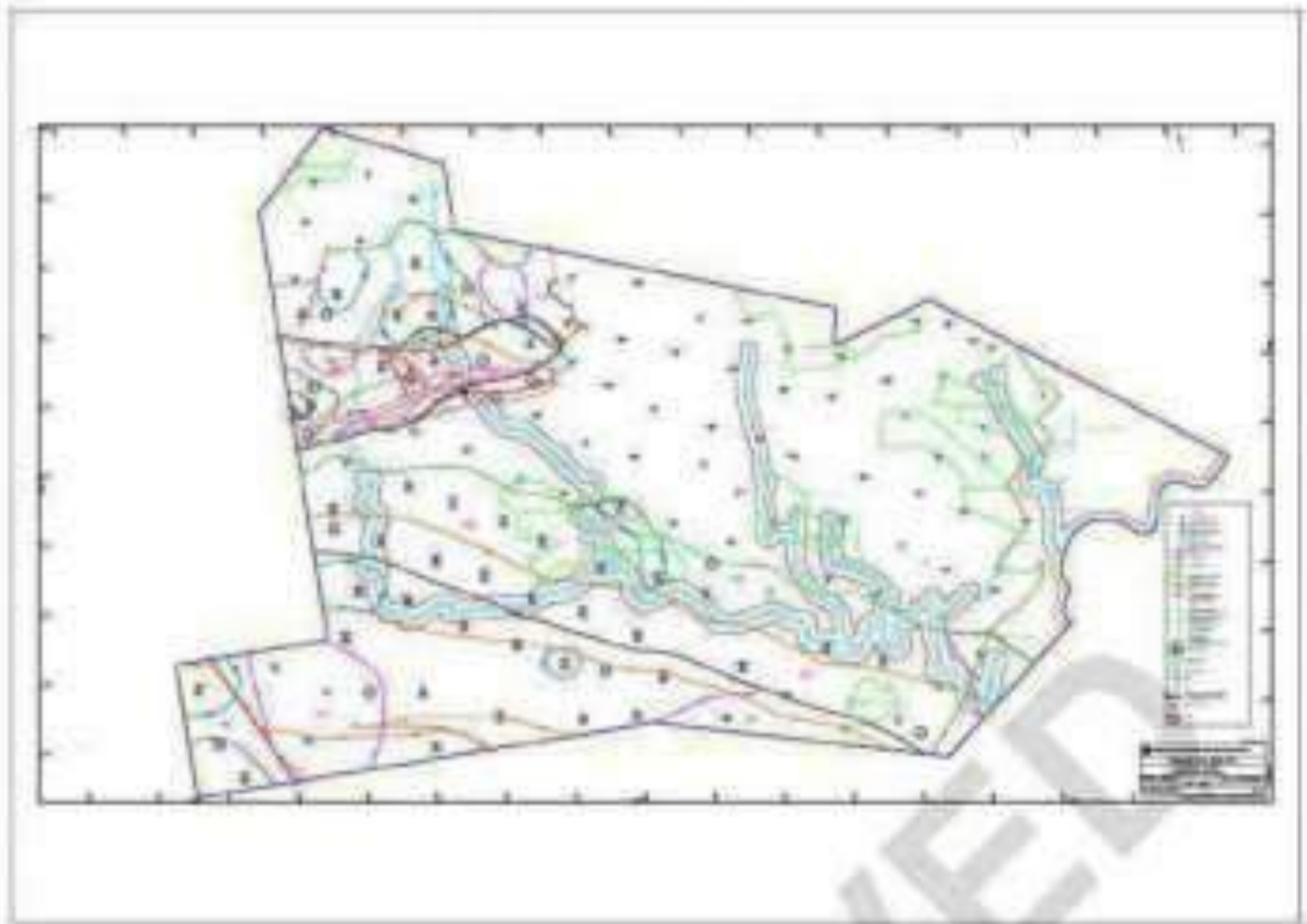


Plan / Plate 10B23

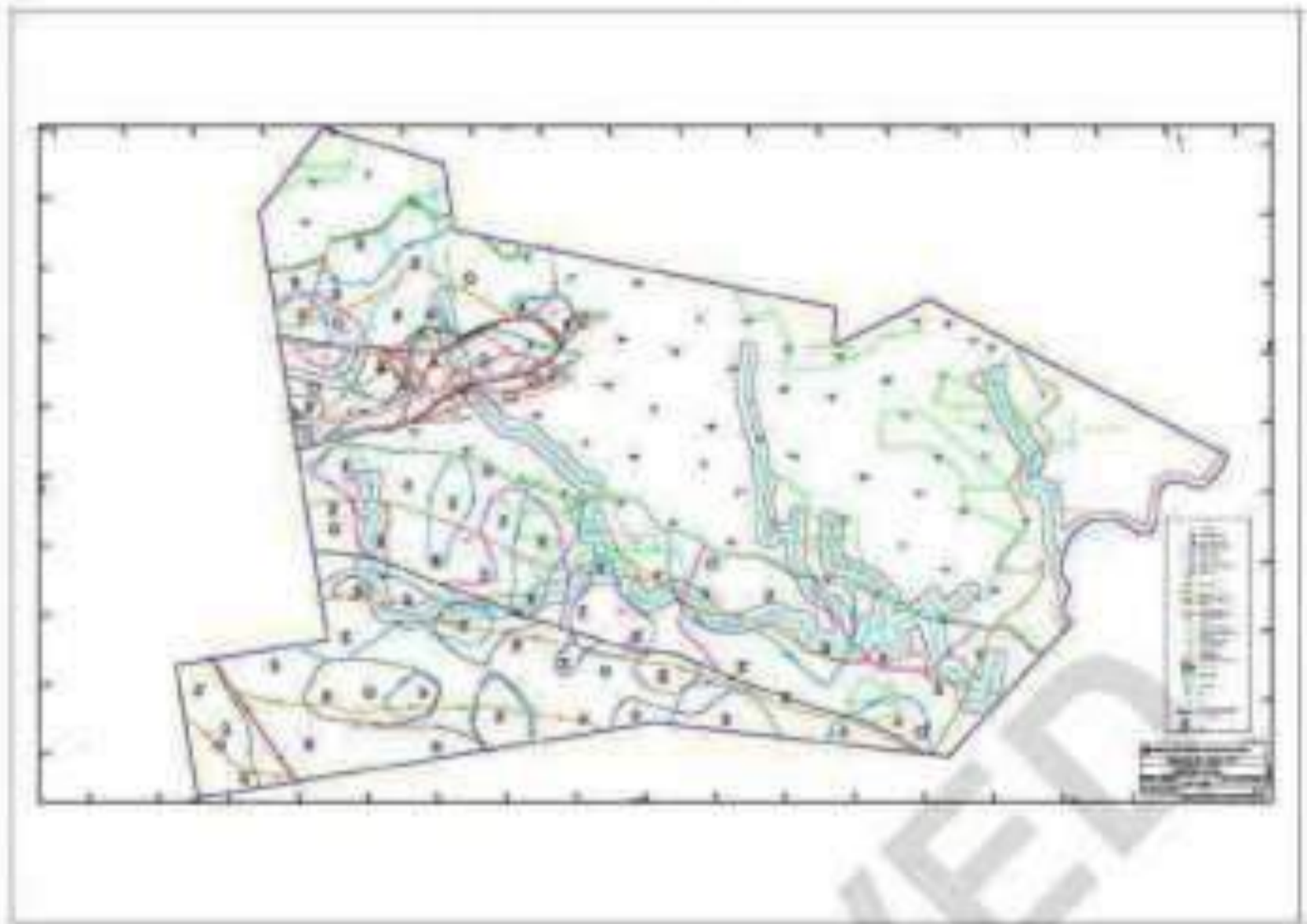


APPROVED

Plan / Plate 10B24



Plan / Plate 10B25



APPROVED

Plan / Plate 10B26



APPROVED





Plan / Plate 10B27



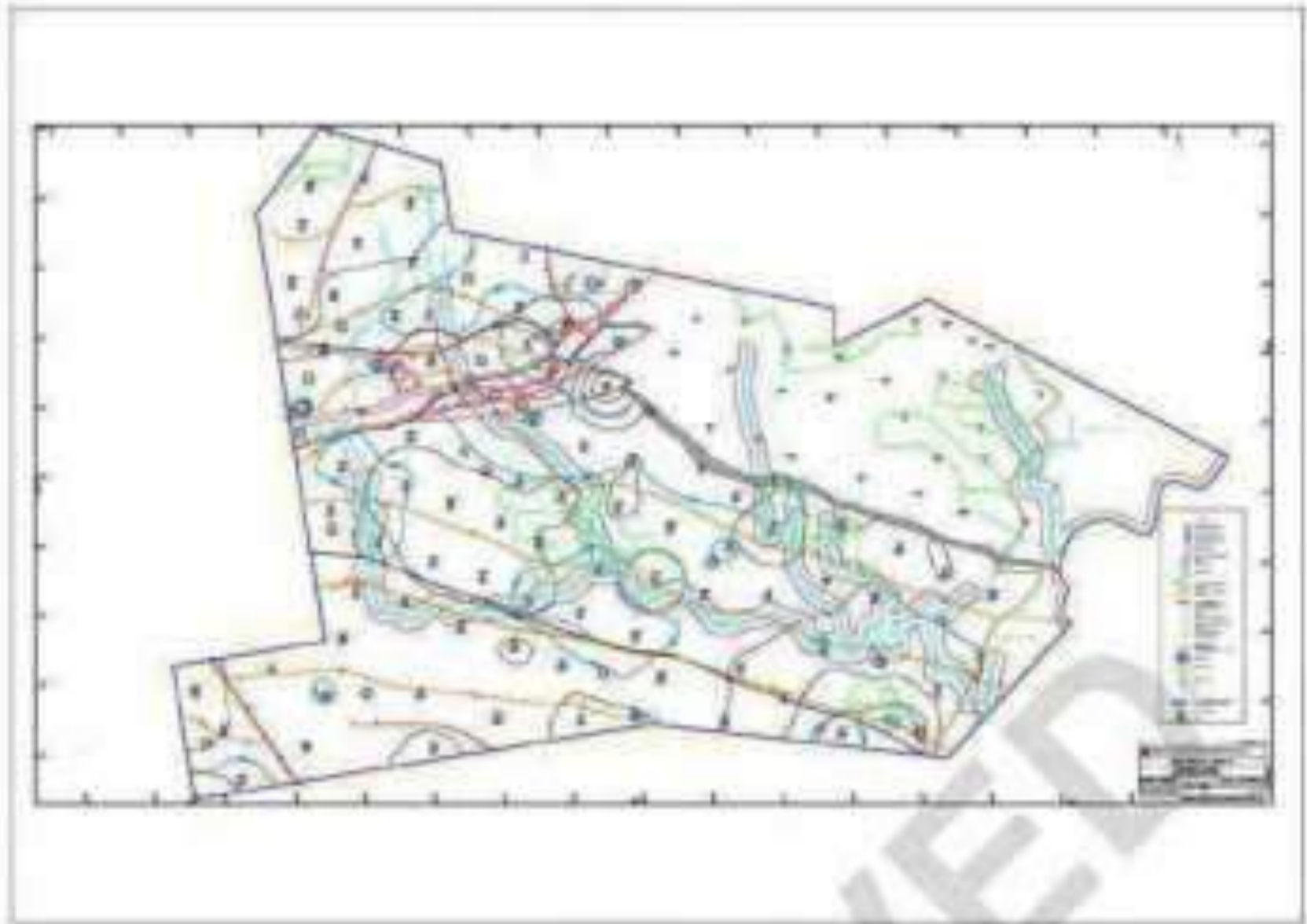
APPROVED

Plan / Plate 10B28



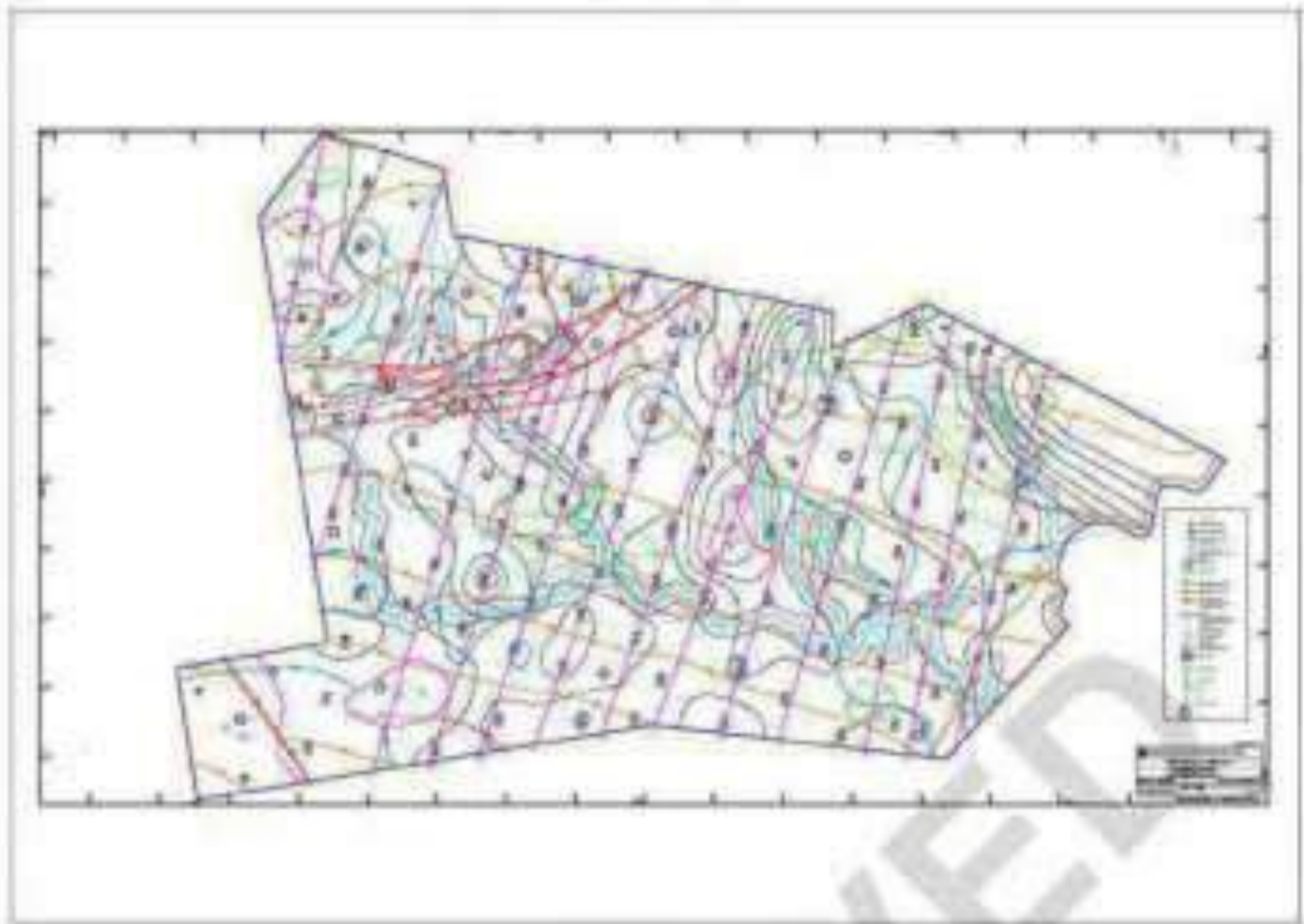
APPROVED

Plan / Plate 10B29



APPROVED

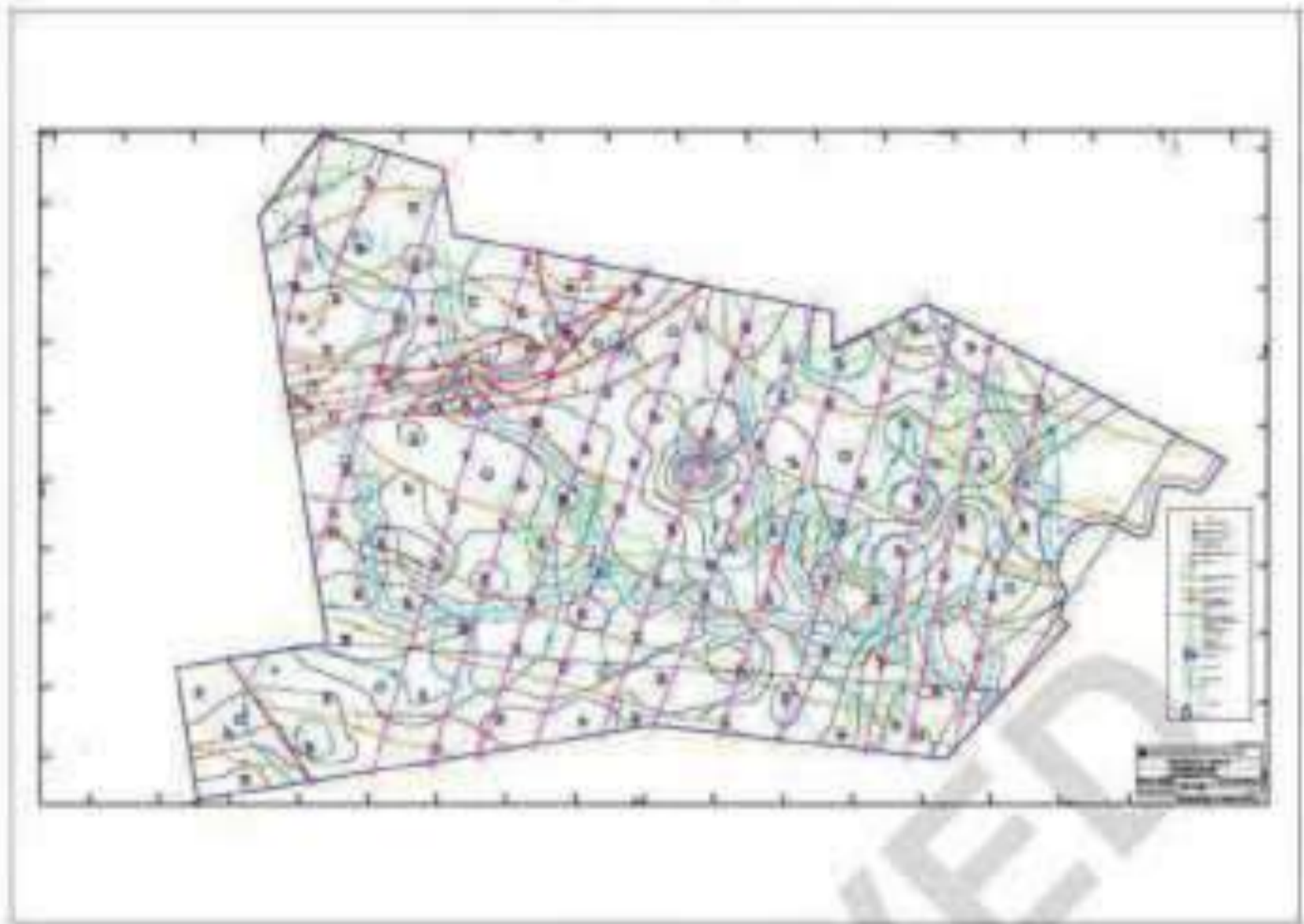
Plan / Plate 10B30



APPROVED



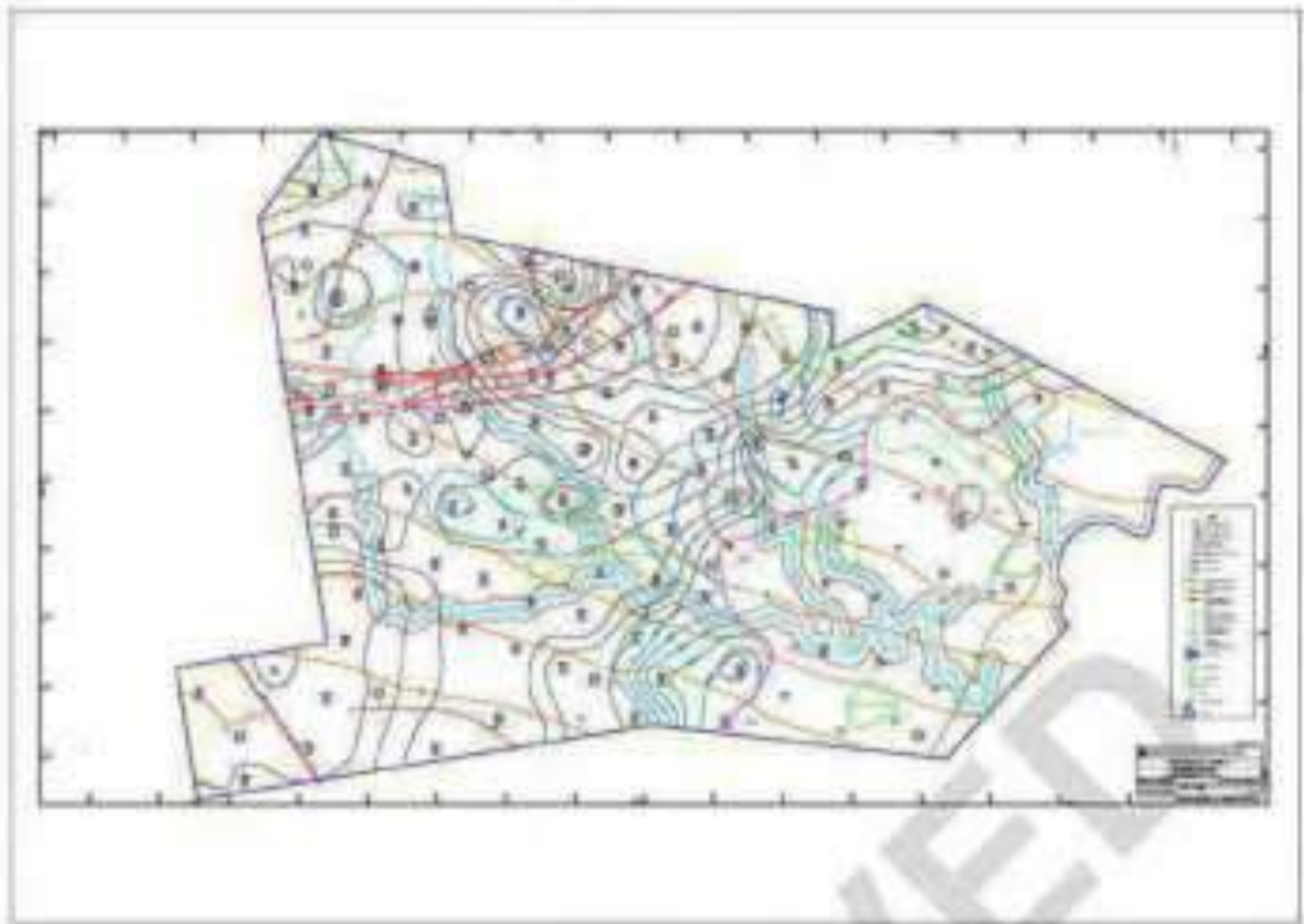
Plan / Plate 10B31



APPROVED

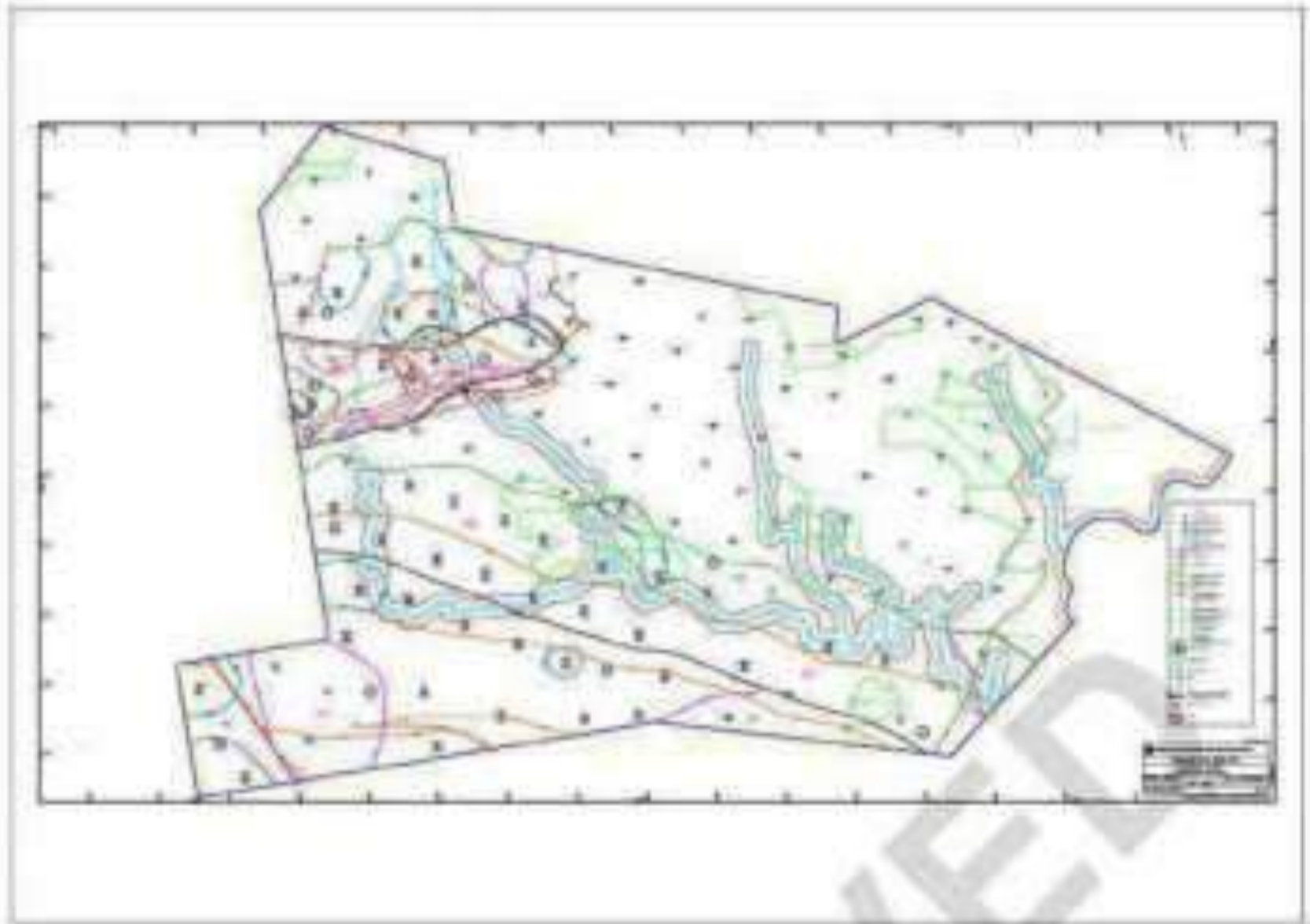


Plan / Plate 10B32

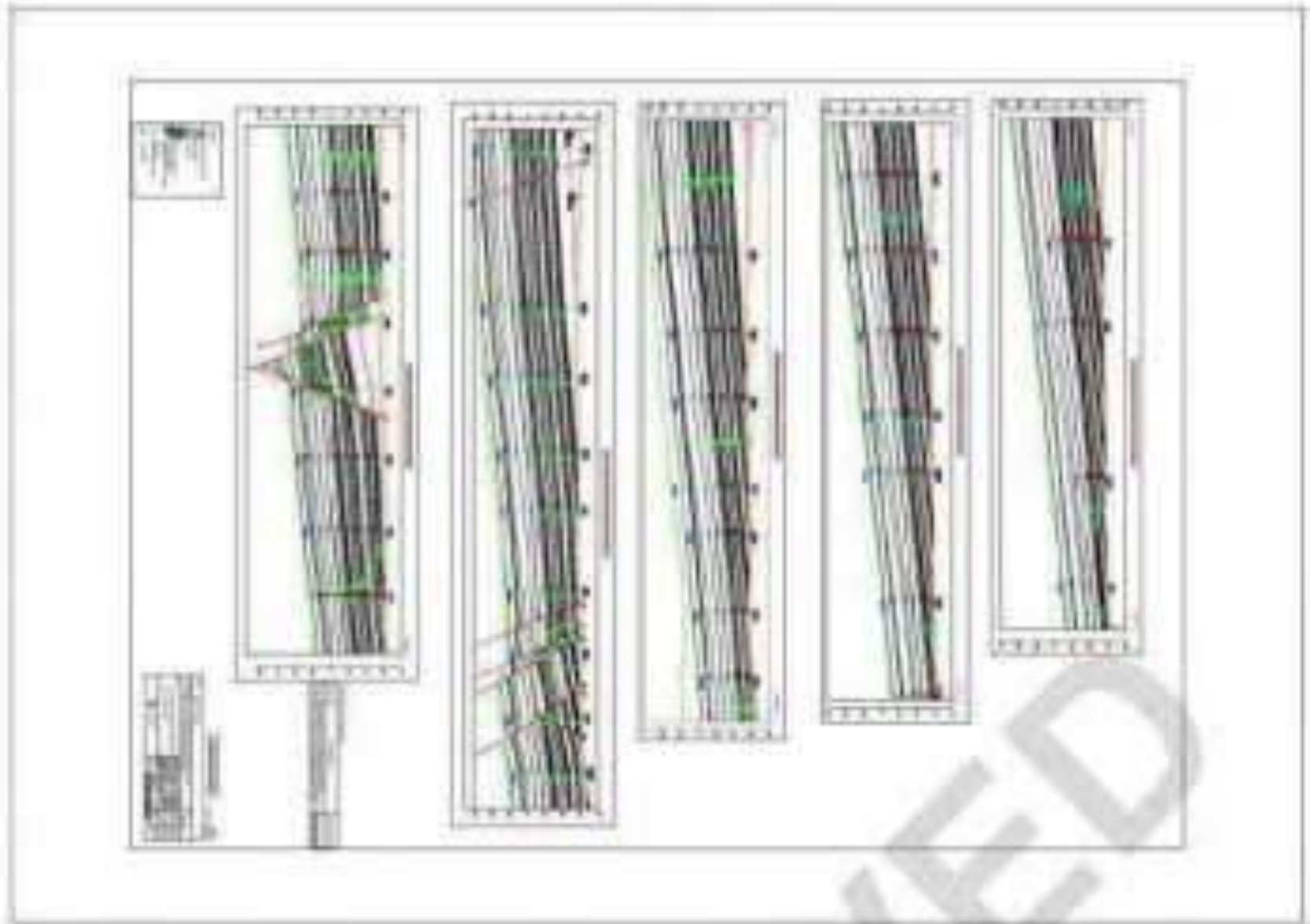


APPROVED

Plan / Plate 10B33



Plan / Plate 11A1



APPROVED



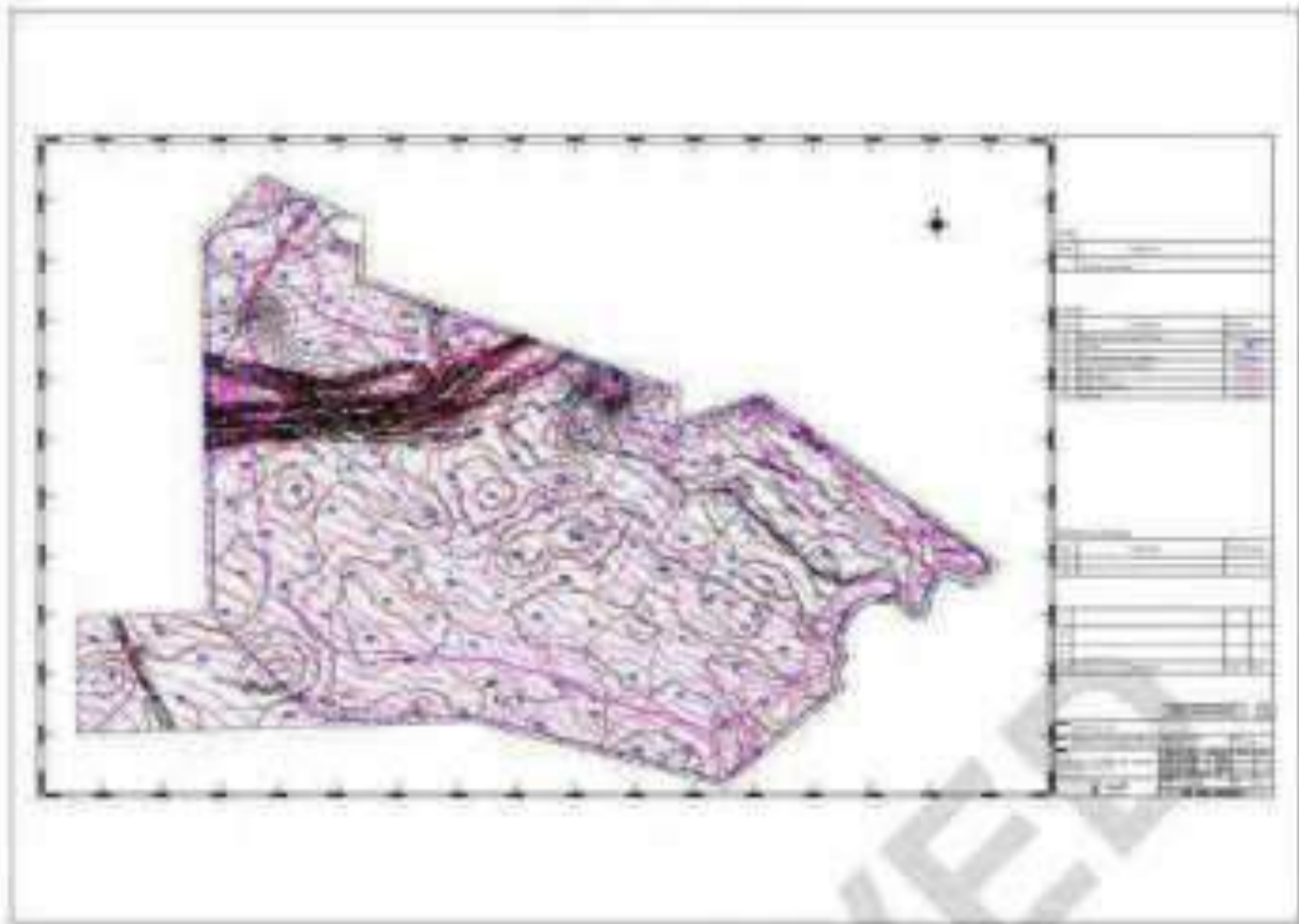


Plan / Plate 12



APPROVED

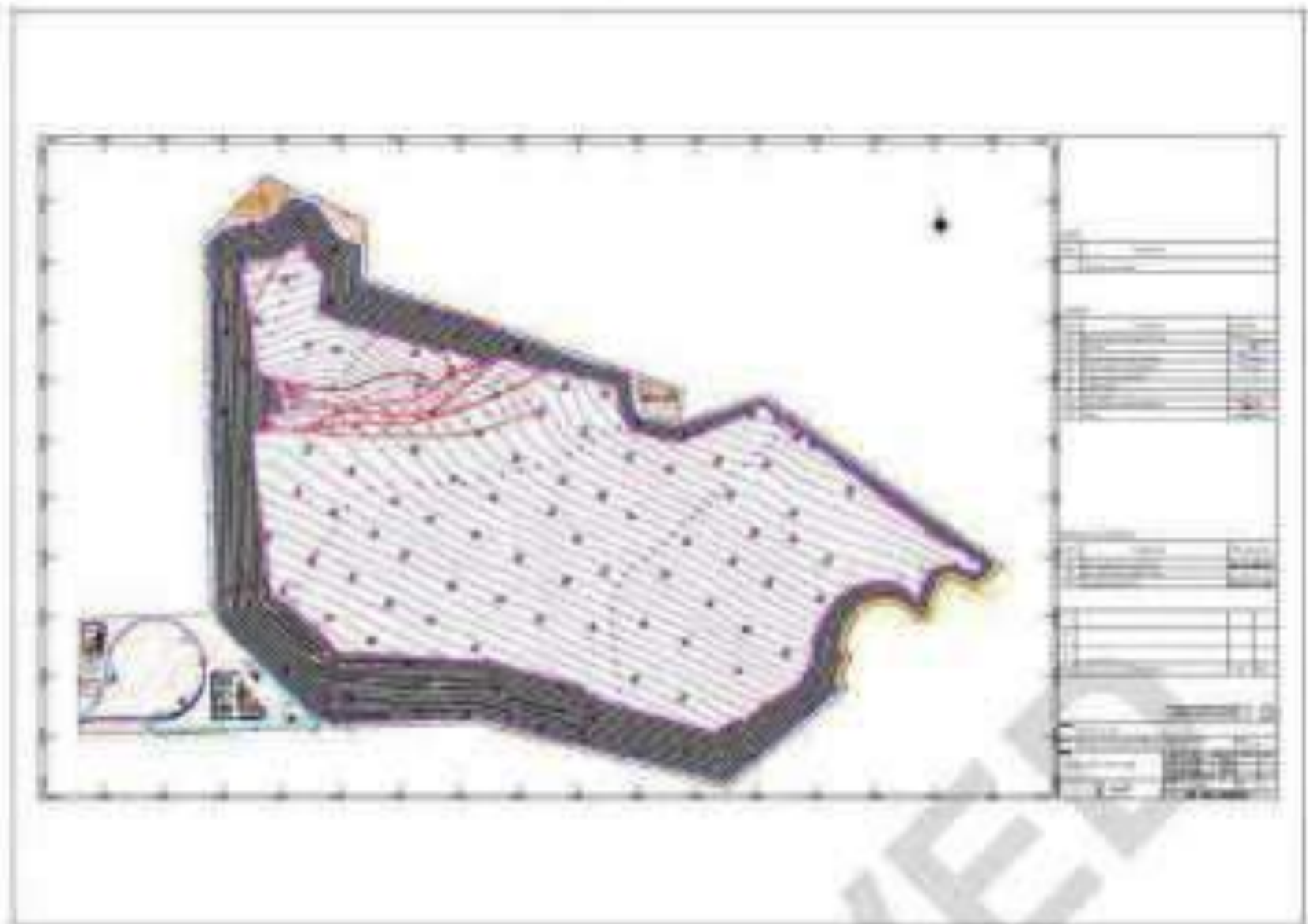
OC Plate-13



APPROVED



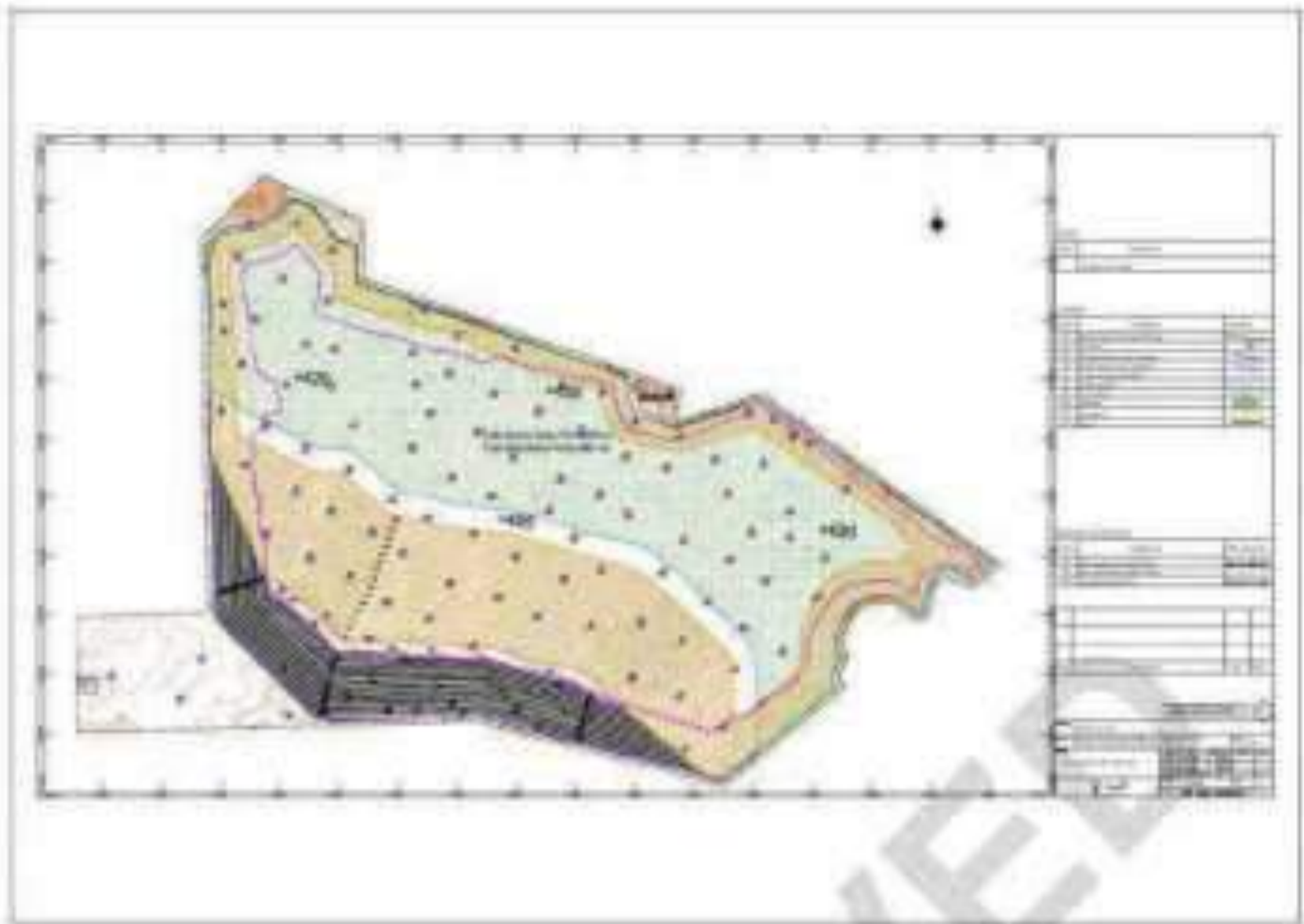
OC Plate-14



APPROVED



Plan / Plate 20



APPROVED

Plan / Plate 21A



APPROVED

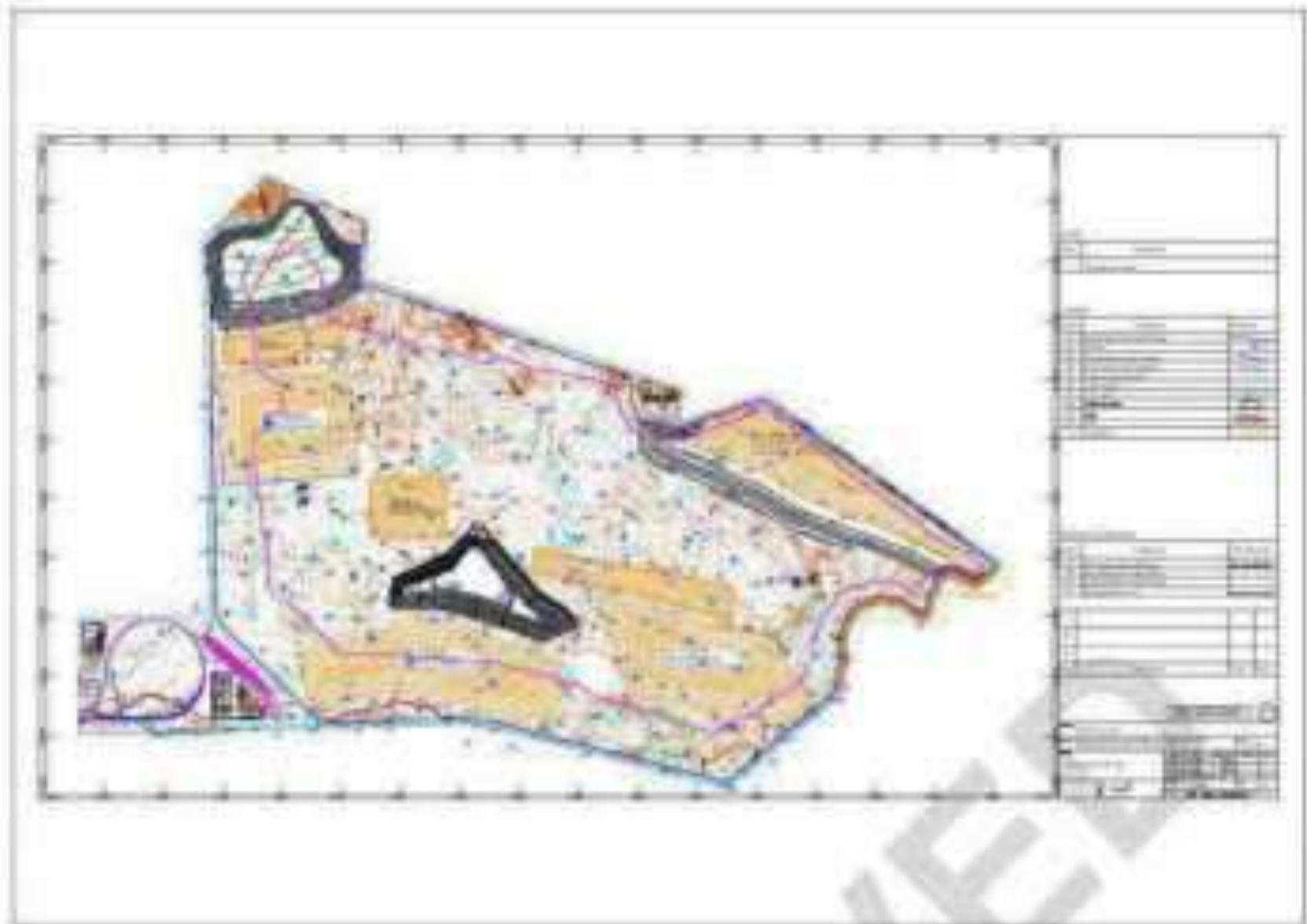


Plan / Plate 21B

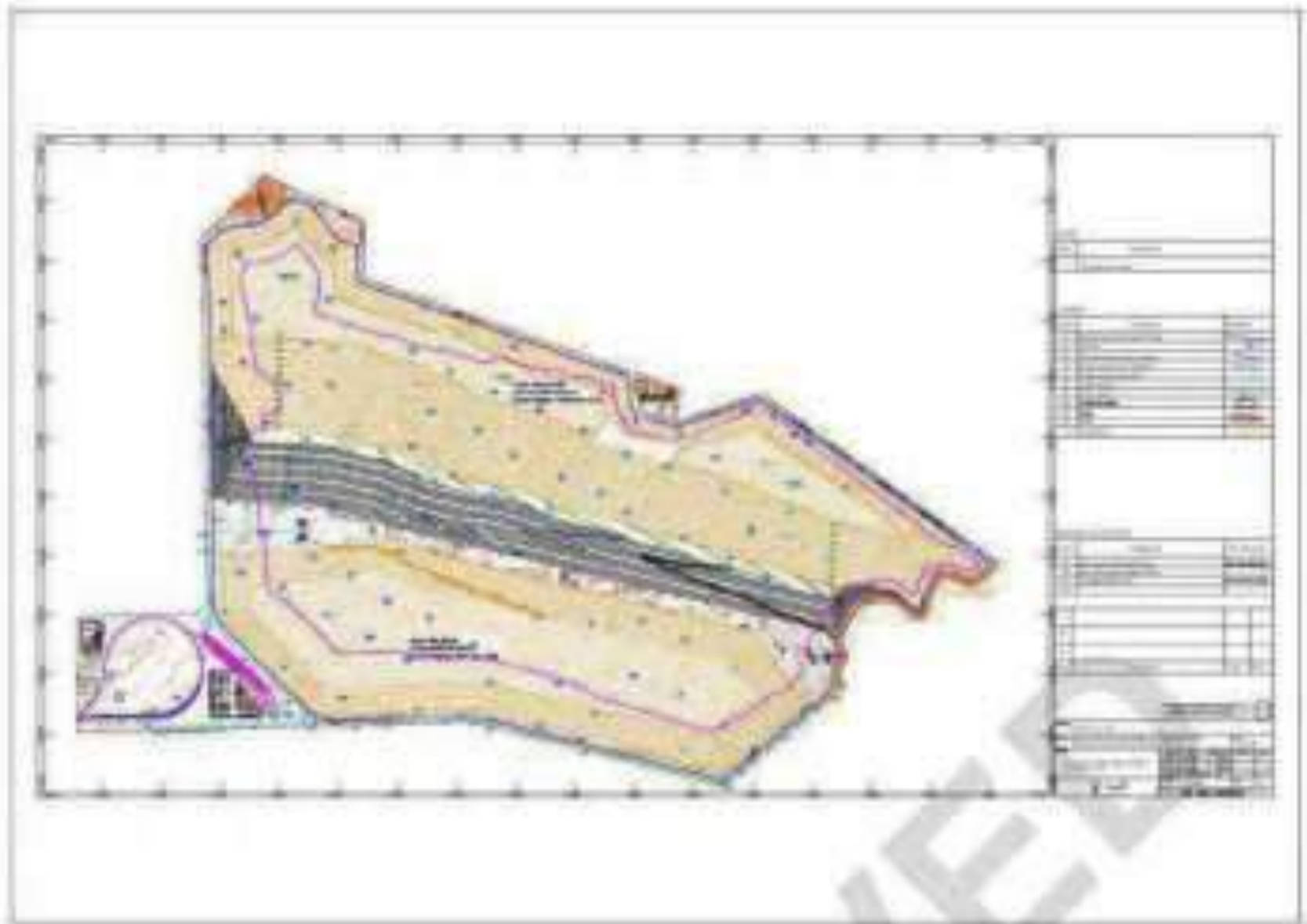


APPROVED

Plan / Plate 21C



Plan / Plate 21D

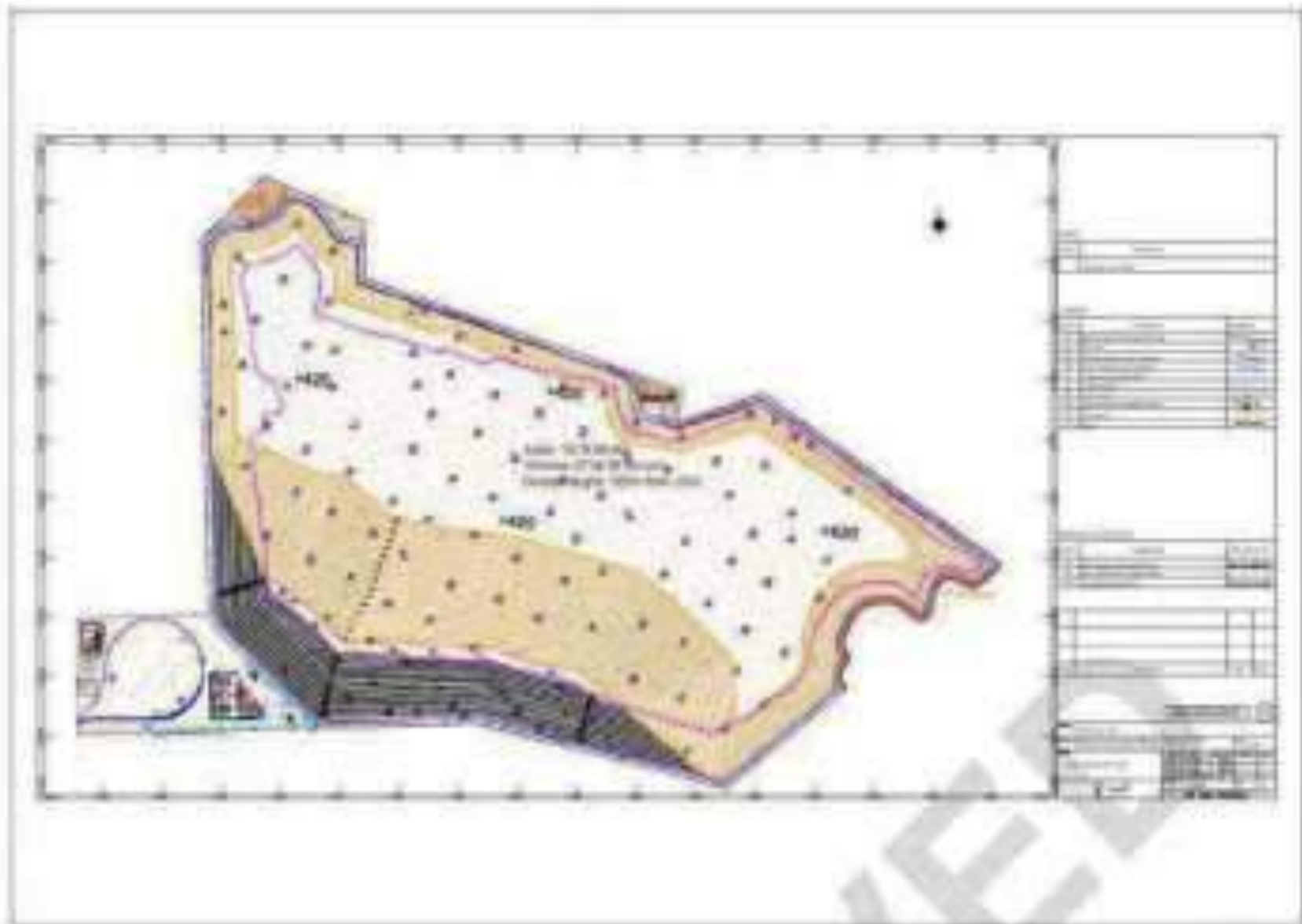


APPROVED



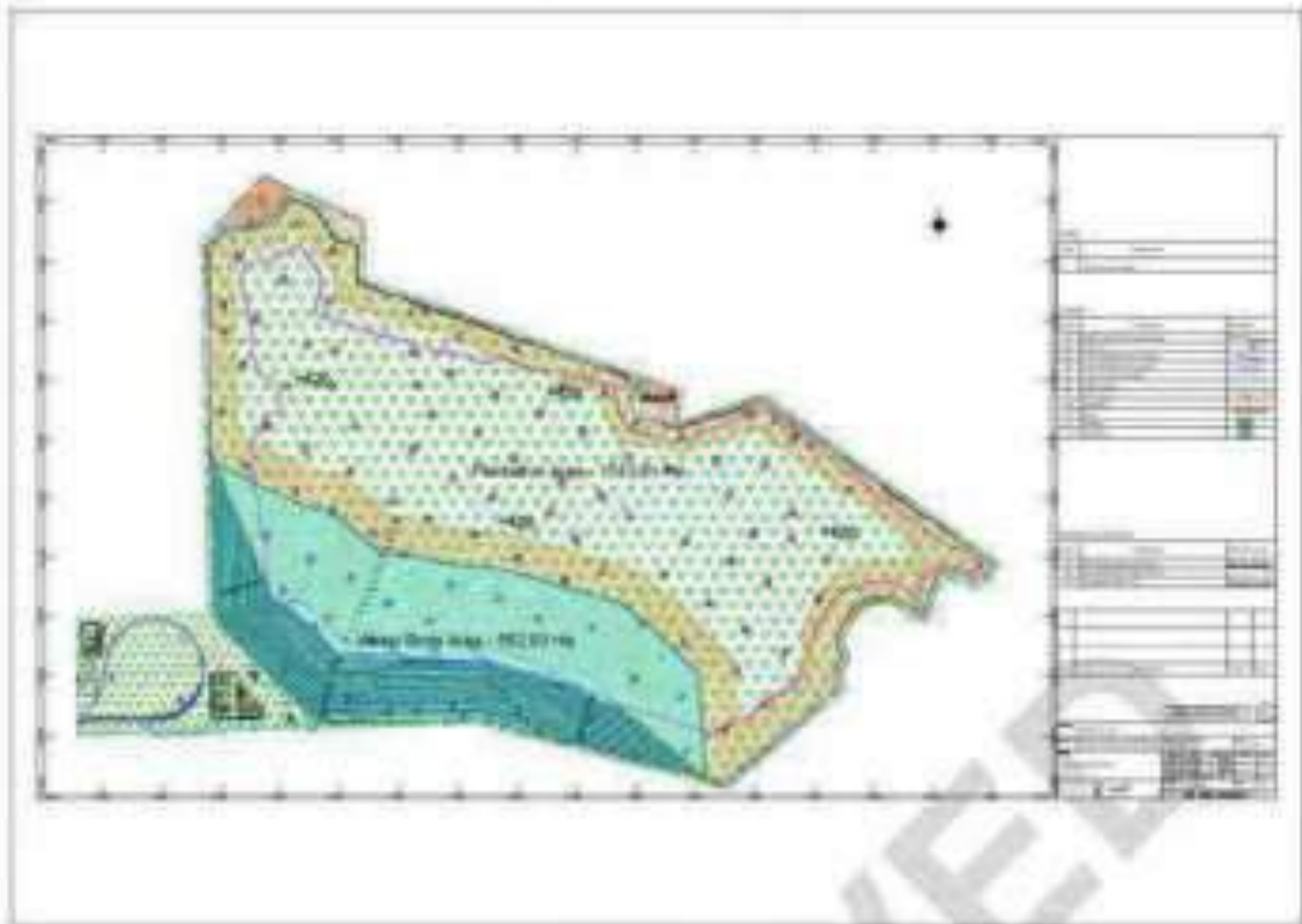


Plan / Plate 21E



APPROVED

Plan / Plate 22



APPROVED



## Additional Plan / Plates-23



**bharatkosh.gov.in**  
Government of India Receipt Portal

**RECEIPT**

Transaction Ref.No. 1512220009288 Dated: Dec 15 2022 12:03PM

Received from M/S. NTPC LIMITED with Transaction Ref.No.  
1512220009288

Dated Dec 15 2022 12:03PM the sum of INR 550100 (Five Lakhs Fifty  
Thousand One Hundred Only ) through Internet based Online payment in the  
account of

Coal and Lignite, Application Processing fee- Mining Plan of NTPC Talaspalli.

Disclaimer:- This is a system generated electronic receipt, hence no physical signature  
is required for the purpose of authentication.

Printed On: 15-12-2022 12:7:21

Courtesy - Controller General of Accounts

APPROVED



एन टी सी लिमिटेड  
 NTPC Limited  
 1980-1981  
 1982-1983  
 1984-1985  
 1986-1987  
 1988-1989  
 1990-1991  
 1992-1993  
 1994-1995  
 1996-1997  
 1998-1999  
 2000-2001  
 2002-2003  
 2004-2005  
 2006-2007  
 2008-2009  
 2010-2011  
 2012-2013  
 2014-2015  
 2016-2017  
 2018-2019  
 2020-2021  
 2022-2023

Ref. No.: CS-7014-602(R2)-9-CS-LOA-735E

Date: 16.10.2023

To,

Ms. VPR Mining Infrastructure Private Limited,  
 D. No. B-2-203/82/A/1255, 3<sup>rd</sup> Floor, Plot No. 1255,  
 Lakshmi Towers, Jubilee Hills,  
 Hyderabad - 500 033

Kind Attn.: Mr. G. Venkata Satyanarayan, Director

Sub: Letter of Acceptance for Development and Operation of East PIT of  
 Talapalli Coal Block, Bidding Document No.CS-7014-602(R2)-9

Dear Sir,

1.0 This has reference to the following:

- (a) Our IFB No. CS-7014-602(R2)-9 dated 31.05.2023, read with its  
 Corrigendum No. 01 dated 23.06.2023
- (b) Bidding Documents for the subject package uploaded at Government e-  
 Marketplace website <https://gem.gov.in> (GeM Portal) against GeM Bid  
 Number GEM/2023/B/3607433 dated 25.06.2023 under 'Mine  
 Development & Operation Services (MDO)' service category.
- (c) Following Amendments, Errata and Clarifications to the Bidding  
 Documents issued:
  - (a) Amendment No. 01 to Bidding Documents vide document no.  
 CS-7014-602(R2)-9-AMDT 01 dated 12.07.2023
  - (b) Errata No. 01 to Bidding Documents vide document no.  
 CS-7014-602(R2)-9-ERRATA 01 dated 11.07.2023
  - (c) Errata No. 02 to Bidding Documents vide document no.  
 CS-7014-602(R2)-9-ERRATA 02 dated 12.07.2023
  - (d) Clarification No. 01 to Bidding Documents vide document no.  
 CS-7014-602(R2)-9-Clf 01 dated 11.07.2023
  - (e) Clarification No. 02 to Bidding Documents vide document no.  
 CS-7014-602(R2)-9-Clf 02 dated 12.07.2023
  - (f) Clarification No. 03 to Bidding Documents vide document no.  
 CS-7014-602(R2)-9-Clf 03 dated 12.07.2023

BIKRAM

Digitally signed  
 by BIKRAM  
 Reason:

MANDAR



Digitally signed by BIKRAM, DN: cn=BIKRAM, o=Government of India, ou=Ministry of Coal, email=BIKRAM@nic.gov.in, c=IN





**NTPC Limited**

( A Government of India Enterprise )  
**SSC - Coal Mining(Ranchi)**  
lailunga Road,Gharghoda  
Raigarh  
Chhattisgarh- 496111, India  
Telephone No. : Fax No. :

**Service Purchase Order**

PAN No. : AAACN0255D  
CIN No. : L40101DL1975GOI007966

**Purchase Order No. : 5500040880-108-1071 Date : 01.07.2022 ( version : 0 )**

**To**

**Vendor Code : 1206117**

P. C. PATEL INFRA PVT. LTD.  
PLOT NO-4,SURVEY NO-242, 1ST FLR,  
BHOOMI CMPLX,AAIYA NAGAR,MUNDRA RD  
BHUUJ  
KUTCH  
Gujarat  
India - 370001  
Tel: 02832232210  
Fax: 02832230722  
E-Mail : vadodara@pcpatelinfra.com

**Kind Attention** : Sh. Bhavesh Prabhulal Dholu, Director  
**Subject:** : Mining operation for overburden removal,coal extraction and other associated works from the West Pit of Talaipalli Coal Mining Project through limited outsourcing mode  
**NIT NO.** : 9900236565 Dated  
**Your Offer No.** : Your online bid opened on 21.04.2022 and emails dated 02.06.2022 and 09.06.2022.  
**Your Reference** :  
**Our Reference** : Tender ID: 2022\_NTPC\_61380\_1 and LOI Ref. No. SSC\_COAL/SSC-C&M/2021-22/PRANAY/880860 dated 30.06.2022.

Dear Sir,

This has reference to our above mentioned NIT, Your offer and subsequent discussions. We are pleased to accept your offer opened on and confirm having awarded on you the work of Mining operation for overburden removal,coal extraction and other associated works from the West Pit of Talaipalli Coal Mining Project through limited outsourcing mode of total value INR 9253,867,140.00 (Rupee NINE ARAB TWENTY-FIVE CRORE THIRTY-EIGHT LAKH SIXTY-SEVEN THOUSAND ONE HUNDRED FORTY ONLY) mentioned in the scope of works, special terms & conditions, Bill of quantities etc.

The duration of the service period shall be from 30.06.2022 to 29.09.2027. Though the duration of contract shall remain same, the actual date of commencement of the contract shall be as per the direction of EIC. GM, TLCMP shall be EIC for this work.

This service purchase order along with its annexure is being issued to you in duplicate .We request you to return the duplicate copy of this service purchase order, duly signed on each page by your authorised signatory in token of your unequivocal acknowledgment of the same within 15 days from the date of this service purchase order. If no communication is received within 15 days of receipt of Purchase Order, it will be treated that order has been accepted in entirety.

We thank you for the interest shown by you in our project and the cooperation extended to us. We expect to receive your continued cooperation in future also.

Thanking You,  
For & on behalf of NTPC Limited.

**PRANAY  
SHARMA**

Digitally signed by  
PRANAY SHARMA  
Date: 2022.07.01  
16:42:58 +05'30'

**Break up of Price (For Service Related Lines Only)**

-----

SI No.	Service Code	Description	Qty.	UOM	Rate	Premium	Discount	Addl Discount	Net Rate	Value
10 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
20 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
30 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
40 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
50 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
60 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
70 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
80 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
90 .10		OB, Coal, crushing, transport, others	1,587,300. 000	MT	630.00	0.00	0.00	0.00	630.0000	999,999,000. 00
100 .10		OB, Coal, crushing, transport, others	402,978.0 00	MT	630.00	0.00	0.00	0.00	630.0000	253,876,140. 00

Payment shall be made against monthly RA bill based on the quantity of monthly dispatched coal from the Surface Coal Stock Yard/ Wharf Wall as measured at NTPC's weigh bridge/In motion Weigh Bridge after adjustment of penalty (if any) w.r.t provisions of the contract document. The dispatched quantity will be provided by Dispatch Department of NTPC Ltd and shall be signed by the Contractor.

Further, in case of coal dispatch not commensuration with the production, an adhoc payment on the basis of coal produced, crushed and stocked at designated coal stock yards, for the quantity of 80% of volume of crushed coal at coal stock yard on the basis of measurement, shall be made. However, final quantity of coal shall be reconciled based on the final dispatch of such quantity.

#### Base Mining Fee

The Base Mining Fee shall be as awarded mining fee in Letter of Award.

The Base Mining Fee specified above includes all expenses as may be incurred by the Contractor in mining ROM coal, removal of Overburden & its handling and dumping the same at the designated sites, transportation from the coal from face to the Crushers, crushing expenses to deliver desired output, Operation and maintenance of the associated Infrastructure Facilities including all spares and consumables, Construction of nala/Garland drain, diversion of 11 KV line, Construction of approach road, power line arrangement from 132 KV/33 KV Substation of NTPC to West Pit etc., required during the Term of the contract.

Further the Mining Fee shall include all Taxes, Duties, Levies and Charges assessed on the Contractor, its sub-contractors or their employees by the Authority(ies) except for the elements mentioned at Clauses 6.11.

With effect from the Coal Production Start Date, for each quarter, the NTPC Ltd. shall pay to the Contractor the Base Mining Fee for the quantity of coal delivered on monthly basis, escalation as per clause 6.3 for the quantity of coal delivered on quarterly basis, and Strip Ratio adjustment as per clause 6.3.5 for the quantity of coal delivered on quarterly basis. All payments by the NTPC Ltd. shall be in Indian Rupees only. Quarter in case of escalation shall be Financial Quarter.

At the start of every financial year, EIC will provide a Monthly coal production and Overburden removal schedule and stripping ratio schedule to be followed for every quarter as per the annual coal and Overburden extraction target mentioned in clause 3.4.

However, for shortfall in extraction of scheduled overburden, at the end of every quarter i.e. every three months from start of OB removal/Coal extraction, retention of such amount as calculated as per clause 6.4.1 of this scope of work, following strip ratio formula shall be made. For any excess removal of overburden, shall be carry forwarded into next production year.

The retention amount on account of shortfall of overburden shall be released when the achieved cumulative stripping ratio exceeds scheduled cumulative stripping ratio for the production year along with the subsequent RA Bill. At the end of term of the contract, after reconciliation and measurement, if there is shortfall in stripping ratio against the contracted quantity of coal awarded, recovery as per stripping ratio formula shall be made. However, for excess OB removal at the end of term of the contract, after reconciliation and measurement, excess mining fee shall be paid as per the stripping ratio formula.

However, the EIC shall certify that the excavation are made within the quarry limits/designated areas, as per enclosed plans along with tender documents.

There shall be no review of the Mining Fee payable by the NTPC Ltd. to the Contractor throughout the Term of the contract.

#### Escalation on Base Mining Fee

The escalation on Base Mining Fee shall be as per the following terms and the formula:

#### Components of Escalation:

The details of different components of escalation are provided in the table below:

S.No.

Value of Co-efficient

Description of coefficient

Source of Index/Price

1 F = 0.20

2 a = 0.04 Other Stores WPI series for "All Commodities" as published by the Office of Economic Advisor, Ministry of Commerce & Industry, Government of India (Base Year: 2011-12 = 100)

3 b=0.04 to 0.08 Tyres Monthly WPI series for "Medium & Heavy Commercial Vehicle Tyre" as published by the Office of Economic Advisor, Ministry of Commerce & Industry, Government of India (Base Year: 2011-12 = 100)

4 c = 0.14-0.20 Heavy Machinery and parts WPI series for "Mining, Quarrying & Metallurgical Machinery/parts" as published by the Office of Economic Advisor, Ministry of Commerce & Industry, Government of India (Base



Year: 2011-12 = 100)

5 \*d = Fuel Arithmetical Average of notified Price of High Speed Diesel per litre at the pump station of Indian Oil Corporation Limited nearest to the Project Site (selling price inclusive of Taxes & Duties per litre of H.S.D Oil) for a particular month.

6 e= 0.04 to 0.08 Explosive WPI series for "Explosive" as published by as published by the Office of Economic Advisor, Ministry of Commerce & Industry, Government of India (Base Year: 2011-12 = 100)

7 \*p= Power "Power Tariff Schedule for High Voltage (HV) Consumers under HV2:Mines for 11 KV supply voltage # Energy Charge" as notified by Chhattisgarh State Electricity Regulatory Commission.

8 l= 0.06 Salaries and wages "All India consumer Price Index for industrial workers" (All India monthly average) published by Labour Bureau, Simla, Government of India. (Base Year: 2001= 100)

w=0.06 Salaries and wages

Arithmetical average of Minimum Wages for Unskilled, Skilled, Semi-skilled and Highly skilled workers notified by the Central Government for the particular classified Area in which the project site is located, HPC wages notified by CACLB for mining or notified by the State Government of the State in which the Project Site is located, whichever is higher.

- A, B, C & E refers to the published Price Indices of corresponding major cost components, as mentioned in the table above.

- P shall be the Power Tariff, as mentioned in the table above

- D shall be the Diesel Price, as mentioned in the table above

- L shall be the Index for Labour, as mentioned in the table above

- W shall be for salary and wages, as mentioned in the table above

\* Bidder have to indicate Value of Coefficients of Fuel and Power (d & p) keeping the sum i.e. d+p =0.30 to 0.40 And

Bidder have to indicate Value of Coefficients of Tyres(b), Heavy Machinery and parts (c ), Fuel(d), Explosive(e), and Power ( p) keeping the sum i.e. F+a+b+c+d+e+p+l+w= 1.00

#### Periodicity of Escalation

All components shall be escalable on Quarterly basis except diesel. Escalation for diesel shall be done on monthly basis as per clause 6.3.1.

#### Escalation Formula

The escalation on Base Mining Fee shall be determined as follows:

$$MF_n = (MF_0) \times (F + a \times A_n / A_0 + b \times B_n / B_0 + c \times C_n / C_0 + d \times D_n / D_0 + e \times E_n / E_0 + p \times P_n / P_0 + l \times L_n / L_0) + w \times W_n / W_0$$

Where,

n =nth quarter (period counted as 1st April to 30th June and subsequent quarter) counted from the Coal Production Start Date.

MF<sub>n</sub> = Escalated Mining Fee per MT of coal to be calculated at the beginning of quarter n, and adjusted subsequently for any revision in the diesel price during such quarter.

MF<sub>0</sub> = The Base Mining Fee as described at clause 6.2

For the indices/prices, subscript 'o' refers to indices/prices as on 1(one) month prior to the date set for opening of Techno-Commercial Proposals. Subscript 'n' refers to average of monthly indices/prices prevailing during the last quarter (every month for diesel).

Deleted

#### Adjustment to Mining Fee for Strip Ratio

The escalated Mining Fee as brought out above shall be adjusted for the Strip Ratio as provided by EIC for the current quarter. The adjustment in Mining Fee for the Strip Ratio shall be as under:

$$\text{Mining Fee adjusted for Strip Ratio (MF}_{n\text{es}}) = MF_n \times (0.1 + 0.9 \times ((1 + SR_n) / (1 + SR_0)))$$

Where,

SR<sub>0</sub> = the Base Strip Ratio for the Term of the contract fixed at 3.174 cum/t

SR<sub>n</sub> = the Strip Ratio (rounded upto 3 decimals) for the current quarter n as specified by EIC for the quarter.

MF<sub>n</sub>es = Adjusted Mining Fee per tonne of coal after adjustment for the Strip Ratio (rounded upto two decimals)

The Payment throughout the ensuing quarter shall be made based on the adjusted Mining Fee for Strip Ratio and escalation.

#### Shortfall in Strip ratio

In case for a operating quarter the Strip Ratio is lower than that specified by EIC, EIC shall have the right to adjust Mining Fee from RA bills. The adjustment of Mining fee shall be as follows:

For the first quarter of the Operating Year n

MFnes = Escalated Mining Fee per MT of coal for the Operating Quarter n after adjustment of Strip Ratio to be calculated at the beginning of the quarter as per clause 6.3.5.

MFne = Escalated Mining Fee per MT of coal for the Operating Quarter n to be calculated at the beginning of the quarter as per clause 6.3.3.

SRn = Strip Ratio (rounded upto 3 decimals) for the Operating year as specified in tender documents/ or any modification done by EIC.

SRn1 = Actual Strip Ratio for the first quarter in Operating year 'n' measured and rounded upto 3 decimals.

OBp1 = Amount to be recovered from the Contractor for shortfall in OB removal during the first quarter.

SR0 = Average Strip Ratio for the Term of the Contract fixed at 5.598.

OBp1 = {MFne(av)1 x 0.9 x (SRn- SRn1) / (1+ SR0)} x (DQ1st month + DQ2nd month + DQ3rd month)

Where, MFne(av)1 is the weighted average Mining Fee for the first quarter.

DQ = The aggregate total quantity of coal dispatched, in Tonne, for the month, determined as per Clause 6.1.1;

For the second quarter of the Operating Year n

SRn2 = the Actual cumulative Strip Ratio till the end of that quarter (first six of operating year) in year n measured and rounded upto 3 decimals.

OBp2 = Amount to be recovered from / paid to the Contractor for cumulative shortfall in OB removal upto 2nd operating quarter.

OBp2 = {MFne(av)2 x 0.9 x (SRn- SRn2) / (1+ SR0)} x (DQ1st month + DQ2nd month + DQ3rd month + DQ4th month + DQ5th month + DQ6th month) - OBp1

Where, MFne(av)2 is the cumulative weighted average Mining Fee till the end of second quarter.

The cumulative Strip Ratio till the end of any quarter (e.g. SRn2 till the end of 2nd Quarter) shall not be considered higher than the Strip Ratio for the Operating Year n specified in tender documents or any modification done by EIC in the above formula.

(b) Similar adjustments for OB shall be made for each subsequent quarter during the Operating Year.

Operating year shall be 12 months from the start of mining operation and subsequent 12 months.

#### Excess Removal

In case for a quarter the cumulative Strip Ratio (Total OB removed during the Operating Year till the end of that quarter / Total Coal supplied during the Operating year (DQ) till the end of that quarter) is higher than that specified in Tender documents or any modification done by EIC, no additional payment shall be made for the excess quantity of overburden. However, such excess quantity shall be adjustable in the succeeding quarters of that operating year. Further the excess quantity of overburden over & above the strip ratio for the last quarter of the Operating Year shall be allowed to be carried forward to the succeeding Operating Year and shall be adjusted in the Striping ratio in such operating year except for the quantity which has been paid for on account of latent condition and subject to fulfillment of all conditions as per Tender documents and any agreed modification thereof.

#### Payment of Overburden in exigency cases

In case the coal production is hindered on account of the reason not attributable to Contractor or during the initial period required to touch the mineable seam, payment of 19 % of Base Mining fee per Cum of Overburden/Inter-burden/Top soil shall be paid against the quantity removed, on adhoc basis in a month and the same shall be adjusted in equal installment in next 3 subsequent months RA Bill produced on the basis of coal dispatch.

Payment will be based on the Overburden/Interburden/Top soil excavated and dumped at the designated dumps/area and duly certified by EIC based on joint survey/measurement.

Deleted .

#### Modalities for Billing & Claims

The Contractor shall raise bills by the fifth Business Day of each month, for the day-wise coal delivered by the Contractor to the NTPC Ltd. during the period from first day to the last day of the immediately preceding month based on quantity of coal determined as per provisions of this Contract document.

The bills shall be supported by following documents:

Total dispatch Quantity (up to two decimal point) as provided by Dispatch Department in support of the quantity. Details of Quality parameters for each day of coal delivered during the month and weighted monthly average jointly determined under Clause 8.2.3 & 8.2.4

Details of sizing of coal delivered during the month as determined under Clause 8.2.3

Provided, that in the event of non-finalisation of analysis results of joint samples within the due date, for billing by the Contractor as prescribed under Clause 8.2.1, the Contractor shall raise provisional RA bill on the basis of

the weighted average quality of coal as per joint analysis results available till 25th day of the month. The final adjustment shall be required to be done in Subsequent RA Bill. The excess payment / recovery shall be effected by way of Credit notes / supplementary bills.

Payment for the quantity and quality of coal delivered shall be based on the coal delivered through trucks deployed by NTPC's weighbridge at mine end.

If any amounts are due and payable by either Party to the other Party pursuant to Clauses 8.1.3, 8.2.3, 8.2.4 and 6.4.1., the Party to whom such amount is payable shall raise an invoice for the amount payable within 10 Business Days of the month immediately following the month in which such amount accrues for payment.

Any invoice raised pursuant to Clause 6.7.4 shall be duly supported by a jointly signed statement of joint assessment of such quantity and quality as intimated by the NTPC Ltd. or the Contractor as the case may be.

The Contractor and the NTPC Ltd., as the case be, shall raise claim for adjustments after annual reconciliation pursuant to Clause 6.7.

Regular monthly bills raised for the preceding month by Contractor, shall be verified by the NTPC Ltd., pursuant to various provisions under this Contract, by 8th Business Day of the subsequent month and paid for by account payee cheque/RTGS by the 10th Business Day of that month.

Adjustment for lead during the term of Contract:

No adjustment shall be made on account of lead and lift in case the coal, OB and Topsoil is dumped over the designated place as shown on the plan enclosed. Contractor is supposed to dump the OB and coal at specified places keeping in mind to optimize the lead. The average lead for Coal is 6 Km. The average lead for overburden/interburden is 4 Km. The average lead for topsoil is 3 Km. The contractor shall follow the instruction of NTPC at all time during the contract in this regard.

Due to any contingency reasons not attributable to the contractor, if the Coal or overburden or Topsoil is dumped over the area other than designated places on the instruction of EIC, in such case any increase in lead over and above lead mentioned in clause 6.8, the contractor shall be compensated for incremental increase in lead as per the SOR October 2021 of M/s SECL after its escalation provided in the SOR, on the actual basis separately. The leads shall be jointly estimated by the EIC of NTPC and Contractor.

#### Annual Reconciliation / Adjustments

The Parties shall jointly reconcile all payments made for the coal produced during the First production year (i.e. 12 months from start of OB removal), by end of subsequent month of following production year (second year).

The Parties shall, forthwith, give credit/debit for the amount falling due, if any, as assessed during such joint reconciliation and payments made within five Business Days thereafter. The annual reconciliation shall also include the reconciliation required pursuant to Clause 6.4.1. The annual reconciliation statement shall be jointly signed by the authorised representative of the Contractor and the EIC.

#### Disputes in Payment

In case of any Disputes with respect to the Payment Claims, payment shall be made for the undisputed amount only.

The Party claiming a Dispute shall submit the nature of the Dispute in writing to the other Party within five (5) Business Days.

The disputed amount shall be mutually resolved through good faith discussions within a period of 30 Business Days of intimation failing which it shall be resolved through the Dispute Resolution specified in GCC.

#### Taxes

Except as provided in Clauses 6.11.3 and 6.11.4, the Contractor shall bear and pay any and all taxes, duties, levies and charges including customs duty, excise duty, central sales Tax, local sales tax, Value Added tax (VAT), entry tax, local taxes, duties and levies, works contract tax, income tax etc. as applicable and assessed on the Contractor or its sub- contractors or their employees by Authority(ies) under this Contract document for performance of its Obligations during the Term. The Contractor shall not be entitled to make any claim in this regard. The NTPC Ltd. shall not bear any liability whatsoever on account of taxes, duties & levies other than that mentioned in Clauses 6.11.3 and 6.11.4 below. The Contractor shall be solely responsible and liable for making payment of taxes, duties and levies directly to the concerned Authorities and make necessary reconciliation with them. Further, whenever and to the extent required in accordance with Indian laws such as Income Tax Act the NTPC Ltd. shall make necessary deductions of taxes, duties and levies from any and all amounts payable by the NTPC Ltd. to the Contractor in accordance with the terms of this Contract document.

"Goods and Services Tax" or "GST" means taxes levied under the Central Goods and Services Tax Act, Integrated Goods and Services Tax Act, Goods and Services Tax (Compensation to States) Act, and various State/Union Territory Goods and Services Tax Laws and applicable cesses, if any under the laws in force (hereinafter referred to as relevant GST Laws)."

The Contractor shall ensure that the tax exemptions or concessions or necessary set off available to the Project





**NTPC Limited**

( A Government of India Enterprise )

**SSC - Coal Mining(Ranchi)****Coal Mining HQ, Ginni Plaza Chutia, Opposite- Chutia Police Station  
Ranchi****Jharkhand- 834001, India****Telephone No. : Fax No. :****Service Purchase Order****PAN No. : AAACN0255D****CIN No. : L40101DL1975GOI007966****Purchase Order No. : 5500040988-108-1074 Date : 22.07.2022 ( version : 0 )****To****Vendor Code : 1206641****KALINGA COMMERCIAL CORPORATION LTD****A/47, NILAKANTHA NAGAR, NAYAPALLI,****BHUBANESWAR, KHORDHA, ODISHA****BHUBANESWAR****BHUBANESWAR****Odisha****India - 751012****Tel: 9437918187****E-Mail : srmgrpm@kccl.co.in****Kind Attention : Sh. Manoj Ranjan Samal, Director Finance Ph:9437918187,9937559264  
Email:manojrsamal@ kccl.co.in, srmgrpm@kccl.co.in****Subject: : Retendering of Commencement of mining operation for overburden removal, coal extraction and other associated works from the South Pit Extension of Talaipalli Coal Mining Project through outsourcing mode as an interim arrangement****NIT NO. : 9900240085/108/1074 Dated 17.05.2022****Your Offer No. : 1. Your Techno Commercial bid opened online on 16.06.2022.  
2. Your Price bid opened online on 27.06.2022 following with Reverse Auction****Your Reference :****Our Reference : Tender Ref No : NTPC/SSC - Coal Mining(Ranchi)/9900240085  
Tender ID : 2022\_NTPC\_64007\_1  
LOI Ref. No. SSC\_COAL/SSC-C&M/2021-22/SURESH/ 106599 Dated 21.07.2022****Dear Sir,**

This has reference to our above mentioned NIT, Your offer and subsequent discussions. We are pleased to accept your offer opened on 22.07.2022 and confirm having awarded on you the work of Retendering of Commencement of mining operation for overburden removal, coal extraction and other associated works from the South Pit Extension of Talaipalli Coal Mining Project through outsourcing mode as an interim arrangement of total value INR 6159,799,172.06 (Rupee SIX ARAB FIFTEEN CRORE NINETY-SEVEN LAKH NINETY-NINE THOUSAND ONE HUNDRED SEVENTY-TWO POINT SIX ONLY) mentioned in the scope of works, special terms & conditions, Bill of quantities etc.

The duration of the service period shall be from 28.07.2022 to 27.10.2025. Though the duration of contract shall remain same, the actual date of commencement of the contract shall be as per the direction of EIC. GM, TLCMP shall be EIC for this work.

This service purchase order along with its annexure is being issued to you in duplicate .We request you to return the duplicate copy of this service purchase order, duly signed on each page by your authorised signatory in token of your unequivocal acknowledgment of the same within 15 days from the date of this service purchase order. If no communication is received within 15 days of receipt of Purchase Order, it will be treated that order has been accepted in entirety.

We thank you for the interest shown by you in our project and the cooperation extended to us. We expect to receive your continued cooperation in future also.

**Break up of Price (For Service Related Lines Only)**

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SI No.	Service Code	Description	Qty.	UOM	Rate	Premium	Discount	Addl Discount	Net Rate	Value
10 .10		OB removal	7,750,000	M3	116.90	11.57	0.00	0.00	128.4731	995,666,525.00
20 .10		OB removal	7,750,000	M3	116.90	11.57	0.00	0.00	128.4731	995,666,525.00
30 .10		OB removal	7,750,000	M3	116.90	11.57	0.00	0.00	128.4731	995,666,525.00
40 .10		OB removal	7,750,000	M3	116.90	11.57	0.00	0.00	128.4731	995,666,525.00
50 .10		Coal extraction and transportation	5,039,486.020	MT	78.37	7.76	0.00	0.00	86.1286	520,172,656.81
60 .10		rehandling of Ob /topsoil	2,250,000	M3	87.11	8.62	0.00	0.00	95.7339	215,401,252.50
70 .10		Explosives for mining operation	3,019,743.010	MT	162.09	16.05	0.00	0.00	178.1369	537,927,688.79
80 .10		Nala Diversio	1	LPS	3,384,598.95	335,075.30	0.00	0.00	3,719,674.2500	3,719,674.25
90 .10		11 KV Line Diversion	1	LPS	1,096,966.41	108,599.67	0.00	0.00	1,205,566.0800	1,205,566.08
100 .10		OB removal and transportation	2,808,203	M3	116.90	11.57	0.00	0.00	128.4731	360,778,544.84
110 .10		Explosives for mining operations	3,019,743.010	MT	162.09	16.05	0.00	0.00	178.1369	537,927,688.79

**PROJECT AGREEMENT**

**FOR**

**DEVELOPMENT AND OPERATION**

**OF**

**EAST PIT OF TALAIPALLI COAL BLOCK,**

**STATE OF CHHATTISGARH, INDIA**

**BETWEEN**

**M/s. NTPC Limited ("OWNER")**

**AND**

**M/s. VPR Mining Infrastructure Private Limited ("MINE OPERATOR")**

**AGREEMENT NO.: CS-7014-602(R2)-9-CS-PA-7352**

**Date: 30.10.2023**





**(b) Land Acquisition**

The Mine Operator shall assist Owner for physical possession of land with the requisite rehabilitation/lease documents, R&A, etc.

**(c) R&A**

Activities provided at Clause 18 of Schedule 2 of the Agreement.

**(d) Financial Set up**

The Mine Operator shall achieve financial closure with respect to the financing of any part of the activities required for performance of its obligations under this Agreement.

**(e) Site Construction Activity including construction & maintenance of Infrastructure**

The Mine Operator shall cause the construction, commissioning and maintenance of the Mine Operator's Plants and Equipment and Infrastructure at its own cost. Mine Operator shall undertake the following:

- (i) Upkeep/maintenance of explosives magazines, and Construct, operate and maintain Infrastructure Facilities of mine area, fuel storage facilities, workshops and stores, Effluent Treatment Plant (ETP), Settling ponds for water recycling as per Environmental clearance.
- (ii) Arrangement of power including back up arrangement of appropriate capacity as necessary.
- (iii) Power distribution arrangement from Main Receiving Substation for entire mine area including infrastructure facilities, mining operations.
- (iv) Operation and maintenance of DG set including arrangement of diesel.
- (v) Construct, Operate & maintain roads & culverts connecting the mine site and offices including construction of approach road from nearest PWD road to mine entry.
- (vi) Deleted
- (vii) Excavation of the box cut and all development and maintenance haul roads.
- (viii) construction, maintain and operate canteen- rest shelters, first aid centres, bathing and sanitation facilities for its employees as per the existing rules and/or guidelines.
- (ix) Mine Operator shall be responsible for Progressive Mine Closure Activities as per the approved Mine Closure plan/ guidelines during the term of the contract. Mine Operator shall have to comply with the requirements of the Coal Controller and other concerned authorities time to time to enable NTPC to claim maximum eligible refund, annually, from Coal Controller.



**4.5 Selective Mining**

All mine planning shall be based on the "selective mining" technique which requires to achieve the stipulated quality parameters.

**4.6 Quality Control**

The Mine Operator shall, through a full-time staff of mining/geological technicians, implement a comprehensive program to control the quality of the mined coal in accordance with the weekly digging plan. The Quality Control staff shall interact with operations personnel assigned to coal loading to ensure that the expected coal quality is achieved.

**4.7 Monsoon Planning**

The Mine Operator shall prepare plans and maps such that the mine can operate during the monsoon and meet the required production schedules.

**4.8 Other Routine Tasks of the Mine Operator**

- (a) Water Management – Preparation of plans and maps for managing the normal and monsoon rainfall inter alia including determining the sizes and locations of sumps and diversion ditches and the specifications of pumps
- (b) Overburden Dump Planning - Preparation of plans and maps for managing the overburden dumps. The Mine Operator shall strive to commence in-pit dumping as soon as practicable

**5. MINE OPERATIONS**

**5.1** The Mine Operator shall construct and operate the Site in accordance with the following scope:

- (a) Plan the mine (Site), its development and construction
- (b) Strip OB and store such OB on dumps
- (c) Mine and extract coal in accordance with the requirements of Owner
- (d) Make provisions for HEMM, other mining machinery and its effective maintenance
- (e) Implement, and comply with EMP and environmental clearances;
- (f) Construction, maintenance and operation of mine dewatering plant sump, and garland drains with de-silting provisions
- (g) Construct and maintain all access ways and haul roads
- (h) Arrangement and use of explosives, as per Indian Explosives Act
- (i) Drilling and blasting
- (j) Construction, Operation and maintenance of workshops, stores etc as per the requirement.
- (k) Construction, Operation and maintenance of complete internal power supply system as per the requirement.

- (n) Mine illumination as per prevalent laws
- (o) Arrangement of petrol/diesel oil and lubricants.
- (p) (If applicable) control any spontaneous combustion on Site
- (q) Conduct advance infill drilling, if required by Mine Operator
- (r) OS dump management
- (s) Progressive mine closure with effective land reclamation plan in accordance with approved mine closure plan. The Mine Operator shall submit to the Owner the annual financial statement of cost incurred towards progressive mine closure activities duly certified by National Environmental Engineering Research Institute (NEERI) or Central Mine Planning & Design Institute Limited (CMPDIL) or any other institute as may be notified by the Government for these purposes to an acceptable level by the Coal Controller.
- (t) PCL Store shed
- (u) Development of Power Supply Distribution System for various equipments/facilities included in Mine Operator's scope beyond the Owner's Main Receiving station
- (v) Diversion of roads and power lines (if required) including liaison with Govt. Authorities/State Govt./RFPs.

## 5.2 Management, Superintendence and Personnel

**5.2.1** The Mine Operator shall establish a management team to interface with the Owner, shall assure that members of the team are qualified and authorized to make decisions related to the Site and are available for communication with the Owner during all regular business hours for the duration of this Agreement. The Mine Operator shall, after mobilization at the Site, maintain a sufficient, competent, permanent, full-time staff at the Site to coordinate and provide general direction of the work and progress of the sub-contractors, if any, at the Site. This shall include the services of supervisors and foremen, to direct the activities of skilled and unskilled labour, and all other personnel necessary to complete the Mining Services. The Mine Operator shall cause the Mining Services to be supervised at all times by a job superintendent. Instructions given to the Mine Operator's job superintendents or other personnel so authorized by the Owner or its authorized engineers shall be just as binding as though given directly to the Mine Operator.

The Mine Operator, at all times, shall deploy the team of technical experts comprising of graduates/post graduate mining engineers, geologists, mechanical engineers, electrical engineers, civil engineers, surveyors, etc headed by persons with at least 10 years of post qualification relevant experience preferably in coal mining.

The Mine Operator shall follow the requirements of DGMS regarding the number of supervisors. Those requirements are quite specific and relate to the number of excavators deployed.

The Mine Operator shall investigate and take appropriate action with respect to any personnel problems brought to its attention by the Owner. Any employee, including job superintendents, proving unsatisfactory to the Owner, shall be promptly replaced upon request of the Owner.

F. No. 34011/28/2019-CPAM

Government of India

Ministry of Coal

Shastri Bhawan, New Delhi

Dated, the 29<sup>th</sup> May 2020Office Memorandum

**Subject: Guidelines for Preparation, Formulation, Submission, Processing, Scrutiny, Approval and Revision of Mining plan for the coal and lignite blocks.**

Undersigned is directed to state that the guidelines for formulation of Mining plan and Mine Closure Plan has been amended. It has been decided by the Government that all coal (including lignite) mining operations in India shall henceforth be governed as per modified guidelines enumerated below

1. **Mining Plan:** All coal (including Lignite) mining operation in India shall henceforth be governed as per these modified guidelines listed below and henceforth, the Mine Closure Plan and Final Mine Closure Plan shall be integral part of Mining Plan. Separate approval of Mine Closure Plan/ Final Closure Plan has been done away with. The Guideline/format for formulation of Mining plan is enumerated at **Appendix I**.
  - 1.1 **Implementation of the approved Mining Plans shall be sole responsibility of the mine owner.** Mining operations shall be undertaken in accordance with the duly approved mining plan. The mining plan once approved shall be valid for the balance life of the Mine, provided that any modification(s) of the mining plan is approved by the competent authority and such approval of the modified mining plan shall remain valid for the estimate balance life of the mining plan. Modification of the approved mining plan during the operation of a mining lease also requires prior approval
  - 1.2 The mining plan shall cover prescription for different phases of life of the mine as stage plan. The Stage plan for 1st year, 3rd year, 5th year, year of achieving rated capacity of the mine, Final year (i.e. at the end of mine life) and post closure shall be submitted at the time of initial submission of mining plan. The project proponent shall submit a **report/information** consisting a. compliance status with respect to approval condition of mining plan and grounds specified at para 1.3A, b. stage plan for next five years, c. revised balance life of the mine, and d. revised calculation of ESCROW amount with respect to revised balance life, to Coal Controller, CCO, Kolkata with a copy of the same to Administrative Section dealing with the allocation/allotment of the block and section dealing with approval of mining plan at MoC/CCO, **for information**. Such report/information must be submitted at least 180(one hundred eighty) days before the expiry of 5 (five) year, starting from the commencement of the Mineral Concession (Amendment) Rules, 2020 or the date of execution of the duly executed mining lease deed, whichever is later. Information desired above must bear certificate of **Qualified Person/ Accredited Mining Plan preparing Agency** and have approval of the respective company board. Non submission of such information during the stipulated time may result in withdrawal of mine opening permission or cancellation of the approved mining plan, as may be decided by CCO.
- The Mining Plan approved prior to issue of this Guideline will qualify for submission of such report/information at least 180(one hundred eighty) days prior to expiry of 5 (five) year from the date of notification of the Mineral Concession Amendment Rules 2020
- 1.3 (A) The mining plan may be modified for a. for change in method of mining, b. for facilitating increase in sanctioned peak capacity that is in excess of one hundred and fifty per cent of the

sanctioned rated capacity, e. change in leased area, d. in the interest of safe and scientific mining; e. conservation of minerals; f. for the protection of environment, g. addition of reserve by way of proving of reserve in the existing lease area; h. for changes in final mine closure conditions; or i. and such other change that may be determined by the Central Government. While submission of revision/ modification of mining plan the reason for revision/ modification shall be specified in writing by the lessee

- (B) Notwithstanding anything contained in clause (A) above, for other minor changes, the project proponent is empowered to make modification with the approval of the respective company board. These minor changes shall cover a. changes in land type within the leased area; b. changes in HCMM deployment plan, and c. changes in location of infrastructure within the leased area. The project proponent shall submit specific report of such minor changes to Coal Controller, CCO, Kolkata with a copy of the same to Administrative Section dealing with the allocation/allotment of the block and section dealing with approval of mining plan at MoC/CCO, for information
- 1.4 The Mining Plan submitted for approval shall have prior approval of the concerned Board of the Company
- 1.5 The base date of the Mining Plan should be taken as cut-off date on which the extractable reserve, balance life etc. has been quantified.
- 1.6 The proposed leased area in the Mining Plan shall include the area specified in the mining lease within which mining operations can be undertaken and includes the non-mineralized area required and approved for the activities falling under the definition of mine as referred in The Mines Act 1952. Evacuation route, R&R and Employee Township area outside the block will not be part of the Mining plan
- 1.7 Pre-mining land ownership/land type furnished in the mining plan will be of indicative in nature along with data source at its footnote (viz. from topo sheet, cadastral plan etc.)
- 1.8 The excavation/ mining area envisaged in the mining plan must be restricted within the allotted/vested geological block boundary/existing mining lease and if the project area is confined within the allotted block boundary/existing mining lease, a certificate to this effect is to be provided by the **Qualified Person/ Accredited Mining Plan preparing Agency** preparing the mining plan. The certificate must be made on the Conceptual Plan depicting Cardinal Point Co-ordinates (shape co-ordinates) of the project boundary, Lease boundary and Geological Block boundary (binding co-ordinates given in the vesting order).
- 1.9. Under provisions of Rule 16 of MCR 1950, State Government is custodian of the exploration data. As such in the cases, where the project area extends beyond the block boundary/existing mining lease the Mines and Geology Department of the concerned State Government shall issue a certificate specifying (a) intent of the State Government for grant of lease beyond the vested geological boundary; (b) non-existence of coal/ lignite in the area beyond the vested/allotted geological block boundary/existing mining lease to rule out the issue of encroachment. The application for issue of certificate from the Mines and Geology Department of the State Government must be supported with proof of the non-existence of coal/lignite in the area under reference (along with their Cardinal Point coordinates) duly certified by custodian agency viz. CMPDIL/ SCCL in case of coal and NLCIL in case of lignite
- Where the project area extends beyond the block boundary/existing mining lease, the certificate issued by the Mines and Geology Department of the concerned State Government must be attached in the Mining Plan
- 1.10. In case of allotted/auctioned coal/lignite blocks, the mining plan may be revised for extraction of more coal on year to year basis.

Provided that the mining plan shall be revised for extraction of less coal on year on year basis only under following circumstances: a. if the remaining extractable reserve of the coal mine is less than

3(three) times of the rated Capacity of the current Approved Mining Plan, b. Change in method of mining from Opencast to Underground necessitated due to change in geo-mining conditions. However, revision of Mining Plan for extraction of less coal would be subject to prior approval of the Nominated Authority

- 1.11 The approval of the revised Mining Plan shall not result in changes in the terms and conditions or efficiency parameters mentioned in the CMDPA/Allotment Agreement signed at the time of allotment/leasing for the auctioned/allotted blocks without prior approval of the nominated authority or Central Government, as the case may be. However, efficiency parameters mentioned in the CMDPA/Allotment Agreement shall be linked to the rated capacity of the mine.
- 1.12 The project proponent shall envisage the action plan for exploration and liquidation of the balance reserve yet to be projectised.
- 1.13 The project proponent shall take all necessary precautions regarding safety of mine workings and persons deployed therein and shall adhere to all the statutory clearances with regards to safety.
- 1.14 Proposed project area envisaged in the mining plan shall not encroach into any other adjacent coal block unless permitted to do so by the Ministry of Coal in writing
- 1.15 The approval of the Mining Plan is without prejudice to the requirement of approvals from competent /prescribed authority under the relevant rules, regulations etc.
- 1.16 The project proponent shall submit an undertaking that the mine shall be operated as per the Environment Clearance (EC) & Forestry Clearance (FC) for the project
- 1.17 **Statutory Obligation:** The legal obligations, if any, which the lessee is bound to implement, like special conditions imposed while execution of lease deed, approval of Mining Plan, conditions imposed by the Ministry of Environment, Forest and Climate Change (MoEF&CC), Central Pollution Control Board (CPCB), State Pollution Control Board (SPCB), Directorate General of Mines Safety (DGMS) or any other organizations describing the nature of conditions and compliance positions thereof, should be indicated in the Mining Plan
2. **Mine closure Plans:** Mine Closure Plans will have two components viz. i) Progressive or Concurrent Mine Closure Plan, and ii) Final Mine Closure Plan. Progressive Mine Closure Plan would include various land use activities to be done continuously and sequentially during the entire period of the mining operations, whereas the Final Mine Closure activities would start towards the end of mine life, and may continue even after the reserves are exhausted and/or mining is discontinued till the mining area is restored to an acceptable level. The Mine closure details of the Mining Plan should be oriented towards the restoration of land back to its original as far as practicable or further improved condition.
- 2.1 Mining is to be carried out in a phased manner along with reclamation and afforestation work in the mined-out area
- 2.2 Progressive mine closure plan shall be prepared for a period of every five years from the beginning of the mining operations. These plans would be examined periodically in every five years period and to be subjected to third party monitoring by the agencies approved by the Central Government, like Central Mine Planning and Design Institute Ltd (CMPDIL), National Environmental Engineering Research Institute (NEERI), Indian Institute of Technology (IIT-ISM) or any other institutes/ organizations/ agencies specified from time to time for the purpose.
- 2.3 Various project specific activities viz. mined-out land details & their technical and biological restoration plan, water quality management, infrastructure to be retained and demolished, disposal of mining machinery, etc. shall be furnished in the relevant paras. Where the backfilling of the mine void is being carried out as part of regular mining operation, it shall not be included in the list of progressive mine closure activities. However, in case, where the backfilling of mine void is to be carried out specifically for closure of the mine, quantum of such overburden and the mine closure fund earmarked for the purpose must be included in the list of activities to be taken up for mine closure in the mining plan at the time of submission itself.

2.4 The Government may at any time before the closure of mine require certain activities to be included in the mine closure plans, which it may consider necessary for the safety and conservation of environment, or in compliance with any modification, amendment in the relevant legislation

2.5 **Abandonment cost:** The total cost for carrying out such activities shall be estimated for assessment of abandonment cost of the mine involving progressive and final mine closure activities such as barbed wire fencing all around the working area, dismantling of structures/demolition and cleaning of sites, rehabilitation of mining machinery, plantation, physical/biological reclamation, landscaping, biological reclamation of left-out overburden dump, filling up of de-coaled void, post environmental monitoring, supervision charges, power cost, protective and rehabilitation measures including their maintenance and monitoring, miscellaneous charges etc. for the specified post closure period

2.6 **Escrow Account Calculation:** In August 2009 it was estimated that typically closure cost for an opencast mine was around rupees six lakhs per hectare of the total project area and rupees one lakh per hectare for underground project area at the-then price level. Accordingly vide letter dated 7<sup>th</sup> January 2013 a guideline for mine closure was issued which needed modification in these rates based on the wholesale price index (WPI) as notified by Government of India from time to time while preparing the Mining plan and Mine Closure Plan. The escalated rate (based on the current base year i.e. 01.04.2019) is Rupees Nine Lakh per hectare in opencast and Rupees one lakh fifty thousand per hectare for underground Mine. These rates will be considered as Base Rate to be applicable from 01.04.2019, which may change as specified from time to time by the Government of India.

*{Exemplary Calculation: (Rs 6 lakhs x 1.561 linking factor for base year 2004-05 x WPI 121.1 as on April 2019) / WPI as on August 2009) = Rupees 8.75 lakh, rounded to Rupees 9 (nine) lakhs per hectare in case of Opencast project}.*

Henceforth, these rates will stand modified based on the wholesale price index (WPI) as notified by Government of India from time to time. Annual closure cost is to be computed considering the total project area of the mine multiplied by escalated rate (at the above mentioned rates) and dividing the same by the balance life of the mine in years. An amount equal to the annual cost is to be deposited each year throughout the mine life compounded @ 5% annually

*{For example if the annual cost works out to Rs 100, then in the first year the amount to be deposited will be Rs 100, in the second year  $100 \times (1 + 5\%)^1$ , in the third year  $100 \times (1 + 5\%)^2$  and so on.}*

Further, in case of the mine, where escrow account is already open, the annual closure cost is to be computed considering the total project area at the above mentioned rates minus the amount already deposited and dividing the same by the balance life of the mine in years and annual cost as arrived should be compounded @ 5% annually.

2.7 **Financial Assurance:** The Mining Company/ Mine Owner as a part of Financial Assurance will open a Fixed Deposit Escrow account, with the Coal Controller Organization (on behalf of the Central Government) as exclusive beneficiary prior to commencement of any activities on the land/project area of the mine and shall submit the same to Coal Controller Organization (CCO) before the permission is given for opening the mine. The mining company shall cause the payment to be deposited at the rate computed as indicated at Para 2.6. The owner of the company may select the Schedule Bank where the Escrow account is to be opened and inform the same to the Coal Controller, CCO, Kolkata

2.8 Coal Controller, Kolkata shall get the WPI (used for escalation of closure cost at the time of formulation of Mining plan) updated, at the time of opening of Escrow account. The mine owner/ company including all public/ private sector companies shall deposit the yearly amount in a Schedule Bank in accordance with Para 2.6. Coal Controller, Kolkata shall also get the

**information, submitted under to para 1.2, verified and get the yearly closure cost modified with respect to the latest WPI in accordance with para 2.6.**

- 2.9 **Final Mine Closure:** The details of the Mining Plan (covering Final Mine Closure Plan envisaging the details of the updated cost estimates for various mine closure activities and the Escrow Account already set up, shall be submitted to the approving authority for approval at least five years before the intended final closure of the mine
- 2.10 **Final Mine Closure** would be considered to be completed only after acceptance of the third-party audit report by the Coal Controller on the compliance of all provisions of Mine Closure Plan. Any Institute/ Organization/Agency as may be specified by the Government for this purpose may be engaged for Third Party audit to create a self-sustained ecosystem. Failure of restoration within the specified period may result in forfeiture of Escrow Account created as per Para 2.6& 2.7. The details of the Final Mine Closure Plan along with the details of the updated cost estimate for various mine closure activities and escrow account already set up shall be submitted at the time of approval of final mine closure plan
- 2.11 **Time Scheduling for abandonment:** The Action plan for carrying out all abandonment operations (progressive and final mine closure) should be furnished in the form of bar chart for a period of life of the mine plus post closure period. Post closure period shall be taken as 3 (three) years for Underground mines and Opencast mines having stripping ratio lesser than 6(six) MM<sup>3</sup>/Tc & 5 (five) years for mines having stripping ratio more than 6(six) MM<sup>3</sup>/Tc.
- 2.12 **Implementation of the approved Mine Closure Plan shall be sole responsibility of the mine owner.** Mining is to be carried out in a phased manner i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 50% of the total deposited amount including interest accrued in the ESCROW account may be released after every five years in line with the periodic examination of the Closure Plan as per Para 2.2. The amount released should be equal to expenditure incurred on the progressive mine closure in past five years or 50% whichever is less. The balance amount shall be released to mine owner/leaseholder at the end of the final Mine Closure on compliance of all provisions of Closure Plan. This compliance report should be duly signed by the lessee and certify that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organisations, court etc and certified by the Coal Controller.
- 2.13 **Responsibility of the mine owner:** It is the responsibility of the mine owner to ensure that the protective measures contained in the mine closure plan including reclamation and rehabilitation works have been carried out in accordance with the approved mine closure plan and final mine closure plan
- 2.14 The owner shall submit to the Coal Controller a yearly report before 1st July of every year setting forth the extent of protective and rehabilitative works carried out as envisaged in the approved mine closure plans (Progressive and Final Closure Plans)
- 2.15 The money to be provided per hectare of total Project Area for the purpose is to be deposited every year on commencement of any development activity on the land for the mine after opening a Fixed Deposit Escrow Account prior to obtaining mine opening permission from Coal Controller. Mining companies/owners including all Public Sector Undertakings shall deposit the yearly amount in a Scheduled Bank. If the Mine owners fail to deposit the required annual amount in accordance with Para 2.6, 2.7 & 2.8, the Government can withdraw the mining permission
- 2.16 The funds so generated are towards the security to cover the cost of closure in case the mine owner fails to complete the relevant closure activities. The prime responsibility of mine closure shall always lie with the mine owner, and in case these funds are found to be insufficient to cover the cost of final mine closure including the areas covered in Para 2.3 2.6, 2.7, 2.8 & 2.9 above The mine owner shall undertake to provide the additional fund equivalent to the gap in



funding before five years of Mine Closure failing which it may be recovered by such other methods as the competent authority may deem fit in this regard.

2 17 **Final Closure Certificate:** The Mine owner shall be required to obtain a mine closure certificate from Coal Controller to the effect the protective, reclamation, and rehabilitation work in accordance with the approved Mining plan covering final mine closure provisions/activities have been carried out by the mine owner for surrendering the reclaimed land to the State Government.

2 18 The balance amount at the end of the final Mine Closure shall be released to mine owner on compliance of all provisions of Closure Plan duly signed by the mine owner to the effect that said closure of mine complied with all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller. This should also indicate the estimated extractable coal reserves and coal actually mined out.

2 19 If the Coal Controller has reasonable grounds for believing that the protective, reclamation and rehabilitation measures as envisaged in the approved mine closure plan in respect of which financial assurance was given has not been or will not be carried out in accordance with mine closure plan, either fully or partially, the Coal controller shall give the mine owner a written notice of his intention to issue the orders for forfeiting the sum assured at least thirty days prior to the date of the order to be issued after giving an opportunity to be heard.

### 3. Formulation of Mining Plan by Qualified Person (QP) or Accredited Mining Plan Preparing Agency (MPPA):

3 1 System of granting Recognition to a person for preparation of mining plan u/s 22C of MCR 1960 & preparation of mining plan only by RQP u/s 22B of MCR 1960 shall be done away with, after commencement of the Mineral Concessions (Amendment) Rules, 2020.

3 2 After commencement of Mineral Concession (Amendment) Rule 2020, no mining plan shall be accepted unless it is prepared by Qualified Person (QP) or Accredited Mining Plan Preparing Agency (MPPA).

3 3 Quality Council of India (QCI) or National Accreditation Board for Education and Training (NABET) shall be engaged for accrediting following entities:

- (i) Accredited Prospecting Agency (APA) for undertaking prospecting operations and preparation of geological reports for Coal and Lignite Mines, and
- (ii) Mining Plan Preparing Agency (MPPA) for preparation of mining plan (for Coal, Lignite Mines and Sand for Stowing)

3 4 The Quality Council of India (QCI) or National Accreditation Board for Education and Training (NABET) shall grant accreditation in accordance with such standards and procedures as specified in schedule VI of Mineral Concession (Amendment) Rule 2020.

3 5 Qualified Agency (QP) or Mining Plan Preparing Agency (MPPA) who prepares mining plan for a block/mine, shall have recognition from the concerned company board that the qualification of the QP or accreditation of the MPPA has been duly verified and is in line with the relevant provision of the MCR 1960.

### 4 Submission, Processing and Scrutiny of Mining Plan

4 1 On and from the date of publication of order and upto the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, every mining plan submitted for approval/modification shall be accompanied with a non-refundable application fee specified from time to time in this regard, for the project area specified in the mining plan.

4 2 On and from the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, every mining plan submitted for approval/modification

shall be accompanied with a non-refundable application fee specified from time to time in this regard, for the project area specified in the mining plan and peer/expert review done by any accredited mining plan preparing or reviewing agency at their (applicant's) own cost. During examination of the Mining Plan by the internal committee of MoC if it is felt that a review by expert or by specialized agency is required, the committee may recommend referring the mining plan to such expert/agency with the approval of the MP approving authority. Charges for the expert review shall be borne by the applicant.

- 4.3 All pages (including cover page, plates and Annexures) shall bear the signature & stamp furnishing details of the QP/Accredited Mining Plan preparing Agency (MPPA) in physical mode of submission and e-signature/digital signature during the online system of submission.
- 4.4 Ministry of Coal is in process of development of on-line portal for submission and approval of mining plan system of acceptance of Physical copy shall be continued till the development/operationalization of online portal for submission and approval of mining plan.
- 4.4.1 Submission to Physical Copy Mining Plan to Ministry of Coal:**
- 4.4.1.1 The project proponent shall submit one soft copy and four hard copies of Mining Plan (draft)- one each to the concerned Administrative Section of the Ministry of Coal for the concerned block, Section of MoC/CCO dealing with approval of Mining plan, Coal Controller, CMPDIL/ Extended office of CCO & the dispatch receipt of the speed post (confirming that the draft Mining Plan has been sent). The contact details and correspondence address of the section dealing with the approval of Mining plan, administrative section for the mine, members of the committee etc. shall be updated time to time, on the website of the Ministry of Coal/Coal Controller Organisation.
- 4.4.1.2 The project proponent shall incorporate the observation (if any) and submit the mining plan (after incorporating the compliance to the observation) to section of MoC/CCO dealing with approval of Mining plan, concerned administrative section of the Ministry of Coal, Coal Controller and CMPDIL/ Extended office of CCO.
- 4.4.1.3 **Submission of Mining Plan (after incorporating compliance) to Ministry of Coal:** The project proponent shall submit 04 (Four) hard copies & 01 (one) soft copy of modified Mining Plan and the compliance to the observations along with copy of the dispatch receipt of the Speed Post (confirming that the modified Mining Plan has been sent to section of MoC/CCO dealing with approval of Mining Plan, concerned administrative section of the Ministry of Coal, Coal Controller, and CMPDIL/ Extended office of CCO).
- 4.4.1.4 The procedure of submission at Para 4.3.1 will be replaced by process of submission at para 4.3.2 on development of portal for online submission and approval of Mining Plan.
- 4.4.2 Online System of Submission of Mining Plan for Approval:**
- 4.4.2.1 Project proponent shall register online, using registered official mail ID.
- 4.4.2.2 For the purpose of preparation of Mining plan through a QP or MPPA, project proponent shall share a temporary login with QP/MPPA. This temporary login shall be valid till the preparation and approval of mining plan only.
- 4.4.2.3 The QP-MPPA shall upload the Mining plan through the temporary login and submit it to the project proponent, QP/MPPA once submits the mining plan to the project proponent, he shall not be able to modify.
- 4.4.2.4 The Project Proponent shall make payment of processing charges/fees online as specified from time to time by Ministry of Coal.
- 4.4.2.5 The Project Proponent shall after incorporating relevant company board approvals submit the mining plan to the Approving Authority. The mining plan submitted to approving authority shall become visible to Administrative Section for the respective block, section of MoC/CCO dealing

with approval of Mining plan, members of the Internal Committee, Coal Controller, CMPDIL, Extended office of CCO, simultaneously. System of SMS alerts shall be available at all stages:

- 4.4.2.6 Observations of the Committee Members shall be uploaded online and the project proponent shall also submit Mining Plan, after incorporating compliance, online

## 5 Scrutiny & Processing of Mining Plan

- 5.1.1 The current system of getting the mining plan scrutinized through CMPDI, Ranchi shall continue. Ministry of Coal is in process of creating an extended office of Coal Controller Organization at Delhi which shall be delegated with the work of processing and scrutiny of mining Plan. A letter to this effect shall be issued separately.
- 5.1.2 CMPDIL/Extended office of CCO at Delhi shall scrutinize the mining plan and submit comments to section of MoC/CCO dealing with approval of Mining plan within Fifteen (15) days of receipt of the Mining Plan. Non-submission of comments within the stipulated time may be presumed as "no comment" from CMPDIL/Extended office of CCO at Delhi, if consider necessary to make a physical verification of the site/site visit for scrutiny of the mining plan, may make such site visit/physical verification of the site, however, no relaxation in the time line as specified above may be given
- 5.1.3 Administrative Section of the Ministry of Coal (dealing with the block) shall scrutinize the mining plan with respect to Vesting order/ allotment order and CMDPA signed with allottee at the time of allotment and submit observations to section of MoC/CCO dealing with approval of Mining plan (till the development of portal for Mining plan approval) within Fifteen (15) days of receipt of the Mining Plan. Non-submission of comments within the stipulated time may be presumed as "no comment" from the administrative section,
- 5.1.4 Members of the Internal Committee shall examine the mining plan from Technical and administrative angle based on the observations of the Administrative Section (dealing with the respective block) and CMPDI/Extended office of CCO and the peer/expert review report submitted with the mining plan and submit observations to section of MoC/CCO dealing with approval of Mining plan (till the development of portal for Mining plan approval) within Fifteen (15) days of receipt of the Mining Plan. Non-submission of comments within the stipulated time may be presumed as "no comment" from the administrative section
- 5.1.5 Section of MoC/CCO dealing with approval of Mining plan shall communicate the observation (if any) to the project proponent for compliance till the development of online system for submission, processing, and approval of mining plan
- 5.1.6 Subsequent to development of online portal for submission, processing, and approval the observations of the internal committee members shall be uploaded directly on the portal, which will be visible to the project proponent. A timeline of 15 days shall be available for the internal committee members to upload the comments. Non-submission of comments within the stipulated time may be presumed as "no comment".

## 6 Timeline for submission of Compliance:

Once the observation of the Scrutiny of the mining plan is communicated either in hard copy, mail or online, the Project Proponent is required to submit the mining plan after incorporating the compliance to the observation within a period of 15 days of the communication, failing which the mining plan submitted for approval shall be rejected

Provided that any such application may be entertained after the said period of 15 Days, if the applicant satisfies the approving authority that he had sufficient cause for non-submission of mining plan (after incorporating the compliance) in time. However, in any case this period may not be extended beyond 30 days from the date of receipt of communication of the observation.

## 7 Approving Authority:

- 7.1 On and from the date of publication of order and upto the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, the powers to approve mining plan for all categories of coal and lignite mines and sand for stowing shall be exercisable by Project Adviser, Ministry of Coal
- 7.2 On and from the expiry of period of nine months from the commencement of the Mineral Concession (Amendment) Rules, 2020, the power to approve mining plan for all categories of coal and lignite mines including sand for stowing shall be exercisable by the Coal Controller, CCO, Kolkata, a subordinate office of Government of India in the Ministry of Coal.
- 7.3 The person delegated to approval of Mining Plan under sub-section (1) of section 26 read with clause (b) of sub-section (2) of section 5 of the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957) (hereinafter, the "Act") may seek help of an Internal committee constituted for the purpose
- 7.4 The approving authority shall dispose of the application for approval of the Mining Plans within a period of 30 days from the date of receiving of such application (The Mining Plan received on or before 30th of Current Month will be considered in the ensuing meeting) Provided that the aforesaid period of 30 days shall be applicable only if the Mining Plan is complete in all respect, and in case of any modifications subsequently suggested after the initial submission of the Mining Plan for approval, the said period shall be applicable from the date on which modified mining plan is re-submitted.

## 8 Internal Committee for Scrutiny of Mining Plan:

- 8.1 Members of the Internal Committee shall examine the mining plan from Technical and administrative angle based on the observations of the Administrative Section dealing with the respective block & CMPDIL/ Extended office of CCO.
- 8.2 The internal committee shall recommend the mining plan for "Approval" or "Rejection". In case of recommendation for Rejection, the committee shall record the reason for Rejection.
- 8.3 Till the opening of CCO office at Delhi, the internal committee shall consist of
1. Director (Technical), MoC, Member Secretary
  2. Director/ Deputy Secretary, MoC of the section dealing with the allocation/allotment of the respective block, Member
  3. Coal Controller or his representative, Member
  4. Director level officer of CMPDIL, Member
  5. Director/Deputy Secretary, Nominated Authority, Member
- 8.4 After opening of CCO office at Delhi, the internal committee shall consist of
1. Director level officer of CCO having relevant working experience.. Member
  2. Director/ Deputy Secretary of the section dealing with the respective block, Member
  3. Head of Regional Coal Controller Office (having relevant working experience in mine planning), CCO Regional Office New Delhi, Member Secretary
  4. Any other technical person having working experience of not less than 15 (fifteen) years in mine planning, Member

## 9 Communication of Approval:

- 9.1 In case of allotted/auctioned mine, section dealing with approval of Mining Plan shall communicate the decision of the approving authority within a period of 5 (five) working days in form of a letter confirming "in-principle approval" of the Mining Plan to the project proponent

with a copy of the same to the Nominated Authority, Govt. of India. Final approval of the Mining Plan in such cases shall be communicated by the section dealing with approval of Mining Plan, only on receipt of applicable payments and its confirmation from the Nominated Authority, Govt. of India.

- 9.2 While for mines other than auctioned/allotted mines, section dealing with approval of Mining Plan shall communicate the decision of the approving authority within a period of 5 working days.

## 10 Revision:

- 10.1 Any person aggrieved by any order made or direction issued in respect of mining plan by an officer competent to approval mining plans shall within 30 days of the communication of such order or direction, apply to the Secretary (Coal), Ministry of Coal for a revision of such order or direction thereon.
- 10.2 On receipt of any application for revision the authority shall give the aggrieved person a reasonable opportunity of being heard and may within 30 days confirm, modify or set aside the order or direction and his decision thereon shall be final.
- 11 **This Guideline** supersedes the previous orders and are without any prejudice to any other relevant rules and regulations, such as those issued by the State Governments, Ministry of Environment, Forest and Climate Change, Ministry of Labour and Employment, etc.

**(Hitlar Singh)**

Under Secretary to the Government of India

To,

**All the existing Coal and Lignite Block allocates**

Copy to:-

1. All Joint Secretaries, MoC
2. Coal Controller, Coal Controller's Office, 1- Council House Street, Kolkata.
3. CMD, CIL, Newtown, Rajarhat, Kolkata-700156, W.B.
4. CMD, NLCIL, Cuddalore, Distt. Neyveli- 607801 (Tamil Nadu).
5. CMD, Singareni Collieries Company Limited (SCCL), Kothagudem Collieries, Khammam Distt (A.P).
6. Tech. Director (NIC) - with the request to place it to Website of the Ministry of Coal

**DETAILS TO BE FURNISHED IN THE MINING PLANS FOR COAL/LIGNITE BLOCKS****A. Cover Page**

The Cover page should contain the following information:

- (i) Name of the Mining Plan and Mine Closure Plan /Final Mine Closure Plan
- (ii) Indication, if it is a Modified Mining plan seeking approval under Rule 22F of MCR 1960, it should be marked as “**Modified Mining Plan with Modification No**” i.e. First Modification, Second Modification etc.
- (iii) Name of the Coal-Lignite Block area (Acre/Hectare/Sq. Km.)
- (iv) Name of the Coalfield and its location i.e. District and State
- (v) Name and address of the Applicant
- (vi) Targeted capacity
  - a Rated capacity \_\_\_\_\_ (Mty)
  - b Peak Capacity (@ 150% of the rated capacity) : in \_\_\_\_\_ Mty.
- (vii) Name of the **Qualified person/ Accredited Mining Plan preparing agency (MPPA)** preparing the mining plan with details

**B. Index of Chapters of the Mining Plan (Including Mine Closure Plan) / Mine Closure Plan or Final Mine Closure Plan**

<i>S/No</i>	<i>Chapters</i>	<i>Page No</i>
1	Checklist	
2	Project Information	
3	Exploration, Geology, Seam Sequence, Coal Quality and Reserve	
4	Mining	
5	Safety Management	
6	Infrastructure Facilities proposed and their Location	
7	Land Requirement	
8	Environment Management	
9	Progressive & Final Mine Closure Plan	

**C. Index for List of Annexure****D. Index of List of Plans/ Drawing Attached enclosed as Plates****E. List of Abbreviations used.**

- (viii) All Plans must be colored distinctly with proper legends.

## CHECKLIST

<i>Details</i>		(✓ / ✗)
	Expert-review Report	
Text	Project Information	
Text	Exploration, Geology, Seam Sequence, Coal Quality and Reserve	
Text	Mining	
Text	Safety Management	
Text	Infrastructure Facilities proposed and their Location	
Text	Land Requirement	
Text	Environment Management	
Text	Progressive & Final Mine Closure Plan	
Annexure	Copy of allotment order /Vesting order	
Annexure	<p>Certificate of <b>Qualified person/ Accredited Mining Plan preparing agency (MPPA)</b> if the project area is confined within the vested/allotted block boundary/<u>existing mining lease</u> and</p> <p>Where the project area extends beyond the block boundary, a certificate of <b>Qualified person/ Accredited Mining Plan preparing agency (MPPA)</b> should be supported with a certificate of State Government mines and Geology department must be attached, which should specify (a) intent of the state government for grant of lease beyond the vested geological boundary/<u>existing mining lease</u>, (b) non-existence of Coal/ Lignite in the area beyond the vested/allotted geological block boundary/<u>existing mining lease</u> to rule out the issue of encroachment and use of coal bearing area (beyond the vested/allotted block boundary/<u>existing mining lease</u>) in the mining plan</p>	
Annexure	Approval of the Company Board	
Annexure	Copy of earlier approval of mining plan	
Annexure	Plan / chart showing schedule of Implementation of Mine closure activities (progressive and final closure) with duration of important activities	
Annexure	<b>Expert-Review Report carried out by an Accredited Mining Plan Preparing Agency (MPPA)</b>	

<i>Details</i>		(✓ / ✖)
<b>Annexure</b>	Other document (if any)	
<b>Plates</b>	Location plan	
<b>Plates</b>	Plan certified by <b>Qualified person/ Accredited Mining Plan preparing agency (MPPA)</b> if the project area is confined within the vested/allotted block boundary <u>existing mining lease</u> and where the project area extends beyond the block boundary, a Plan certified by <b>Qualified person/ Accredited Mining Plan preparing agency (MPPA)</b> should be supported with a plan with cardinal co-ordinates duly certified by the Mines and Geology Department of the concerned State Government. <b>Plan in support of Annexure - II</b>	
<b>Plates</b>	Printed copy of the KML file superimposed in the recent (not older than one year from the base date) dated satellite Image duly certified by Accredited Agency should also be attached  Note: The soft copy of the KML file shall also be part of the Soft copy of the mining Plan.	
<b>Plates</b>	Cadastral plan showing approved block boundary vis-a-vis proposed/existing mining lease & Mine boundary superimposed over it in distinct color, showing land use and infrastructure etc .	
<b>Plates</b>	Geological plan showing all the boreholes drilled and proposed to be drilled showing allotted block boundary and required lease area	
<b>Plates</b>	Representative Graphic Litholog	
<b>Plates</b>	Surface Plan showing drainage system, Contour, preferably at 3m interval, location of BH (borehole)	
<b>Plates</b>	Conceptual plan showing infrastructure facilities including colony, boundary of mining area, mine entries, roads including road diversion alignment etc.	
<b>Plates</b>	Tentative land use plan showing land type (Govt. forest and tenancy land) with its data source	
<b>Plates</b>	Block contour plan and seam folio plan, iso-grade plan	
<b>Plates</b>	Cross-section showing coal/lignite seam(s)	
<b>Plates</b>	Plan showing existing and proposed surface layout(s)	
<b>Plates</b>	Plan showing total coal thickness and overburden thickness and stripping ratio (in case of opencast (OC) Mines)	
<b>Plates</b>	Final stage quarry plan showing haul road alignment (in case of OC Mines)	



<i>Details</i>		<i>(✓ / ✖)</i>
<b>Plates</b>	Plan showing mode and location of entries and surface layouts (in case of underground (UG) Mines)	
<b>Plates</b>	Layout of the panel for each system (like Longwall, Continuous Miner, Bord& Pillar, road header etc.) should be given (in case of UG Mines)	
<b>Plates</b>	Layout of pillar extraction (in case of UG Mines)	
<b>Plates</b>	Support system (in case of UG Mines)	
<b>Plates</b>	Haulage and transport system (in case of UG Mines)	
<b>Plates</b>	Post mining land use plan	
<b>Plates</b>	Progressive mine closure plan/ stage plans	
<b>Plates</b>	Reclamation plan	

## Chapter 1 : Project Information

	<i>Parameters</i>	<i>Details</i>
<b>1.1</b>	<b>INTRODUCTION</b>	
1.1.1	Name of Coal / Lignite Block	
1.1.2	Name of the Coalfield/ Lignite Field	
1.1.3	Base date of Mining Plan/ Mine Closure Plan	
1.1.4	Linked End Use Plant	
1.1.5	Distance of End use plant from the pit head of the project in "km"	
1.1.6	Mode of Coal Transport	

**1.2 LOCATION, TOPOGRAPHY AND COMMUNICATION**

1.2.1	Location of coal deposit (District and State)	
1.2.2	Communication: PWD roads, railway lines, Air	
1.2.3	Availability of power supply, water etc.	
1.2.4	Prominent physiographic features, drainage pattern, natural water courses, rainfall data, highest flood level	
1.2.5	Important surface features within the project area and major diversion or shifting involved	

**1.3 DETAILS OF THE ALLOTMENT AGREEMENT**

1.3.1	Name the Allottee	
1.3.2	Details of allotment/vesting order	
1.3.3	Name and address of the applicant	
1.3.4	Name of the Previous allottee of the Block	
1.3.5	Starting Date of the Mine as per CMDPA	
1.3.6	Rated Capacity as per CMDPA	
1.3.7	Production Schedule as per opening permission (meeting provisions of CMDPA if any)	
1.3.8	End Use of Coal/Lignite as	

	<i>Parameters</i>	<i>Details</i>															
	per allotment order if any																
13.9	Cardinal Points co-ordinates of the Block boundary	<table border="1"> <thead> <tr> <th>ID</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td>2</td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td></td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td></td> <td>° ' " N</td> <td>° ' " E</td> </tr> </tbody> </table>	ID	Latitude	Longitude	1	° ' " N	° ' " E	2	° ' " N	° ' " E		° ' " N	° ' " E		° ' " N	° ' " E
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#### 1.4 DETAILS OF THE PREVIOUS APPROVAL OF MINING PLAN

14.1	Date of Approval																							
14.2	Conditions, if any																							
14.3	Scheduled year of start of production																							
14.4	Proposed year of achieving the targeted production																							
14.5	Date of actual commencement of mining operations, if operations already started																							
14.6	Likely date of mining operations, if operations not yet started & reasons for non-commencement of operations																							
14.7	<b>Planned production and actual levels achieved in last 3 years (Coal in Mte, OB in MM<sup>3</sup>, SR in MM<sup>3</sup>/te)</b>	<table border="1"> <thead> <tr> <th rowspan="2">Year</th> <th colspan="2">Coal "Mte"</th> <th rowspan="2">OB MM<sup>3</sup></th> <th rowspan="2">SR "MM<sup>3</sup>/te"</th> </tr> <tr> <th>UG</th> <th>OC</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Year	Coal "Mte"		OB MM <sup>3</sup>	SR "MM <sup>3</sup> /te"	UG	OC															
Year	Coal "Mte"			OB MM <sup>3</sup>	SR "MM <sup>3</sup> /te"																			
	UG	OC																						
14.8	<b>Statutory obligations vis-à-vis compliance status in a tabular form</b>																							
14.9	Reasons for difference between the planned and actual production levels																							

#### 1.5 PARAMETERS OF APPROVED MINING PLAN VIS-À-VIS PROPOSED MINING PLAN

	<b>Approved Mining Plan</b>	<b>Proposed Mining Plan</b>
15.1	Block Area in "Ha"	
15.2	Block Area Projectised "Ha"	
15.3	Lease area "Ha"	
15.4	Project Area "Ha"	
15.5	Life of the Project "Yrs"	
15.6	Minimum and Maximum Depth of working "m"	

	<i>Parameters</i>	<i>Details</i>
1.5.7	Net Geological Block "Ha"	
1.5.8	Production Target "MTPA"	
1.5.9	Seams Available "As per GR"	
1.5.10	Seams not considered for Mining with Reasons	
1.5.11	Gross Geological Reserve "Mt"	
1.5.12	Net Geological Reserve "Mt"	
1.5.13	Blocked Reserve "Mt"	
1.5.14	Minable Reserve "Mt"	
1.5.15	Extractable Reserves "Mt"	
1.5.16	% of Extraction recovery	
1.5.17	Reserve Depleted (till the base date) Reserves " Mt"	
1.5.18	Balance Extractable reserve "Mt"	
1.5.19	Average Grade	
1.5.20	OB in MMS	
1.5.21	SR MM3/te	
1.5.22	Mining Technology	
1.5.23	Coal Beneficiation envisaged	
1.5.24	Handling of Rejects	
1.5.25	Land use pattern " Ha"	
1	Excavation Area	
2	Top Soil Dump	
3	External Dump	
4	Safety Zone	
5	Other Use	
6	Infrastructure area	
7	Green Belt	
8	Undisturbed Area	
	<b>Total</b>	
1.5.26	<b>Reasons for revision</b>	

## Chapter 2 : Exploration, Geology, Seam Sequence, Coal Quality and Reserve

	<i>Parameters</i>	<i>Details</i>																
<b>2.1</b>	<b>DETAILS OF THE BLOCK</b>																	
2.1.1	Particulars of adjacent blocks: North, South, East, West	North : South:	East: West:															
2.1.2	Location of the Block District / State																	
2.1.3	Area of the Block "Ha"																	
2.1.4	Area of the geological block projected "in Ha" (Area of the geological block considered for liquidation of coal reserve)																	
2.1.5	Balance area yet to be projected "Ha"																	
2.1.6	Likely Reserve in the area yet to be projected "Mte"																	
2.1.7	Cardinal Point Co-ordinates of the non-coal/lignite bearing area/ <u>existing mining lease</u> outside the allotted Geological Coal/Lignite block  (Duly certified in line with para 19 of the Guideline, if fresh mining lease required)	<p align="center"><b>Cardinal Points Co-ordinates of the Proposed area outside the non-coal/lignite bearing area outside the allotted Geological Coal/Lignite block</b></p> <table border="1"> <thead> <tr> <th>ID</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td>2</td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td></td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td></td> <td>° ' " N</td> <td>° ' " E</td> </tr> </tbody> </table>		ID	Latitude	Longitude	1	° ' " N	° ' " E	2	° ' " N	° ' " E		° ' " N	° ' " E		° ' " N	° ' " E
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2.1.8	<p>Certificate of Qualified person/ Accredited Mining Plan preparing agency (MPPA) if the project area is confined within the vested/allotted block boundary/<u>existing mining lease</u> and</p> <p>Where the project area extends beyond the block boundary, a certificate of <b>Qualified person/ Accredited Mining Plan preparing agency (MPPA)</b> should be supported with a certificate of State Government mines and Geology department must be attached, which should specify (a) intent of the state government for grant of lease beyond the vested geological boundary; (b) non-existence of Coal/ Lignite in the area beyond the vested/allotted geological block boundary/<u>existing mining lease</u> to rule out the issue of encroachment and use of coal bearing area (beyond the vested/allotted block boundary/<u>existing mining lease</u>) in the mining plan</p> <p>The Project area, Lease area and geological block area in "Ha" shall also be envisaged</p>	<p align="center"><b>Cardinal Points Co-ordinates of the Proposed Lease Area considered in the Mining Plan</b></p> <table border="1"> <thead> <tr> <th>ID</th> <th>Latitude</th> <th>Longitude</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td>2</td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td></td> <td>° ' " N</td> <td>° ' " E</td> </tr> <tr> <td></td> <td>° ' " N</td> <td>° ' " E</td> </tr> </tbody> </table> <p><b>Note:</b> Certificate should be given on conceptual plan envisaged in the proposed mining plan depicting OB area, infrastructure locations and cardinal point co-ordinates of the lease area, block area, project area.</p> <p>In case the project boundary extends beyond the allotted geological block boundary/<u>existing mining lease</u> certificate of non-occurrence of coal should be clearly shown</p> <p>Certificate should envisage that the Geo-reference Co-ordinates considered for preparation of Mining plan is in line with Vesting/allotment order and does not encroach</p>		ID	Latitude	Longitude	1	° ' " N	° ' " E	2	° ' " N	° ' " E		° ' " N	° ' " E		° ' " N	° ' " E
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	<i>Parameters</i>	<i>Details</i>
		any other adjacent block, and non-coal bearing certificate of the area in case any proposed infrastructure or OB dump is outside the block area.
2.1.9	KML file of the Proposed lease area Project Area and geological block.	<b>Note:</b> Printed copy of the KML file superimposed in the recent (not older than one year from the base date) dated satellite Image duly certified by Accredited Agency should also be attached.  Note: The soft copy of the KML file shall also be part of the Soft copy of the mining Plan.
2.1.10	Whether the proposed project area is confined within the allotted block boundary/ <u>existing mining lease</u> , if not, the reason for deviation from allotted block boundary, may be given. If the project area extends outside the allotted block boundary/ <u>existing mining lease</u> ,	
2.1.11	confirmation about non-occurrence of coal/lignite in the area under reference needs to be furnished	
2.1.12	Type of the Project (Operating / under Implementation) and year of Starting.	
<b>2.2</b>	<b>EXPLORATION, GEOLOGY AND ASSESSMENT OF RESERVE</b>	
2.2.1	Regional geological set up of the area, local geology, structure, stratigraphic sequence, characteristics of the litho-logical units (coal seams /partings/overburden)	(In Maximum 500 Words)
2.2.2	Local geology, Structure, Stratigraphic sequence, Characteristics of the litho-logical units (coal seams /partings/overburden).	(In Maximum 500 Words)
2.2.3	Geological Block Area "Ha"	
2.2.4	Status of Exploration of the block	
2.2.5	Area covered by 'detailed' exploration within the block (sq km)	
2.2.6	Whether entire lease area has been covered by 'detailed' exploration	
2.2.7	No. of boreholes drilled within the block	
2.2.8	Whether any further exploration/study is required or suggested and time frame in which it is to be completed	
2.2.9	Year wise future programme of exploration	
2.2.10	Overall borehole density within the block (no./ sq km) approx	
2.2.11	No of Seams available as per GR (Geological Report)	
2.2.12	Seams not considered for Mining with Reasons	
2.2.13	Dip of the Seam	
2.2.14	Seam wise thickness, depth and reserve	



## Chapter 3: Mining

	<i>Parameters</i>	<i>Details</i>
<b>3.1</b>	<b>MINING METHOD</b>	
3.1.1	Existing method of mining if the mine is under operation	
3.1.2	Proposed method of mining with justification on suitability of method of mining	<ul style="list-style-type: none"> <li>• Seams to be worked. Choice of Mining Method and justification for Optimization of targeted capacity, sequence of mining, production scheduling, equipment configuration etc.</li> <li>• Behavior of coal roof &amp; floor and support system for strata control including, Geo-technical investigations, rock mechanics study carried out already, if any. Scheme of mine development in tandem with production, transport and winding system in underground for coal and rock (if required) and personnel; Sources of stowing material (if applicable)</li> <li>• Brief description of all operation e.g winning, transport, blasting, overburden removal and disposal, Life of the mine furnishing the assumptions made and the detailed computations</li> <li>• <b>Location of Mine Opening:</b> In case of opencast mines location of Access trench &amp; reason for selection of site thereof the mining system (geometry and bench parameters and its sequence of development, along with a drawing) and quarry parameters (surface area, floor area), thickness range of each seam and parting, minimum and maximum depth. Quarry stage plans including OB dumps for 1st year, 3rd year, 5th year, year of achieving rated capacity of the mine, Final year (i.e. at the end of mine life) and post closure subsequently, also indicating the volume of excavation for coal and OB, area of excavation volume of internal and external dump and the area, in hectare, for internal and external dumps and height. Seam wise calendar programme of excavation, timeframe for commencement of Backfilling &amp; justification therefor.</li> <li>• In case of underground mining number and location, length &amp; depth of shafts, inclines, and other mode of entries to be shown in the plan, e.g Shaft 1, Shaft -2 etc.). HFL of the area, gassiness of the seams, Technology tie-ups if any.</li> <li>• Seams to be worked, method of working, optimization of coal roof &amp; floor and support system for strata control including, Geo-technical investigations, rock mechanics study carried out already, if any, Scheme of mine development in tandem with production, extent of working for 1st year, 3rd year, 5th year, year of achieving rated capacity of the mine, Final year (i.e. at the end of mine life) and post closure, (all stages may be marked in distinct color in the working plan of each seam), transport and winding system in underground for coal and rock (if required) and personnel; Sources of stowing material (if applicable)</li> <li>• Adequacy of ventilation system taking into account the</li> </ul>



	<i>Parameters</i>	<i>Details</i>																																																						
		development works with supporting calculations, specifications of Main Mechanical Ventilator, blasting requirements and requirement of explosives, pumping requirements and standby arrangements. <b>(In Maximum 2000 Words)</b>																																																						
3.1.3	Coal production capacity proposed "Mtpa"																																																							
3.1.4	Justification for optimization Coal production capacity	<b>(In Maximum 500 Words)</b>																																																						
3.1.5	Calendar year from which the production will start																																																							
3.1.6	Year of Achieving rated production																																																							
3.1.7	Tentative Coal production Plan "MT"	<table border="1"> <thead> <tr> <th colspan="2">Year</th> <th colspan="3">Coal Production Schedule</th> <th rowspan="2">OB "MM3"</th> <th rowspan="2">SR</th> </tr> <tr> <th>Year of Operation</th> <th>Calendar Year</th> <th>UG</th> <th>OC</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td colspan="2">Up to 31.03.2019</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y-1</td> <td>2019-20</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y-2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y-3</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y-4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Y-5</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p><b>Note: Calendar Plan / Production Plan for the entire life of the mine.</b></p>	Year		Coal Production Schedule			OB "MM3"	SR	Year of Operation	Calendar Year	UG	OC	Total	Up to 31.03.2019							Y-1	2019-20						Y-2							Y-3							Y-4							Y-5						
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3.1.8	<b>Rated Capacity "Mtpa"</b>																																																							
	- By OC																																																							
	- By UG																																																							
	- Overall																																																							
3.1.9	<b>Life of the mine: "Years"</b>																																																							
	- By OC																																																							
	- By UG																																																							
	- Overall																																																							
3.1.10	Whether the proposed external OB dump site is coal/ lignite bearing. If so, whether coal/lignite below waste disposal area is extractable																																																							
3.1.11	Whether negative proving for coal / lignite in the proposed site for OB dump infrastructure has been done.																																																							
3.1.12	Results of any investigation carried out for scientific mining, conservation of minerals and protection of																																																							

	<i>Parameters</i>	<i>Details</i>
	environment, future proposals	
<b>3.1.13</b>	Type of Equipment/ HEMM proposed	

## Chapter 4 : Safety Management

	<i>Parameters</i>	<i>Details</i>
<b>4.1</b>	<b>Safety Management</b>	
4.1.1	<p><b>Important safety aspects:</b> Major Risks and uncertainties to the project viz. Proximity to river, adjacent working, geo-mining disturbances, slope stability and remedial measures suggested.</p> <p>It should also include proposed overall slope of the quarry and OB dump, dump height, strata control, fire and spontaneous heating, gas monitoring, disaster management danger from inrush of water etc</p>	(In Max 500 Words)
4.1.2	<p>A Commitment from the Company Board that entire mining operation will be carried out as per the Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017 and wherever specific permission will be required the company will approach the concerned authorities.</p>	(To be furnished as a Part of Annexure)

## Chapter 5 : Infrastructure Facilities

	<i>Parameters</i>	<i>Details</i>
5.1	Mine infrastructure required e.g. Equipment maintenance planning. Office buildings. Workshop. Power supply arrangement. Water supply etc	<b>(Tabular Form)</b> <i>(Location to be shown in Conceptual Plan/Plates)</i>
5.2.	Power supply & illumination	<i>(Max 500 Words)</i> <i>(Location to be shown in Plates)</i>
5.3	Drainage & Pumping · Assessment of Volume of Water for Pumping. Pumping Capacity and Pump Selection	<i>(Max 500 Words)</i> <i>(Location to be shown in Plates)</i>
5.4	Coal Handling Arrangement Brief detail of the CEIP/ Mode of Dispatch. Coal quality and Coal staking and handling arrangement	<i>(Max 500 Words)</i> <i>(Location to be shown in Plates)</i>
5.5	Coal washing and the proposed handling-disposal of rejects	<i>(Max 500 Words)</i> <i>(Location to be shown in Plates)</i> Annual Raw coal Feed plan and product with reduction in ash% <sub>a</sub> from feed to product must be furnished in a tabular form

## Chapter 6 : Land Requirement

	<i>Parameters</i>	<i>Details</i>																																																																																																																																																																																													
6.1	<b>LAND REQUIREMENT</b>																																																																																																																																																																																														
6.1.1	Total Land requirement for the mine in "Ha"	<i>Break up of pre-mining land type (indicative) and source of data.</i>																																																																																																																																																																																													
		<table border="1"> <thead> <tr> <th colspan="2">Land Type</th> <th>Area</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Tenancy</td> <td>Agricultural</td> <td></td> </tr> <tr> <td>Township</td> <td></td> </tr> <tr> <td>Grazing</td> <td></td> </tr> <tr> <td>Barren Water Bodies</td> <td></td> </tr> <tr> <td>Road Community/other use</td> <td></td> </tr> <tr> <td rowspan="4">Govt Non Forest</td> <td>Agricultural</td> <td></td> </tr> <tr> <td>Township</td> <td></td> </tr> <tr> <td>Grazing</td> <td></td> </tr> <tr> <td>Barren/other use</td> <td></td> </tr> <tr> <td rowspan="2">Forest</td> <td>Reserve</td> <td></td> </tr> <tr> <td>Protected</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>FreeHold</td> <td></td> <td></td> </tr> <tr> <td><b>Total</b></td> <td></td> <td></td> </tr> </tbody> </table>		Land Type		Area	Tenancy	Agricultural		Township		Grazing		Barren Water Bodies		Road Community/other use		Govt Non Forest	Agricultural		Township		Grazing		Barren/other use		Forest	Reserve		Protected					FreeHold			<b>Total</b>																																																																																																																																																									
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<i>Parameters</i>		<i>Details</i>									
	Green field										
	Water Reservoir Near pit										
	1. Convey										
	1 undisturbed Mining right for CG										
	Reservoir										
	1 of head power plant										
	Water harvesting										
	Agricultural land										
	<b>Total</b>										
6.1.3	Surface features over the block area										
6.1.4	No. of villages/Houses to be shifted										
6.1.5	Population to be affected by the project										
6.1.6	Proposed Rehabilitation programme										
<b>6.2</b>	<b>DETAILS OF LEASE</b>										
6.2.1	Status of Lease										
6.2.2	Existing Lease Area "Ha"										
6.2.3	Period for which Mining Lease has been granted/is to be renewed, is to be applied for										
6.2.4	Date of expiry of earlier Mining Lease, if any										
6.2.5	Whether the lease boundary/ required boundary is same as mentioned in the allotment order										
6.2.6	Lease Area (applied/ required) as per the Mining Plan under consideration (Ha)										
6.2.7	Whether the applied lease area falls within the allotted block										
<b>6.2.8</b>	Area (Ha) of lease which falls outside the delineated Block Boundary/Existing Mining Lease										
6.2.9	<b>Details of outside area:</b>										
	Whether forms part of any other coal block										
	Whether it contains any coal/lignite reserves										
	Purpose for which it is										

	<i>Parameters</i>	<i>Details</i>
	required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others (specify)	
6.2.10	<b>Whether some part(s) of the allotted block has not been applied for mining lease.</b>	
	- Total area in Ha of such part(s)	
	- Total reserves in such part(s). (Mt)	
	- Brief reasoning for leaving such part(s)	

## Chapter 7 : Environmental Management

	<i>Parameters</i>	<i>Details</i>
7	<b>ENVIRONMENTAL MANAGEMENT</b>	
7.1	<b>Commitment from the project proponent that the company will comply Environment and Forest Condition stipulated in the respective clearances</b>	



## Chapter 8 : Progressive &amp; Final Mine Closure Plan

	<i>Parameters</i>		<i>Details</i>						
8.1	<b>Land Degradation and restoration Schedule</b>								
8.1.1	Tentative Land Degradation and Technical Reclamation (Cumulative Area "Ha")								
	Year/Stage (Life of the mine plus post closure period)  Up to Base year *	Land Degraded				Technically Reclaimed Area			
		Excav	Dump (Extra 1 Top Soil)	Infra/ others	Total	Backfill	Dump (Extra 1 Top Soil)	Others	Total
	Y-1	19-20							
	Y-3	21-22							
	Y-5	23-24							
	Y-10	28-29							
	Y-15	33-34							
	Y-20								
	Y-25								
	Y-30								
	Y-33*								
	<b>Post Closure</b>								
Y-36									
* - Considering Base year i.e. 2018-19 and life of 33 years in this case									
Note: For the purpose of preparation of Stage plan and action plan for restoration and assessment of life of mine and escrow account, the year in which any activity over the proposed land is envisaged, should be considered as 1 <sup>st</sup> year i.e. <b>First year of development</b> .									
Stages of reclamation and restoration of land should be given for 1 <sup>st</sup> , 3 <sup>rd</sup> , 5 <sup>th</sup> and subsequently every five year for the entire life of the project and for 3 years post closure									
8.1.2	Tentative Biological Reclamation (Cumulative in "Ha")								
	Year/Stage (Life of the mine plus post closure period)  Up to Base year *	Biologically Reclaimed Area					Forest land (Return)	Ln Disturbed: To be left for Public.com Use	Total
		Agriculture	Plantation	Water Body	Public/ Company Use	Total			
	Y-1	19-20							
	Y-3	21-22							
	Y-5	23-24							
	Y-10	28-29							
	Y-15	33-34							
	Y-20								
	Y-25								
Y-30									

		<i>Parameters</i>			<i>Details</i>								
		Y-27											
		Y-30											
		Y-33*											
		<b>Post Closure</b>											
		Y-35											
<p><b>Stages of reclamation and restoration of land should be given for 1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup> and subsequently every five year for the entire life of the project and for 3 years post closure</b></p>													
8.2	<b>Post Closure Water Quality management:</b>	<p align="center"><b>(Max 200 Words)</b>            (Existing water bodies available in the lease hold area, Measures to be taken for protection of the same including control of erosion, sedimentation, siltation, water treatment, diversion of water course if any, Measures for protection of contamination of ground water from leaching etc.)</p>											
8.3	<b>Post Closure Air Quality management</b>	<p align="center"><b>(Max 200 Words)</b></p>											
8.4	<b>Waste Management (Figures in MM3) (Tentative)</b>												
		Year/Stage (Life of the mine plus post closure period)	OB Removal (Cumulative)			External Dump (Cumulative)		Internal Backfilling (Cumulative)		Embankment (Cumulative)			
			Top Soil	OB	Total	Top Soil	OB	Top Soil	OB	Top Soil	OB		
		Up to Base year *											
		Y-1	19-20										
		Y-3	21-22										
		Y-5	23-24										
		Y-10	28-29										
		Y-15	33-34										
		Y-20											
		Y-25											
		Y-30											
		Y-33*											
		<b>Post Closure</b>											
		Y-36											
<p>* - Considering Base year i.e. 2018-19 and life of 33 years in this case</p> <p><b>Stages at 1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup> and subsequently every five year for the entire life of the project and for 3 years post closure</b></p>													

	<i>Parameters</i>	<i>Details</i>				
8.5	<b>Top Soil Management – (Including Action plan for Top Soil management) (Tentative)</b> (All Figures are Cumulative and in MM3)					
	<b>Year/Stage (Life of the mine plus post closure period)</b>	<b>Top Soil Removal Plan</b>	<b>Top Soil Used</b>			
			<b>Spreading Over Embankment</b>	<b>Spreading over Backfill area</b>	<b>Spreading over External OB Dump area</b>	<b>Used in Green Belt area</b>
	<b>Up to Base year *</b>					<b>Total Utilised</b>
	Y-1	19-20				
	Y-3	21-22				
	Y-5	23-24				
	Y-10	28-29				
	Y-15	33-34				
	Y-20					
	Y-25					
	Y-30					
	Y-33*					
	<b>Post Closure</b>					
	Y-36					
	<b>Stages at 1<sup>st</sup>, 3<sup>rd</sup>, 5<sup>th</sup> and subsequently every five year for the entire life of the project and for 3 years post closure</b>					
8.6	<b>Management of Coal Rejects.</b>	<b>(Max 150 Words)</b> <b>Proposal regarding future maintenance and dismantling of structures, slurry pond and rejects</b>				
8.7	<b>Restoration of Land used for Infrastructure</b>	(Infrastructure to be retained and to be dismantled are to be presented in a tabular form envisaging measures to be taken for their physical stability and maintenance for the retained infrastructure facilities)				
8.8	<b>Disposal of Mining Machinery</b>					
8.9	<b>Safety &amp; Security</b>	<b>Measures to be implemented to prevent access to surface opening for underground working, excavation etc</b>				
8.10	<b>Abandonment Cost and Financial Assurance</b>					
8.10.1	<b>Abandonment Cost: Cost of Activities to be taken up for closure of the mine</b>					





## ANNEXURES

<i>Parameters</i>	<i>Details</i>	
I Copy of allotment order/Vesting order.	<b>Mandatory Document</b>	<b>Annexure - I</b>
<p>II Certificate of Qualified person (QP) / Accredited Mining Plan preparing agency (MPPA) if the project area is confined within the vested/allotted block boundary <u>existing mining lease area</u></p> <p>Where the project area extends beyond the block boundary, a certificate of Qualified person (QP)/ Accredited Mining Plan preparing agency (MPPA) should be supported with a certificate of State Government mines and Geology department must be attached, which should specify (a) intent of the state government for grant of lease beyond the vested geological boundary, (b) non-existence of Coal/ Lignite in the area beyond the vested/allotted geological block boundary <u>existing mining lease</u> to rule out the issue of encroachment and use of coal bearing area (beyond the vested/allotted block boundary <u>existing mining lease</u>) in the mining plan</p>	<p style="text-align: center;"><b>Mandatory Document</b></p> <p>Note: Certificate should be given in conceptual plan envisaged in the proposed mining plan depicting OB area, infrastructure locations and geo-reference co-ordinates of the lease area, block area, project area.</p> <p>In case the project boundary extends beyond the allotted geological block boundary certificate of non-occurrence of coal should be clearly shown</p> <p>Certificate should envisage that the Cardinal Point Co-ordinates considered for preparation of Mining plan is in line with Vesting/allotment order and does not encroach any other adjacent block, and non-coal bearing certificate of the area in case any proposed infrastructure or OB dump is outside the block area.</p> <p>The Project area, Lease area and geological block area in "Ha" shall also be envisaged</p>	<b>Annexure - II</b>
III Approval of the Company Board Approval:	<p style="text-align: center;"><b>Mandatory Document</b></p> <p style="text-align: center;"><b>Board approval must Specify:</b></p> <ul style="list-style-type: none"> <li>• Approvals of Mining Plan from the Board of the company giving undertaking for correctness of data used in preparation of Mining Plan;</li> <li>• Details of the <b>Qualified person (QP)/ Accredited Mining Plan preparing agency (MPPA)</b> with certification that the eligibility of Qualified person</li> </ul>	<b>Annexure - III</b>

<i>Parameters</i>	<i>Details</i>
	<p>Accredited Mining Plan preparing agency has been verified.</p> <ul style="list-style-type: none"> <li>• Acceptance of the Mining Plan by the company board with recommendation for approval.</li> <li>• Undertaking that the mine will be developed as per the approval of the mining plan from Ministry of coal and all other approvals, as required will be obtained from relevant authorities</li> <li>• Commitment that entire mining operation will be carried out as per the Statutory provision given under Mines Act 1952, Coal Mine Regulation 2017, EP Act 1986 and FC Act 1980 and wherever specific permission will be required the company will approach the concerned authorities.</li> <li>• Financial Assurance for implementation</li> <li>• Undertaking that the reclamation &amp; rehabilitation work shall be carried out in accordance with the approved Mine Closure Plan and any modification /amendments which may be made in the mine Closure Plan by Ministry of Coal, from time to time</li> <li>• Undertaking that the protective measures contained in the mine closure plan including reclamation and rehabilitation works will be carried out in accordance with the approved mine closure plan and final mine closure plan and undertake to submit a yearly report before 1<sup>st</sup> July of every year to the Coal Controller setting forth the extent of protective and rehabilitative works carried out as envisaged in the approved mine closure plans (Progressive and Final Closure).</li> <li>• Undertaking that they will obtain a mine closure certificate from Coal Controller to the effect that the protective, reclamation and rehabilitation works carried out in accordance with the approved mine</li> </ul>

<i>Parameters</i>		<i>Details</i>	
		closure plan/final mine closure plan and will surrender the reclaimed land to the State Government concerned	
IV	Copy of earlier approval of mining plan	<b>Mandatory Document</b>	<b>Annexure - IV</b>
V	Plan / chart showing schedule of implementation of Mine closure activities (progressive and final closure) with duration of important activities	<b>Mandatory Document</b>	<b>Annexure - V</b>
VI	Non-refundable Application Fee	<b>Proof of the payment</b>	<b>Annexure - VI</b>
VII	Expert-Review Report	<b>Carried out by Accredited Mining Plan Preparing Agency (MPPA)</b>	<b>Annexure - VII</b>
VIII	Other document (if any)		<b>Annexure - ...</b>



## PLANS/ PLATES

I	Location plan	
II	<p>Plan certified by <b>Qualified person (QP) / Accredited Mining Plan preparing agency (MPPA)</b> if the project area is confined within the vested/allotted block boundary and</p> <p>Where the project area extends beyond the block boundary, a Plan certified by <b>Qualified person (QP) / Accredited Mining Plan preparing agency (MPPA)</b> should be supported with a plan with cardinal point co-ordinates duly certified by the State Government mines and Geology department</p> <p><b>Plan in support of Annexure - II</b></p>	<p><b>Plan in support of Annexure - II</b></p> <p><b>Note:</b> Certificate should be given on conceptual plan envisaged in the proposed mining plan depicting OB area, infrastructure locations and cardinal Point co-ordinates of the lease area, block area, project area:</p> <p>In case the project boundary extends beyond the allotted geological block boundary certificate of non-occurrence of coal should be clearly shown.</p> <p>Certificate should envisage that the cardinal point Co-ordinates considered for preparation of Mining plan is in line with Vesting/allotment order and does not encroach any other adjacent block, and non-coal bearing certificate of the area in case any proposed infrastructure or OB dump is outside the block area:</p>
III	KML file of the Proposed lease area, Project Area and geological block.	<p><b>Note:</b> A printed copy of the KML file superimposed in the recent (not older than one year from the base date) dated satellite Image duly certified by Accredited Agency should also be attached</p> <p>The soft copy of the KML file shall also be part of the Soft copy of the mining Plan.</p>
IV	Cadastral plan showing approved block boundary vis-à-vis proposed-existing mining lease & Mine boundary superimposed over it in distinct color, showing land use and infrastructure etc	
V	Geological plan showing all the boreholes drilled and proposed to be drilled showing allotted block boundary and required lease area	
VI	Graphic Litholog	
VII	Surface Plan showing drainage system, Contour at minimum 3m interval, location of BH	
VIII	Conceptual plan showing infrastructure facilities including colony, boundary of mining area, mine entries, roads including road diversion alignment etc	
IX	Tentative land use plan showing land type (Govt., forest and tenancy land)	

	with its data source			
X	Floor contour plan and seam folio plan. ISO-grade plan	Seam	Floor Contour	Seam Folio
XI	X-section showing coal/Lignite seams			
XII	Plan showing existing and proposed surface layout			
	<b>OPENCAST (OC) MINES</b>			
XIII	Plan showing total coal thickness and overburden thickness and stripping ratio	OC		
XIV	Final stage quarry plan showing haul road alignment	OC		
	<b>UNDER GROUND (UG) MINES</b>			
XV	Plan showing mode and location of entries and surface layouts	UG		
XVI	Layout of the panel for each system (like Longwall, Continuous Miner, Bord& Pillar, road header etc )	UG		
XVII	Layout of pillar extraction	UG		
XVIII	Support system	UG		
XIX	Haulage and transport system	UG		

**CLOSURE PLAN**

XX	Post mining land use plan			
XXI	Progressive mine closure plan/ stage plan indicating stages at 1st,3rd, 5th. year of achieving rated capacity of the mine and end of life (showing area, volume, dump height etc for OC and seam-wise layout projects and ventilation system in UG)	Year	Plate No	
		1st		
		3rd		
		5th		
		PRC		
		End of Life		
XXII	Reclamation plan			

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## VAKALATHAMA

BEFORE THE INDIAN CENTRAL ELECTRICITY REGULATORY COMMISSION, AT  
NEW DELHI

PETITION NO. \_\_\_\_\_/MP/2023

IN THE MATTER OF:

NTPC Limited

...Petitioner

Versus

Madhya Pradesh Power Management Company Limited & Ors.

...Respondent

I, Ajay Dua, Authorized Representative of NTPC Limited, the Petitioner in the above mentioned matter do hereby appoint and retain Mr. Sri Venkatesh, Mr. Sahad Bhatia, Mr. Siddharth Inshi, Mr. Abhishek Nongia, Mr. Mohit Gupta, Ms. Himangi Kapoor, Mr. Viveet Kumar, Mr. Nikunj Bhatnagar, Mr. Ayush Sinha, Mr. Harsh Vardhan, Mr. Aditya Vardhan Sharma, Mr. Anant Singh Ubeja, Mr. Kunal Veer Chopra, Ms. Nehal Jain, Mr. Vedant Chaudhary, Mr. Bhavesh Gangadharam, Mr. Ashutosh Kumar Srivastava, Mr. Nihal Bhambhani, Mr. Siddharth Nigotra, Mr. Shivam Kumar, Mr. Kartikay Trivedi, Mr. Anshwyn Singh and Mr. Purnam Bhatnagar, Advocates (SKV Law Offices) to appear, plead and act for me/us in the abovementioned Petition and to conduct and prosecute all proceedings that may be taken in respect thereof and applications for return of documents, enter into compromise and to draw any moneys payable to me/us in the said proceeding and also to appear in all petitions, applications for review before the Central Electricity Regulatory Commission.

Place: *Noida*

DATE: *21-1-23*

Executed in my presence



\*Signature with date

Advocate for the Petitioner

  
Signature of the Party

**MR. SRI VENKATESH**  
Advocate  
B-58, Defence Colony, New Delhi-110024  
Phone No. 9114771818

\*Signature with date

(Name and Designation)

(Address for service on the Counsel for Petitioner)

Sri Venkatesh

B-58, Defence Colony, New Delhi-110024

Phone No. 9114771818

Phone No. 911-4709951-99

Email: [lawoffice@skvlawoffices.com](mailto:lawoffice@skvlawoffices.com)



  
Smt Venkatesh  
(D/015/2008)

  
Sridhar Jothi  
(D/2008/2017)

  
Vinod Kumar  
(D/4063/2019)

  
Nerva Vardhan  
(D/13621/2022)

  
Anurag Kumar Srivastava  
(D/268/2017)

  
Nihal Bhargava  
(D/9517/2017)


  
Shivan Kumar  
(D/3458/2019)

  
Purnima Bhutan  
(D/4057/2022)

  
Aditya Varshan Sharma  
(D/1517/2016)

  
Abhishek Nargis  
(D/2691/2019)

  
Nehal Jain  
(D/1465/2022)

  
Nehal Gupta  
(D/5916/2020)

  
Sallab Bhutan  
(D/2324/2017)

  
Hiranga Kapoor  
(D/1156/2017)

  
Nikun Bhargava  
(D/7122/2022)

  
Anshika Sikha  
(D/8839/2023)

  
Bhavish Gargacharan  
(D/7325/2017)

  
Kartikay Trivedi  
(D/5063/2021)

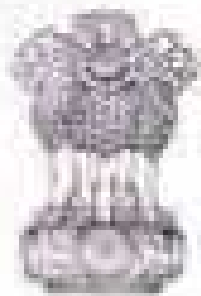
  
Siddhant Rignia  
(D/6858/2019)

  
Anshika Singh  
(D/463/2023)

  
Anam Singh  
(D/2183/2018)

  
Rishi Chhara  
(D/8136/2021)

  
Vidant Chaudhary  
(D/2909/2021)



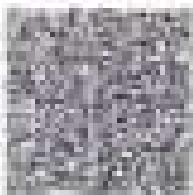
सत्यमेव जयते

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e-Stamp

Certificate No.	1. IN-DL21040200120766U
Certificate Issued Date	2. 20-Apr-2020 07:38 PM
Account Reference	3. BAFACD (P)/2042000 DELHI DELHI
Unique Doc. Reference	4. DUB04-DL04M000000000000000000
Authorized by	5. NTPC Limited
Description of Document	6. Article 48(a) Power of attorney - GPM
Property Description	7. Not Applicable
Consideration Price (Rs.)	8. 0
Buyer Party	9. NTPC Limited
Seller Party	10. Not Applicable
Stamp Duty Paid By	11. NTPC Limited
Stamp Duty Amount (Rs.)	12. 00
	13. 1979/2020



**GENERAL POWER OF ATTORNEY**

Be it known to all that NTPC Limited (A Government of India Company) incorporated under the Companies Act, 1956 having its Registered office at NTPC, Bhasan, SCHEP Complex, 5, Institutional Area, East Road, New Delhi-110 002 (hereinafter called "Company"), do hereby nominate, nominate and appoint Sri Ajay Das, Chief General Manager (Commercial) of the Company as its true and lawful attorney (hereinafter called "Attorney") to do for and on behalf and in the name of the Company all or any of the acts, deeds or things hereinafter mentioned, that is to say:-



*AJAY DAS*

1. To institute, defend, argue and conduct legal cases, sign and verify, please, written statements, petitions and objections, criminal complaints, memorandum of appeal, claims affidavits, applications, replications and pleadings of all kinds and to file them in: Central Electricity Regulatory Commission, Appellate Tribunal for Electricity, State Electricity Regulatory Commission etc., any Courts (whether having original or appellate jurisdiction) Arbitration and other Government or Local Authorities or Regulatory Authorities, Tax Authorities, Tribunals etc.
2. To appear and act in all the Courts (whether original or appellate), before the Taxation Authorities, Central Electricity Regulatory Commission, State Electricity Regulatory Commission, Tribunals including Appellate Tribunal for Electricity, etc., Arbitrators, any office of Govt. or Dist. Board, Municipal Board of notified area or any other local authority.
3. To file and receive back documents, to deposit and withdraw money from Courts, Tribunals, Registrar's Office and other Government or Local Authorities and to issue valid receipts therefor.
4. To apply for and obtain refund of stamp-duty in Court etc. etc.
5. To apply for the impounding of Judicial Official records in any Court, Tribunal, Arbitration, Government office or records maintained by other Authorities.
6. To apply and retain certified copies of judgments, or to obtain documents and papers from any Court, Tribunal, Arbitration, Govt. office or any other Authorities.
7. To issue legal notices and accept services of summons, notices or writs issued by any Court, Tribunal or Arbitration, Govt. office or any other Authority except the Company.
8. To appear or engage any Advocate, Vakil, Pleader, Solicitor or any other legal practitioner or attorney to appear and conduct case proceedings on behalf of the Company and to settle their fees and charges etc.
9. To sub-delegate all or any of the aforesaid powers to officers under him.
10. To compromise, compound or withdraw the cases, suits etc. from any Court, Tribunal, Arbitration, Government or other Authorities.



*Handwritten signature*

- 11. To execute deeds, agreements, bonds and other documents and return-in connection with the affairs of the Company and file them or cause to be filed for Registration, wherever necessary;
- 12. To obtain permissions from Govt. of India / Reserve Bank of India or other Authorities, if necessary;
- 13. Generally to do all lawful acts, necessary for the above mentioned purposes.

The Company hereby agrees to ratify and confirm all and whatsoever the said Attorney shall lawfully do, execute or perform or cause to be done, executed or performed in exercise of the power or authority conferred under and by virtue of this Power of Attorney.

IN WITNESS WHEREOF THE Company in pursuance of the Resolution of the Board of Directors of the Company passed at its Meeting held on 23<sup>rd</sup> October, 2021 and subsequent delegation vide General Power of Attorney dated 9<sup>th</sup> August, 2021 has, under the hand of its Director (Operational) and under the Corporate Seal of the Company, executed this Power of Attorney in favour of Ajay Datta, Chief General Manager (Construction) of the Company on this 13<sup>th</sup> day of July, 2022

Signed for and on behalf of  
NTPC Limited

*Ramesh Babu*  
RAMESH BABU  
Director (Operational)  
NTPC Limited

1011, Jawahar, Jangam Complex,  
T. Jawahar Road, Lucknow, India

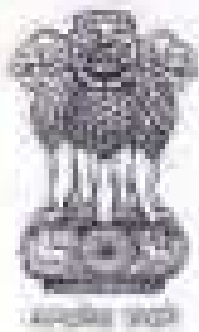
The Corporate Seal of NTPC Limited has been affixed hereto in the presence of the witness and:-

1. *[Signature]*  
S. S. SHARMA  
Senior Manager  
NTPC Limited  
NTPC Jawahar, Jangam Complex,  
T. Jawahar Road, Lucknow, India

2. *[Signature]*  
S. S. SHARMA  
Senior Manager  
NTPC Limited  
NTPC Jawahar, Jangam Complex,  
T. Jawahar Road, Lucknow, India

ATTENDED  
BY  
S. S. SHARMA  
Senior Manager  
NTPC Limited  
13 JUL 2022





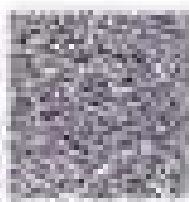
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e-Stamp

Certificate No. \_\_\_\_\_  
 Certificate Issued Date \_\_\_\_\_  
 Account Reference: \_\_\_\_\_  
 Unique Doc. Reference: \_\_\_\_\_  
 Purchased by \_\_\_\_\_  
 Description of Document \_\_\_\_\_  
 Property Description \_\_\_\_\_  
 Consideration Price (Rs.) \_\_\_\_\_  
 First Party \_\_\_\_\_  
 Second Party \_\_\_\_\_  
 Stamp Duty Paid By \_\_\_\_\_  
 Stamp Duty Amount(Rs.) \_\_\_\_\_

IN CLT (2000/2000/0001)  
 GOVERNMENT OF NCT OF DELHI  
 IMPROVEMENT OF HOUSING DELHI (CLD) GP  
 SUBSIDIZED HOUSING SCHEME (IHS) (CLD)  
 NTPC Limited  
 APPLICANT POWER OF ATTORNEY - DPA  
 Not Applicable  
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 (0000)  
 NTPC Limited  
 Not Applicable  
 NTPC Limited  
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**DEED OF REVOCATION OF POWER OF ATTORNEY**

It is known to all concerned that NTPC Limited (A Government of India Company incorporated under the Companies Act, 1956) having its Registered office at NTPC Bhawan, SCOPE Complex, 7, Institutional Area, Lodhi Road, New Delhi-110 002 (hereinafter called "Company") by a General Power of Attorney executed on 30<sup>th</sup> December, 2020 and attested by a Notary Public, appointed Shri Ajay Nataraj, then Chief General Manager (Commercial) of the Company, as its legal attorney

*Handwritten signature*



hereinafter called "Attorney") to do and perform all acts, deeds and things therein  
referred.

WHEREAS Shri Anil Naikyal has represented and been referred from the post of  
Executive Director (Commercial) of the Company with effect from 30<sup>th</sup> April, 2023.

AND WHEREAS it has become necessary and expedient to revoke the powers or  
authority conferred upon Shri Anil Naikyal by the Company under the aforesaid  
General Power of Attorney dated 31<sup>st</sup> December, 2020.

KNOW ALL MEN that by this Deed of Revocation the Company, do hereby cancel  
the said General Power of Attorney dated 31<sup>st</sup> December, 2020 with effect from 30<sup>th</sup>  
April, 2023, absolutely and revoke all powers or authority thereby and hereunder  
given to the said Attorney either expressly or impliedly, to all intents and purposes,  
provided that nothing herein contained shall render invalid or ineffective any act,  
deed or thing lawfully done or caused to be done by the said attorney under and by  
virtue of the powers conferred on him under General Power of Attorney dated 31<sup>st</sup>  
December, 2020 on or before 30<sup>th</sup> April, 2023, by these presents.

IN WITNESS WHEREOF the Company has, under the hand of its Director  
(Operations), executed this Deed of Revocation revoking the General Power of  
Attorney dated 31<sup>st</sup> December, 2020 granted in favour of Shri Anil Naikyal.

Dated this 12<sup>th</sup> day of May 2023.

Signed for and on behalf of  
NTP Limited

AMESH BABU N  
Director (Operations)  
NTP Limited

NTP House, Bunder Bazar,  
Chandernagore, Maharashtra, India - 401 001.

The Common Seal of NTP Limited  
has been affixed hereto by  
the Director of the Company and

A. S. GAJJAR  
Director (Finance)  
NTP Limited

NTP House, Bunder Bazar,  
Chandernagore, Maharashtra, India - 401 001.

AMESH BABU N  
Director (Operations)  
NTP Limited

NTP House, Bunder Bazar,  
Chandernagore, Maharashtra, India - 401 001.



Includes the power to sub-delegate to: Agn. Dir., Chief General Manager (Commercial), NTPC Ltd., working in the Corporate Office at NTPC Bhawan, SCOPE-Corridor, 7, Institutional Area, Indira Road, New Delhi - 110001 to hereby authorize and empower the following executives of NTPC Limited namely (1) Mr. Shivkumar V. Vaidikamma, GM (Commercial); (2) Mr. Anil Kumar Srivastava, GM (Commercial); (3) Mr. Madhav Sagar, GM (Commercial); (4) Mr. Anand Sagar Pandey, AGM (Commercial); (5) Mr. P. B. Varshney, AGM (Commercial); (6) Mr. Ashish Ranjan Mishra, AGM (Commercial); (7) Mr. Santosh Kumar Jaggard, AGM (Commercial); (8) Mr. Uma Shankar Mishra, AGM (Commercial); (9) Mr. Prakash Chaturvedi, AGM (Commercial); (10) Mr. Manoj Kumar Sharma, DGM (Commercial); (11) Mr. Mukhesh Singh Nigam, DGM (Commercial); (12) Mr. V. S. Sharma, AGM (Commercial); (13) Mr. Rajesh Kumar Sharma, AGM (Commercial); (14) Mr. Vinay Singh, DGM (Commercial); (15) Mr. Rajesh Jain, AGM (Commercial); (16) Manendra Singh, AGM (Commercial) to exercise the powers mentioned here under relating to cases before Central Electricity Regulatory Commission, various State Electricity Regulatory Commissions, Appellate Tribunal for Electricity, various High Courts, Supreme Court and other Courts, Forums, Tribunals and Commissions etc.

1. To institute and defend legal cases, sign and verify plaints, written statements, petitions and objections, memorandums of appeal, claims, affidavits, applications, applications and pleading of all kinds and to file them in Central Electricity Regulatory Commission, various State Electricity Regulatory Commissions, Appellate Tribunal for Electricity, various High Courts, Supreme Court and other Courts, Forums, Tribunals and Commissions etc.
2. To appear and defend cases before Central Electricity Regulatory Commission, various State Electricity Regulatory Commissions, Appellate Tribunal for Electricity, various High Courts, Supreme Court and other Courts, Forums, Tribunals and Commissions etc.
3. Generally, to do all legal acts necessary for the above mentioned purposes.

  
 ANIL KUMAR SRIVASTAVA  
 Chief General Manager (Commercial)  
 NTPC Ltd.

Date: 23/05/2022  
 Mr. Anil Kumar Srivastava  
 Chief General Manager (Commercial)  
 NTPC Ltd.

Place: New Delhi  
 Date: 23/05/2022

Witness 1:   
 (Chief General Manager)

Witness 2:   
 Anil Kumar Srivastava  
 Chief General Manager  
 NTPC Ltd.

**ATTENDED**  
  
 ANIL KUMAR SRIVASTAVA  
 Chief General Manager  
 NTPC Ltd.



23/05/2022

**Fee Acknowledgement**  
Counterfoil (Office Copy)

**Transaction Id.:** b73b83b6ef8a0754543b  
**Payment** 18595761312  
**Gateway ID:**  
**Status:** success

**Received From :** NTPC Limited

**The Sum of Rs. :** 300000

**Fee Type** Petition Filing Fees

**Dated :** Nov 22, 2023, 11:00 PM

**Fee Mode** NB

## FORM-1

1.	Name of the Petitioner/Applicant	NTPC Limited
2.	Address of the Petitioner/Applicant	NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road, New Delhi - 110003
3.	Subject Matter	Petition under Regulation 22 of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 read with Regulation 9 (4) of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (Second Amendment) Regulations, 2021 seeking condonation of delay of 22.5 months in declaring Commercial Operation Date of Talaipalli Coal Mine and approval of input price of coal supplied from Talaipalli Coal Mine to end use generating station i.e., Lara STPS for the period from Commercial Operation Date i.e., 01.10.2023 to 31.03.2024.
4.	Petition No., or Application No, if any	Petition No. _____/MP/2023
5.	Details of generation assets (a) Generating station/units (b) Capacity in MW (c) Date of commercial operation (d) Period for which fee paid (e) Amount of fee paid (f) Surcharge, if any	NA
6.	Details of transmission assets (a) Transmission line and sub-stations (b) Date of commercial operation (c) Period for which fee paid (d) Amount of fee paid (e) Surcharge, if any	NA
7.	Fee paid for Adoption of tariff for (a) Generation asset (b) Transmission asset	NA

## FORM-I

8.	Application for the license (a) Trading license (b) Transmission license (c) Period for which paid (d) Amount of fee paid	NA
9.	Fee paid for Miscellaneous Petition	Rs. 300000/-
10.	Fee paid for Interlocutory Application	NA
11.	Fee paid for Regulatory Compliance Petition	NA
12.	Fee paid for Review Application	NA
13.	License fees for Inter-State Trading (a) Category (b) Period (c) Amount of fee paid (d) Surcharge, if any	NA
14.	License fees for Inter-State Transmission (a) Expected/Actual transmission charge (b) Period (c) Amount of fee calculated as a percentage of transmission charge (d) Surcharge, if any	NA
15.	Annual Registration Charge for Power Exchange/OTC Platform (a) Period (b) Amount of turnover (c) Fee paid (d) Surcharge, if any	NA
16.	Details of fee remitted (a) Transaction id, Reference No./ Payment id (b) Date of remittance (c) Amount remitted	b73b83b6ef8a0754543b 22.11.2023 Rs.3,00,000/-
Note: While Sl.No.1 to Sl. No.3 and Sl. No.16 are compulsory, the rest may be filled up as applicable		
		22.11.2023
Signature of the authorized signatory with date		

**DR. ANAND KUMAR AGGARWAL**  
 Sr. Manager (Operations)  
 Add. General Manager (Commercial)  
 P.O. & P. Office, NTPC Limited  
 BPO, NTPC, Sector-16, Gurgaon-122 002 (Haryana)

THE UNIVERSITY OF  
WEST OF ENGLAND

STUDY SUPPORT  
CENTRE

NAME: \_\_\_\_\_  
MATHS NO: \_\_\_\_\_

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20/11/2013



STUDENT SUPPORT CENTRE





Form No. 10  
Date: \_\_\_\_\_

Name: S. S. S. S.  
Address: (Racku)  
City: \_\_\_\_\_  
State: \_\_\_\_\_  
Pin: \_\_\_\_\_

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
State: \_\_\_\_\_  
Pin: \_\_\_\_\_

**NOTE:** This form is to be filled up by the student only. It should be filled up before the start of the examination and submitted along with the answer sheet.

Roll No. \_\_\_\_\_  
Date: \_\_\_\_\_

Signature: \_\_\_\_\_  
Date: \_\_\_\_\_



Name: \_\_\_\_\_  
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State: \_\_\_\_\_  
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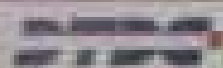
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