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CENTRAL COALFIELDS LIMITED (CCL)

PROJECT REPORT (including Mining Plan) OF CHANDRAGUPT OCP (CAPACITY-15.0 MTY)

NORTH KARANPURA COALFIELD
DIST – HAZARIBAGH (JHARKHAND)

[TEXT & APPENDICES]

MARCH 2020

REGIONAL INSTITUTE-III
CENTRAL MINE PLANNING & DESIGN INSTITUTE LIMITED
(A Subsidiary of Coal India Limited)
GONDWANA PLACE, KANKE ROAD, RANCHI – 834 031,
JHARKHAND, INDIA


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
DCL, AMRAPALI-CHANDRAGUPTA AREA



Coal India Limited
A MAHARATNA COMPANY
Coal Bhawan, 3rd Floor, Core - 2
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CIN - L23109WB1973GOI028844

Ref No.CIL:XI(D):04112:2020: 25212

Dated 23rd June'2020

To
GM (PMD),
Coal India Limited,
3rd Floor, New Town,
Rajarhat, Kolkata - 700 156.

Sub: Minutes of 405th CIL Board Meeting held on 12th June'2020.

Reproduced below is the relevant extracts from the minutes of 405th meeting of Board of Directors of Coal India Limited held on 12th June'2020 at Kolkata with regard to the following item:

"ITEM NO.405.4 (W)

Sub: Project Report for Chandragupt OCP (15 MTY), CCL

- 4.23 Director (Technical), CIL apprised the Committee that this Project Report was deliberated in 104th Empowered Sub-Committee for Appraisal, Evaluation and Approval of Projects held on 5th June'20. The Committee after detailed deliberation recommended to CIL Board to consider the Project Report of Chandragupt OCP including Mining plan for a rated capacity of 15 MTY to be implemented under Mine Developer cum Operator (MDO) mode with an estimated capital of Rs. 973.50 Crores that would be invested by CCL for full life of the project as brought out in the agenda note.

The Board was apprised that competent approval had been accorded to CCL for preparation of NIT, floating of tender and evaluation of technical bid for selection of MDO operator for faster implementation of the project with the instruction that opening of financial bid and subsequent award of work post approval of the Project Report of Chandragupt OCP by CIL Board.

To a query, it was to apprised that RFP of this project would be floated within 30th June'2020.

Company Secretary apprised the Board that in the absence of required number of Independence Directors, Board may consider and accord its in-principle approval to Project Report and 1st year capital expenditure for taking the project forward. As and when the required number of Independence Directors join the Board, the project would be considered for approval.

In view of the above and as recommended by ESC of CIL Board, Board accorded its in-principle approval to Project Report of Chandragupt OCP including Mining plan for a rated capacity of 15 MTY to be implemented under Mine Developer cum Operator (MDO) mode with an estimated capital of Rs. 973.50

M/K


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OCP EAST PROJECT
CCL AREA

Crores that would be invested by CCL from its internal resources for full life of the project as brought out in the agenda note.

FURTHER, Board accorded its approval for 1st year capital expenditure of Rs.307.21 Crores to take the project forward.

FURTHER, as recommended by ESC of CIL, Board advised that after the finalization of MDO partner post bidding process, the financial parameters of the project may be reworked and the revised financial parameters be placed to CIL Board for information."

This is for your information and to take necessary action please.

Yours faithfully,

M Vis
23/6/20

(M. Viswanathan)
Company Secretary

SK
SANJEEV KUMAR
MANAGER
CHANDRAGIPTI TRANSCAST PROJECT
CHANDRAGIPTI TRANSCAST AREA

ITEM NO.408.4 (I)

Sub: Approval of Project Reports by CIL Board for the PRs which have been accorded "in principle" approval with 1st year capital expenditure.

- 4.10 Company Secretary apprised the Board that DPE had earlier stipulated that Maharatna powers can be exercised by the Board if a minimum of four Independent Directors are in the Board. Since CIL Board did not have four Independent Directors w.e.f. 17th November' 19, as recommended by Empowered Sub-Committee for Evaluation Appraisal and Approval of Project Report, CIL Board in its 399th, 402nd and 405th Board meetings accorded 'in principle approval' to 13 Project Reports and also first year capital expenditure to take the Projects forward.

Thereafter, CIL took up the matter with DPE and DPE vide its OM dated 25th June '20 clarified that even in the absence of required number of Independent Directors the Boards of Maharatna, Navratna and Miniratna CPSEs might also exercise the delegated powers till such time the position of Independent Directors are filled by the competent authority subject to the condition that the Govt. Directors, the Finance Director and the concerned Functional Director (s) must be present when major decisions are taken specially when they pertain to investments, expenditure and such decision should preferably be unanimous. This was intimated to Board in its 407th Meeting held on 3rd July'20. He further apprised that in view of the clarification given by DPE, Board might consider and approve these 13 Project Reports to enable the Subsidiaries to implement these Projects.

Hence, as brought out in the agenda note, Board accorded its approval to the following Project Reports as under:

| Sl No | Project Report | Subsidiary | Capacity (MTY) | Total capital investment (Rs. in crore) | Mode of implementation |
|-------|---|------------|-------------------------------|---|--|
| 1 | Revised PR for Bhatadih Expn. OC Mine (including Mining Plan) | WCL | 2.00 | 729.86 | Partial hiring option under cost plus contract |
| 2 | PR of Dinesh (MKD-III) Expn. OCP (including Mining Plan) | WCL | 8.00 | 1184.33 | Total hiring option |
| 3 | PR for Kotre Basantpur Pachmo OCP | CCL | 5.00 | 861.06 | Total outsourcing option |
| 4 | Recast Expn PR of Amrapali OCP | CCL | 25.00 (Peak Capacity -35 MTY) | 5136.15 | East Section Departmental and West Section Outsourcing |


SANJEEV KUMAR
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CHANDRAGUPTA
CCL, 4th FLOOR
1ST PROJECT

| | | | | | |
|----|---|------|---------------------------------|---------|---|
| 5 | RPR of Magadh Expn. OCP | CCL | 51.00 (Peak Capacity -70 MTY) | 7254.37 | Quary-I outsourced and Quary-II Departmental |
| 6 | RCE of Khadia Expn OCP (4 to 10 MTY) Completion Report of RCE of Khadia Expn OCP (4 to 10 MTY) | NCL | 10.00 | 793.32 | RCE prepared for approved option of PR i.e. Partial OB outsourcing option |
| | | | | 796.85 | |
| 7 | PR of Tikak West Expn OCP | NEC | 0.40 | 349.92 | Total Outsourcing |
| 8 | Expansion PR for Jhanjra UG | ECL | 5.00 (Peak Capacity - 5.48 MTY) | 1922.24 | Equipment hiring option |
| 9 | PR for Shyamsundarpur UG (incl. Sarpi Unit) | ECL | 1.59 | 672.39 | Equipment hiring option |
| 10 | PR for Baroud OC Expn | SECL | 10.00 / | 2309.80 | Total Outsourcing option |
| 11 | PR for Balaram Expansion OCP | MCL | 15.00 | 3504.21 | Partial Outsourcing |
| 12 | PR for Sanghmitra OCP (including Mining Plan) | CCL | 20.00 | 1694.74 | MDO Mode |
| 13 | PR for Chandragupt OCP (including Mining Plan) | CCL | 15.00 (Peak Capacity - 20 MTY) | 973.50 | MDO Mode |

ITEM NO.408.4 (K)

Sub: Procurement of 96 nos., 240T Rear Dumpers along with spares and consumables for 96 months (12 months warranty period + 84 months thereafter) for Gevra (84 nos.) and Kusmunda (12 nos.) projects of SECL.

- 4.11 Director (Technical), GM (EED) and GM (MM), CIL apprised the Board, the details of the proposal as under :-

A Global e-Tender was floated for the requirement. Against the Global Tender, four bids from M/s. J. V. Gokal & Co. Pvt. Ltd., Mumbai (on behalf of M/s. OJSC "BELAZ", Belarus), M/s. Tata Hitachi Construction Machinery Co. Pvt. Ltd., Bengaluru (on behalf of M/s. Hitachi Construction Machinery Co. Ltd., Japan), M/s. Liebherr India Pvt. Ltd., Kolkata (on behalf of M/s. Liebherr Mining Equipment Newport News Co., USA) and M/s. GMMCO Ltd., Kolkata (on behalf of M/s. Caterpillar Inc., USA) were received and all the four bids were found to be techno-commercially acceptable. After opening of price bids, Reverse Auction was conducted and the lowest price for both the projects was received from M/s. J. V. Gokal & Co. Pvt. Ltd., Mumbai for Belaz make Dumper Model 75306 (net power 1742 kW). The case was considered by a duly constituted Tender Committee.

(Signature)
SANJEEV KUMAR
MANAGER

CHANDRAGUPTA OPENCAST PROJECT
OCL, AMRAPALI-CHANDRAGUPTA AREA



A Miniratna Company

सेंट्रल कोलफील्ड्स लिमिटेड

(भारत सरकार का एक उपक्रम)

प्रोजेक्ट & प्लानिंग विभाग

दरभंगा हाउस, राँची

CENTRAL COALFIELDS LIMITED

(Govt. of India Undertaking)

PROJECT & PLANNING DEPARTMENT

DARBHANGA HOUSE, RANCHI 834001,

PBX # 0651 2360606 (10 lines),

0651 2360123 (5 lines),

P&P Deptt.- 0651 2360513

Ref No: GM (P&P)/Chandragupt OCP 12020/ 3060-64 / E-649507 Date 23.12.2020

सेवा में,

श्रीमान महाप्रबंधक महोदय,
आमपाली एवं चन्द्रगुप्त क्षेत्र, सीसीएल।

Sub: Hard copy of approved Project Report of Chandragupt OCP (15 MTY) in MDO mode.

Dear Sir,

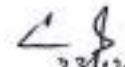
Enclosed herewith please find one hard copy of approved Project Report of Chandragupt OCP (15 MTY) in MDO mode, sent by CMPDI, Ranchi.

This is for kind information and needful, please.

Thanking you.

Encl: As above

आपका विश्वासी


23/12/2020
महाप्रबंधक

परियोजना एवं योजना विभाग,
सीसीएल मुख्यालय, राँची

प्रतिलिपि (सादर सूचनार्थ).

1. तकनीकि निदेशक (संचालन), सीसीएल.
2. तकनीकि निदेशक (परियोजना एवं योजना), सीसीएल।

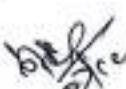
प्रतिलिपि:

- 1) स्टाफ ऑफिसर(पी&पी), आमपाली एवं चन्द्रगुप्त क्षेत्र,
- 2) मोडल ऑफिसर, आमपाली एवं चन्द्रगुप्त क्षेत्र, परियोजना एवं योजना विभाग मुख्यालय।

प्रमुख आमपाली क्षेत्र

GM(M-A)/CD/RR

DATE: 23/12/2020

PA to GM
To keep in safe
custody


सुनील



सीएमपीडीआई
cmpdi
A Mini Ratna Company

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CENTRAL COALFIELDS LIMITED (CCL)

PROJECT REPORT (including Mining Plan) OF CHANDRAGUPT OCP (CAPACITY-15.0 MTY)

NORTH KARANPURA COALFIELD
DIST – HAZARIBAGH (JHARKHAND)

[TEXT & APPENDICES]

(Approved by 408th Board of CIL held on 04.08.2020)

MARCH 2020

REGIONAL INSTITUTE-III
CENTRAL MINE PLANNING & DESIGN INSTITUTE LIMITED
(A Subsidiary of Coal India Limited)
GONDWANA PLACE, KANKE ROAD, RANCHI – 834 031,
JHARKHAND, INDIA


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRITAPAL CHANDRAGUPTA AREA

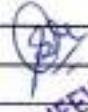
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 CHANDRAGUPTA OPENCAST PROJECT
 CCL, ANHAPALLI-CHANDRAGUPTA AREA

SUMMARISED DATA

| Sl. No. | Particulars | Unit | Value | | |
|-------------------------------|--|--------------------------------------|---------------------------------------|----------------|------------------------|
| A. | GENERAL | | | | |
| 1 | Name of Project | | Chandragupt OCP (15.0MTY) | | |
| 2 | Type of Project | | New | | |
| 3 | Name of Coalfield / Company | | N.K. Coalfield/Central Coalfield Ltd. | | |
| 4 | Nearest Railway Station from project | Name km | Ray 37km | | |
| 5 | Nearest National / State Highway / Approach road | Name km | State Highway 7 5km | | |
| B. | GEOLOGICAL | | | | |
| 1 | Name of geological blocks considered | Name | Pachra & Pachra South | | |
| 2 | Area of the geological blocks | sq. km | 15.41 Sq. km | | |
| 3 | Borehole Density within blocks | BHs / sq.km | 10.6 | | |
| 4 | Description of all coal seams within block | | | | |
| Stratigraphic Sequence | Thickness (m) | No. of borehole intersections | Net Geological Reserves (MT) | Remarks | |
| | <i>Min.</i> | <i>Max.</i> | | | |
| Soil/ Alluvium | 0 | 12 | | | |
| Barakar above IVD | 16.76 | 26.95 | | | |
| Seam-IVD | 0.6 | 1 | 55 | - | Reserve not considered |
| Parting | 1.58 | 4.94 | | | |
| Seam-IVC | 0.23 | 0.84 | 61 | - | Reserve not considered |
| Parting | 2.41 | 6 | | | |
| Seam-IVB | 0.6 | 1.8 | 68 | 8.957 | |
| Parting | 5.97 | 11.27 | | | |
| Seam-IVA | 0.16 | 2.43 | 74 | 11.028 | |
| Parting | 0.4 | 8 | | | |
| Seam-IV | 3.87 | 10.11 | 76 | 73.126 | |
| Parting | 1.59 | 9.8 | | | |
| Seam-III(Top) | 2.74 | 4.71 | 53 | 31.185 | |
| Parting | 0 | 26.16 | | | |
| Seam-III(Bottom) | 1.71 | 5.31 | 67 | 41.439 | |
| Seam-III(Combined) | 7.83 | 10.11 | 30 | 29.985 | |
| Parting | 2.69 | 23.4 | | | |
| Seam-II(Top) | 0.27 | 4.96 | 111 | 33.293 | |
| Parting | 0.34 | 6.63 | | | |
| Seam-II(Bot) | 1.75 | 8.12 | 126 | 85.788 | |
| Parting | 1.49 | 23.48 | | | |
| Seam-I(Top) | 6.18 | 13.29 | 132 | 211.868 | |
| Parting | 1.28 | 5.50 | | | |
| Seam-I(Bottom) | 3.1 | 14.69 | 140 | 182.591 | |
| TOTAL | | | | 709.260 | |
| C. | TECHNICAL | | | | |
| 1 | Area of the proposed mine block | sq. km | | 13.32 | |
| 2 | Borehole density within mine area | BHs/sq. km | | 11.8 | |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPT OCP - MDO MODE
 CCL AMBAPALI-CHANDRAGUPTA AREA

| 3 | Mine parameters: Extent along strike (Avg.) Extent along dip (Avg.) | km km | 2.38 5.36 | | | | |
|----------------------|--|--|----------------------------|-------------------------|-----------------|------------------------|---------------------|
| 4 | Description of coal seams proposed to be worked along with the parting details | | | | | | |
| Name of seam | Thickness range considered (m) | Av. Thickness / Parting Thickness (m) | Av. Grade (C.V.) K. Cal/Kg | Av. gradient (1 in ...) | Depth range (m) | Mineable Reserves (Mt) | Volume of OB (Mcum) |
| Top OB | 4.00-144.62 | 29.94 | | | | | 411.04 |
| Seam-IVB | 0.68-1.80 | 1.06 | 3560-4770 | 15 | 4.23-141.5 | 8.37 | |
| Parting | 5.69-11.27 | 8.48 | | | | | 50.46 |
| Seam-IVA | 0.16-2.43 | 1.29 | 2935-5450 | 15 | 3.8-148 | 10.74 | |
| Parting | 0.40-8.00 | 4.25 | | | | | 137.73 |
| Seam-IV | 3.87-10.11 | 6.25 | 3690-5545 | 15 | 4.91-159 | 60.11 | |
| Parting | 1.59-9.80 | 5.34 | | | | | 58.19 |
| Seam-IIIT | 2.74-4.71 | 3.26 | 4085-5420 | 15 | 5.4-169 | 24.35 | |
| Parting | 0.00-26.16 | 5.50 | | | | | 15.44 |
| Seam-IIIB | 1.71-5.31 | 3.76 | 3379-5440 | 15 | 4.9-171 | 35.14 | |
| Seam-IIIC | 7.83-10.11 | 7.84 | 3620-4860 | 15 | 4.9-183 | 18.87 | |
| Parting | 2.69-23.40 | 11.48 | | | | | 73.68 |
| Seam IIT | 0.27-4.96 | 1.93 | 2940-5305 | 15 | 5-197 | 24.95 | |
| Parting | 0.34-6.63 | 5.05 | | | | | 52.41 |
| Seam IIB | 1.75-8.12 | 4.74 | 3140-4685 | 15 | 5-214 | 66.02 | |
| Parting | 1.49-23.48 | 11.50 | | | | | 129.44 |
| Seam IT | 6.18-13.29 | 10.09 | 3335-5110 | 15 | 5-240 | 149.17 | |
| Parting | 1.28-5.50 | 4.19 | | | | | 66.96 |
| Seam IB | 3.10-14.69 | 7.92 | 3130-4395 | 15 | 6-250 | 129.57 | |
| Total Coal OB | | | | | | 527.30 | 995.34 |
| 5 | Av. Stripping Ratio | m ³ /t | | 1.89 | | | |
| 6 | Method of Mining | Opencast by Shovel-Dumper, S.M. - Dumper Combination | | | | | |
| 7 | Target Output | | | | | | |
| | Normative production capacity (at 100%) | Mt | | 15.00 | | | |
| | Peak production | Mt | | 20.00 | | | |
| | Production capacity (at 85%) | Mt | | 12.75 | | | |
| 8 | Year of achieving Target Production (from zero date) | | | 6 th Year | | | |
| 9 | Year of start of Internal Dumping | | | 4 th Year | | | |
| 10 | Production Phasing (from zero date upto target year) | Mt | | | | | |
| | Year | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| | Coal (Mt) | 2.80 | 4.50 | 8.00 | 11.00 | 13.00 | 15.00 |
| | OB (Mcum) | 7.39 | 10.89 | 15.37 | 17.57 | 19.16 | 21.34 |
| 11 | Total Mine Life (at Nom. production capacity) | Years | | 41 | | | |
| | Pre-construction period | Years | | Nil | | | |
| | Construction period | Years | | Nil | | | |
| | Production build-up period | Years | | 6 | | | |
| | Production period | Years | | 32 | | | |
| | Tapering / mine closure period | Years | | 3 | | | |

SANJEEV KUMAR
MANAGER
CHANDRAGUPT OCP
CCL: MDO MODE

TEXT


SANJEEV KUMAR
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CHODDRAKUNTA OPENCAST PROJECT
OCL, ANHAPALLE, CHODDRAKUNTA AREA

MINING PLAN


SANJEEV KUMAR
MANAGER
CHANDRASHUKTA OPENCAST PROJECT
INDIA



CHAPTER-I INTRODUCTION

1.1 Background of the Project Report:

The Pachra Block and Pachra South Geological Block lies in North Karanpura Coalfield of CCL command area. Both the blocks are adjacent and share common boundary. The area of the Pachra Block is 7.88 Sq. Km. and of Pachra South Block is 7.30 sq. km. The total area of the blocks is 15.18 sq. km.

The Blocks shares boundary with Non-CIL blocks in Eastern and Northern side in North Karanpura Coalfield. The Barki River flows in western side of the blocks. The Chandragupt OCP has been planned to exploit the coal of these blocks. The Amrapali OCP boundary is in the western side of the Barki River.

1.2 Agency wise Exploration Status :

Pachra Block - Total explored area is 7.88 Sq Km (6.94 Sq Km being coal bearing area).

| Particulars | Year of Drilling | Mererage (m) | No. of Bore holes |
|-------------|------------------|--------------|-------------------|
| GSI | 1968-69 | 294.51 | 1 |
| CMPDI | 1991-95 | 9670.30 | 83 |
| Total | | 9964.81 | 84 |

Borehole Density (per sq km) – 12.

Net geological reserves within the block are estimated at 271.612 MT of coal and 327.751 Mcum of overburden at a stripping ratio of 1.2 cum/te.

Pachra South Block - Total explored area is 7.30 Sq Km.

| Particulars | Year of Drilling | Meterage (m) | No. of Bore holes |
|-------------|------------------|--------------|-------------------|
| CMPDI | 1994 | 382.90 | 2 |
| CMPDI | 1992-97 | 12852.15 | 78 |
| Total | | 13235.05 | 80 |

Borehole Density (per sq km) – 11.

Net geological reserves within the block are estimated at 437.648 MT of coal and 873.765 Mcum of overburden at a stripping ratio of 2 cum/te.

1.3 Present Status of the mine/project:

Coal mining activity has not yet started in these blocks. Mining activity in the adjoining block to the west of Barki River, namely Amrapali OCP is undergoing. The block is covered by different land types viz., forest, tenancy, GMK, GMA and JJ.


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CCL, AMRAPALI, CHANDRAGUPTA AREA
R/S, CMPDI

1.4 Salient feature of present PR (Capacity, Capital, etc.)

The normative production of the project is 15.0 MTY of G-11 grade coal. The present report envisages the implementation of project in MDO Mode where Expenditure heads are as follows:

| CCL | MDO |
|--|---|
| <ul style="list-style-type: none"> • Land • Railway siding • Vehicles for Departmental Manpower • Prospection & Boring (GR) • R&R expenditure • PR & EMP preparation | <ul style="list-style-type: none"> • Residential & service building for MDO Manpower • Residential & service building for Departmental Manpower • HEMM • Other than HEMM • Furniture & Fittings for MDO Manpower • Furniture & Fittings for Departmental Manpower • Vehicles for MDO Manpower • Prospection & Boring (Production support) • Capital Outlay in Mines other than R&R part • Roads & culverts • Water supply & Sewerage |

1.5 Difficulties and constraints in mining with associated risk.

- a) The proposed mining block is surrounded by non-CIL coal bearing area. The adjoining blocks are as follows:
 1. in the north: Sisai Block
 2. in the East: Chatti-Bariatu / Chatti-Bariatu South Block
 3. in the South: Peko Block (unexplored)
 4. In the west: perennial river Barki

as such there is severe space constraint for overburden dumping.
- b) The maximum depth of the mine is 240m and at places the dip (average 4-6 deg) increases to 11 deg. The proposed mining block is encountered by 18 (eighteen) numbers of faults of variable throw (maximum 90m).
- c) The infrastructural facilities like railway siding, roads, colony, power supply, etc are almost non-existent. Due to paucity of non-coal bearing area within the block, infrastructure facilities (such as initial OB dump, railway line, etc) are proposed to be shared with Amrapali OCP located in the west of the Barki River. A high level bridge over Barki River needs to be constructed to connect the proposed OCP with Amrapali OCP.
- d) Chotki River flowing through the proposed quarry needs to be diverted.
- e) Villages are located within the proposed quarry which needs to be shifted and rehabilitated.


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL AREA, CHANDRAGUPTA AREA
 R/O, CMPDI

CHAPTER-II

PROJECT SITE INFORMATION

2.1 Location

The Chandragupt Opencast project falls within Pachra and Pachra South geological blocks. It is located in the northern part of North Karanpura Coalfields and is included in survey of India toposheet no. 73A/13 and 73E/1 in Hazaribagh district of Jharkhand. Pachra Integrated project is bounded between latitude 23°51'30" to 23°54'45"N and longitude 85°01'15" to 85°03'15".

Area of the Project: 14.95 sq km.

Limiting Boundaries of the Projectised Area:

- Northern Boundary: Incrop of Seam-IB.
- Southern Boundary: Southern geological block boundary of Pachra South Block.
- Eastern Boundary: Geological block boundary between Pachra Block and Chatti Bariatu block and Pachra South Block and Chatti Bariatu South block.
- Western Boundary: Leaving a surface barrier of 60m from 'Barki River' and along the incrop of Seam IB.

2.2 Accessibility and Communication:

The State Highway No 7 connecting Tandwa with Hazaribagh (40km) via Barkagaon passes 4km south of the block. The SH-7 (starting from Bijupara) is connected to NH-75 (starting from Ranchi). The Tandwa village is about 92km from Ranchi. However, the block remains isolated from Tandwa during rainy season due to non-existence of bridge over Barki River flowing through the western boundary of the block. The block is approachable during dry season through a kutchra road of about 6km from Kerandari village.

The nearest railway station is Ray, which is at a distance of 37 km from the block on the Barkakana-Dehri-on-sone loop line of North-Eastern Railways. Tori is another railway station, located south-west of the block at a crow-fly distance of about 55 km on the above loop line.

2.3 Climate and Rainfall Data:

The climate is tropical with severe summer. The temperature during summer (March-June) goes as high as 45°C. Summer days are hot with dusty wind, but nights are generally pleasant. The minimum summer temperature is 20°C. The winter (November-February) is cold and the minimum temperature recorded is 1°C. The Rainy season is generally from June to October. The total rainfall an average is 1055mm, 60% of which takes place in rainy season only.

2.4 Topography with drainage pattern of area:

The block is characterized by more or less flat terrain with gentle undulations. The maximum elevation of 500m is observed near borehole no CNKP-88 & CNKP-91. The minimum elevation is about 445m on the bank of the Barki River.

The drainage of the block is controlled by the Barki River flowing north to south along the western boundary. There is another small river called Chotki River flowing north-east to south-west that finally join Barki River near borehole no CNKP-174. There are other small nallas flowing across the block that finally join Barki River. The Barki river after meeting with Chundru River near Tandwa village flows further southwards in the name of Garhi river which is an important tributary of west to east flowing Damodar river.

2.5 Present Land Use Pattern

The details of the pre-mining land use pattern within the proposed leasehold boundary of the Chandragupt OCP (15MTY) are given in the following table:

| Sl No | Type of land | Area (in Ha) |
|-------|-----------------|--------------|
| 1 | Forest Land | 663.90 |
| 2 | Non-Forest Land | |
| a. | GMK Land | 332.44 |
| b. | Tenancy land | 498.66 |
| | TOTAL | 1495.00 |

The Land details are tentative and likely to be revised after actual survey by CCL. The Project affected Families (PAF) have been roughly estimated as 500. The actual number of Project affected Families (PAF) and Project affected person (PAP) will be assessed after Socio-Economic Survey.


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CHAPTER-III GEOLOGY AND DEPOSIT APPRAISAL

3.1 Background/Introduction-

After the nationalization of Coal Industry and spurt in demand for power grade coal in the country large areas were identified in North Karanpura coalfield for exploration and exploitation of coal deposits at a shallower depth. With this background, the detail exploration in Tandwa 'C' block of Geological Survey of India was taken up by CMPDI in June 1991. Subsequently this block was divided into four sub-blocks viz. Pachra, Chatti-Bariatu, Pachra South and Chatti-Bariatu South. The present endeavor is limited to Pachra and Pachra South block.

3.1.1 Different GRs prepared at different period for the blocks under reference:

| Sl No | Name of the GR | Year of preparation of GR |
|-------|---|---------------------------|
| 1 | Geological report, Pachra Block | Feb, 1995 |
| 2 | Geological report on Pachra South Block | July, 1997 |

3.1.2 Block Boundaries

| Boundary | Pachra Geological Block | Pachra South Geological Block |
|----------|------------------------------------|--|
| Northern | Limit of Sisai block | Limit of Pachra block |
| Eastern | Limit of Chatti-Bariatu block | Limit of Chatti-Bariatu south block |
| Southern | Along fault F1 | Roughly at the 250m depth line of lowermost Barakar seam |
| Western | Barki River flowing north to south | Barki River flowing north to south |

3.1.3 Any other relevant details

The regional exploration activities of the GSI in the NK Coalfields resulted into identification of a series of quarriable blocks. Tandwa 'C' block is one of them. Pachra and Pachra South are two of the four blocks falling in Tandwa 'C' block

3.2 Exploration Status

3.2.1 Number of boreholes and meterage drilled by the various agencies and period of drilling thereof, in the block area


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Table 3.1: Summary of Exploratory Boreholes

| Year | Agency | Block Name | Number of boreholes | Meterage |
|---------|--------|--------------|---------------------|----------|
| 1 | 2 | 3 | 4 | 5 |
| 1968-69 | GSI | Pachra | 1 | 294.51 |
| 1991-95 | CMPDI | Pachra | 83 | 9670.30 |
| 1994 | CMPDI | Pachra South | 2 | 382.90 |
| 1992-97 | CMPDI | Pachra South | 78 | 12852.15 |

3.2.2 Density of boreholes in block area

Seam-wise number of borehole intersection, area & borehole density

| Seam | No of boreholes encountered | Area (sq km) | Borehole density (per sq km) |
|----------------|-----------------------------|--------------|------------------------------|
| IVD | 62 | 6.01 | 10.3 |
| IVC | 70 | 6.12 | 11.4 |
| IVB | 81 | 6.48 | 12.5 |
| IVA | 88 | 7.10 | 12.4 |
| IV | 91 | 8.97 | 10.1 |
| III Top | 67 | 7.36 | 9.1 |
| III Bottom | 83 | 8.81 | 9.4 |
| III Combined | 38 | 4.26 | 8.9 |
| II Top | 132 | 12.74 | 10.4 |
| II Bottom | 146 | 13.22 | 11.0 |
| I Top & Middle | 157 | 13.93 | 11.3 |
| I Bottom | 167 | 14.58 | 11.5 |
| K1 | 14 | | |
| K2 | 30 | | |
| K3 | 31 | | |
| K4 | 30 | | |
| K5 | 33 | | |

3.2.3 Number of boreholes analysed band by band and seam overall proximate and ultimate analysis for projectised area only.

| | Number of boreholes |
|---------------------------------|---------------------|
| Band by band analysis | 119 |
| Seam overall proximate analysis | 133 |
| Ultimate Analysis | 20 |
| Ash fusion range & HGI | 19 |
| Ash Analysis | 12 |


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3.3 Geology and Structure of Block area

3.3.1 Brief geological setting along with generalized sequence within the block/coalfield

The North Karanpura Coalfield forms a prominent east-west trending valley between Hazaribagh plateau in the north and Ranchi plateau in the south, The Aswa Pahar in the south-east separates the North and South Karanpura Coalfields by east-west elongated metamorphic patch. However, they are interconnected near Bachra and Hindegir by a narrow tongue of Talchir outcrops. On the eastern side, North Karanpura Coalfield is separated from the West Bokaro Coalfield by a narrow stretch for metamorphic rocks having several outliers of Talchir Formation. In the west, it is separated by a stretch of about 20 kms wide metamorphic belt from Auranga Coalfield.

The generalized stratigraphic sequence of North Karanpura Coalfield as established has been given below:-

3.3.2 Coal bearing formations and their general behaviour

Geological Succession of North Karanpura Coalfield

| Period | Group | Sub-Group | Formation | Lithology |
|---------------------------------|----------------|---------------------------|-------------------|--|
| Recent | - | - | Alluvium | Detrital & alluvial soil/sub-soil. |
| Jurassic | - | Co-ovals of Rajmahal Trap | Igneous intrusive | Dolerite and Mica Peridotite. |
| Triassic | Upper-Gondwana | - | Mahadeva | Massive coarse to conglomeratic, feldspathic & ferruginous sandstone, shale intercalations. |
| Upper permian to Lower Triassic | Lower Gondwana | - | Panchet | Yellowish to white coarse grained sandstone, red, chocolate coloured plastic clays. In the upper part yellowish friable sandstone whereas in the lower part greenish yellow sand/silt stone. |
| Upper Permian | - | - | Raniganj | Fine to medium grained quartzo-feldspathic & quartzitic sandstone often micaceous, interbanded shale & sandstone, carbonaceous shale and thin coal seams. |
| | | Damuda | Barren Measures | Dark shale, sandy micaceous shale with sideritic interbanded shale and sandstones. |
| | | | Barakar | Conglomerate, sandstone, shale, intercalation siltstone & shale, carbonaceous shale, fire clay, coal seams. |

| Period | Group | Sub-Group | Formation | Lithology |
|------------------------|-------|-----------|--------------|--|
| | | | Karharbari | Dark mottled sandstone with occasional shale bands, fireclay, chocolate coloured clays and coal seams. |
| Permo-Carboniferous | - | - | Talchir | Rikba plant beds, boulders, conglomerates, varvites, sandstone, tilloids and tillites. |
| -----Unconformity----- | | | | |
| Pre-Cambrian | - | - | Metamorphics | Granite gneisses, pegmatite, phyllites, mica schist, amphibolites and quartzites. |

3.3.3 Sequence of coal seams and partings within the block area

Table 3.2: Sequence and brief description of Coal Seams in the block

| Seam | Area of Development (sq. km) | Thickness range (m) | C.V. (kcal/kg) | Borehole intersection (s) | Borehole density | Geological Reserve (MT) |
|-------------------|------------------------------|---------------------|----------------|---------------------------|------------------|-------------------------|
| Soil/ Alluvium | | 0-12 | | | | |
| Barakar above IVD | | 16.76-26.95 | | | | |
| Seam-IVD | 525.23 | 0.60-1.0 | 3290-4995 | 55 | 10.3 | |
| Parting | | 1.58-4.94 | | | | |
| Seam-IVC | 513.1 | 0.23-0.84 | 2825-4960 | 61 | 11.4 | |
| Parting | | 2.41-6 | | | | |
| Seam-IVB | 544.42 | 0.6-1.80 | 3560-4770 | 68 | 12.5 | 8.957 |
| Parting | | 5.97-11.27 | | | | |
| Seam-IVA | 597.83 | 0.16-2.43 | 2935-5450 | 74 | 12.4 | 11.028 |
| Parting | | 0.40-8.00 | | | | |
| Seam-IV | 721.42 | 3.87-10.11 | 3690-5545 | 76 | 10.1 | 73.126 |
| Parting | | 1.59-9.80 | | | | |
| Seam-III (Top) | 613.8 | 2.74-4.71 | 4085-5420 | 53 | 9.1 | 31.185 |
| Parting | | 0.00-26.16 | | | | |
| Seam-III (Bottom) | 730.04 | 1.71-5.31 | 3379-5440 | 67 | 9.4 | 41.439 |


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| Seam | Area of Development (sq. km) | Thickness range (m) | C.V. (kcal/kg) | Borehole intersection (s) | Borehole density | Geological Reserve (MT) |
|---------------------|------------------------------|---------------------|----------------|---------------------------|------------------|-------------------------|
| Seam-III (Combined) | 191.68 | 7.83-10.11 | 3620-4860 | 30 | 8.9 | 29.985 |
| Parting | | 2.69-23.40 | | | | |
| Seam-II (Top) | 1033.42 | 0.27-4.96 | 2940-5305 | 111 | 10.4 | 33.293 |
| Parting | | 0.34-6.63 | | | | |
| Seam-II (Bot) | 1067.46 | 1.75-8.12 | 3140-4885 | 126 | 11 | 85.788 |
| Parting | | 1.49-23.48 | | | | |
| Seam-I (Top) | 1108.99 | 6.18-13.29 | 3335-5110 | 132 | 11.3 | 211.868 |
| Parting | | 1.28-5.50 | | | | |
| Seam-I (Bottom) | 1133.15 | 3.10-14.69 | 3130-4395 | 140 | 11.5 | 182.591 |

3.3.4 Structural setting within the project area

The Pachra Integrated block comprises Barren measure, Barakar, Karharbari and Talchir formations. The Karharbari and Barren measure outcrop in northern, central and southern part of the block. Talchir do not cropout in the block. The outcrop of Barakar formations is the most potential and hosts all coal horizons. The predominant rock types of Barakar formations are sand stone, followed by shale, intercalation of shale and sand stone, carbonaceous horizons including coal seams, clays, etc.

3.3.5 Dip and Strike

The strike of the strata varies widely within the block. In the Pachra Block the strike is roughly east to west with southerly dip of 3-15deg except in the south eastern part where it has increased to 10-15deg. The dip varies from 3-6deg in eastern and central part. However steeper dips of 10-15deg are observed in the south eastern part of the block. In the Pachra South Block also the strike is roughly east to west with southerly dip. The dip varies from 3-5deg in northern part which becomes steeper (10-15deg) in the southern part of the block.

3.3.6 Faults and their characteristic features –

The two geological blocks under consideration has been traversed by 18 no. of faults.

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Brief Description of Faults in the Pachra block

| Fault | Location | General Trend of fault trace | Amount of throw & direction | Evidence |
|-------|--|------------------------------|-----------------------------|---|
| F1 | Continues from Amrapali block and forms the southern limit of the block. | NW-SE | North easterly (10-40m) | Based on stratum contours & CNKP-117 |
| F3 | Continues from Amrapali block and runs in the northern part of the block | E-W | Northerly (2-50m) | Encountered in boreholes CNKA-401, 412 & CNKP-155 |
| F4 | Runs almost parallel to F3 | E-W | Northerly (15-53m) | Topographic expression in NE of the block |
| F5 | Runs almost parallel to F3 | E-W | Northerly (15-25m) | Based on stratum contours |
| F6 | Runs almost parallel to F1 | NW-SE | North easterly (5-25m) | Based on stratum contours |
| F7 | Runs almost parallel to F3 | E-W | Northerly (10-20m) | Based on stratum contours |
| F8 | Runs parallel to F3 in northern part | E-W | Northerly (0-20m) | Based on stratum contours |
| F9 | Runs in the north eastern part of the block. | NW-SE | South westerly (15m) | Based on stratum contours |

Brief Description of Faults in the Pachra South block

| Fault | Location | General Trend of fault trace | Amount of throw & direction | Evidence |
|-------|---|------------------------------|-----------------------------|---------------------------------------|
| F1 | Continues from Amrapali block and forms the northern limit of the block | NW-SE | North easterly (10-40m) | Encountered in borehole CNKP-117. |
| FS2 | Originates from F1 near BH CNKP-57 to CNKP-123 | NW-SE | North easterly (0-10m) | Encountered in borehole CNKP-86. |
| FS3 | Continues from Amrapali block between BH CNKP-249 and 56 | E-W | Northerly (20m) | Based on stratum contours. |
| FS4 | Continues from Amrapali block between BH CNKP-122, 295 and 109 | E-W | Northerly (10-30m) | Omission of Seam-IB CNKP-109 and 290. |
| FS5 | Originates from FS4 near BH CNKP-288 and extends upto CNKP-292 | NW-SE | North easterly (0-10m) | Omission of Seam-IIT in CNKP-251. |
| FS6 | Continues from Amrapali block in the south central part of the block | E-W | Northerly (20m-90m) | Omission of Seam-II in CNKP-251. |

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| Fault | Location | General Trend of fault trace | Amount of throw & direction | Evidence |
|-------|--|------------------------------|-----------------------------|-----------------------------------|
| FS7 | Originates from FS6 near BH CNKP-115. | NW-SE | Southerly (0-20m) | Omission of Seam-IIT in CNKP-118. |
| FS8 | Originates from FS6 near BH CNKP-67. | E-W | Northerly (10-40m) | Based on stratum contours. |
| FS9 | Originates from FS10 near BH CNKP-245. | E-W | Northerly (10m) | Based on stratum contours. |
| FS10 | Originates near western boundary between BH CNKP-254 and CNKP-334 | E-W | Northerly (0m-25m) | Based on stratum contours. |
| FS11 | Originates near western boundary west of BH CNKP-255 in the southern part. | NW-SE-EW | Northerly (0m-20m) | Based on stratum contours. |

3.3.7 Presence of dyke, sills (igneous intrusive), etc.

A dolerite dyke having roughly 1.76km length running from borehole no CNKP-149 to CNKP-155 has been noticed in the north part of the property. It has slight curvilinear trend and runs almost E-W. Its width in the eastern part is generally 3-4m which has thickened to around 10m in the west.

Fire clay horizons in three small isolated pockets (near KT-4, CNKP-12, 14, 16 & 17; CNKP-1 & 3; CNKP-21) have been noticed having a thickness range of 0.84m to 1.84m.

Surface burning has been recorded in 5 boreholes (CNKP-15, 46, 186 & 86, 118). The maximum depth of burning as recorded in CNKP-15 is 18.49m.

3.4 Description of Coal Seams

Four coal seams from Seam-I to Seam-IV of Barakar formation of the NK Coalfield occur in the Pachra Integrated block. In addition few split seams also occur in the block. Altogether, 12 no of seams viz., Seam-I Bottom, Seam-I Top, Seam-II Bottom, Seam-II Top, Seam-III Bottom, Seam-III Top, Seam-III Combined, Seam-IV, Seam-IVA, Seam-IVB, Seam-IVC and Seam-IVD occur within the blocks.

The Karharbari seams from K1 to K5 have been encountered but are generally less than 0.5m in thickness, except K5 which has a thickness of around 1.5-2.0m in localized area near the northern block boundary.

3.4.1 Important coal seams of the project area and their general behavior

The most potential coal seams of the block from thickness point of view are Seam-I Bottom, Seam-I Top, Seam-II Bottom, Seam-III Bottom, Seam-III Top, Seam-III Combined and Seam-IV.

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The incrop of coal seams run almost east to west. The coal seams of the block are non-coking. Although the quality data of Seam-I Bottom and Seam-I Top indicates semi to weekly coking, but due to high ash content (>35%), these seams has also been placed as non-coking coal.

3.4.2 Description of Individual coal seams of the project area:

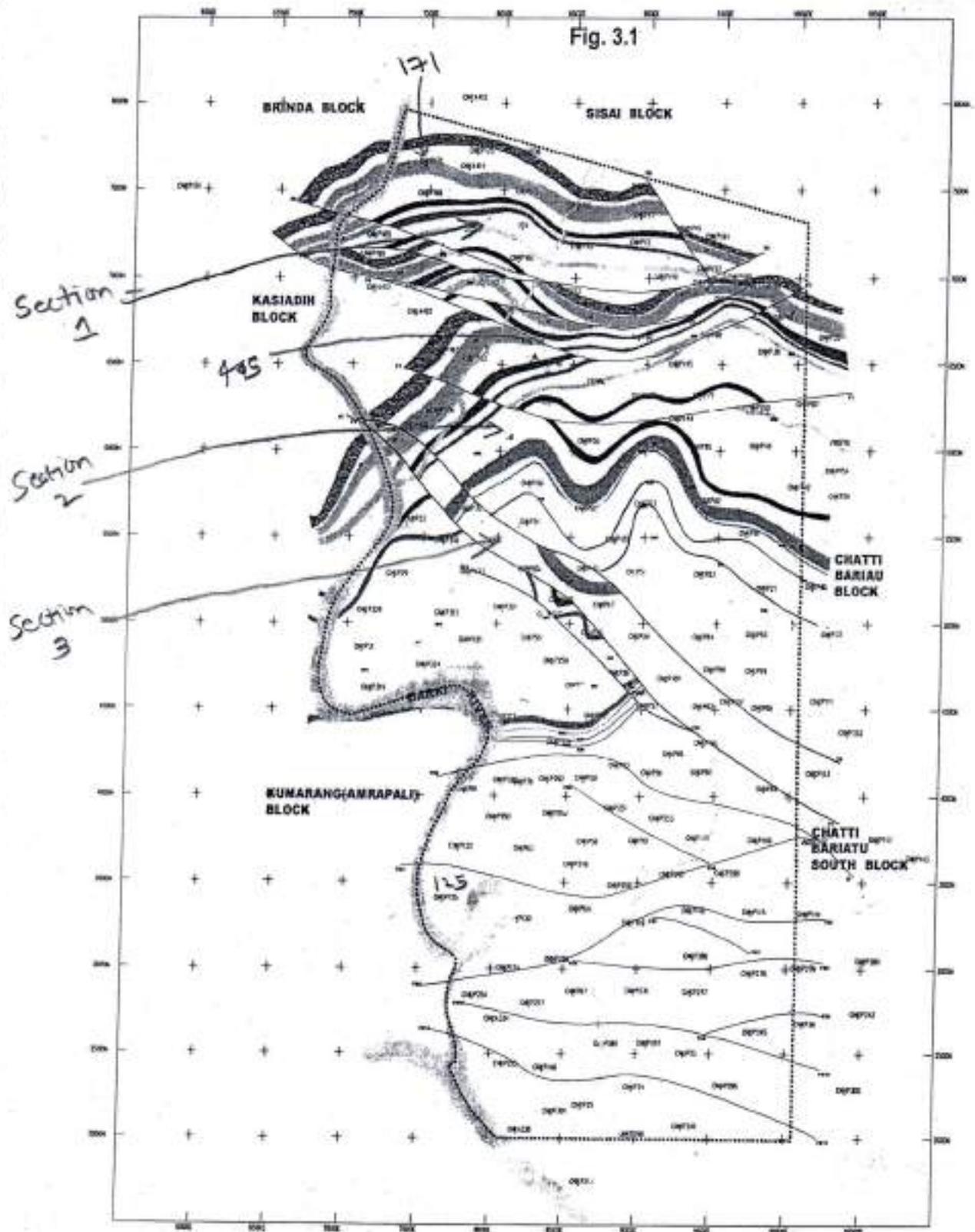
3.4.2.1 Details of splitting

Seam I is splitted into Seam I Bot and Seam I Top. I Bottom is the bottommost potential coal seam of the block. It incrops in the northern part of the property. Seam II is splitted into Seam II Bot and Seam II Top. The incrop runs almost parallel to the incrop Seam I Top. Seam III is splitted into Seam III Bot and Seam III Top. It has merged in the western part of the property where it has been named as III combined. Seam IV is splitted into Seam IV, IVA, IVB, IVC and IVD.

The details of incrop of each seam is shown in the geological plan of the combined blocks of Pachra and Pachra South. (Ref Fig No 3.1).


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Fig. 3.1



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3.4.4.2 Roof and floor characteristics

| Coal Seam | Floor characteristics | Roof characteristics |
|-----------|---|--|
| IVB | Generally composed of carbonaceous shale or sandy shale | Shale or sandy shale. |
| IVA | Generally composed of carbonaceous shale and sandy shale. | Carbonaceous shale or shale. |
| IV | Immediate floor is generally shale or sandy shale. | Roof is carbonaceous shale or sandy shale. |
| III Top | Immediate floor is generally shaly sandstone or medium grained sandstone. | Roof is carbonaceous shale or sandy shale. |
| III Bot | Immediate floor is generally shale, sandstone and carbonaceous shale. | Roof is sandy shale or medium grained sandstone. |
| III Comb | Carbonaceous shale, sandy shale, grey shale and fine to medium grained sandstone. | Carbonaceous shale, fine to medium grained sandstone and grey shale. |
| II Top | Immediate floor is generally shale, sandy shale and medium grained sandstone. | Roof is sandy shale or carbonaceous shale. |
| II Bot | Floor is generally composed of carbonaceous shale and sandy shale. | Roof is carbonaceous shale or shale. |
| I Top | Immediate floor is generally sandy shale or fine grained sandstone. | Immediate roof is generally carbonaceous shale followed by fine to coarse grained sandstone. |
| I Bot | Immediate floor is generally carbonaceous shale. | Fine grained to medium grained sandstone. |

3.4.2.3 Burning of coal seams

Surface burning has been noticed in the block near the borehole CNKP15, 46, 136, 86 and 180. The maximum depth of burning as recorded in CNKP15 is 18.49m. The burning is probably due to spontaneous combustion of coal in the geological past and was controlled mainly by the then water table. In the burning zone the rocks are characterized by whitish to pinkish clay, fused sandstone and shale and soil with either grey or white in colour.


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3.4.2.4 Quality parameters:

| Ultimate Analysis on Dmmf basis | Grade (Incl. bands) | Calorific Value K.Cal/kg | Proximate Analysis on 60% RH & 40Deg C (including bands) | | | Dirt Band % | Coal Seam/ Parting |
|---------------------------------|---------------------|--------------------------|--|-----------|-----------|-------------|--------------------|
| | | | M% | Ash% | VM | | |
| 84.1 | D-G | 3560-5010 | 3.8-10.4 | 25.2-44.6 | 21.0-25.3 | 12-15 | IVB |
| 4.9-5.3 | | | | | | | Parting |
| 84.3 | D-UNG | 2935-5450 | 3.7-8.5 | 22.7-52.6 | 17.9-24.4 | 15-20 | I VA |
| 4.6-5.2 | | | | | | | Parting |
| 84.9 | D-G | 3690-5545 | 3.2-8.4 | 22.4-45.5 | 20.2-26.5 | 8-10 | IV |
| 4.5-5.3 | | | | | | | Parting |
| 85.2 | D-F | 4085-5420 | 2.6-8.6 | 25.8-40.7 | 20.6-26.6 | 5-10 | III Top |
| 4.4-5.2 | | | | | | | Parting |
| 85.2 | D-G | 3379-5440 | 2.7-8.6 | 24.0-46.5 | 20.4-26.8 | 8-10 | III Bot |
| 4.6-5.3 | | | | | | | Parting |
| 81.1 | E-G | 3620-4860 | 2.8-7.0 | 31.9-42.1 | 20.8-23.6 | 10-15 | III Comb |
| 4.5-5.3 | | | | | | | Parting |
| 85.8 | D-UNG | 2940-5305 | 1.9-9.6 | 23.5-55.0 | 20.0-26.6 | 8-10 | II Top |
| 4.7-5.3 | | | | | | | Parting |
| 85.8 | E-UNG | 3140-4885 | 1.4-7.1 | 28.2-52.6 | 18.1-24.7 | 18-20 | II Bot |
| 4.7-5.6 | | | | | | | Parting |
| 86.1 | E-G | 3335-5110 | 1.5-7.4 | 30.8-49.6 | 20.1-26.5 | 18-20 | I Top |
| 4.6-5.6 | | | | | | | Parting |
| 79.8 | F-UNG | 3130-4395 | 1.2-7.0 | 35.9-51.7 | 19.0-23.8 | 15-20 | I Bot |
| 4.7-5.7 | | | | | | | Parting |

3.4.2.5 Details of dirt bands and their general behavior.

| Coal Seam | No of Dirt Bands | Combustible Dirt Band | | No of Dirt Bands | Non-Combustible Dirt Band | |
|-----------|------------------|-------------------------|-----------|------------------|---------------------------|-----------|
| | | Cumulative Thickness of | Dirt Band | | Cumulative Thickness of | Dirt Band |
| IVB | 1 | 0.05-0.10 | 0.1 | 0-0.10 | Nil | |
| I VA | 2-3 | 0.30-0.35 | 0-1 | 0-0.29 | 0-0.15 | |
| IV | 1-2 | 0.3-0.5 | 0-1 | 0-0.26 | 0-0.15 | |
| III Top | 2-3 | 0.1-0.3 | 0-1 | 0-0.15 | 0-0.15 | |
| III Bot | 1-2 | 0.1-0.3 | 0-1 | 0-0.26 | 0-0.15 | |
| III Comb | 1-4 | 0.4-1.0 | 0-3 | 0-0.69 | 0-0.69 | |
| II Top | 1-2 | 0.1-0.2 | 0-1 | 0-0.06 | 0-0.06 | |
| II Bot | 3-6 | 0.6-1.2 | 0-1 | 0-0.39 | 0-0.39 | |

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| Coal Seam | Combustible Dirt Band | | Non-Combustible Dirt Band | |
|-----------|-----------------------|-----------------------------------|---------------------------|-----------------------------------|
| | No of Dirt Bands | Cumulative Thickness of Dirt Band | No of Dirt Bands | Cumulative Thickness of Dirt Band |
| I Top | 4-6 | 1.0-1.5 | 0-3 | 0-0.5 |
| I Bot | 2-6 | 0.5-1.5 | 0-4 | 0-0.84 |

3.5 Geological Reserves

The Reserve Estimation has been carried out for all the potential coal seams, viz., Seam-I Bottom, Seam-I Top, Seam-II Bottom, Seam-II Top, Seam-III Bottom, Seam-III Top, Seam-III Combined, Seam-IV, Seam-IVA, Seam-IVB, Seam-IVC and Seam-IVD have not been considered as their thickness is less than 1m.

3.5.1 Brief methodology adopted for reserve estimation

Isochore method of reserve estimation has been employed for each seam. The volume of reserves for individual areas between the isochore lines were multiplied with the corresponding specific gravity of the coal seam to get the "gross" geological reserve. A deduction of 10% was made from this to get the "net" geological reserve. Vertical excavation was considered for estimation.

3.5.2 Net Geological Reserves within the block:

Table 3.5: Depth-wise Geological Reserve

| SEAM | Depth-wise Geological Reserve | | | | | | TOTAL |
|----------|-------------------------------|--------|---------|---------|---------|------|---------|
| | DEPTH (in m) | | | | | | |
| | <50 | 50-100 | 100-150 | 150-200 | 200-250 | >250 | |
| IVB | 0.00 | 0.21 | 3.77 | 3.82 | 0.97 | 0.08 | 8.957 |
| IVA | 0.00 | 0.98 | 4.54 | 4.42 | 2.02 | 0.08 | 11.028 |
| IV | 0.00 | 8.36 | 20.06 | 24.62 | 19.33 | 0.75 | 73.126 |
| III Top | 0.00 | 4.50 | 6.68 | 10.38 | 9.31 | 0.31 | 31.185 |
| III Bot | 0.32 | 9.55 | 7.96 | 12.44 | 10.73 | 0.45 | 41.439 |
| III Comb | 0.00 | 13.09 | 12.18 | 3.84 | 0.88 | 0.00 | 29.985 |
| II Top | 1.26 | 12.63 | 5.47 | 7.54 | 6.14 | 0.22 | 33.293 |
| II Bot | 5.44 | 30.43 | 20.03 | 16.53 | 12.91 | 0.45 | 85.788 |
| I Top | 25.28 | 67.90 | 37.40 | 46.46 | 33.38 | 0.95 | 211.868 |
| I Bot | 27.03 | 51.79 | 32.29 | 39.22 | 31.07 | 0.69 | 182.591 |
| TOTAL | 59.32 | 199.43 | 150.39 | 169.26 | 126.73 | 3.98 | 709.26 |


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Table 3.6: Grade-wise Geological Reserve

| SEAM | GRADE | | | | | |
|----------|-------|--------|--------|--------|------|---------|
| | D | E | F | G | UNG | TOTAL |
| IVB | 0.00 | 1.69 | 7.17 | 0.10 | 0.00 | 8.957 |
| IVA | 0.12 | 0.63 | 3.85 | 6.38 | 0.05 | 11.028 |
| IV | 3.56 | 59.47 | 9.96 | 0.14 | 0.00 | 73.126 |
| III Top | 0.87 | 25.41 | 4.91 | 0.00 | 0.00 | 31.185 |
| III Bot | 0.30 | 9.10 | 31.45 | 0.59 | 0.00 | 41.439 |
| III Comb | 0.00 | 7.32 | 22.57 | 0.10 | 0.00 | 29.985 |
| II Top | 0.40 | 8.61 | 20.84 | 3.44 | 0.00 | 33.293 |
| II Bot | 0.00 | 0.96 | 27.63 | 57.19 | 0.01 | 85.788 |
| I Top | 0.00 | 1.71 | 174.54 | 35.62 | 0.00 | 211.868 |
| I Bot | 0.00 | 0.00 | 79.86 | 102.73 | 0.00 | 182.591 |
| TOTAL | 5.25 | 114.90 | 382.76 | 206.29 | 0.06 | 709.260 |

3.6 Recommendation- Pachra and Pachra South block are both potential quarriable block in the northern part of the North Karanpura Coalfield with a total coal reserve of 709.26MT. The coal is usually inferior in quality, generally represented by 'F' grade.

3.6.1 Future exploration requirement – To further improve the fault, seam incrops interpretation in the Blocks during coal exploitation, few boreholes may be required to precisely locate their incrop. About 700m in Pachra block and about 1000m in Pachra South Block of drilling will be required.

3.6.2 Utility of coal – On account of being high in moisture and ash content and non-caking bituminous type, the coal from the blocks are suitable for thermal power generation, brick burning or for local house hold use.

3.7 Any other relevant issues – There is no bridge on Barki River flowing close to Tandwa village which completely disrupts communication network with the block. The kutchra road connecting the block from Kerandari village is also a constraint in approachability during rainy season due to non-existence of bridge/culvert on the nala flowing roughly 1km North of Kerandari village.


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CHAPTER-IV

MINE BOUNDARY, RESERVES AND MINE LIFE

4.1 Introduction

The Project Report for Chandragupt OCP proposes to exploit the coal seams from Seam I to Seam IV based on the "Geological Report, Pachra Block, North Karanpura Coalfield" prepared in Feb 1995 and "Geological Report, Pachra South Block, North Karanpura Coalfield" prepared in July 1997 for a rated capacity of 15.0 MTY of ROM coal to meet the growing demand of power grade coal from CCL / N.K. Coalfield, in order to cater the galloping needs of coal for Power sector in respect to linkage for new Power Station in the Public and Private sectors. The parameters of the opencast minefield and the technical condition of its development make it feasible by to produce 15.0 MT of ROM coal per annum with normal technical indices i.e., deployment of equipment, strike length of the quarry, annual advances of the faces, etc.

Ten numbers of mineable coal horizons, namely Seam-IB, Seam-IT, Seam-IIB, Seam-IIT, Seam-IIIB, Seam-IIIC, Seam-IIIT, Seam-IV, Seam- IVA & IVB are occurring within this mining block. The Seam-IB is the base seam of the quarry.

The mineable reserves within the proposed quarriable block have been estimated as 527.30MT of coal corresponding to a volume of OBR of 995.34 Mcum at an average stripping ratio of 1.89 cum/te. The life of the project is estimated as 41 years for a rated output of 15.0 Mtes of 'G-11' grade coal per annum.

4.2 Mine Boundaries:

a) Northern Boundary:

The northern floor boundary of the quarry has been fixed along the incrop of the seam-IB in the Pachra Geological Block.

b) Eastern Boundary:

The eastern boundary has been fixed along the geological block boundary between Pachra Block and Chatti Bariatu block and Pachra South Block and Chatti Bariatu South block leaving 7.5m of inter-quarry boundary.

c) Western Boundary:

The western surface boundary has been fixed leaving a minimum surface barrier of 60m from 'Barki River' and along the incrop of Seam IB. An embankment with a top RL of +465m has been proposed between Barki River and western surface boundary as a flood protection measure.

rainy season. It may be mentioned that the HFL for Barki River is +455m as indicated by villagers of the area.

d) Southern Boundary:

The southern surface boundary has been fixed leaving a barrier of 100m from the southern geological block boundary of Pachra South Block.

4.3 Mineable Reserves:

The quarry boundaries have been maximized to the extent possible and almost entire geologically explored area of Pachra and Pachra South mining block has been considered for mining up to the base seam-IB and the extractable reserves have been maximized to produce coal @ 15.00 MTY within the proposed boundaries of the quarries.

Seamwise Details of Mineable Reserves:

| Name of seam | Area considered in Ha. | Thickness variation 'm' | Net Geo. Reserve (of Geological Block) (MT) | Mineable Reserve (MT) |
|--------------|------------------------|-------------------------|---|-----------------------|
| Seam-IVB | 544.42 | 0.6-1.80 | 8.957 | 8.37 |
| Seam-IVA | 597.83 | 0.16-2.43 | 11.028 | 10.74 |
| Seam-IV | 721.42 | 3.87-10.11 | 73.126 | 60.11 |
| Seam-IIIT | 613.80 | 2.74-4.71 | 31.185 | 24.35 |
| Seam-IIIB | 730.04 | 1.71-5.31 | 41.439 | 35.14 |
| Seam-IIIC | 191.68 | 7.83-10.11 | 29.985 | 18.87 |
| Seam-IIT | 1033.42 | 0.27-4.96 | 33.293 | 24.95 |
| Seam-IIB | 1067.46 | 1.75-8.12 | 85.788 | 66.02 |
| Seam-IT | 1108.99 | 6.18-13.29 | 211.868 | 149.17 |
| Seam-IB | 1133.15 | 3.10-14.69 | 182.591 | 129.57 |
| Total | | | 709.260 | 527.30 |

Section wise sector wise Mineable Reserves:

The calendar programme has been drawn by dividing the whole mining block into three sections namely Section-1, Section-2 & Section-3. To achieve the targeted capacity of 15MTY at the earliest, all the three sections are proposed to be opened concurrently. The details of the sections are as follows:

Section-1: It falls within Pachra Block and is bounded in the north, east & west by the northern, eastern & western boundary of the Pachra Integrated OCP respectively, whereas the southern boundary has been restricted to the upthrow Fault F3 (throw of upto 50m). For reserve estimation, it has been sub-divided into 8 (eight) sectors. The sector-wise mineable reserve is as follows:

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(All Fig in MT)

| SECTOR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | TOTAL |
|--------|------|------|------|------|------|------|------|------|-------|
| COAL | 1.98 | 1.86 | 4.16 | 5.63 | 7.34 | 5.10 | 7.46 | 8.39 | 41.93 |
| IVB | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IVA | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IV | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IIIT | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.02 |
| IIIB | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.06 | 0.23 | 0.20 | 0.54 |
| IIIC | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| IIT | 0.00 | 0.00 | 0.03 | 0.46 | 0.63 | 0.37 | 0.13 | 0.19 | 1.80 |
| IIB | 0.03 | 0.06 | 0.51 | 0.94 | 0.99 | 0.62 | 0.92 | 0.89 | 4.95 |
| IT | 0.29 | 0.84 | 1.98 | 2.41 | 2.79 | 1.83 | 3.14 | 3.32 | 16.60 |
| IB | 1.66 | 0.96 | 1.65 | 1.82 | 2.87 | 2.21 | 3.05 | 3.79 | 18.02 |

Section-2: It falls in the southern part of Pachra Block. It is bounded in the east & west by the eastern & western boundary of the Pachra Integrated OCP respectively, whereas the Fault F3 forms the northern boundary and Fault F1 forms the southern boundary. For reserve estimation, it has been sub-divided into 9 (nine) sectors. The sector-wise mineable reserve is shown below:

(Fig in MT)

| SECTOR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | TOTAL |
|--------|------|------|------|------|-------|-------|-------|-------|-------|--------|
| COAL | 0.91 | 1.53 | 4.89 | 0.65 | 17.64 | 15.97 | 21.60 | 17.42 | 88.03 | 168.62 |
| IVB | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 0.30 | 2.14 | 2.54 |
| IVA | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.06 | 0.41 | 0.52 | 3.02 | 4.03 |
| IV | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 2.35 | 2.66 | 10.33 | 15.69 |
| IIIT | 0.00 | 0.00 | 0.00 | 0.20 | 0.47 | 0.62 | 1.28 | 0.98 | 4.68 | 8.23 |
| IIIB | 0.01 | 0.01 | 0.10 | 0.26 | 1.60 | 1.32 | 1.56 | 1.16 | 5.74 | 11.77 |
| IIIC | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.63 | 1.34 | 1.21 | 4.65 | 7.87 |
| IIT | 0.06 | 0.02 | 0.11 | 0.05 | 0.78 | 0.71 | 1.07 | 0.82 | 3.78 | 7.41 |
| IIB | 0.14 | 0.16 | 0.57 | 0.11 | 3.06 | 2.48 | 3.17 | 2.28 | 11.56 | 23.53 |
| IT | 0.00 | 0.24 | 2.48 | 0.04 | 7.29 | 5.60 | 6.07 | 4.46 | 22.62 | 48.80 |
| IB | 0.69 | 1.10 | 1.62 | 0.00 | 4.37 | 4.19 | 4.26 | 3.02 | 19.51 | 38.77 |

Section-3: It falls in the Pachra South Block. It is bounded in the east, west & south by the eastern, western & southern boundary of the Pachra Integrated OCP respectively, whereas the Fault F1 forms the northern boundary. For reserve estimation, it has been sub-divided into 16 (sixteen) sectors. The sector-wise mineable reserve is as follows:

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(Fig in MT)

| SECTOR | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | TOTAL |
|--------|-----|-----|------|------|------|-----|-----|-----|------|------|------|------|------|------|------|------|--------|
| COAL | 4.2 | 10 | 23.9 | 12.4 | 10.9 | 7.8 | 6.1 | 7.5 | 12.4 | 26.5 | 14.0 | 13.8 | 20.2 | 18.5 | 71.9 | 54.7 | 316.75 |
| IVB | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.3 | 0.7 | 0.5 | 0.6 | 0.2 | 0.4 | 0.8 | 1.3 | 0.4 | 5.8 |
| IVA | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.6 | 0.6 | 0.6 | 0.3 | 0.5 | 1.0 | 1.5 | 0.8 | 6.9 |
| IV | 0.8 | 2.6 | 1.9 | 1.1 | 1.0 | 1.2 | 1.1 | 1.2 | 2.8 | 3.4 | 2.7 | 2.5 | 2.7 | 3.3 | 10.6 | 5.6 | 44.5 |
| IIIT | 0.0 | 1.1 | 0.4 | 0.2 | 0.1 | 0.1 | 0.4 | 0.3 | 0.9 | 1.4 | 0.9 | 0.9 | 1.0 | 0.9 | 4.8 | 2.7 | 16.1 |
| IIIB | 0.1 | 0.9 | 1.0 | 0.3 | 0.2 | 0.1 | 0.5 | 0.4 | 0.9 | 1.8 | 1.1 | 1.2 | 1.5 | 1.1 | 6.8 | 5.0 | 22.9 |
| IIIC | 0.0 | 0.0 | 0.7 | 0.8 | 1.4 | 1.5 | 1.0 | 0.6 | 0.8 | 1.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.1 | 0.0 | 11.0 |
| IIT | 0.4 | 0.7 | 2.0 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.5 | 1.2 | 0.6 | 0.6 | 0.9 | 0.7 | 3.2 | 2.6 | 15.5 |
| IIB | 0.9 | 1.4 | 3.9 | 1.2 | 1.3 | 0.9 | 1.0 | 0.8 | 1.3 | 3.3 | 1.6 | 1.6 | 2.4 | 1.9 | 7.4 | 6.7 | 37.5 |
| IT | 1.2 | 2.0 | 8.2 | 4.2 | 3.3 | 1.9 | 1.9 | 1.8 | 2.2 | 6.4 | 2.8 | 3.2 | 5.5 | 4.5 | 19.3 | 15.5 | 83.8 |
| IB | 0.8 | 1.2 | 5.7 | 3.7 | 2.7 | 1.6 | 1.6 | 1.5 | 1.7 | 6.3 | 2.6 | 2.8 | 4.6 | 3.6 | 17.0 | 15.4 | 72.7 |

4.4 Target Output & Mine Life:

The mine has been planned for a nominal production capacity of 15.00MT per annum of coal and peak production 20.00 MTY. The target has been assessed based on geological constraints, optimization of mining operations, size of the quarry, rate of advance, etc.

Mine Life:

The project will sustain a mine life at nominal production for a period of 41 years of mining operations. The break-up of total period is as follows:

- Construction period - Nil,
- Production build-up period - 6 years,
- Production period - 32 years,
- Tapering period - 3 years,
- Total period - 41 years.

The Section-1, Section-2 & Section-3 will sustain for a period of 10, 28 & 41 years of project life respectively.

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CHAPTER-V METHOD OF MINING

5.1 General

Considering the geo mining characteristics of the mining block i.e. thick deposits at shallow depth, moderate gradient of the seams, occurrence of geological disturbances, and opencast method of mining with shovel-dumper combination is proposed to work in Chandragupt OCP.

5.2 Geo-Mining Characteristics

The Geo-Mining characteristics of the proposed Chandragupt OCP (15.0MTY) are given in the table below. A total no. of twelve coal horizons is occurring within the quarriable area. However reserves of two seams IVC and IVD has not been considered due to thickness less than 1m.

5.2.1 Seam Gradient – The dip of the formation varies from 4° - 6° towards south in major part of the area. However, steeper dips varying from 10° - 15° have been observed near the eastern side of faults F6 & F1.

5.2.2 Geological Disturbances

8 (eight) faults have been encountered in Pachra block as per the Geological Report of Pachra Block.

| Fault | Extent | Trend | Direction & Amount of Throw |
|-------|--|-------|-----------------------------|
| F1 | Continues from Amrapali block and forms the southern limit of the block | NW-SE | North easterly (10-40m) |
| F3 | Continues from Amrapali block and runs in the northern part of the block | E-W | Northerly (2-50m) |
| F4 | Runs almost parallel to F3 | E-W | Northerly (15-53m) |
| F5 | Runs almost parallel to F3 | E-W | Northerly (15-25m) |
| F6 | Runs almost parallel to F1 | NW-SE | North easterly (5-25m) |
| F7 | Runs almost parallel to F3 | E-W | Northerly (10-20m) |
| F8 | Runs parallel to F3 in northern part | E-W | Northerly (0-20m) |
| F9 | Runs in the north eastern part of the block. | NW-SE | South westerly (15m) |

11 (eleven) faults have been encountered in Pachra South block based on the Geological Report of Pachra South Block.

| Fault | Extent | Trend | Direction & Amount of Throw |
|-------|---|-------|-----------------------------|
| F1 | Continues from Amrapali block and forms the northern limit of the block | NW-SE | North easterly (10-40m) |
| FS2 | Originates from F1 near BH CNKP-57 to CNKP-123 | NW-SE | North easterly (0-10m) |

| Fault | Extent | Trend | Direction & Amount of Throw |
|-------|--|--------------|-----------------------------|
| FS3 | Continues from Amrapali block between BH CNKP-249 and 56 | E-W | Northerly (20m) |
| FS4 | Continues from Amrapali block between BH CNKP-122, 295 and 109 | E-W | Northerly (10-30m) |
| FS5 | Originates from FS4 near BH CNKP-288 and extends upto CNKP-292 | NW-SE | North easterly (0-10m) |
| FS6 | Continues from Amrapali block in the south central part of the block | E-W | Northerly (20m-90m) |
| FS7 | Originates from FS6 near BH CNKP-115. | NW-SE | Southerly (0-20m) |
| FS8 | Originates from FS6 near BH CNKP-67. | E-W | Northerly (10-40m) |
| FS9 | Originates from FS10 near BH CNKP-245. | E-W | Northerly (10m) |
| FS10 | Originates near western boundary between BH CNKP-254 and CNKP-334 | E-W | Northerly (0m-25m) |
| FS11 | Originates near western boundary west of BH CNKP-255 in the southern part. | NW-SE- EW | Northerly (0m-20m) |

5.2.3 Details of sequence of coal seam and parting

| Name of seam/parting | Thickness range of coal/parting (m) |
|----------------------|-------------------------------------|
| Soil/Alluvium | 0.00-12.00 |
| Barren Measure | 13.20-19.77 |
| Barakar above IVD | 16.76-26.95 |
| Seam IVD | 0.60-1.0 |
| Parting | 1.58-4.94 |
| Seam IVC | 0.23-0.84 |
| Parting | 2.41-6 |
| Seam IVB | 0.6-1.80 |
| Parting | 5.97-11.27 |
| Seam IVA | 0.16-2.43 |
| Parting | 0.40-8.00 |
| Seam IV | 3.87-10.11 |
| Parting | 1.59-9.80 |
| Seam IIIT | 2.74-4.71 |
| Parting | 0.00-26.16 |
| Seam IIIB | 1.71-5.31 |
| Seam IIIC | 7.83-10.11 |
| Parting | 2.69-23.40 |
| Seam IIT | 0.27-4.96 |
| Parting | 0.34-6.63 |
| Seam IIB | 1.75-8.12 |
| Parting | 1.49-23.48 |
| Seam IT+MC | 6.18-13.29 |
| Parting | 1.28-5.50 |
| Seam IB | 3.10-14.69 |


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5.3 Mine parameters

| Particulars | Minimum (m) | Maximum (m) |
|--|--------------------|-------------|
| Dimension of the quarry along strike (on floor) | 1500 | 2780 |
| Depth of quarry | - | 250 |
| Dip rise length (on floor) | 4650 | 5560 |
| Final Quarry Floor area (sq. km) | 11.46 | |
| Final Quarry Surface area (sq. km) | 13.33 | |
| 25 th Year Quarry Surface area (sq. km) | 11.65 | |
| Maximum depth of quarry at 25 th Year stage (m) | 185 | |
| Total Mineable reserves (Mt) | 527.30 | |
| Total OB (Mcum) | 995.34 | |
| Average Stripping Ratio (Cum/Tonne) | 1.89 | |
| Seam gradient (Avg. gradient of the quarry floor) | 6 Degree (1 in 15) | |

Section wise Details

| Particulars | Section-1 | Section-2 | Section-3 |
|---------------------------------|-----------|-----------|-----------|
| Quarry Surface area (in Ha) | 213.36 | 466.90 | 652.16 |
| Max Depth (in m) | 70 | 170 | 250 |
| Avg. length along strike (in m) | 2200 | 2500 | 1750 |
| Mineable reserves (in MT) | 41.93 | 168.62 | 316.75 |
| Total OB (Mcum) | 60.97 | 215.38 | 718.99 |
| Avg. Stripping Ratio (cum/te) | 1.45 | 1.28 | 2.27 |

5.4 Choice of Technology:

Shovel Dumper Combination

Keeping in view of the Geological and Mining parameters of Chandragupta mining block i.e. moderate gradient of the seam (4° - 8°) in major part of the block. For rated output of 15.00 MTY, Shovel-dumper for OB and surface Miner with FE Loader mining system with inclined slicing has been envisaged for the quarry. However, horizontal slicing has been proposed at places in Section-2 & 3 where steeper gradient of about 10° or more has been encountered.

Equipment Selection: Considering the average strike length of the quarry, gradient and thickness of the seam, annual load of excavation and lead the following equipment's have been selected.


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 1
 2A

Yearwise Population of HEMM

| Particulars | Capacity / Year | 1 | 2 | 3 | 4 | 5 | 6 | Max. beyond Target year |
|------------------------------|-----------------|----|----|----|----|----|----|-------------------------|
| Coal | | | | | | | | |
| Elec Hyd. Shovel | 5.5-6.5 cum | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Surface Miner | SM 3800-4200 | | 1 | 2 | 3 | 4 | 4 | 4 |
| Diesel RBH Drill | 160mm | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Rear Dumpers | 60T | 5 | 9 | 16 | 22 | 26 | 30 | 44 |
| FE Loader | 5-7 Cum | | 2 | 4 | 5 | 7 | 7 | 7 |
| Dozer with ripper attachment | 410 HP | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| Dozer | 410 HP | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| OB | | | | | | | | |
| Elec Hyd Shovel | 20-22 cum | | | | | | | 2 |
| Elec Hyd Shovel | 10-12 cum | 3 | 3 | 5 | 5 | 6 | 6 | 7 |
| Rear Dumpers | 190T | | | | | | | 13 |
| Rear Dumpers | 100T | 17 | 25 | 36 | 41 | 45 | 48 | 48 |
| Electric RBH Drill | 250 mm | | | | | | | 5 |
| Diesel RBH Drill | 160mm | 5 | 5 | 8 | 8 | 9 | 9 | 10 |
| Dozer | 410 HP | 4 | 4 | 6 | 6 | 7 | 7 | 7 |
| Dozer | 750-850HP | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| Common | | | | | | | | |
| Diesel Hyd. Backhoe | 4.3-5 cum | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Diesel Hyd. Shovel | 3.2-3.5 cum | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Grader | 500 HP | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| AT crane | 80T-100T | | | | | | | 1 |
| RT crane | 40T | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| RT crane | 20T | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Mobile Crane | 8-14T | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| FE Loader | 5-7 Cum. | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Water Sprinkler | 70 KL | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Water Sprinkler Mist Spray | 28KL | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Wheel Dozer | 460 HP | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Dump Trucks | 12-15 T | 5 | 6 | 6 | 6 | 6 | 6 | 6 |
| Diesel Browser | 16KL | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Fire Tender | | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Hyd. Rock Breaker | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cable Handler | | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Tyre Handler | 35kN | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Reclamation | | | | | | | | |
| FE Loader | 5-7 cum | | 1 | 1 | 1 | 1 | 1 | 1 |
| Dozer | 410 HP | | 1 | 1 | 1 | 1 | 1 | 1 |
| Grader | 280 HP | | 1 | 1 | 1 | 1 | 1 | 1 |
| Water Sprinkler | 70KL | | 1 | 1 | 1 | 1 | 1 | 1 |
| Water Sprinkler Mist Spray | 28KL | | 1 | 1 | 1 | 1 | 1 | 1 |
| Dumper | 60T | | 2 | 3 | 3 | 3 | 3 | 3 |

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5.5 Mining System and system parameters

Inclined mining system with shovel-dumper combination has been adopted considering the geo-mining conditions. However, in a small part of the quarry, the dip of the seam varies between 10° - 15° (near the eastern side of faults F6 & F1). In this portion, mining will be done by horizontal slicing with shovel-dumper combination. Following mining system parameters have been considered in the project:

Some major system parameters for both coal winning & OB removal are given below:-

1. Mining Benches

| | |
|--|----------------|
| a) Maximum Bench Height for 10 - 12 Cum Hyd. shovel Bench | -12-15m |
| b) Minimum working Bench Width for 10 - 12 Cum Hyd. shovel | - 50m |
| c) Non-working Bench width for 10 - 12 Cum Hyd. shovel | - 30m |
| c) Maximum Bench Height for 20 - 22 Cum Hyd. shovel Bench | -15-18m |
| d) Minimum working Bench Width for 20 - 22 Cum Hyd. shovel | - 60m |
| e) Non-working Bench width for 20 - 22 Cum Hyd. shovel | - 40m |
| f) Working Bench of Surface Miner | -60m |
| 2. Width of the permanent haul road | - 30 m. |
| 3. Width of the temporary transport ramp | - 25 m. |
| 4. Usual height of the spoil dump bench | - 30 m. |
| 5. The width of the active dump bench | - 60 m. |
| 6. Bench Slope (working) | |
| O.B. bench | - 70° |
| Coal bench | - 70° |
| Dump bench | - 37° |
| Overall pit slope | - 37° |


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CHAPTER-VI

MINING & DUMPING STRATEGY

6.1 Constraints on Mine Development

Presence of River and its diversion: Chotki River passes through the proposed quarriable area of Chandragupt OCP. This river must be diverted before the start of the quarry operation to sustain the production schedule. Minor earth cutting is required for this diversion to maintain the water flow.

➤ A small notch of Barki River bounded by boreholes CNKP120, CNKP124 and CNKP125 also needs to be diverted.

There is constraints of dumping in lease hold area of Chandragupt OCP and the dumping in initial year has been proposed in adjacent Amrapali OCP, hence a bridge over Barki River must be constructed before the mine operation at suitable place.

6.2 Mining Strategy / Mining Sequence

Chandragupt OCP is a new mine. The mine is proposed to be worked in three sections concurrently to build up to the rated capacity of 15MTY by the 6th of quarry operation.

The quarry is proposed to be worked by inclined slicing method by shovel-dumper combination. Horizontal slicing by shovel-dumper combination will also be employed at places with steeper gradient. A haul road in the western flank has been proposed on the floor of base seam.

Section-1 will be opened near the north-west of BH no CNKP171 from the incrop of Seam I Bottom and has a life of 10 years of quarry operation. The coal and OB both will be transported through the western flank.

Section-2 is proposed to be opened near BH no CNKP405 from the incrop of Seam I Bottom and has a life of 28 year of quarry operation. The coal will be transported through western flank and OB will be transported through the eastern flank.

Section-3 is proposed to be opened near BH No. CNKP405 from the incrop of Seam II Bottom and has a life of 41 years quarry operation. The coal will be transported through western flank and OB will be transported through the eastern flank.

6.3 Mining Parameters:

Some major system parameters for both coal winning & OB removal are given below:-

1. Mining Benches:

- a) Maximum Bench Height


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- 20-22 Cum Electrical Hyd. shovel Bench - 15-18m
- 10-12 Cum Electrical Hyd. shovel Bench - 12-15m

b) Minimum Bench Width:

| | | |
|----|---|---------|
| | Working Bench Width for 20-22cum Hyd Shovel | - 50m |
| | Working Bench Width for 10-12cum Hyd Shovel | - 40m |
| | Non-working Bench width for 10-12cum Hyd Shovel | - 25m |
| 2. | Width of the permanent haul road | - 30 m. |
| 3. | Usual height of the spoil dump bench | - 30 m. |
| 4. | The width of the active dump bench | - 60 m. |
| 5. | Bench Slope (working) | |
| | O.B. bench | - 70° |
| | Coal bench | - 70° |
| | Dump bench | - 37° |
| 6. | Overall pit slope | - 37° |

6.4 Dumping Strategy

Spoil Dump

Total volume of overburden from all the 3 (three) sections of the proposed OCP has been estimated as 995.34 Mcum. 48.38 Mcum OB will be dumped at Amrapali out of total 70.38 Mcum during the first 5th year of quarry operation. From 4th year onwards, overburden of Section 1, Section 2 and Section 3 has to be dumped internally.

| | | Volume of OB (M cum) |
|---|-----------------------------|----------------------|
| 1 | External Dump (at Amrapali) | 48.38 |
| 2 | Internal Dump | 946.96 |
| | Total | 995.34 |

The maximum RL of the external dump (at Amrapali) and internal dump is +550m & +500m respectively.

Top Soil Management

The salvaging, stockpiling and re-application of top soil to be used as growth medium in the reclamation of Internal & External overburden dumps within the mining area is a major environment protection programme. Soil management in opencast mine is necessary to re-establish the stability & productivity of lands disturbed due to mining activity.


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Year-wise external and internal dumping:

(Fig in Mcum)

| YEAR | Volume of External dumping | Volume of Internal dumping | Total |
|--------------|----------------------------|----------------------------|---------------|
| 1 | 7.39 | 0.00 | 7.39 |
| 2 | 10.89 | 0.00 | 10.89 |
| 3 | 15.37 | 0.00 | 15.37 |
| 4 | 6.73 | 10.84 | 17.57 |
| 5 | 8.01 | 11.15 | 19.16 |
| 6 | - | 21.32 | 21.32 |
| 7 | - | 21.30 | 21.30 |
| 8 | - | 21.41 | 21.41 |
| 9 | - | 20.62 | 20.62 |
| 10 | - | 21.31 | 21.31 |
| 11 | - | 22.10 | 22.10 |
| 12 | - | 23.11 | 23.11 |
| 13 | - | 25.67 | 25.67 |
| 14 | - | 28.83 | 28.83 |
| 15 | - | 32.10 | 32.10 |
| 16 | - | 32.60 | 32.60 |
| 17 | - | 32.60 | 32.60 |
| 18 | - | 32.60 | 32.60 |
| 19 | - | 32.60 | 32.60 |
| 20 | - | 32.09 | 32.09 |
| 21 | - | 32.09 | 32.09 |
| 22 | - | 32.09 | 32.09 |
| 23 | - | 32.09 | 32.09 |
| 24 | - | 32.10 | 32.10 |
| 25 | - | 32.09 | 32.09 |
| 26 | - | 31.81 | 31.81 |
| 27 | - | 30.81 | 30.81 |
| 28 | - | 27.94 | 27.94 |
| 29 | - | 23.50 | 23.50 |
| 30 | - | 23.50 | 23.50 |
| 31 | - | 23.50 | 23.50 |
| 32 | - | 23.50 | 23.50 |
| 33 | - | 23.50 | 23.50 |
| 34 | - | 23.50 | 23.50 |
| 35 | - | 23.50 | 23.50 |
| 36 | - | 23.50 | 23.50 |
| 37 | - | 23.50 | 23.50 |
| 38 | - | 22.27 | 22.27 |
| 39 | - | 17.85 | 17.85 |
| 40 | - | 13.84 | 13.84 |
| 41 | - | 8.25 | 8.25 |
| Total | 48.38 | 946.96 | 995.34 |

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6.5 Sequence of Dumping Operations and Stage-Wise Details

| Sl. No. | Particulars | Section-1 | Section -2 | Section -3 |
|---------|----------------------------|-----------|------------|------------|
| 1. | Coal Mined (MT) | 41.93 | 168.62 | 316.75 |
| 2. | OB removed (M cum) | 60.97 | 215.38 | 718.99 |
| 3. | Stripping Ratio (M cum/t) | 1.45 | 1.28 | 2.27 |
| 4. | Excavated quarry area (Ha) | 217.53 | 471.40 | 641.94 |
| 5. | Internal dump (Mcum) | 180.00 | 324.00 | 442.96 |
| 6. | External dump (Mcum) | 16.64 | 16.25 | 15.50 |

Dumping Arrangements

The Maximum height of OB dump above ground level is 60m with maximum overall slope of 37°. The height of the individual bench is 30m with facing berm width of 30m and side berm width of 20m (Internal Dump), where as in case of external dump the berm width is kept 20m on all sides.

The maximum RL of the internal dump is +500m. However, the internal dump may require to be raised further by few meters during the quarry operation, which will subsequently be brought down to +500m at the final stage of quarry operation so as to maintain the pre-mining topography of the area.

↙ The void left at the end of mine life is 64.59 Ha in the southernmost part of the quarry.


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CHAPTER-VII

MINING SCHEDULE & EQUIPMENT PHASING

7.1 Design criteria:

Following design criteria has been adopted for the mining operation.

- Working Regime

This opencast mine will work on 3 shift/day basis and 7 days/week schedule and the number of working days /year are adopted as 330 considering annual public holidays, unscheduled delays and bad weather effect particularly in rainy season.

- Average Specific Gravity of different coal seams:

| | <u>Seam</u> | <u>Avg Sp Gr</u> (te/m^3) |
|-------|-------------|----------------------------------|
| i) | Seam IVB | 1.62 |
| ii) | Seam IVA | 1.67 |
| iii) | Seam IV | 1.59 |
| iv) | Seam IIIT | 1.59 |
| v) | Seam IIIB | 1.62 |
| vi) | Seam IIIC | 1.62 |
| vii) | Seam IIT | 1.63 |
| viii) | Seam IIB | 1.68 |
| ix) | Seam IT | 1.64 |
| x) | Seam IB | 1.67 |

7.2 Calendar Programme of Excavation

The mining schedule has been formulated based on the adopted sequence of opencast mine development at optimum conditions of mining operations for the entire life of Chandragupt opencast mine.

The total extractable reserves have been estimated as 527.30Mtes corresponding to a volume of OBR of 995.34Mcum at an average stripping ratio of 1.89 cum/te. The rated output of 15.0 MTY would be achieved in the 6th year of quarry operation. The quarry is proposed to be worked in 3 (three) sections **concurrently**. Peak overburden load for the project has been estimated as 32.60 Mcum during the 16th to 19th years of quarry operation. The Section-wise seam-wise coal and OB is given in the Tables below:


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Detailed Calendar Programme of Section-1

| YEAR | SECTION-1 COAL (MT) | | | | | | | | | | TOTAL COAL (MT) |
|--------------|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|-----------------|
| | SEAM | | | | | | | | | | |
| | IVB | IVA | IV | IIIT | IIIB | IIIC | IIT | IIB | IT | IB | |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.22 | 1.26 | 1.50 |
| 2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.76 | 1.19 | 2.00 |
| 3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.46 | 1.90 | 1.62 | 4.00 |
| 4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.81 | 2.16 | 1.65 | 5.00 |
| 5 | 0.00 | 0.00 | 0.00 | 0.01 | 0.03 | 0.00 | 0.42 | 0.71 | 1.95 | 1.88 | 5.00 |
| 6 | 0.00 | 0.00 | 0.00 | 0.01 | 0.04 | 0.00 | 0.41 | 0.65 | 1.87 | 2.02 | 5.00 |
| 7 | 0.00 | 0.00 | 0.00 | 0.01 | 0.09 | 0.00 | 0.28 | 0.61 | 1.88 | 2.13 | 5.00 |
| 8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.00 | 0.09 | 0.62 | 2.10 | 2.04 | 5.00 |
| 9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.00 | 0.11 | 0.55 | 2.01 | 2.21 | 5.00 |
| 10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.00 | 0.10 | 0.47 | 1.75 | 2.00 | 4.43 |
| TOTAL | 0.00 | 0.00 | 0.00 | 0.02 | 0.54 | 0.00 | 1.80 | 4.95 | 16.60 | 18.02 | 41.93 |

| YEAR | SECTION-1 OB (M CUM) | | | | | | | | | TOTAL OB (M CUM) | S.R. (cum/t) |
|--------------|----------------------|-----------------|-------------|--------------|-------------|---------------|-------------|--------------|--------------|------------------|--------------|
| | TOP OB | PARTING BETWEEN | | | | | | | | | |
| | | IVB-IVA | IVA-IV | IV-III/IIIIC | IIIIT-IIIIB | IIIB/IIIC-IIT | IIT-IIB | IIB-IT | IT-IB | | |
| 1 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.26 | 1.85 | 4.10 | 2.73 |
| 2 | 2.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.39 | 1.48 | 1.27 | 5.49 | 2.74 |
| 3 | 1.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.69 | 1.26 | 2.28 | 1.22 | 7.05 | 1.76 |
| 4 | 1.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.99 | 1.08 | 2.31 | 1.09 | 7.04 | 1.41 |
| 5 | 1.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.81 | 0.97 | 2.37 | 1.07 | 7.03 | 1.41 |
| 6 | 2.35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.86 | 2.02 | 1.19 | 7.02 | 1.40 |
| 7 | 3.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 0.75 | 1.38 | 1.31 | 7.00 | 1.40 |
| 8 | 2.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.76 | 1.07 | 1.91 | 1.02 | 7.01 | 1.40 |
| 9 | 2.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.37 | 0.68 | 1.64 | 1.13 | 6.02 | 1.20 |
| 10 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 | 0.51 | 1.39 | 1.03 | 3.21 | 0.72 |
| TOTAL | 18.28 | 0.00 | 0.00 | 0.00 | 0.00 | 4.90 | 7.57 | 18.05 | 12.17 | 60.97 | 1.45 |

Detailed Calendar Programme of Section-2

| YEAR | SECTION-2 COAL (MT) | | | | | | | | | | TOTAL COAL (MT) |
|------|---------------------|------|------|------|------|------|------|------|------|------|-----------------|
| | SEAM | | | | | | | | | | |
| | IVB | IVA | IV | IIIT | IIIB | IIIC | IIT | IIB | IT | IB | |
| 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.05 | 0.12 | 0.00 | 0.61 | 0.80 |
| 2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.03 | 0.16 | 0.22 | 1.09 | 1.50 |
| 3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.00 | 0.06 | 0.29 | 1.22 | 0.88 | 2.50 |
| 4 | 0.00 | 0.00 | 0.00 | 0.14 | 0.24 | 0.00 | 0.10 | 0.37 | 1.31 | 0.84 | 3.00 |
| 5 | 0.00 | 0.01 | 0.00 | 0.15 | 0.42 | 0.01 | 0.18 | 0.69 | 1.59 | 0.95 | 3.99 |
| 6 | 0.00 | 0.02 | 0.00 | 0.13 | 0.45 | 0.01 | 0.22 | 0.86 | 2.06 | 1.24 | 5.00 |
| 7 | 0.00 | 0.02 | 0.00 | 0.13 | 0.45 | 0.01 | 0.22 | 0.86 | 2.06 | 1.24 | 5.00 |
| 8 | 0.00 | 0.03 | 0.03 | 0.15 | 0.44 | 0.05 | 0.22 | 0.84 | 1.99 | 1.25 | 5.00 |
| 9 | 0.00 | 0.04 | 0.11 | 0.19 | 0.41 | 0.20 | 0.22 | 0.77 | 1.75 | 1.31 | 5.00 |
| 10 | 0.00 | 0.04 | 0.11 | 0.19 | 0.41 | 0.20 | 0.22 | 0.77 | 1.75 | 1.31 | 5.00 |
| 11 | 0.02 | 0.10 | 0.44 | 0.37 | 0.63 | 0.38 | 0.37 | 1.21 | 2.58 | 1.89 | 8.00 |

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| | | | | | | | | | | | |
|--------------|-------------|-------------|--------------|-------------|--------------|-------------|-------------|--------------|--------------|--------------|---------------|
| 12 | 0.03 | 0.19 | 0.85 | 0.47 | 0.58 | 0.49 | 0.39 | 1.17 | 2.24 | 1.57 | 8.00 |
| 13 | 0.05 | 0.17 | 0.85 | 0.47 | 0.58 | 0.49 | 0.39 | 1.17 | 2.24 | 1.57 | 8.00 |
| 14 | 0.11 | 0.25 | 1.08 | 0.46 | 0.55 | 0.53 | 0.38 | 1.09 | 2.11 | 1.44 | 8.00 |
| 15 | 0.15 | 0.28 | 1.19 | 0.45 | 0.53 | 0.55 | 0.38 | 1.05 | 2.04 | 1.38 | 8.00 |
| 16 | 0.18 | 0.28 | 1.04 | 0.44 | 0.53 | 0.49 | 0.36 | 1.05 | 2.05 | 1.58 | 8.00 |
| 17 | 0.19 | 0.25 | 0.96 | 0.43 | 0.52 | 0.42 | 0.34 | 1.05 | 2.06 | 1.78 | 8.00 |
| 18 | 0.19 | 0.25 | 0.96 | 0.43 | 0.52 | 0.42 | 0.34 | 1.05 | 2.06 | 1.78 | 8.00 |
| 19 | 0.19 | 0.25 | 0.96 | 0.43 | 0.52 | 0.42 | 0.34 | 1.05 | 2.06 | 1.78 | 8.00 |
| 20 | 0.19 | 0.25 | 0.96 | 0.43 | 0.52 | 0.42 | 0.34 | 1.05 | 2.06 | 1.78 | 8.00 |
| 21 | 0.16 | 0.22 | 0.83 | 0.37 | 0.46 | 0.37 | 0.30 | 0.92 | 1.80 | 1.56 | 7.00 |
| 22 | 0.16 | 0.22 | 0.83 | 0.37 | 0.46 | 0.37 | 0.30 | 0.92 | 1.80 | 1.56 | 7.00 |
| 23 | 0.16 | 0.22 | 0.83 | 0.37 | 0.46 | 0.37 | 0.30 | 0.92 | 1.80 | 1.56 | 7.00 |
| 24 | 0.16 | 0.22 | 0.83 | 0.37 | 0.46 | 0.37 | 0.30 | 0.92 | 1.80 | 1.56 | 7.00 |
| 25 | 0.16 | 0.22 | 0.84 | 0.37 | 0.46 | 0.37 | 0.30 | 0.92 | 1.80 | 1.56 | 7.00 |
| 26 | 0.14 | 0.18 | 0.72 | 0.32 | 0.39 | 0.32 | 0.26 | 0.79 | 1.55 | 1.33 | 6.00 |
| 27 | 0.14 | 0.18 | 0.72 | 0.32 | 0.39 | 0.32 | 0.26 | 0.79 | 1.54 | 1.33 | 6.00 |
| 28 | 0.11 | 0.15 | 0.58 | 0.26 | 0.32 | 0.26 | 0.21 | 0.63 | 1.24 | 1.07 | 4.82 |
| TOTAL | 2.54 | 4.03 | 15.69 | 8.23 | 11.77 | 7.87 | 7.41 | 23.53 | 48.80 | 38.77 | 168.62 |

| YEAR | SECTION-2 OB (M CUM) | | | | | | | | | TOTAL OB (M CUM) | S.R. (cum/t) |
|------|----------------------|-----------------|--------|----------------------|---------------|-----------------------|-------------|--------|-------|------------------------|-----------------|
| | TOP OB | PARTING BETWEEN | | | | | | | | | |
| | | IVB- IVA | IVA-IV | IV- IIIT/ IIIC | IIIT- IIIB | IIIB/ IIIC- IIT | IIT- IIB | IIB-IT | IT-IB | | |
| 1 | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 0.03 | 0.07 | 0.15 | 2.28 | 2.85 |
| 2 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 0.46 | 0.31 | 0.28 | 3.40 | 2.27 |
| 3 | 2.50 | 0.00 | 0.00 | 0.00 | 0.00 | 1.01 | 0.42 | 0.96 | 0.42 | 5.32 | 2.13 |
| 4 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.17 | 0.43 | 1.00 | 0.42 | 6.03 | 2.01 |
| 5 | 3.50 | 0.00 | 0.00 | 0.00 | 0.64 | 0.89 | 0.49 | 1.06 | 0.57 | 7.14 | 1.79 |
| 6 | 3.61 | 0.00 | 0.00 | 0.00 | 0.83 | 1.10 | 0.62 | 1.39 | 0.74 | 8.30 | 1.66 |
| 7 | 3.61 | 0.00 | 0.00 | 0.00 | 0.83 | 1.10 | 0.62 | 1.39 | 0.74 | 8.30 | 1.66 |
| 8 | 3.62 | 0.01 | 0.05 | 0.28 | 0.64 | 1.03 | 0.63 | 1.41 | 0.73 | 8.40 | 1.68 |
| 9 | 3.51 | 0.03 | 0.23 | 1.23 | 0.00 | 0.79 | 0.66 | 1.46 | 0.68 | 8.60 | 1.72 |
| 10 | 3.51 | 0.03 | 0.23 | 1.23 | 0.00 | 0.79 | 0.66 | 1.46 | 0.68 | 8.60 | 1.72 |
| 11 | 0.49 | 0.23 | 0.48 | 2.14 | 0.00 | 1.13 | 0.94 | 2.15 | 1.02 | 8.60 | 1.07 |
| 12 | 0.55 | 0.52 | 0.66 | 2.40 | 0.00 | 0.92 | 0.76 | 1.85 | 0.93 | 8.60 | 1.08 |
| 13 | 0.55 | 0.52 | 0.66 | 2.40 | 0.00 | 0.92 | 0.76 | 1.85 | 0.93 | 8.60 | 1.08 |
| 14 | 1.47 | 0.57 | 0.49 | 2.03 | 0.00 | 0.74 | 0.64 | 1.74 | 0.93 | 8.60 | 1.07 |
| 15 | 1.89 | 0.59 | 0.41 | 1.86 | 0.00 | 0.66 | 0.58 | 1.69 | 0.92 | 8.60 | 1.07 |
| 16 | 2.09 | 0.65 | 0.38 | 1.52 | 0.00 | 0.96 | 0.54 | 1.55 | 0.91 | 8.60 | 1.08 |
| 17 | 2.28 | 0.71 | 0.35 | 1.18 | 0.00 | 1.25 | 0.51 | 1.42 | 0.89 | 8.60 | 1.07 |
| 18 | 2.28 | 0.71 | 0.35 | 1.18 | 0.00 | 1.25 | 0.51 | 1.42 | 0.89 | 8.60 | 1.07 |
| 19 | 2.28 | 0.71 | 0.35 | 1.18 | 0.00 | 1.25 | 0.51 | 1.42 | 0.89 | 8.60 | 1.07 |
| 20 | 2.28 | 0.71 | 0.35 | 1.18 | 0.00 | 1.25 | 0.51 | 1.42 | 0.89 | 8.60 | 1.07 |
| 21 | 3.07 | 0.63 | 0.31 | 1.03 | 0.00 | 1.10 | 0.45 | 1.24 | 0.78 | 8.60 | 1.23 |
| 22 | 3.07 | 0.63 | 0.31 | 1.03 | 0.00 | 1.10 | 0.45 | 1.24 | 0.78 | 8.60 | 1.23 |
| 23 | 3.07 | 0.63 | 0.31 | 1.03 | 0.00 | 1.10 | 0.45 | 1.24 | 0.78 | 8.60 | 1.23 |
| 24 | 3.07 | 0.63 | 0.31 | 1.03 | 0.00 | 1.10 | 0.45 | 1.24 | 0.78 | 8.60 | 1.23 |

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| | | | | | | | | | | | |
|--------------|--------------|--------------|-------------|--------------|-------------|--------------|--------------|--------------|--------------|---------------|-------------|
| 25 | 3.07 | 0.63 | 0.31 | 1.03 | 0.00 | 1.10 | 0.45 | 1.24 | 0.78 | 8.60 | 1.23 |
| 26 | 3.57 | 0.54 | 0.26 | 0.89 | 0.00 | 0.94 | 0.38 | 1.06 | 0.67 | 8.30 | 1.38 |
| 27 | 2.57 | 0.54 | 0.26 | 0.89 | 0.00 | 0.94 | 0.38 | 1.06 | 0.67 | 7.30 | 1.22 |
| 28 | 0.63 | 0.43 | 0.21 | 0.71 | 0.00 | 0.75 | 0.31 | 0.85 | 0.54 | 4.44 | 0.92 |
| TOTAL | 68.63 | 10.65 | 7.25 | 27.48 | 2.94 | 27.22 | 14.59 | 36.23 | 20.39 | 215.38 | 1.28 |

Detailed Calendar Programme of Section-3

| YEAR | SECTION-3 COAL (MT) | | | | | | | | | | TOTAL COAL (MT) |
|------|---------------------|------|------|------|------|------|------|------|------|------|-----------------|
| | SEAM | | | | | | | | | | |
| | IVB | IVA | IV | IIIT | IIIB | IIIC | IIT | IIB | IT | IB | |
| 1 | 0.00 | 0.00 | 0.09 | 0.00 | 0.01 | 0.00 | 0.05 | 0.11 | 0.14 | 0.09 | 0.50 |
| 2 | 0.00 | 0.01 | 0.19 | 0.00 | 0.02 | 0.01 | 0.10 | 0.22 | 0.28 | 0.18 | 1.00 |
| 3 | 0.00 | 0.01 | 0.28 | 0.00 | 0.03 | 0.01 | 0.14 | 0.33 | 0.42 | 0.27 | 1.50 |
| 4 | 0.01 | 0.02 | 0.70 | 0.21 | 0.19 | 0.01 | 0.24 | 0.51 | 0.68 | 0.42 | 3.00 |
| 5 | 0.01 | 0.02 | 1.03 | 0.43 | 0.36 | 0.02 | 0.29 | 0.57 | 0.80 | 0.47 | 4.00 |
| 6 | 0.02 | 0.03 | 1.11 | 0.44 | 0.40 | 0.05 | 0.38 | 0.74 | 1.14 | 0.70 | 5.00 |
| 7 | 0.01 | 0.01 | 0.40 | 0.08 | 0.22 | 0.15 | 0.43 | 0.83 | 1.69 | 1.18 | 5.00 |
| 8 | 0.01 | 0.01 | 0.40 | 0.08 | 0.22 | 0.15 | 0.43 | 0.83 | 1.69 | 1.18 | 5.00 |
| 9 | 0.01 | 0.01 | 0.40 | 0.08 | 0.22 | 0.15 | 0.43 | 0.83 | 1.69 | 1.18 | 5.00 |
| 10 | 0.01 | 0.01 | 0.45 | 0.09 | 0.24 | 0.17 | 0.48 | 0.92 | 1.88 | 1.31 | 5.57 |
| 11 | 0.06 | 0.06 | 0.63 | 0.13 | 0.21 | 0.41 | 0.38 | 0.82 | 2.35 | 1.96 | 7.00 |
| 12 | 0.08 | 0.08 | 0.65 | 0.13 | 0.17 | 0.48 | 0.30 | 0.69 | 2.34 | 2.07 | 7.00 |
| 13 | 0.12 | 0.12 | 0.63 | 0.08 | 0.11 | 0.88 | 0.36 | 0.85 | 2.11 | 1.74 | 7.00 |
| 14 | 0.09 | 0.11 | 0.83 | 0.07 | 0.09 | 1.11 | 0.36 | 0.85 | 1.89 | 1.58 | 7.00 |
| 15 | 0.09 | 0.10 | 1.02 | 0.16 | 0.19 | 1.19 | 0.38 | 0.85 | 1.63 | 1.39 | 7.00 |
| 16 | 0.15 | 0.15 | 0.98 | 0.31 | 0.40 | 0.78 | 0.38 | 0.83 | 1.63 | 1.39 | 7.00 |
| 17 | 0.29 | 0.24 | 1.13 | 0.27 | 0.38 | 0.53 | 0.31 | 0.75 | 1.68 | 1.41 | 7.00 |
| 18 | 0.37 | 0.42 | 1.39 | 0.47 | 0.51 | 0.45 | 0.25 | 0.70 | 1.37 | 1.06 | 7.00 |
| 19 | 0.31 | 0.35 | 1.27 | 0.45 | 0.50 | 0.44 | 0.27 | 0.75 | 1.44 | 1.21 | 7.00 |
| 20 | 0.13 | 0.15 | 0.91 | 0.37 | 0.48 | 0.41 | 0.32 | 0.87 | 1.70 | 1.65 | 7.00 |
| 21 | 0.14 | 0.17 | 1.04 | 0.42 | 0.55 | 0.47 | 0.36 | 1.00 | 1.93 | 1.90 | 8.00 |
| 22 | 0.14 | 0.17 | 1.04 | 0.42 | 0.55 | 0.47 | 0.36 | 1.00 | 1.94 | 1.89 | 8.00 |
| 23 | 0.30 | 0.30 | 1.39 | 0.49 | 0.58 | 0.35 | 0.35 | 0.89 | 1.75 | 1.60 | 8.00 |
| 24 | 0.35 | 0.33 | 1.48 | 0.50 | 0.59 | 0.32 | 0.35 | 0.86 | 1.69 | 1.53 | 8.00 |
| 25 | 0.10 | 0.15 | 1.43 | 0.54 | 0.70 | 0.32 | 0.35 | 0.93 | 1.85 | 1.62 | 8.00 |
| 26 | 0.13 | 0.18 | 1.47 | 0.55 | 0.75 | 0.33 | 0.40 | 1.03 | 2.22 | 1.92 | 9.00 |
| 27 | 0.18 | 0.22 | 1.21 | 0.46 | 0.68 | 0.28 | 0.40 | 1.07 | 2.44 | 2.06 | 9.00 |
| 28 | 0.24 | 0.33 | 1.42 | 0.52 | 0.74 | 0.33 | 0.44 | 1.11 | 2.75 | 2.31 | 10.18 |
| 29 | 0.50 | 0.79 | 1.89 | 0.58 | 0.72 | 0.47 | 0.45 | 1.20 | 2.99 | 2.41 | 12.00 |
| 30 | 0.34 | 0.53 | 1.77 | 0.71 | 0.96 | 0.20 | 0.50 | 1.21 | 3.12 | 2.66 | 12.00 |
| 31 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.21 | 2.84 | 12.00 |
| 32 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.21 | 2.84 | 12.00 |
| 33 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.21 | 2.84 | 12.00 |
| 34 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.20 | 2.84 | 12.00 |
| 35 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.24 | 3.21 | 2.83 | 12.00 |
| 36 | 0.15 | 0.24 | 1.43 | 0.69 | 1.11 | 0.00 | 0.56 | 1.38 | 3.31 | 3.13 | 12.00 |
| 37 | 0.10 | 0.17 | 1.25 | 0.61 | 1.10 | 0.00 | 0.58 | 1.49 | 3.37 | 3.35 | 12.00 |

CHANDRAGUPTA, 507/11/20
 CCL, KANAKPUR, GATEWAY

SANJEEV KUMAR
 MANAGER

| | | | | | | | | | | | |
|--------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|
| 38 | 0.10 | 0.17 | 1.25 | 0.61 | 1.10 | 0.00 | 0.58 | 1.48 | 3.37 | 3.35 | 12.00 |
| 39 | 0.08 | 0.14 | 1.04 | 0.51 | 0.92 | 0.00 | 0.48 | 1.24 | 2.80 | 2.79 | 10.00 |
| 40 | 0.06 | 0.11 | 0.83 | 0.40 | 0.74 | 0.00 | 0.39 | 0.99 | 2.24 | 2.23 | 8.00 |
| 41 | 0.04 | 0.07 | 0.52 | 0.25 | 0.46 | 0.00 | 0.24 | 0.62 | 1.40 | 1.40 | 5.00 |
| TOTAL | 5.84 | 7.71 | 43.42 | 16.11 | 22.86 | 11.02 | 15.74 | 37.49 | 83.78 | 72.78 | 316.75 |

| YEAR | SECTION-3 OB (M CUM) | | | | | | | | | TOTAL OB (M CUM) | S.R. (cum/t) |
|------|----------------------|-----------------|--------|-------------|-----------|---------------|----------|--------|-------|------------------|--------------|
| | TOP OB | PARTING BETWEEN | | | | | | | | | |
| | | IVB-IVA | IVA-IV | IV-III/IIIC | IIIT-IIIB | IIIB/IIIC-IIT | IIT-IIIB | IIB-IT | IT-IB | | |
| 1 | 0.15 | 0.01 | 0.23 | 0.27 | 0.24 | 0.01 | 0.02 | 0.04 | 0.03 | 1.00 | 2.00 |
| 2 | 0.30 | 0.01 | 0.46 | 0.54 | 0.49 | 0.02 | 0.04 | 0.08 | 0.06 | 2.00 | 2.00 |
| 3 | 0.45 | 0.02 | 0.69 | 0.80 | 0.73 | 0.04 | 0.06 | 0.12 | 0.09 | 3.00 | 2.00 |
| 4 | 0.61 | 0.02 | 1.31 | 1.03 | 0.92 | 0.06 | 0.11 | 0.30 | 0.14 | 4.50 | 1.50 |
| 5 | 0.72 | 0.02 | 1.70 | 0.93 | 0.81 | 0.07 | 0.14 | 0.45 | 0.16 | 5.00 | 1.25 |
| 6 | 0.77 | 0.03 | 1.82 | 1.15 | 0.96 | 0.08 | 0.21 | 0.70 | 0.29 | 6.00 | 1.20 |
| 7 | 1.18 | 0.04 | 0.64 | 1.08 | 0.75 | 0.09 | 0.32 | 1.25 | 0.63 | 6.00 | 1.20 |
| 8 | 1.18 | 0.04 | 0.64 | 1.08 | 0.75 | 0.09 | 0.32 | 1.25 | 0.63 | 6.00 | 1.20 |
| 9 | 1.18 | 0.04 | 0.64 | 1.08 | 0.75 | 0.09 | 0.32 | 1.25 | 0.63 | 6.00 | 1.20 |
| 10 | 4.14 | 0.05 | 0.72 | 1.20 | 0.83 | 0.10 | 0.36 | 1.40 | 0.70 | 9.50 | 1.71 |
| 11 | 8.55 | 0.44 | 0.66 | 0.54 | 0.36 | 0.11 | 0.38 | 1.59 | 0.87 | 13.50 | 1.93 |
| 12 | 10.20 | 0.57 | 0.57 | 0.19 | 0.11 | 0.10 | 0.35 | 1.53 | 0.87 | 14.50 | 2.07 |
| 13 | 12.33 | 0.65 | 1.70 | 0.09 | 0.10 | 0.12 | 0.31 | 1.08 | 0.68 | 17.06 | 2.44 |
| 14 | 14.27 | 0.48 | 3.21 | 0.07 | 0.07 | 0.16 | 0.26 | 1.09 | 0.63 | 20.24 | 2.89 |
| 15 | 14.64 | 0.70 | 5.35 | 0.09 | 0.10 | 0.30 | 0.26 | 1.43 | 0.63 | 23.50 | 3.36 |
| 16 | 12.45 | 1.48 | 5.77 | 0.22 | 0.20 | 0.54 | 0.46 | 2.09 | 0.80 | 24.00 | 3.43 |
| 17 | 12.60 | 1.55 | 4.61 | 0.52 | 0.19 | 0.80 | 0.66 | 2.19 | 0.88 | 24.00 | 3.43 |
| 18 | 14.19 | 2.32 | 4.25 | 0.35 | 0.27 | 0.83 | 0.37 | 0.87 | 0.54 | 24.00 | 3.43 |
| 19 | 14.65 | 1.88 | 4.03 | 0.33 | 0.27 | 0.79 | 0.43 | 1.05 | 0.57 | 24.00 | 3.43 |
| 20 | 15.55 | 0.51 | 3.36 | 0.28 | 0.27 | 0.69 | 0.59 | 1.58 | 0.66 | 23.50 | 3.36 |
| 21 | 14.42 | 0.59 | 3.84 | 0.31 | 0.30 | 0.78 | 0.68 | 1.81 | 0.76 | 23.50 | 2.94 |
| 22 | 14.42 | 0.59 | 3.84 | 0.31 | 0.30 | 0.78 | 0.68 | 1.81 | 0.76 | 23.50 | 2.94 |
| 23 | 9.94 | 1.78 | 6.49 | 0.42 | 0.28 | 0.93 | 0.84 | 2.06 | 0.75 | 23.50 | 2.94 |
| 24 | 8.76 | 2.10 | 7.19 | 0.45 | 0.28 | 0.97 | 0.89 | 2.12 | 0.75 | 23.50 | 2.94 |
| 25 | 10.95 | 0.71 | 6.03 | 0.37 | 0.23 | 1.04 | 0.92 | 2.34 | 0.91 | 23.50 | 2.94 |
| 26 | 10.86 | 0.81 | 5.33 | 0.36 | 0.23 | 1.16 | 1.10 | 2.57 | 1.07 | 23.50 | 2.61 |
| 27 | 13.54 | 0.90 | 2.66 | 0.25 | 0.18 | 1.14 | 1.23 | 2.46 | 1.15 | 23.50 | 2.61 |
| 28 | 14.44 | 0.82 | 2.42 | 0.23 | 0.16 | 1.04 | 1.12 | 2.24 | 1.05 | 23.50 | 2.31 |
| 29 | 5.84 | 3.42 | 6.11 | 0.49 | 0.29 | 1.17 | 1.59 | 2.69 | 1.90 | 23.50 | 1.96 |
| 30 | 8.04 | 2.28 | 4.53 | 0.94 | 0.14 | 1.74 | 1.38 | 3.02 | 1.42 | 23.50 | 1.96 |
| 31 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 32 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 33 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 34 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 35 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 36 | 8.04 | 1.41 | 3.99 | 1.54 | 0.10 | 2.69 | 1.39 | 2.96 | 1.37 | 23.50 | 1.96 |
| 37 | 8.19 | 1.13 | 3.96 | 1.70 | 0.13 | 2.98 | 1.39 | 2.57 | 1.44 | 23.50 | 1.96 |

SANJEEV KUMAR
MANAGER

CHANDRAGUPTA OPENCAST PROJECT
CCL- MDO MODE - MARCH 2020

| | | | | | | | | | | | |
|--------------|---------------|--------------|---------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|-------------|
| 38 | 6.96 | 1.13 | 3.96 | 1.70 | 0.13 | 2.98 | 1.39 | 2.57 | 1.44 | 22.27 | 1.85 |
| 39 | 5.10 | 0.94 | 3.30 | 1.41 | 0.11 | 2.48 | 1.16 | 2.14 | 1.20 | 17.85 | 1.79 |
| 40 | 3.64 | 0.75 | 2.64 | 1.13 | 0.08 | 1.99 | 0.93 | 1.72 | 0.96 | 13.84 | 1.73 |
| 41 | 1.88 | 0.47 | 1.65 | 0.71 | 0.05 | 1.24 | 0.58 | 1.07 | 0.60 | 8.25 | 1.65 |
| TOTAL | 324.13 | 39.81 | 130.48 | 30.71 | 12.50 | 41.55 | 30.26 | 75.16 | 34.39 | 718.99 | 2.27 |

Combined Detailed Calendar Programme

| YEAR | COMBINED COAL (MT) | | | | | | | | | | TOTAL COAL (MT) |
|------|--------------------|------|------|------|------|------|------|------|------|------|-----------------|
| | SEAM | | | | | | | | | | |
| | IVB | IVA | IV | IIIT | IIIB | IIIC | IIT | IIB | IT | IB | |
| 1 | 0.00 | 0.00 | 0.09 | 0.00 | 0.02 | 0.00 | 0.10 | 0.26 | 0.36 | 1.96 | 2.80 |
| 2 | 0.00 | 0.01 | 0.19 | 0.00 | 0.03 | 0.01 | 0.12 | 0.43 | 1.25 | 2.46 | 4.50 |
| 3 | 0.00 | 0.01 | 0.28 | 0.00 | 0.08 | 0.01 | 0.23 | 1.08 | 3.53 | 2.78 | 8.00 |
| 4 | 0.01 | 0.02 | 0.70 | 0.35 | 0.44 | 0.01 | 0.71 | 1.69 | 4.15 | 2.91 | 11.00 |
| 5 | 0.01 | 0.03 | 1.04 | 0.59 | 0.80 | 0.03 | 0.90 | 1.97 | 4.34 | 3.30 | 13.00 |
| 6 | 0.02 | 0.04 | 1.11 | 0.58 | 0.90 | 0.06 | 1.01 | 2.25 | 5.07 | 3.96 | 15.00 |
| 7 | 0.01 | 0.03 | 0.40 | 0.22 | 0.76 | 0.16 | 0.93 | 2.31 | 5.63 | 4.54 | 15.00 |
| 8 | 0.01 | 0.04 | 0.43 | 0.23 | 0.81 | 0.21 | 0.74 | 2.29 | 5.78 | 4.47 | 15.00 |
| 9 | 0.01 | 0.06 | 0.51 | 0.27 | 0.75 | 0.35 | 0.76 | 2.15 | 5.44 | 4.70 | 15.00 |
| 10 | 0.01 | 0.06 | 0.56 | 0.28 | 0.76 | 0.36 | 0.80 | 2.17 | 5.39 | 4.62 | 15.00 |
| 11 | 0.08 | 0.17 | 1.07 | 0.50 | 0.83 | 0.79 | 0.75 | 2.03 | 4.93 | 3.85 | 15.00 |
| 12 | 0.11 | 0.26 | 1.50 | 0.61 | 0.75 | 0.97 | 0.70 | 1.87 | 4.58 | 3.65 | 15.00 |
| 13 | 0.17 | 0.30 | 1.48 | 0.55 | 0.69 | 1.37 | 0.75 | 2.03 | 4.35 | 3.32 | 15.00 |
| 14 | 0.21 | 0.36 | 1.91 | 0.53 | 0.64 | 1.65 | 0.75 | 1.94 | 4.00 | 3.02 | 15.00 |
| 15 | 0.24 | 0.38 | 2.21 | 0.61 | 0.73 | 1.74 | 0.76 | 1.89 | 3.68 | 2.77 | 15.00 |
| 16 | 0.33 | 0.43 | 2.02 | 0.75 | 0.93 | 1.27 | 0.73 | 1.88 | 3.69 | 2.98 | 15.00 |
| 17 | 0.49 | 0.49 | 2.09 | 0.70 | 0.90 | 0.96 | 0.65 | 1.80 | 3.74 | 3.19 | 15.00 |
| 18 | 0.56 | 0.67 | 2.35 | 0.90 | 1.03 | 0.87 | 0.58 | 1.75 | 3.45 | 2.85 | 15.00 |
| 19 | 0.50 | 0.60 | 2.23 | 0.87 | 1.02 | 0.87 | 0.62 | 1.81 | 3.50 | 2.98 | 15.00 |
| 20 | 0.32 | 0.40 | 1.87 | 0.80 | 1.00 | 0.84 | 0.66 | 1.93 | 3.75 | 3.44 | 15.00 |
| 21 | 0.31 | 0.39 | 1.88 | 0.80 | 1.01 | 0.84 | 0.66 | 1.92 | 3.74 | 3.45 | 15.00 |
| 22 | 0.31 | 0.39 | 1.88 | 0.80 | 1.01 | 0.84 | 0.66 | 1.91 | 3.75 | 3.45 | 15.00 |
| 23 | 0.47 | 0.52 | 2.22 | 0.86 | 1.04 | 0.72 | 0.66 | 1.79 | 3.56 | 3.16 | 15.00 |
| 24 | 0.51 | 0.55 | 2.33 | 0.88 | 1.05 | 0.69 | 0.65 | 1.80 | 3.47 | 3.06 | 15.00 |
| 25 | 0.26 | 0.37 | 2.27 | 0.91 | 1.16 | 0.69 | 0.65 | 1.85 | 3.65 | 3.18 | 15.00 |
| 26 | 0.27 | 0.37 | 2.17 | 0.87 | 1.14 | 0.65 | 0.65 | 1.83 | 3.78 | 3.26 | 15.00 |
| 27 | 0.32 | 0.40 | 1.93 | 0.78 | 1.08 | 0.60 | 0.66 | 1.86 | 3.99 | 3.39 | 15.00 |
| 28 | 0.36 | 0.48 | 1.96 | 0.76 | 1.04 | 0.59 | 0.64 | 1.78 | 4.01 | 3.37 | 15.00 |
| 29 | 0.50 | 0.79 | 1.90 | 0.58 | 0.72 | 0.47 | 0.45 | 1.20 | 2.98 | 2.40 | 12.00 |
| 30 | 0.34 | 0.53 | 1.78 | 0.71 | 0.96 | 0.20 | 0.50 | 1.23 | 3.10 | 2.65 | 12.00 |
| 31 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.21 | 2.84 | 12.00 |
| 32 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.21 | 2.85 | 12.00 |
| 33 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.21 | 2.84 | 12.00 |
| 34 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.23 | 3.21 | 2.84 | 12.00 |
| 35 | 0.22 | 0.34 | 1.68 | 0.80 | 1.13 | 0.01 | 0.53 | 1.24 | 3.21 | 2.83 | 12.00 |
| 36 | 0.15 | 0.24 | 1.43 | 0.69 | 1.11 | 0.00 | 0.56 | 1.38 | 3.30 | 3.14 | 12.00 |
| 37 | 0.10 | 0.17 | 1.25 | 0.61 | 1.10 | 0.00 | 0.58 | 1.48 | 3.37 | 3.35 | 12.00 |

SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, ANANDAPALLY CHANDRAGUPTA AREA

| | | | | | | | | | | | |
|--------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|
| 38 | 0.10 | 0.17 | 1.25 | 0.61 | 1.10 | 0.00 | 0.58 | 1.48 | 3.36 | 3.35 | 12.00 |
| 39 | 0.08 | 0.14 | 1.04 | 0.51 | 0.92 | 0.00 | 0.48 | 1.24 | 2.80 | 2.79 | 10.00 |
| 40 | 0.06 | 0.11 | 0.83 | 0.40 | 0.74 | 0.00 | 0.39 | 0.99 | 2.24 | 2.23 | 8.00 |
| 41 | 0.04 | 0.07 | 0.52 | 0.25 | 0.46 | 0.00 | 0.24 | 0.62 | 1.40 | 1.40 | 5.00 |
| TOTAL | 8.37 | 11.74 | 59.11 | 24.35 | 35.14 | 18.87 | 24.95 | 66.02 | 149.17 | 129.57 | 527.30 |

| YEAR | COMBINED OB (M CUM) | | | | | | | | | TOTAL OB (M CUM) | S.R. (cum/t) |
|------|---------------------|-----------------|--------|-------------|---------|-------------|-------|-------|-------|------------------|--------------|
| | TOP OB | PARTING BETWEEN | | | | | | | | | |
| | | IVB-IVA | IVA-IV | IV-III/IIIC | III-III | III/IIIC-II | II-II | II-IT | IT-IB | | |
| 1 | 2.65 | 0.01 | 0.23 | 0.27 | 0.24 | 0.55 | 0.05 | 1.37 | 2.03 | 7.39 | 2.64 |
| 2 | 4.60 | 0.01 | 0.46 | 0.54 | 0.49 | 0.43 | 0.88 | 1.87 | 1.61 | 10.89 | 2.42 |
| 3 | 4.55 | 0.02 | 0.69 | 0.80 | 0.73 | 1.74 | 1.75 | 3.36 | 1.72 | 15.37 | 1.92 |
| 4 | 5.19 | 0.02 | 1.31 | 1.03 | 0.92 | 2.22 | 1.62 | 3.62 | 1.65 | 17.57 | 1.60 |
| 5 | 6.02 | 0.02 | 1.70 | 0.93 | 1.44 | 1.76 | 1.60 | 3.88 | 1.81 | 19.16 | 1.47 |
| 6 | 6.73 | 0.03 | 1.82 | 1.15 | 1.79 | 1.79 | 1.69 | 4.11 | 2.22 | 21.32 | 1.42 |
| 7 | 7.95 | 0.04 | 0.64 | 1.08 | 1.58 | 1.59 | 1.70 | 4.03 | 2.68 | 21.30 | 1.42 |
| 8 | 7.05 | 0.05 | 0.70 | 1.36 | 1.39 | 1.88 | 2.03 | 4.57 | 2.38 | 21.41 | 1.43 |
| 9 | 6.89 | 0.07 | 0.88 | 2.31 | 0.75 | 1.25 | 1.66 | 4.36 | 2.44 | 20.62 | 1.37 |
| 10 | 7.69 | 0.08 | 0.95 | 2.44 | 0.83 | 1.13 | 1.53 | 4.26 | 2.41 | 21.31 | 1.42 |
| 11 | 9.04 | 0.67 | 1.14 | 2.67 | 0.36 | 1.24 | 1.32 | 3.74 | 1.90 | 22.10 | 1.47 |
| 12 | 10.75 | 1.10 | 1.24 | 2.59 | 0.11 | 1.02 | 1.11 | 3.38 | 1.80 | 23.11 | 1.54 |
| 13 | 12.68 | 1.18 | 2.36 | 2.49 | 0.10 | 1.04 | 1.07 | 2.93 | 1.62 | 25.67 | 1.71 |
| 14 | 15.74 | 1.04 | 3.70 | 2.10 | 0.07 | 0.90 | 0.89 | 2.83 | 1.55 | 28.83 | 1.92 |
| 15 | 16.53 | 1.29 | 5.76 | 1.94 | 0.10 | 0.96 | 0.84 | 3.12 | 1.56 | 32.10 | 2.14 |
| 16 | 14.54 | 2.13 | 6.15 | 1.74 | 0.20 | 1.50 | 1.00 | 3.65 | 1.71 | 32.60 | 2.17 |
| 17 | 14.88 | 2.27 | 4.96 | 1.70 | 0.19 | 2.05 | 1.17 | 3.61 | 1.77 | 32.60 | 2.17 |
| 18 | 16.47 | 3.04 | 4.60 | 1.54 | 0.27 | 2.08 | 0.88 | 2.29 | 1.43 | 32.60 | 2.17 |
| 19 | 16.93 | 2.59 | 4.38 | 1.52 | 0.27 | 2.05 | 0.94 | 2.47 | 1.46 | 32.60 | 2.17 |
| 20 | 17.83 | 1.23 | 3.71 | 1.46 | 0.27 | 1.94 | 1.10 | 3.00 | 1.55 | 32.09 | 2.14 |
| 21 | 17.49 | 1.21 | 4.15 | 1.35 | 0.30 | 1.88 | 1.12 | 3.05 | 1.54 | 32.09 | 2.14 |
| 22 | 17.49 | 1.21 | 4.15 | 1.35 | 0.30 | 1.88 | 1.12 | 3.05 | 1.54 | 32.09 | 2.14 |
| 23 | 13.01 | 2.41 | 6.80 | 1.45 | 0.28 | 2.03 | 1.29 | 3.30 | 1.53 | 32.09 | 2.14 |
| 24 | 11.83 | 2.73 | 7.50 | 1.48 | 0.28 | 2.07 | 1.33 | 3.36 | 1.53 | 32.10 | 2.14 |
| 25 | 14.02 | 1.33 | 6.33 | 1.41 | 0.23 | 2.13 | 1.36 | 3.58 | 1.69 | 32.09 | 2.14 |
| 26 | 14.42 | 1.35 | 5.59 | 1.25 | 0.23 | 2.10 | 1.49 | 3.64 | 1.74 | 31.81 | 2.12 |
| 27 | 16.10 | 1.43 | 2.92 | 1.14 | 0.18 | 2.08 | 1.62 | 3.52 | 1.82 | 30.81 | 2.05 |
| 28 | 15.07 | 1.25 | 2.63 | 0.94 | 0.16 | 1.79 | 1.43 | 3.09 | 1.59 | 27.94 | 1.86 |
| 29 | 5.84 | 3.42 | 6.11 | 0.49 | 0.29 | 1.17 | 1.59 | 2.69 | 1.90 | 23.50 | 1.96 |
| 30 | 8.04 | 2.28 | 4.53 | 0.94 | 0.14 | 1.74 | 1.38 | 3.02 | 1.42 | 23.50 | 1.96 |
| 31 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 32 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 33 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 34 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 35 | 7.80 | 1.82 | 4.03 | 1.31 | 0.07 | 2.27 | 1.40 | 3.53 | 1.27 | 23.50 | 1.96 |
| 36 | 8.04 | 1.41 | 3.99 | 1.54 | 0.10 | 2.69 | 1.39 | 2.96 | 1.37 | 23.50 | 1.96 |
| 37 | 8.19 | 1.13 | 3.96 | 1.70 | 0.13 | 2.98 | 1.39 | 2.57 | 1.44 | 23.50 | 1.96 |

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| | | | | | | | | | | | |
|--------------|---------------|--------------|---------------|--------------|--------------|--------------|--------------|---------------|--------------|---------------|-------------|
| 38 | 6.96 | 1.13 | 3.96 | 1.70 | 0.13 | 2.98 | 1.39 | 2.57 | 1.44 | 22.27 | 1.88 |
| 39 | 5.10 | 0.94 | 3.30 | 1.41 | 0.11 | 2.48 | 1.16 | 2.14 | 1.20 | 17.85 | 1.79 |
| 40 | 3.64 | 0.75 | 2.64 | 1.13 | 0.08 | 1.99 | 0.93 | 1.72 | 0.96 | 13.84 | 1.73 |
| 41 | 1.88 | 0.47 | 1.65 | 0.71 | 0.05 | 1.24 | 0.58 | 1.07 | 0.60 | 8.25 | 1.65 |
| TOTAL | 411.04 | 50.46 | 137.73 | 58.19 | 15.44 | 73.68 | 52.41 | 129.44 | 66.96 | 995.34 | 1.89 |

| YEAR | COAL | | | | OB | | | | SR |
|--------------|---------------|--------------|---------------|---------------|---------------|--------------|---------------|---------------|-------------|
| | Combined | Section 1 | Section 2 | Section 3 | Combined | Section 1 | Section 2 | Section 3 | |
| 1 | 2.80 | 1.50 | 0.80 | 0.50 | 7.39 | 4.10 | 2.28 | 1.00 | 2.64 |
| 2 | 4.50 | 2.00 | 1.50 | 1.00 | 10.89 | 5.49 | 3.40 | 2.00 | 2.42 |
| 3 | 8.00 | 4.00 | 2.50 | 1.50 | 15.37 | 7.05 | 5.32 | 3.00 | 1.92 |
| 4 | 11.00 | 5.00 | 3.00 | 3.00 | 17.57 | 7.04 | 6.03 | 4.50 | 1.60 |
| 5 | 13.00 | 5.00 | 4.00 | 4.00 | 19.16 | 7.03 | 7.14 | 5.00 | 1.47 |
| 6 | 15.00 | 5.00 | 5.00 | 5.00 | 21.32 | 7.02 | 8.30 | 6.00 | 1.42 |
| 7 | 15.00 | 5.00 | 5.00 | 5.00 | 21.30 | 7.00 | 8.30 | 6.00 | 1.42 |
| 8 | 15.00 | 5.00 | 5.00 | 5.00 | 21.41 | 7.01 | 8.40 | 6.00 | 1.43 |
| 9 | 15.00 | 5.00 | 5.00 | 5.00 | 20.62 | 6.02 | 8.60 | 6.00 | 1.37 |
| 10 | 15.00 | 4.43 | 5.00 | 5.57 | 21.31 | 3.21 | 8.60 | 9.50 | 1.42 |
| 11 | 15.00 | | 8.00 | 7.00 | 22.10 | | 8.60 | 13.50 | 1.47 |
| 12 | 15.00 | | 8.00 | 7.00 | 23.11 | | 8.60 | 14.50 | 1.54 |
| 13 | 15.00 | | 8.00 | 7.00 | 25.67 | | 8.60 | 17.06 | 1.71 |
| 14 | 15.00 | | 8.00 | 7.00 | 28.83 | | 8.60 | 20.24 | 1.92 |
| 15 | 15.00 | | 8.00 | 7.00 | 32.10 | | 8.60 | 23.50 | 2.14 |
| 16 | 15.00 | | 8.00 | 7.00 | 32.60 | | 8.60 | 24.00 | 2.17 |
| 17 | 15.00 | | 8.00 | 7.00 | 32.60 | | 8.60 | 24.00 | 2.17 |
| 18 | 15.00 | | 8.00 | 7.00 | 32.60 | | 8.60 | 24.00 | 2.17 |
| 19 | 15.00 | | 8.00 | 7.00 | 32.60 | | 8.60 | 24.00 | 2.17 |
| 20 | 15.00 | | 8.00 | 7.00 | 32.09 | | 8.60 | 23.50 | 2.14 |
| 21 | 15.00 | | 7.00 | 8.00 | 32.09 | | 8.60 | 23.50 | 2.14 |
| 22 | 15.00 | | 7.00 | 8.00 | 32.09 | | 8.60 | 23.50 | 2.14 |
| 23 | 15.00 | | 7.00 | 8.00 | 32.09 | | 8.60 | 23.50 | 2.14 |
| 24 | 15.00 | | 7.00 | 8.00 | 32.10 | | 8.60 | 23.50 | 2.14 |
| 25 | 15.00 | | 7.00 | 8.00 | 32.09 | | 8.60 | 23.50 | 2.14 |
| 26 | 15.00 | | 6.00 | 9.00 | 31.81 | | 8.30 | 23.50 | 2.12 |
| 27 | 15.00 | | 6.00 | 9.00 | 30.81 | | 7.30 | 23.50 | 2.05 |
| 28 | 15.00 | | 4.82 | 10.18 | 27.94 | | 4.44 | 23.50 | 1.86 |
| 29 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 30 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 31 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 32 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 33 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 34 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 35 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 36 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 37 | 12.00 | | | 12.00 | 23.50 | | | 23.50 | 1.96 |
| 38 | 12.00 | | | 12.00 | 22.27 | | | 22.27 | 1.86 |
| 39 | 10.00 | | | 10.00 | 17.85 | | | 17.85 | 1.79 |
| 40 | 8.00 | | | 8.00 | 13.84 | | | 13.84 | 1.73 |
| 41 | 5.00 | | | 5.00 | 8.25 | | | 8.25 | 1.65 |
| TOTAL | 527.30 | 41.93 | 168.63 | 316.75 | 995.34 | 60.97 | 215.38 | 718.99 | 1.89 |

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7.3 Type and Size of Main Mining Equipment

Loading and transportation of coal and OB, blast hole drilling and face preparation have been proposed to be carried out by deploying heavy earth moving machine (shovel – dumper/Surface Miner- FE Loader - Dumper combination).. Elec. Hyd shovels 20-22 cum have been provided for Top OB and other big/ consistent partings. Due to multiple seam /parting scenario and inconsistent load, electric hydraulic shovels of smaller sizes of (5-6 Cum) for Coal and (10-12 Cum) for parting have been provided for other partings to ensure flexibility of operation. Coal winning is proposed to be carried out largely using Surface Miner – FE Loader-Dumper combination and partly using shovel – dumper combination.

Equipment Schedule:

| Particulars | Capacity / Year | 1 | 2 | 3 | 4 | 5 | 6 | Max. beyond Target year |
|------------------------------|-----------------|----|----|----|----|----|----|-------------------------|
| Coal | | | | | | | | |
| Elec Hyd. Shovel | 5.5-6.5 cum | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Surface Miner | SM 3800-4200 | | 1 | 2 | 3 | 4 | 4 | 4 |
| Diesel RBH Drill | 160mm | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Rear Dumpers | 60T | 5 | 9 | 16 | 22 | 26 | 30 | 44 |
| FE Loader | 5-7 Cum | | 2 | 4 | 5 | 7 | 7 | 7 |
| Dozer with ripper attachment | 410 HP | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| Dozer | 410 HP | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| OB | | | | | | | | |
| Elec Hyd Shovel | 20-22 cum | | | | | | | 2 |
| Elec Hyd Shovel | 10-12 cum | 3 | 3 | 5 | 5 | 6 | 6 | 7 |
| Rear Dumpers | 190T | | | | | | | 13 |
| Rear Dumpers | 100T | 17 | 25 | 36 | 41 | 45 | 48 | 48 |
| Electric RBH Drill | 250 mm | | | | | | | 5 |
| Diesel RBH Drill | 160mm | 5 | 5 | 8 | 8 | 9 | 9 | 10 |
| Dozer | 410 HP | 4 | 4 | 6 | 6 | 7 | 7 | 7 |
| Dozer | 750-850HP | 1 | 1 | 1 | 1 | 1 | 1 | 3 |
| Common | | | | | | | | |
| Diesel Hyd. Backhoe | 4.3-5 cum | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Diesel Hyd. Shovel | 3.2-3.5 cum | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Grader | 500 HP | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| AT crane | 80T-100T | | | | | | | 1 |
| RT crane | 40T | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| RT crane | 20T | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Mobile Crane | 8-14T | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| FE Loader | 5-7 Cum. | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Water Sprinkler | 70 KL | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Water Sprinkler Mist Spray | 28KL | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Wheel Dozer | 460 HP | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Dump Trucks | 12-15 T | 5 | 6 | 6 | 6 | 6 | 6 | 6 |

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| Particulars | Capacity / Year | 1 | 2 | 3 | 4 | 5 | 6 | Max. beyond Target year |
|----------------------------|-----------------|---|---|---|---|---|---|-------------------------|
| Diesel Browser | 16KL | 1 | 1 | 2 | 2 | 2 | 2 | 2 |
| Fire Tender | | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Hyd. Rock Breaker | | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cable Handler | | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Tyre Handler | 35kN | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Reclamation | | | | | | | | |
| FE Loader | 5-7 cum | | 1 | 1 | 1 | 1 | 1 | 1 |
| Dozer | 410 HP | | 1 | 1 | 1 | 1 | 1 | 1 |
| Grader | 280 HP | | 1 | 1 | 1 | 1 | 1 | 1 |
| Water Sprinkler | 70KL | | 1 | 1 | 1 | 1 | 1 | 1 |
| Water Sprinkler Mist Spray | 28KL | | 1 | 1 | 1 | 1 | 1 | 1 |
| Dumper | 60T | | 2 | 3 | 3 | 3 | 3 | 3 |

7.4 Drilling & Blasting Operation:

Salient Physico-Mechanical Features of OB Rock and coal

Overburden rocks consist of medium grained sandstone to coarse grained sandstone. Assumed category of rock is 50% of CAT-3 + 50% of CAT-4.

Type and capacity of drills

The blasthole drills of 250/160mm diameter drills for OB/ partings and coal benches has been envisaged.

Elements of Drilling and Blasting:

Drilling of coal & OB benches is recommended to be done vertically at 90°. It is suggested to use slurry explosive in cartridge/site mixed slurry for better result and enhance safety with proper stemming material. Secondary blasting is not suggested in any circumstances. Mine shall create proper explosive storage capacity to cater daily explosive requirement to meet the annual-coal target.

The blasthole pattern (along with Burden & Spacing) will depend on actual site condition. Special precaution needs to be taken during drilling and blasting so that formation of boulders and/ or mixing of coal with OB is avoided.

Operating conditions of the drills

Provision for secondary blasting should be kept to a minimum. Proper blasthole design of the OB and coal bench will reduce the necessity of secondary blasting. The burden and spacing of each bench should be designed in such a manner that it should produce the necessary fragmentation with due consideration to safety of men and machine. The actual blast-hole design should be done only after conducting field trials and controlled blasting should be practised.

✓ A dolerite dyke having roughly 1.76km length has been encountered in the northern part of the property. Additional precaution for drilling and blasting needs to be taken to negotiate the same.

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CHAPTER-VIII COAL QUALITY

8.1 INTRODUCTION

There are standard co-relatable coal seams of Barakar formation occurring in Pachra Integrated OC. Seam I Bot, I Top, II Bot, II Top, III Com, III Bot, III Top, IV, IVA and IVB.

8.2 QUALITY ANALYSIS

Presence of in seam band seam wise (Numbers and thickness of each band, total band thickness).

The average in band quality of different seams has been summarised below:

Table 8.1 – In Band Seam Quality – PIT-1

| Seam/ Parting | Average Quality Parameters | | | | |
|---------------|----------------------------|-----------|-------|-------------|-------|
| | Ash% | Moisture% | VM% | CV(Kcal/kg) | Grade |
| IVB | 29.97 | 11.69 | 33.03 | 4092.27 | G11 |
| IVA | 39.14 | 6.49 | 21.46 | 3928.62 | G12 |
| IV | 30.68 | 8.20 | 22.36 | 4508.93 | G10 |
| III Top | 31.22 | 8.91 | 22.67 | 4317.97 | G10 |
| III Comb. | 34.33 | 7.90 | 23.0 | 4197.56 | G11 |
| III Bottom | 33.94 | 7.03 | 22.27 | 4331.68 | G10 |
| II Top | 31.92 | 7.44 | 22.98 | 4415.67 | G10 |
| II Bottom | 40.43 | 5.75 | 21.73 | 3919.62 | G12 |
| I Top | 42.47 | 5.39 | 22.93 | 3962.74 | G12 |
| I Bottom | 42.58 | 5.20 | 22.20 | 3798.62 | G12 |

Table 8.2 – In Band Seam Quality – PIT-2

| Seam/ Parting | Average Quality Parameters | | | | |
|---------------|----------------------------|-----------|-------|-------------|-------|
| | Ash% | Moisture% | VM% | CV(Kcal/kg) | Grade |
| IVB | 33.61 | 11.69 | 28.73 | 4055.33 | G11 |
| IVA | 40.67 | 6.49 | 21.20 | 4006.37 | G11 |
| IV | 30.68 | 8.20 | 23.10 | 3775.54 | G12 |
| III Top | 31.22 | 8.91 | 22.89 | 4280.62 | G11 |
| III Comb. | 34.33 | 7.90 | 22.75 | 4222.58 | G11 |
| III Bottom | 33.94 | 7.03 | 22.35 | 4270.82 | G12 |
| II Top | 31.92 | 7.44 | 22.73 | 4379.92 | G10 |
| II Bottom | 40.43 | 5.75 | 21.56 | 4538.41 | G10 |
| I Top | 42.47 | 5.39 | 22.4 | 3766.06 | G12 |
| I Bottom | 42.58 | 5.20 | 21.95 | 4055.33 | G11 |


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Table 8.3 – In Band Seam Quality – PIT-3

| Seam/ Parting | Average Quality Parameters | | | | |
|---------------|----------------------------|-----------|-------|-------------|-------|
| | Ash% | Moisture% | VM% | CV(Kcal/kg) | Grade |
| IVB | 36.75 | 6.72 | 22.69 | 4132.11 | G11 |
| IVA | 41.24 | 5.78 | 20.29 | 3844.33 | G12 |
| IV | 32.18 | 5.40 | 23.10 | 4735.52 | G9 |
| III Top | 33.85 | 5.06 | 22.83 | 4633.32 | G9 |
| III Comb. | 36.54 | 4.17 | 22.27 | 4487.52 | G10 |
| III Bottom | 38.17 | 4.37 | 21.98 | 4339.39 | G10 |
| II Top | 38.91 | 4.30 | 22.81 | 4230.58 | G11 |
| II Bottom | 44.44 | 3.71 | 21.09 | 3829.03 | G12 |
| I Top | 41.52 | 3.17 | 22.72 | 4181.97 | G11 |
| I Bottom | 45.32 | 2.74 | 21.52 | 3909.07 | G12 |

8.3 PROJECTED COAL QUALITY

The overall grade of the product mix of project will be 'G11'.

Table 8.4 – Year wise quality

| Year | Ash% | Moisture% | VM% | GV (Kcal/kg) |
|------|-------|-----------|-------|--------------|
| Y1 | 39.73 | 4.93 | 22.39 | 4167 |
| Y2 | 39.65 | 4.89 | 22.35 | 4149 |
| Y3 | 39.53 | 5.10 | 22.36 | 4113 |
| Y4 | 39.45 | 5.12 | 22.36 | 4113 |
| Y5 | 39.40 | 5.12 | 22.36 | 4124 |
| Y6 | 39.42 | 5.04 | 22.34 | 4130 |
| Y7 | 39.54 | 5.00 | 22.34 | 4126 |
| Y8 | 39.57 | 5.01 | 22.35 | 4119 |
| Y9 | 39.53 | 5.07 | 22.35 | 4103 |
| Y10 | 39.57 | 5.00 | 22.34 | 4108 |
| Y11 | 39.41 | 4.79 | 22.27 | 4118 |
| Y12 | 39.47 | 4.80 | 22.27 | 4105 |
| Y13 | 39.43 | 4.83 | 22.27 | 4095 |
| Y14 | 39.42 | 4.84 | 22.30 | 4093 |
| Y15 | 39.38 | 4.82 | 22.30 | 4097 |
| Y16 | 39.34 | 4.79 | 22.29 | 4106 |
| Y17 | 39.30 | 4.80 | 22.28 | 4115 |
| Y18 | 39.18 | 4.82 | 22.27 | 4122 |
| Y19 | 39.22 | 4.81 | 22.27 | 4118 |
| Y20 | 39.35 | 4.78 | 22.29 | 4107 |
| Y21 | 39.53 | 4.65 | 22.28 | 4116 |
| Y22 | 39.53 | 4.65 | 22.28 | 4116 |


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| Year | Ash% | Moisture% | VM% | CV (Kcal/kg) |
|-------|-------|-----------|-------|--------------|
| Y23 | 39.47 | 4.66 | 22.26 | 4125 |
| Y24 | 39.43 | 4.68 | 22.26 | 4126 |
| Y25 | 39.46 | 4.66 | 22.29 | 4127 |
| Y26 | 39.67 | 4.52 | 22.27 | 4134 |
| Y27 | 39.69 | 4.52 | 22.26 | 4130 |
| Y28 | 39.91 | 4.36 | 22.24 | 4141 |
| Y29 | 40.76 | 3.75 | 22.16 | 4174 |
| Y30 | 40.76 | 3.75 | 22.16 | 4174 |
| Y31 | 40.76 | 3.75 | 22.16 | 4174 |
| Y32 | 40.76 | 3.75 | 22.16 | 4174 |
| Y33 | 40.76 | 3.75 | 22.16 | 4174 |
| Y34 | 40.76 | 3.75 | 22.16 | 4174 |
| Y35 | 40.76 | 3.75 | 22.16 | 4174 |
| Y36 | 40.76 | 3.75 | 22.16 | 4174 |
| Y37 | 40.76 | 3.75 | 22.16 | 4174 |
| Y38 | 40.76 | 3.75 | 22.16 | 4174 |
| Y39 | 40.76 | 3.75 | 22.16 | 4174 |
| Y40 | 40.76 | 3.75 | 22.16 | 4174 |
| Y41 | 40.76 | 3.75 | 22.16 | 4174 |
| TOTAL | 39.82 | 4.52 | 22.26 | 4132.55 |

Although coal seam, overburden / interburden will be worked separately having separate benches, yet, there is a chance of deterioration in quality of coal due to admixtures from roof and floor of the seam and by the inclusion of bands (<1m) within the seam. It is envisaged that the roof of the seam is properly cleaned before blasting. A proper organization and strict quality control measures are necessary to maintain the quality of coal at faces with all precautions for quality control to reduce contamination at each contact point of coal & OB or parting.

As evident from above table the average product Mix quality of seams for all pits shall be G11 with average GCV range of 4000 - 4300 Kcal /kg.


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CHAPTER-IX

PUMPING AND DRAINAGE

9.1 INTRODUCTION

The pumping system of Chandragupt OCP of CCL has been designed to dewater the inflow of water due to precipitation within the active pit limit during the monsoon and non-monsoon season and the ground water discharged from aquifers to enable the mining activity to continue round the year. The planning of dewatering the mine has been done in such a way that the working faces and haul roads will remain dry as far as possible. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self drainage of water to the sump at the lowest level of the quarry.

9.2 SOURCE OF WATER

The intake of rainwater to the opencast mine is non-uniform during the year. The maximum rainwater intake will be during the period of about four months (middle of June to middle of October) in a year. During dry season, seepage from strata is expected to be moderate and the same can be dealt by running required number of pumps provided for pumping during monsoon. During this period, repair & overhauling of the pumps will be done by rotation.

It is proposed to make garland drains around the quarries and divert the surface water including rainwater from catchments area to nearby natural course of water / nallah.

The capacity of main pumps is selected to pump out the expected make of water accumulated in the mine due to maximum rainfall in a day.

During the heavy monsoon period, the work in lower most benches may have to be stopped as it has been proposed to use a part of the lower most benches as sump.

Water accumulated in the sump will be pumped out to the surface and discharged into the nallah flowing outside the quarry. It is proposed to create a sedimentation lagoon by constructing a series of check dams across the nallah. The lagoon will help to separate the suspended solids from the mine water.

Water overflowing the check dams would join near-by Barki River.

SURFACE DRAINAGE AND FLOOD PROTECTION

All the smaller natural channels of water and nallah, finally join the Barki river form the group representing the surface water resources in the region. A suitable garland drain is proposed to arrest the rainwater entering into the mine.

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9.4 THE SURFACE DRAINAGE AND FLOOD PROTECTION SYSTEM FOR THE MINE WILL INCLUDE

- Diversion of water courses to other water courses away from the mining area.
- Diversion dams/ bunding arrangement as part of water course diversions to prevent water entering the mining area.
- Cross drainage structures where the haul road and other access roads cross diversions.
- Various inlet, outlet and erosion protection structures.

9.5 IN-PIT DRAINAGE WORK

During the rainy season, water will be allowed to accumulate in the sump on the floor of lower most Seam of the quarry. Sumps are provided for the dewatering pumps which will transfer in-pit water for controlled discharge off the site. The planning of dewatering the mine shall be done in such a way that the working faces and haul roads in the quarry shall remain dry as far as possible. The layout of the quarry provides suitable gradient along the quarry floors and the benches to facilitate self drainage of water to the sump at the lowest level of the quarry.

Water accumulated in the mine sump will be pumped out to the surface and finally discharged into the near- by Barki river.

9.6 GENERAL CONSIDERATIONS

9.6.1 The pumping requirement has been calculated on the basis of the following general considerations:-

- The geographical location of the Project.
- Meteorological data from the area / nearest rain-gauge station concerning rainfalls.
- Life of the mine and percentage probability of maximum rainfall in one day during the life of the mine.
- General climatic conditions, Surface features of the terrain beyond the boundary of the mine / opencast working.
- Catchments area: Mined out areas and areas beyond excavation, and dumped / spoil dump area.
- Run-off characteristics of the area.
- Depth of the quarries at different stages.
- Inflow to the quarry of UG water & seepage from nearby nallah/ river.


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- Desired location at the surface where the quarry water can be discharged, considering the Surface drainage system.
- Maximum number of days to pump out the accumulated water in the quarry during peak rainfall in monsoon and the number of pumping operation hours per day-5 days @ 20 hours per day
- Geological characteristics of OB and coal seams.
- Desired location at surface where quarry water can be discharged considering the surface drainage system.
- Effective working hours – 20 hours/day for pumping calculation, but in monsoon period pumping may be done round the clock.

9.6.2 BASIC DATA

The following data has been taken into consideration for arriving at the volume of water accumulating in the quarry and the size of the pumps:-

Table-10.1: Basic data for Quarry Pumping

| | | | |
|-----|---|---|---|
| (a) | Maximum depth of the proposed mine | : | PIT1-90m, PIT2-165m, PIT3-220m |
| (b) | Probable maximum rainfall in a day in monsoon period from the probability curve | : | 150mm |
| (c) | Depth and Catch-ment area stage wise | : | Given in the stage wise calculation of water volume. |
| (d) | Run-off Co-efficient considered | : | i) For mined out area = 0.5 |
| | | : | ii) For internal dump area = 0.10 |
| | | : | iii) For area beyond excavation = 0.10 |
| (e) | Inflow of water to the quarry due to seepage and underground precipitation | : | 10% of probable water accumulation due to nearby Barki river. |
| (f) | The rainfall data has been adopted as recorded. | : | IMD Hazaribagh |

9.7 ASSEMENT OF MAXIMUM RAINFALL IN A DAY

This has been drawn from the probability curve of rain-fall data received from IMD Hazaribagh, for last 10 years. The calculation has been done taking into consideration the entire area of the quarry of the proposed mine for its entire years of operational life. The probable maximum daily rainfall has been taken as 150mm for calculation purpose.

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9.7.1 CALCULATIONS AND ASSESSMENT OF VOLUME OF WATER TO BE PUMPED

The calculation has been done taking into consideration the entire area of the quarry of the proposed mine. Pumping system has been designed for the volume of water accumulated in the mine at the final stage of production considering probable maximum daily rainfall as 150mm. Pumping capacity worked out as under (considering water to be pumped out in 100 hrs @ 20 hrs pumping per day). The volume of maximum precipitation of water in the mine taking 10% for seepage and underground precipitation due to nearby Barki river on the day of maximum rainfall has been as under:

Table-9.2: Calculation of Volume of water

PIT-1

| At the end of year | Catchment's area in Sq. km | | | | Depth of mine (m) | Max. ^m probable rainfall in a day (mm) | Volume of water ('000 Cum/day) |
|--------------------|----------------------------|----------------|--------------------|------------------------|-------------------|---|--------------------------------|
| | Total quarry area | Mined-out area | Internal dump area | Area beyond excavation | | | |
| 5 th | 0.87150 | 0.83 | 0.500 | 0.04150 | 58 | 150 | 36.160 |
| 10 th | 2.2470 | 2.14 | 1.950 | 0.1070 | 90 | 150 | 49.616 |

PIT-2

| At the end of year | Catchment's area in Sq. km | | | | Depth of mine (m) | Max. ^m probable rainfall in a day (mm) | Volume of water ('000 Cum/day) |
|--------------------|----------------------------|----------------|--------------------|------------------------|-------------------|---|--------------------------------|
| | Total quarry area | Mined-out area | Internal dump area | Area beyond excavation | | | |
| 6 th | 1.0710 | 1.02 | 0.800 | 0.0510 | 50 | 150 | 32.192 |
| 13 th | 2.7825 | 2.65 | 1.200 | 0.1325 | 80 | 150 | 141.611 |
| 18 th | 3.0975 | 2.95 | 1.420 | 0.1475 | 95 | 150 | 152.089 |
| 23 rd | 3.8640 | 3.68 | 2.340 | 0.1840 | 130 | 150 | 152.196 |
| 28 th | 4.5675 | 4.35 | 3.110 | 0.2175 | 165 | 150 | 157.204 |

PIT-3

| At the end of year | Catchment's area in Sq. km | | | | Depth of mine (m) | Max. ^m probable rainfall in a day (mm) | Volume of water ('000 Cum/day) |
|--------------------|----------------------------|----------------|--------------------|------------------------|-------------------|---|--------------------------------|
| | Total quarry area | Mined-out area | Internal dump area | Area beyond excavation | | | |
| 6 th | 0.5565 | 0.53 | 0.310 | 0.0265 | 60 | 150 | 23.702 |
| 13 th | 1.5750 | 1.50 | 0.510 | 0.0750 | 80 | 150 | 91.328 |
| 18 th | 2.1420 | 2.04 | 1.150 | 0.1020 | 95 | 150 | 94.083 |
| 23 rd | 3.2550 | 3.10 | 2.300 | 0.1550 | 90 | 150 | 106.508 |

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| | | | | | | | |
|------------------|--------|------|-------|--------|-----|-----|---------|
| 28 th | 4.3470 | 4.14 | 3.100 | 0.2070 | 125 | 150 | 139.706 |
| 33 rd | 4.4100 | 4.20 | 4.000 | 0.2100 | 150 | 150 | 85.965 |
| 38 th | 5.4600 | 5.20 | 4.600 | 0.2600 | 180 | 150 | 129.690 |
| 41 st | 6.6150 | 6.30 | 5.300 | 0.3150 | 220 | 150 | 175.148 |

9.9 PUMPING CAPACITY

PUMPING CAPACITY REQUIRED :

Probable water accumulation on the day of maximum rainfall taking 10% for seepage and underground precipitation:-

PIT-1

5th Year = 36160 Cum., Pumping capacity/hr = 362 cum/hr (100 lps)

10th Year = 49616 Cum., Pumping capacity/hr = 496 cum/hr (137 lps)

PIT-2

6th Year = 32192 Cum., Pumping capacity/hr = 322 cum/hr (89 lps)

13th Year = 141611 Cum., Pumping capacity/hr = 1416 cum/hr (392 lps)

18th Year = 152089 Cum., Pumping capacity/hr = 1521 cum/hr (421 lps)

23rd Year = 152196 Cum., Pumping capacity/hr = 1522 cum/hr (422 lps)

28th Year = 157204 Cum., Pumping capacity/hr = 1572 cum/hr (435 lps)

PIT-3

6th Year = 23702 Cum., Pumping capacity/hr = 237 cum/hr (66 lps)

13th Year = 91328 Cum., Pumping capacity/hr = 913 cum/hr (253 lps)

18th Year = 94083 Cum., Pumping capacity/hr = 941 cum/hr (261 lps)

23rd Year = 106508 Cum., Pumping capacity/hr = 1065 cum/hr (295 lps)

28th Year = 139705 Cum., Pumping capacity/hr = 1397 cum/hr (387 lps)

33rd Year = 85965 Cum., Pumping capacity/hr = 860 cum/hr (238 lps)

38th Year = 129690 Cum., Pumping capacity/hr = 1297 cum/hr (359 lps)

41st Year = 175147 Cum., Pumping capacity/hr = 1751 cum/hr (485 lps)

9.10 SELECTION OF PUMPS AND DELIVERY RANGES:

On the basis of the calculation and providing standby pumping capacity, the pumps have been provided for the quarry as under:-

PIT-1

a) PUMPS:-

Main Pumps


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Three nos. of 120 lps x 130 m head pumps have been provided for the quarry. Out of three pumps, two will be working & one standby.

Low Head Pumps

Two nos. of 38 lps x 60 m head pumps have been provided during initial mining operation. Out of two pumps, one pump has been kept as standby.

Face Pumps and Slurry Pumps

Two nos. of Face Pumps of 15 lps x 60 m head and two nos of Slurry Pumps of 22 lps x 45 m head capacities have been provided to pump out the water & slurry respectively accumulated near the working faces of the quarry. Out of these pumps, one pump each has been kept as standby.

Diesel Pump

One number of 80 lps x 130 m head diesel pump has been provided for emergency requirement of the quarry.

PIT-2

a) PUMPS:-

Main Pumps

Five nos. of 120 lps x 220 m head pumps have been provided for the quarry. Out of five pumps, four will be working & one standby.

Low Head Pumps

Three nos of 120 lps x 130 m head and three nos. of 38 lps x 60 m head pumps have been provided during initial mining operation. All the three pumps of 120 lps x 130 m head will be working. Out of three pumps of 38 lps x 60 m head, two will be working & one has been kept as standby.

Face Pumps and Slurry Pumps

Four nos. of Face Pumps of 15 lps x 60 m head and four nos of Slurry Pumps of 22 lps x 45 m head capacities have been provided to pump out the water & slurry respectively accumulated near the working faces of the quarry. Out of these pumps, one pump each has been kept as standby. One pump each of Face & Slurry pump will come to PIT-2 after their utility is over in PIT-1.

Diesel Pump

One number of 80 LPS x 220 m head diesel pump has been provided for emergency requirement of the quarry.

PIT-3

a) PUMPS:-

Main Pumps

Five nos. each of 120 lps x 260 m head and 120 lps x 180 m head pumps have been provided for the quarry. Out of these each five pumps, four will be working & one standby.

Low Head Pumps

Four nos of 120 lps x 130 m head and three nos. of 38 lps x 60 m head pumps have been provided during initial mining operation. Out of these pumps , one pump each has been kept as standby.

Face Pumps and Slurry Pumps

Five nos of Face Pumps of 15 lps x 60 m head and five nos of Slurry Pumps of 22 lps x 45 m head capacities have been provided to pump out the water & slurry respectively accumulated near the working faces of the quarry. Out of these pumps, one pump each has been kept as standby. One pump each of Face & Slurry pump will come to PIT-3 after their utility is over in PIT-1. Two pumps each of Face & Slurry pump will come to PIT-3 after their utility is over in PIT-2.

Diesel Pump

One number of each 80 lps x 260 m and 80 lps x 130 m head diesel pump has been provided for emergency requirement of the quarry. One number of 80 lps x 130 m head diesel pump will come to PIT-3 after its utility is over in PIT-1.

b) SELECTION OF DELIVERY RANGES

The delivery ranges have been selected on the basis of the pumping capacity during probable maximum rainfall and velocity of flow within the reasonable limit. The delivery ranges for different capacity of pumps have been selected for nominal diameters as 250mm, 200mm, 150mm and 100mm for the pumps as per manufacturer's standard.


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CHAPTER-X

COAL HANDLING & DESPATCH ARRANGEMENTS

10.1 INTRODUCTION

The Project report for Chandragupt OCP has been prepared for the production of 15.0 Mty of ROM coal. The total production of coal has been proposed from three sections, namely Section-1, 2 & 3. The coal production have proposed through surface miner as well as shovel dumper. A Coal handling plant has been proposed at surface near quarry mouth to cater entire production either through surface miner or shovel dumper. Accordingly facilities of receiving, crushing, storage & loading /conveying arrangement has been envisaged. Crushing facility has been envisaged to cater the entire production of ROM coal through Shovel - Dumper.

10.2 DESIGN PARAMETERS

10.2.1 BASIC DATA

The following parameters has been considered while designing & planning of different units of coal handling plant:

| Sl. No | Particulars | Considered Summarised Data |
|--------|--|---|
| (a) | Coal production of mine | 15.0 Mty |
| (a) | Coal Handling Plant Capacity | 15.0 Mty |
| (b) | Number of working days/year | 30 |
| (c) | Number of working shift/day | 3 (8 hrs. each) |
| (d) | Number of effective working hours/day | 15 |
| (e) | Type of unloading dumper at receiving pit of CHP | Rear Discharge Dumper |
| (f) | Feed size of ROM. coal (in mm) | 1200 mm from shovel dumper & (-)100 mm through Surface miner. |
| (g) | Despatch size (in mm) | (-) 100 mm |
| (h) | Type of loading | i) By belt conveyors to Silo & RLS into wagons. |
| (i) | Loading hours | Round the clock. |
| (j) | Average Grade of coal | Power grade |
| (k) | H.G.I. | 40-60 |
| (l) | Consumer | Power station. |
| (m) | Mode of Despatch | By conveyer & RLS |


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10.2.2 CHP WORKING SCHEDULE

The coal handling plant will be working in three shifts per day and seven days a week basis with its all units like receiving of ROM coal, conveying, storage in ground bunker, reclamation and load out system through belt conveyers & RLS.

10.2.3 SYSTEM CAPACITY

The handling capacity of the CHP has been planned to match with the production capacity of the mine. Ten nos. of receiving hoppers have been envisaged to receive coal produced through surface miners. Coal produced through surface miners (about 75-80%) will be brought at surface by rear discharge and unloaded in to receiving hoppers. Total ten nos. (2x5 hoppers) have been provided to receive surface miner coal (-100 mm). Each truck receiving hoppers have been provided with electromagnetic vibrating feeder to reclaim coal at under width conveyors. Two nos. of conveyors each having nominal capacity 2000tph and 1600 mm width have been provided under set of 5 nos. of hoppers. Out of five nos. of hopper in each series only four will be operative.

Coal produced through blasting will about 20-25%. As such one no. of sizer having nominal capacity of 1500 TPH have been envisaged for receiving, crushing in two stages and conveying of coal up to bunkers through belt conveyors.

The coal will be stored in two nos. of bunkers at surface. This has been selected to meet any fluctuations of coal output from the mine or due to irregularities of despatch / transport system and seasonal fluctuations. For coal produced through surface miner the nominal system capacity has been selected as 2000 tph for each stream. One stream of nominal capacity 1500 tph has been proposed for coal receiving, crushing conveying for coal produced through shovel dumpers. The nominal capacity of each reclaim or loading conveyors from ground bunker to Silo have been kept 1800 tph. For key plan of proposed coal handling system, please refer drawing.

10.2.4 SALIENT FEATURES

The following factors have been considered in finalising the location and system of proposed Coal handling System:

- Mine boundary, surface, flak and quarry floor
- Mine entry
- Conveying and Loading / feed arrangement
- Topography
- Availability of space
- Receiving arrangements (size of coal and type of dumpers)
- Crushing facility for part of coal produced from shovel dumpers


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- Power supply and distribution network
- Miscellaneous facilities like dust control system, fire fighting and ventilation system. Plant cleaning and infrastructure for preventive maintenance are also envisaged.
- Necessary Electrical, interlocking, signalling and communication facilities.

10.2.5 SYSTEM DESCRIPTION

The CHP will have the following functional units as shown in the key plan of CHP. Receiving Pits for ROM shovel dumpers & surface miner coal, Sizers & belt conveyors

- Ground storage bunkers & Reclamation
- Conveying up to railway siding through belt conveyors.
- Loading of coal through Silo & RLS.
- Loading of sized /Crushed coal (-100mm) through Silo & RLS
- Dust control system
- Dust suppression system
- Noise control system
- Fire Protection system
- Plant cleaning system
- Plant preventive maintenance
- Weighment

10.2.6 PLANT DESCRIPTION

10.2.6.1 Receiving and Crushing Arrangement

Entire ROM coal produced from mine /Project either through Shovel - Dumper combination or Surface miner (-100 mm coal) will be transported by dumpers at surface and discharged to respective receiving hoppers.

For shovel dumper, coal crushing system (at Receiving pit) near mouth of quarries has been provided. One no. of primary and subsequently one secondary sizer of suitable capacity (nominal 1500 tph capacity) has been envisaged for crushing of this coal. The coal will be crushed up to (-) 100 mm size in two stages by primary and secondary sizers. There is one independent stream for crushing of coal up to (-) 100 mm size having nominal capacity 1500 tph. ROM Coal from receiving hopper will be fed to primary sizer through apron feeder. The crushed coal from primary sizer (nominal capacity 1500 TPH each) will be collected by conveyors (1C3) and fed to secondary sizer (nominal capacity 1500 TPH each). The crushed coal from secondary sizer will be collected by conveyor (2C3) and fed to any tripper conveyors (3C3 or 3C4) respectively. This coal from tripper conveyors will spread and stored in ground bunker- 2 of 20,000 te Capacity.

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Width and nominal capacity of all above conveyors (1C3& 2C3) in proposed CHP system will be 1600 mm and 1500 tph respectively.

For coal produced through surface miner (-100 mm size): Ten nos. of receiving hoppers have been envisaged at receiving pit near quarries mouth to receive coal produced through surface miners. Coal produced through surface miners (About 10.5 MTY) will be brought at surface by rear discharge and unloaded in to receiving hoppers. Total ten nos. (2x5 hoppers) have been provided to receive surface miner coal (-100 mm). Each truck receiving hoppers have been provided with electromagnetic vibrating feeder to reclaim coal at under width conveyors. Two nos. of conveyors each having nominal capacity 2000 tph and 1600 mm width have been provided under hoppers. Each conveyors will cater set of 5 nos. of hoppers. Out of five nos. of hopper fitted with Vibrating feeders in each series only four will be operative at a time. The surface miner coal from receiving hoppers will be collected by either of conveyors (1C1 & 1C2) and fed to any conveyor (2C1 & 2C2). Coal from conveyors (2C1 & 2C2) will be fed to tripper conveyors (3C1 or 3C2) respectively. This coal from tripper conveyors will spread and stored in ground bunker- 1 of 20,000 te Capacity.

Width and nominal capacity of all above conveyors (1C1 & 1C2 /2C1 & 2C2/3C1 & 3C2) in proposed CHP system will be 1600 mm and 2000 tph respectively. Key plan and Coal flow arrangement of the proposed coal handling system has been shown in drawing.

10.2.6.2 Storage Bunker and Reclamation system

The crushed coal received through crushing system will be fed to respective tripper conveyors as stated above. The coal from the tripper conveyors (3C1-3C2 & 3C3-3C4) will uniformly discharge coal from one end of the bunker to other end with the help of trippers & cascading chute. This ground bunkers (above ground) have been provided for total storage facility of 40,000 te capacity (2x20000 te) to meet the requirement of fluctuation of coal production. The bunker shall be designed & constructed in a manner so that minimum sloping angle of 55 deg. to the horizontal may be achieved and it will have two slits type opening (in each bunker) for plough feeder at the bottom for reclamation of coal. Below the bunker slits opening reclaim conveyors are provided to collect coal reclaimed through plough feeders. The nominal capacity of the each reclaim conveyors (4C1 - 4C2 & 4C3 - 4C4) and plough feeders shall be of 1800 tph and width 1600 mm. Each bunker have been provided with four nos. of plough feeders out which two will be working at a time in each bunker.

Reclaim conveyors (4C1 - 4C2 & 4C3 - 4C4) shall feed coal to (5C1 - 5C2 & 5C3 - 5C4) belt conveyors which shall finally feed to 4000te to 2 no silos.

Width and nominal capacity of all above reclaim conveyors in proposed CHP system will be 1600 mm and 1800 tph respectively.

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Width and nominal capacity of all above reclaim conveyors in proposed CHP system will be 1600 mm and 1500 tph respectively.

10.2.6.3 Load out and despatch system

Following facilities have been envisaged for conveying, loading despatch of coal from the proposed CHP. The total nominal rated coal production of the Project will be 15.0 Mty.

Sized coal (-) 100 mm stored in bunkers of CHP will be reclaimed through 4 nos. of plough feeders (2 nos. in each bunker). The respective pair of reclaim conveyors fitted below each bunkers will receive sized raw coal from bunkers. Coal reclaimed through plough feeders will be collected by any reclaim conveyors (4C1-4C2 & 4C3-4C4) as per system requirement. Reclaim conveyors (4C1 - 4C2 & 4C3 - 4C4) shall feed coal to (5C1 - 5C2 & 5C3 - 5C4) belt conveyors which shall finally feed to 4000te size to 2 no silos.

Width and nominal capacity of each reclaim conveyor will be 1600 mm and 1800 tph respectively.

Two nos. Silo having capacity of 4000te each have been envisaged on the proposed Chandragupt (Amrapali) railway siding for loading and despatch of coal. Coal from Silo will be loaded into railway wagons through Rapid load out system (capacity 6500 tph) for final despatch of coal to the desired customers.

10.2.6.4 Dust Control System

The Dust control system envisages both dust extraction as well as dust suppression system.

10.2.6.5 Dust Suppression System

The objective of this system is to eliminate the air borne coal dust or suppress the dust at its source. The system involves confinement of the dust within the dust producing area by a curtain of moisture and wetting the coal dust by direct contact between the particles and droplet of water. Adequate number of precision anti-clog nozzles will be installed at suitable locations for suppressing dust by spraying water mixed with suppressant. Suitable control for dust suppression shall be provided and the system shall be so inter-locked that it functions only when the conveyor system is operating or the loading operation is on.

10.2.6.6 Noise Control

Noise pollution causes fatigue to operating personals. Provision will therefore be made to keep down the noise level to the extent possible. All machine mountings will have in their foundations anti-vibration pads/sheets for reducing the vibration and thereby noise. All transfer chutes and hoppers shall have wear resistant rubber or ultra-high molecular weight plastic / synthetic liners of various thickness as per design requirement and their suitability.

10.2.6.7 Fire Fighting System

Necessary fire fighting system has also envisaged for the plant, which includes fire hydrant tees at strategic locations in sufficient quantity with suitable water supply pipe lines to cover the entire plant. Also portable type fire extinguishers to deal with electrical / oil / ordinary fires shall be provided at all strategic locations in the plant.

10.2.6.8 Plant cleaning system

To facilitate cleaning at strategic locations ample number of high pressure water serving points have been envisaged. These service points will be so located that entire working area in the plant or equipment working place can be reached. These service points will be provided with quick connecting hose couplings for easy fixing and dismantling of hoses.

To handle discharge from plant effluent and washing of the plant area, sump pumps of suitable design and capacities have also been envisaged where required. Plant effluent shall be discharged through open drain/ pipe.

10.2.6.9 Plant Preventive Maintenance

For effective maintenance of all the equipment, there will be sufficient working space around the equipment/machinery. All the equipment and conveyor discharge drums/transfer points, etc shall have covered and well ventilated housing complete with access stair ways, hand rails, platforms, cross-over ladders, etc as required.

Necessary mono-rails electric hoists and chain pulley blocks at suitable points of adequate capacity will also be provided on respective floors.

10.2.6.10 Weighment

For the purpose of Weighment of coal handling and dispatched in the CHP, one belt weigher of suitable capacity have been provided in each receiving and despatch circuit of the CHP conveyors. Four nos. of road weigh bridges have also been provided for weighment of coal during initial years of mine operations.

Three nos. in motion rail weigh bridges have also been provided for weighment of empty and loaded rakes for dispatch of coal.

10.3 ELECTRICALS

The electrical system shall comprise:

- Power reception and distribution system
- Centralized sequence control-cum-interlocking, automation, signaling and instrumentation system
- Illumination of plant and adjacent area


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- Centralized welding circuit
- Earthing

10.4 DRAWINGS

A tentative key plan and coal flow of the proposed coal handling system has been given in the drawing.

10.5 RAILWAY SIDING

The proposed railway siding with MGR bulb facilities of adjacent Amrapali Project will be used for loading and dispatch of coal from the mine. The siding would take-off from Manatu station (Near Shivpur) of the proposed Arterial (Tori-Shivpur) line. The approximate distance of the proposed alignment taking off from Manatu station of main Arterial to railway siding of the Amrapali OCP is about 14 Km for single link line and yard portion with MGR bulb. Considering the volume of coal to be despatched through rail, provision for double link line with necessary yard facilities have been envisaged in the proposed siding system. Necessary rail lines in the yard / MGR has been envisaged to accommodate three nos. Silo for loading of coal into railway wagons through RLS. The coal of Chandragupt mine may also be evacuated through this railway siding. As such additional lines in link as well as in yard portion may be required.

Provision has been made in the proposed siding to inter-link in MGR systems so that loading of rakes will be made by any silos & RLS to any consumer wagons for loading and despatching of coal from this project. As such additional rail lines in yard have been proposed to facilitate loading through any Silo simultaneously.

For the proposed production, coal from this Project will be loaded at Amrapali siding through Silo and RLS. Sufficient rail lines in yard and link portion at Amrapali siding has been envisaged to facilitate the loading operation. Provision has been envisaged that two loading chutes of RLS fitted below each silo will be placed on two different rail lines for loading of coal into rail wagons.


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CHAPTER -XI

WORKSHOP & STORE

11.1 INTRODUCTION

The project report for Chandragupt OCP has been prepared for a targeted production of 15.0 MTY. So a new unit workshop has been proposed.

This unit workshop will have two parts – Excavation and E&M workshop. Apart from this, Project store and other common facilities have been provided. A schematic layout plan of the workshop is shown in drawing No. R 3 E & M M 03005 for departmental option.

11.1.1 MAINTENANCE FACILITIES

This unit workshop is envisaged to cater the need of daily maintenance, scheduled maintenance, lubrication, routine inspection, minor/medium repair and replacement of parts/sub-assemblies of HEMM such as- Dumpers, Dozers, Shovels, and Drills etc.

Minor repair of assemblies and sub-assemblies of pumps, CHP, Electrical etc. deployed in the project will also be performed in this workshop. Planning of this unit workshop and project store has been done based on a routine maintenance and repair programme to achieve the high level equipment availability, reliability and longer life.

Maintenance and repair load of this unit workshop has been assessed on the basis of annual operating time, life of the equipment / assemblies/ sub-assemblies etc.

Space requirement for maintenance & repair activities, parking facilities of HEMM, washing of equipment, requirement of open and covered space/sheds etc. have also been worked out based on the number & size of HEMM to be deployed in this mine.

11.1.2 SCOPE OF WORK

This Unit workshop will have two parts- Excavation and E&M workshop. Apart from this, Project store and other common facilities like- canteen, fuelling station, washing station, security post, firefighting etc. have been provided.

Any major overhaul of equipment and manufacturing of spares on large scale are beyond the scope of this workshop. These works will be carried out in nearby Regional workshop or Central workshop, Barkakana.

11.1.3 EXCAVATION WORKSHOP

This part of unit workshop will have the facilities for attending to the scheduled maintenance, daily maintenance, minor/medium repair or replacement of parts/ sub-assemblies

of face and transport equipment such as dumpers, shovels, drills, dozers, cranes, grader and other miscellaneous equipment used for mining operation.

All dumpers and dozers coming to workshop for their daily as well as scheduled maintenance will be first washed at the washing stations provided in the workshop and then brought to the respective maintenance shops.

In Daily maintenance shop, the equipment will be checked for lubrication, tyre inflation, oil levels etc.

The equipment for scheduled preventive maintenance as per recommended schedule of the manufacturers will be directed to Schedule maintenance shop where their complete lubrication will be taken care of along with diagnosis of their technical state. After evaluation of the condition, they will be sent to the Dumper repair shop.

Maintenance and minor repair of Face equipment e.g. shovels & drills will be carried out at the site. The components/ assemblies requiring further repair will be dismantled from the machine and the dis-assembled components will be brought to workshop for new replacement. In case of major repair, these will be sent to central workshop.

11.1.4 E & M WORKSHOP

Considering the nature of repair and maintenance of E&M equipment, which is different from that of the HEMM, a separate E&M workshop has been provided.

This part of the workshop will have the facilities for scheduled maintenance, day-to-day maintenance and minor repair by parts / unit replacement method of all E&M equipment deployed in the project such as Pumps, D.G sets & electrical equipment, CHP etc.

11.2 PROPOSED FACILITIES

Broadly Excavation workshop will have the following functional shops: -

- i) Machine shop
- ii) Electrical repair shop
- iii) Engine repair shop
- iv) Assembly and sub-assembly repair shop
- v) Radiator repair shop
- vi) Welding & Structural shop
- vii) Dumper repair shop
- viii) Dumper Daily Maintenance shop
- ix) Schedule Maintenance (Inspection and lubrication) shop
- x) Dozer repair shop
- xi) Heavy repair shop


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- xii) Field Service equipment
- xiii) Washing Station
- xiv) Stores & common facilities

And E& M workshop will have the following functional shops: -

- i) Machine shop
- ii) Mechanical repair shop
- iii) Electrical repair shop
- iv) L.M.V repair shop
- v) Store

11.3 EXCAVATION WORKSHOP

i) **MACHINE SHOP**

This shop will have the necessary machine tools for restoration of worn-out parts and manufacture of small non-complicated spare parts, which are in short supply, and required for repair of HEMM.

ii) **ELECTRICAL REPAIR SHOP**

This shop will have the facilities for carrying out the minor and medium repairs of the electrical components of the mining equipment. The repair facilities have been limited to the parts replacement and repair of self-starter, Dynamo, Battery charging etc.

iii) **ENGINE REPAIR SHOP**

This shop will have facilities for minor and medium repair and adjustment of Diesel Engine fitted with all types of Dumpers, Dozers, and Scrapers etc. working in the mine.

iv) **ASSEMBLY AND SUB-ASSEMBLY REPAIR SHOP**

Assembly & sub-assembly shop will have the facilities for repairing the assembly and sub-assembly of motor transport equipment. Since most of the machine will be of similar make and model, they will be treated under unit replacement method. The repaired assemblies will be drawn from the shop and fitted to the equipment of same make and model.

v) **RADIATOR REPAIR SHOP**

This shop will carry out the repair and over-hauling of radiators. It is equipped with water tap for proper flushing and cleaning of radiators, testing stand and other repair tools and equipment.

vi) **WELDING & STRUCTURAL SHOP**


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This shop will take-up the welding of buckets of shovels and other jobs of dumpers etc. It will also under take other non-standard welding works.

vii) DUMPER REPAIR SHOP

This shop will cater to the need of repair/replacement of parts/components of the dumpers needing repair after their proper inspection & diagnosis of defects in the Schedule Maintenance shop.

The dumpers, which experience incidental problem in the field and require minor & medium repair will also be attended in this shop.

All dumpers coming for repair must be first washed at the washing station before entering this shop.

viii) DUMPER DAILY MAINTENANCE SHOP

Checking of water and oil levels, greasing of lubrication points, checking of air pressure of tyres, brake testing etc. will be performed in this shop.

ix) DUMPER SCHEDULE MAINTENANCE (LUBRICATION AND INSPECTION) SHOP

The schedule maintenance (lubrication and inspection) of the dumpers as per schedules recommended by the manufacturers will be done in this shop. For this purpose pressurized lubrication system has been provided.

x) DOZER REPAIR SHOP

This shop is meant for carrying out the maintenance and repairs of dozers. The repairs will be done mainly by the replacement of parts, unit and sub-assemblies.

xi) HEAVY REPAIR SHOP

This shop will deal with the medium repair/replacement of component and sub-assemblies of shovels, drills etc, which will be dismantled from the equipment working in the mine and brought to this shop.

xii) FIELD SERVICE EQUIPMENT

Mobile workshop van & Mobile service van have been provided for the maintenance and lubrication of the equipment at the site of their working.

xiii) WASHING STATION

High-pressure multi jet washing unit for dumper and high-pressure water & steam jet washing unit for dozer have been envisaged for washing.

xiv) STORES & COMMON FACILITIES

A small store is provided for storage of 10 days consumption of spares & consumables required for repair & maintenance of HEMM & other mining equipment. The different repair shops will draw day-to-day requirement of spares & other consumables from this store.

A fully equipped fuelling station is also provided for fuelling the vehicles and transport equipment.

11.4 E&M WORKSHOP

I) MACHINE SHOP

This shop will undertake machining and reconditioning of spares. It will also manufacture small spares, which are in short supply and required for the repair of E&M equipment.

II) MECHANICAL REPAIR SHOP

The equipment like pumps and pumping installation experiencing incidental problem in the field and requiring minor repair will be brought to this shop where they will be inspected and repaired. Apart from this the normal maintenance/repair of the pumps will be done in this shop.

III) ELECTRICAL REPAIR SHOP

This shop will deal with the testing and minor repairing of electrical components of CHP equipment, pumps, switchgears etc.

IV) LIGHT MOTOR VEHICLE REPAIR SHOP

This shop will cater to the need of schedule maintenance, minor & medium repair and replacement of components of light and medium duty vehicles such as Jeeps, Cars, Ambulance, Trucks, and School Buses etc. The vehicles will be thoroughly washed at the washing station (meant for light & medium duty vehicles) before going to this shop for repairs.

V) STORES & COMMON EQUIPMENT

A small store is provided for storage of 10 days consumption of spares & consumables required for repair & maintenance of E&M equipment.

11.5 WORKSHOP & STORE LAYOUT

A schematic layout plan of the workshop & project store is shown in drawing no. R3 E&M M 03005.


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11.6 WORKSHOP AND STORE PLANT & MACHINERY

The detail list of required workshop/store P&M has been provided in Appendix-A.3.3

11.7 PROJECT STORE

A project store has been provided to meet the total requirement of proposed workshop as well as additional requirement of entire project.

This full-fledged store is provided adjacent to the workshop boundary with a view to minimize the time for collection of spares and consumables required for the repair & maintenance of HEMM in this unit workshop.

11.8 DRAWINGS

A general Layout plan of both Excavation and E&M workshops along with project store has been shown in Drg. No. R3 E&M M 03005.


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CHAPTER-XII

POWER SUPPLY, ILLUMINATION AND COMMUNICATION

12.1 POWER SUPPLY

12.1.1 Location and existing source of power

The proposed Chandragupt opencast project is located in the North Karanpura Coalfield. This project comes under administrative control of M&A Area of Central Coalfields Limited. This project report has been prepared for a rated production capacity of 15.0 MT of coal per annum. Nearest source of power for this coal block is the upcoming Tandwa Substation of DVC from where a double circuit feeder at 33 kV may be drawn to provide power to Chandragupta OCP.

Proposed scheme of power supply

Considering the population of electrical HEMMs, CHP, Pumping and other common loads proposed in this report, 2 nos 2X10 MVA 33/6.6kV substation has been envisaged for fulfilling the power requirement of the project. Both the sub-stations will receive power at 33 kV from DVC switching station being constructed for feeding power to the upcoming projects of this coalfield, through independent double circuit overhead line feeders. Both the substation will have provision for receiving power at 33kV through 2 nos. 33 kV incoming feeders and facility for distributing the same at 6.6 kV to the different load centers of the project through suitable nos. outgoing 6.6 kV feeders.

Substation-I will be located near the CHP complex and will feed power to Section-1, Section-2, CHP, workshop, quarry and surface illumination etc. Substation II will be located near southeastern boundary of the Section-3 and cater the power requirement of Section-3 quarry & surface illumination and colony.

2 nos. 33 kV double circuit incoming feeders each approx. 12 km long with WOLF or equivalent AAA conductor in double rail pole structure will be constructed from said DVC switching station for receiving power.

Single line diagram of proposed substations have been shown in enclosed drawing no. R3: E&M: 0E2970 and R3: E&M: 0E2971.

12.1.2 Electrical Parameters

Based on the deployment of different equipment / installations of the project, power balance has been prepared to estimate the maximum power demand, annual energy consumption and other electrical parameters. Salient electrical parameters of the project are tabulated below.

Table: 12.1 Salient Electrical Parameters

| Sl No | Description | Values |
|-------|--|--------|
| 1 | Connected Load (kW) | 26135 |
| 2 | Load in operation (kW) | 22282 |
| 3 | Maximum power demand (kVA) | 10046 |
| 4 | Annual Energy Consumption (MkWh) | 59.12 |
| 5 | Energy consumption per tonne of coal production (kWh/te) | 3.9 |

12.1.3 Mine Substations

To meet the power requirement of the project, two nos of 2 X 10 MVA, 33/6.6 kV substation has been envisaged. The transformers capacity for the substation have been selected considering maximum demand of power connected to the substation at an overall power factor of 0.98, with 100 % stand-by transformer capacity. Calculated maximum power demand for the mine will be 10046 kVA.

Both the 2 X 10 MVA, 33/6.6 kV substation proposed for the project will be identical in construction. Each substation will have the following major outdoor and indoor installations.

- **Outdoor Installations.**

- i) 33 kV terminal structures, bus Sections for receiving power.
- ii) 33 kV, Isolators with / without earthing switch / with earthing switch & D.O fuses.
- iii) 33 kV, VCBs.
- iv) L.A. for 33 kV system voltages.
- v) 33 kV CTs & PTs
- vi) Power transformer, 10 MVA, 33/6.6 kV -4 Nos.
- vii) Neutral Grounding Resister for power transformers.
- viii) Station transformers, 160 kVA, 33/415 kV
- ix) Lighting transformers, 100 kVA, 33/0.23 kV (L-L)
- x) 6.6 kV, VCBs
- xi) Capacitor Bank, of required kVAr, 6.6 kV.
- xii) Outdoor Illumination System.
- xiii) Earthing and lightning protection system.

- **Indoor Installations**

- i) Remote control panels for 33 KV outdoor type circuit breakers with VCB.
- ii) Remote control panels for 6.6 KV outdoor type circuit breakers with VCB.
- iii) 415V Switch Board for control of station transformer.


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- iv) 230V (L-L) Lighting distribution board
- v) Indoor Illumination.
- vi) 110 V D.C. Distribution Board.
- vii) Battery, Battery Chargers.
- viii) Indoor control panel for Capacitor banks, 6.6 KV, 2795 kVAR capacitor-2 Nos with APFCR
- ix) Earthing with Grid.

- **6.6 kV outdoor VCBs**

The various functions of the VCBs in the outdoor switchyard energized from the secondary of the 10 MVA 33/6.6 kV power transformers installed at the substation will be as single line diagram:

- **415 V distribution board**

It is proposed to install an indoor type 415V switch board in the substations which will receive power from the secondary side of 160 kVA 33/0.415 kV transformer and distribute the power to various loads of the substation such as float cum charger, oil filtration machine, automatic fire fighting arrangement installations etc. This switch board will comprise of required number of ACB / MCCB.

- **230 V (L-L) Lighting main distribution board**

The 230 V (L-L) switchboards energised from the secondary of the 100 kVA, 33/ 0.23 kV (L-L), pole mounted type lighting transformers installed at the both substation shall comprise 1 number 3 pole MCCB as incoming and required nos. 2 pole MCBs as outgoing control.

- **Protection of substation, Controlling & Signaling.**

33 kV VCB type circuit breakers will be used for primary control of all the 33/6.6 kV 10 MVA transformers of proposed Substations. The circuit breakers, in conjunction with Current transformers, provide protection to the transformers against over current, short circuit, and earth fault. These circuit breakers shall also trip for internal fault of transformers actuated by oil/winding temperature relay and Buchholtz relays activated by gas / oil pressure due to incipient fault inside the transformer. Similar circuit breakers will be used for control of both the incoming feeders and also as a bus coupler.

The transformers will also be provided with differential protection.

6.6 kV VCBs will be used for secondary control of transformers, control of 6.6 kV outgoing feeders & bus-coupler. These VCBs will have provision for protection against over current, short circuit and earth fault.

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For protection against lightning, lightning arrestors conforming to IS: 3070 and IS: 4004 will be provided in the substation yard. Shield wires will be provided for protection of outdoor equipment against direct lightning strokes. For protection of building from lightning strokes, spikes will be provided over the building and these spikes will be interconnected by means of GI flats to form a grid. This grid will be connected to the earth pits at the four corners of the building by means of down conductors.

Remote control and operation of 33 kV circuit breakers will be performed by the control switches provided in the control panel in the substation room.

- **Signaling system in the substation will be provided as under:**

- a) Signaling to inform the personnel about automatic tripping of circuit breakers due to fault.
- b) Warning signal about occurrence of abnormality in any particular device.
- c) Signaling to show actuation of automatic and protective relays.

Similar remote control and signaling devices will be provided in the 6.6 kV outdoor circuit breakers units and indoor control panels also.

- **Interlocking**

The air break isolators associated with the 33 KV circuit breakers in the proposed substations shall be interlocked with the circuit breakers to avoid mal- operation.

The 33 kV and 6.6 kV sectionaliser circuit breaker installed in the 33 kV and 6.6 kV outdoor bus respectively will have electrical interlock with the respective incoming circuit breakers to avoid parallel operation of transformers.

Primary and secondary C.B.s of respective transformers shall be interconnected so that secondary control C.B. shall trip automatically when the primary control C.B. trips.

- **Earthing System**

Main earthing grid shall be provided around the periphery of the substations for interconnection of earth pits as well as to earth all the electrical equipment.

The transformer body and the lightning arrestors provided for the transformers shall be earthed separately as per IE rules but the earth pits shall be interconnected to minimize the earth resistance so that protections to the transformers is most effective. The LAs shall be located as close to the transformers as possible.

Substation earthing shall conform to IS: 3043 (current). The resistance to earth shall not exceed 1 ohm. Separate earth pits would also be constructed around workshop sheds and CHP etc. for proper earthing of equipment. GI strips of adequate size connecting the main earth bus laid around the workshop and CHP would properly earth all the drives in the workshop and CHP.

Restricted neutral earth system shall be provided for 6.6 kV distributions. The neutral of both the 33/6.6 kV power transformers in the proposed substation shall be earthed through earthing resistors to restrict the earth fault current within 50 Amp.

The 6.6/0.415 kV transformer shall be provided with solidly earthed neutral system. The station lighting transformer with voltage 230 V (L to L), shall operate in un-earthed system.

12.1.4 Power Tariff

Estimated power bill has been calculated based on prevailing tariff of DVC as tabulated below:

Table: 12.3 Power Tariff

| Sl No | Description | Rupees |
|-------|--|--------|
| 1. | Normal Demand Charges (Rs. /kVA/month) | 600 |
| 2. | Energy Charges (Rs./kVAh) | 2.95 |
| 3. | Electricity Duty (Rs./kWh) | 0.20 |

12.1.5 Energy Consumption

Estimated maximum annual energy consumption of the project at targeted rate of production works out to be 59.12 M kWh.

12.1.6 Utilization Voltage

The utilization voltages of various equipment / installation of the project are as given below.

Table: 12.4 Utilization Voltage

| Sl. No. | Equipment | Voltage |
|---------|---|----------------|
| 1 | Incoming Supply to Proposed project Substations | 33 kV |
| 2 | Pump-110 kV and above | 6.6 kV |
| 3 | Pumps-below 110 kW | 0.415 kV |
| 4 | Workshop Equipment | 0.415 kV |
| 5 | CHP Equipment | 6.6/0.415 kV |
| 6 | Quarry /Mine Area Lighting | 230 Volt (L-L) |

12.1.7 Power Factor Improvement

2 sets of capacitor banks each rated at 6.6 kV would be installed at each bus section of the 6.6 kV split – bus installed in the switchyard of both substations. Capacity of each set of capacitor banks for main substation will be as per requirement having automatic power factor correction mechanism. The capacitor banks would have the facility to connect or disconnect the required number of units automatically through contactor and automatic power factor correction and relay panel combination depending upon the loading pattern at the substation. These capacitor banks can also be controlled by remote control panel installed in the substation buildings.

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12.1.8 Quarry Power Supply & Distribution

Power supply to HEMM

Power supply to the HEMMs will be provided through dedicated HEMM feeders drawn from both the substations.

Power supply to Pumps

Two numbers 6.6 kV overhead line feeders originating from the both substations are proposed to be drawn up to a convenient location near main sump of the quarries for feeding power to various pumps installed in the project. The overhead line feeders shall receive power at 6.6 kV from the outgoing structures installed in the switchyard of both the substation. Depending upon the various stages of quarry operation these feeders may have to be shifted or extended.

For distributing power to the main pumps, two nos. kiosk type 9 panels and one no. kiosk type 7 panel of outdoor 6.6 kV sectionalised switchboard has been envisaged. This switch board will be installed near the main sump. Power shall be tapped from 6.6 kV overhead feeders by means of outdoor type isolators and power cables to energize the switchboard.

Individual HT pump will receive power from the switchboard through dedicated switch and cable. The location of switchboard will be suitably changed with the change in the location of main sump.

For distributing power to 415V operated pumps, 4 (Four) nos. 400kVA, 6.6kV/415V utilised substations along with three nos 415V suitable distribution panel has been envisaged. These utilised substations will receive power at 6.6kV from 6.6kV pump feeders and feed power to different 415V pumps through said distribution panels.

Power Supply to CHP

Power at 6.6 kV shall be made available to coal handling plant through 6.6 kV overhead line feeders drawn from the Proposed 2X10 MVA, 33/6.6 kVA Sub-substation-I. Provision for drawl of overhead line including terminal structure has been made in the Appendix of electrical P&M. The estimated cost of electrical Substations/ electrical P&M / sequence control operation, Illumination for CHP etc. has been included in the related Appendix for CHP.

Power Supply to Workshop

Power at 6.6 kV shall be made available to workshop through 6.6 kV overhead line feeders drawn from the Proposed 2X10 MVA, 33/6.6 kVA substation to workshop sub-station-I. Provision for drawl of overhead line including terminal structure has been made in the Appendix

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of electrical P&M. At the workshop, power at 6.6 kV will be stepped down to 0.433 kV for supplying power to various power consumers of the workshop.

Power Supply to Township

It has been presumed that Colony will be located at about 5 km from the substation. Different type of residential quarters has been proposed. In addition to above, service buildings such as Staff Rest House, Officers Guest House, Dispensary, Community Hall, Officers Club, School, Post office, Bank, Training Centre etc has been proposed. Power for colony will be received at 6.6kV from Substation-II through a double circuit overhead line feeder and the same will be stepped down to 415V through 250kV 6.6/0.415kV distribution transformers installed at different locations in the colony. Power at 415V/230V will be distributed to the quarters and service buildings with 415V overhead line, cables etc.

12.1.9 Illumination

6.6 kV overhead line feeder originating from both substations are proposed to be drawn up to a convenient location in the quarry for feeding power to the lighting transformers installed in the different location of the mine. The overhead line feeder will receive power at 6.6 kV from the outgoing structure installed in the switchyard of the project substation. Depending upon the various stages of quarry operation these feeders may have to be shifted or extended.

Haul Road Illumination

For illumination of permanent haul roads, 150 W LED lamps and luminaires mounted on 11/13 m (approx.) high steel poles have been envisaged. Temporary haul roads shall be illuminated according to the position of working, through 300 W LED lamp fitted in flood light fixtures mounted on skid mounted / mobile lighting towers.

Illumination of Quarry General Area/ Dump Area

Illumination of working face will be done with 2*300 W LED lamp (High Bay) fitted in flood light fixtures mounted on mobile lighting towers. Illumination of quarry general area/dump area etc. will be done with 2*300 W LED lamp (High Bay) fitted in flood light fixtures mounted on skid mounted lighting towers.

Service Road Illumination

150 W LED lamps in street light luminaires will be used for illumination of service roads of the project. The luminaires will be mounted in 11/13 m steel tubular poles installed at a suitable interval for achieving desired level of illumination.

Sufficient no. of 25/10 kVA, 6.6 kV / 0.23 kV (L – L) lighting transformers have been provided for feeding power to the light fittings installed in the mine.

Township Street Illumination

4.5 km colony road has been proposed in this report. In addition to this there will be approach road of 5 km for the colony. 150W LED lamps in street light luminaires will be installed on steel tubular poles of 415V colony power distribution line / street lighting poles for colony and approach road illumination.

12.2 TELECOMMUNICATION

12.2.1 Communication

Coal production has become highly capital intensive due to large scale mechanisation for production and transportation using the modern technology. To cope up with mechanisation to maintain safety and also to improve the efficiency, there is a need to establish an efficient means of voice and data communication. The effectiveness and reliability of decision making process depends on a reliable means of information exchange among the different units of surface, which totally depends upon the integrated telecommunication systems for voice and data.

12.2.2 Proposed Communication System

The proposed communication system should cater the need of voice communication among personnel related to mine operation, administration and equipment maintenance. The system also takes into account the data communication requirement for mine operation and planning along with the latest office automation facilities.

While preparing the system, due consideration has been given to the state-of-art networking architecture involving the communication of voice and data over the proposed network path to avoid duplicated investment in network and proper conservation of bandwidth.

12.2.3 External Communication

20 (twenty) telephone lines have been provided for communication and access to public communication grid. These telephone sets would be located in the residences and offices of key personnel of the project, sub-station, railway siding, CHP, workshop, etc. and 4 lines shall also be terminated on the exchange for trunking. Besides fixed line telephones, 25 nos. of Mobile connection with sets may also be provided to key personnel of the project.

12.2.4 Voice and data networking

There shall be an IP exchange with a capacity of 300/150 lines upgradable to 500 lines. The proposed exchange shall be housed at mine office, for providing effective and transparent communication. The IP Exchange shall have all the latest features like SIP extension and trunk, High Capacity Server, Media Gateway (single/multiple gateways), Redundancy (Server,

Network), Encryption and Mobility facility like Wi-fi etc. The IP Exchange shall be interfaced with fixed lines for extending external communication having STD & ISD facility.

12.2.5 Technical Specifications

Technical Specification of EPABX

The IP exchange should provide Management and Control of audio video & data traffic from a single source and also provides Mobile Communication solution, Networking application and Computer to Telephone integration application. It should have latest SIP Enabled IP based communication server, fully modular and fully Non-blocking type having distributed Client-Server with redundant server architecture, full feature transparency, CLI facility, ISDN PRI/BRI, together with all latest feature and configuration of a modern communication server.

It should ready to adopt present and future technologies.

It should support 270 analog extension and 30 digital extension. It should also have trunkports and Communication redundancy.

Exchange shall have both voice and data switching capacity.

System software shall have auto-diagnostic programme to detect the faults and localise them.

The exchange should support multi-media application as per latest trend. It should be possible to connect PC's, host computers etc. without modem through Digital/ISDN line.

Exchange shall be DoT/TRC approved with ISDN facility.

Networking Facility

Exchange is required to operate in any one of the following and shall be suitable for both.

- i) Service Provider Junction.
- ii) Exchange should also be able to inter-face directly with other exchanges, if required.

System should be capable to network with the following types of lines:

- a. Direct inward dialling trunk and outward dialling trunk.
- b. ISDN line.

FEATURES

- a. Flexible numbering scheme
- b. Privacy of calls
- c. DID facility junctions.
- d. Conferencing
- e. Automatic call back on busy extn.
- f. Call transfer and Call pick up.
- g. Last number radial.


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- h. SIP extension and trunk
- i. High Capacity Server
- j. Media Gateway
- k. Server and Network redundancy
- l. Encryption
- m. Mobility like SIP and Wi-Fi
- n. IP Telephony feature
- o. IP enhancement facilities
- p. Full active VoIP recording

12.2.6 24 port L3 Switch

The managed L3 Switch shall be a workgroup switch 24/48 port 10/100 having a gigabit uplink port. The switch shall have sufficient backplane and throughput along with QoS features for both voice and data connectivity. This Managed L3 switch should be installed near the telephone exchange.

A. TECHNICAL SPECIFICATION

- 24/48 Nos. 10/100BaseTX + 4 Nos. GBIC (min.)
- The Modules should support 1000 Base SX /1000 Base LX/1000 BaseZX.
- Chassis based Multi-service Switch with minimum 7 Slots
- Redundant CPU
- Redundant Power Supply.
- Backplane: 64 Gbps Switching.
- Forwarding Rate: 48 Million packets per second of L2 & L3 & L4 Packets.
- MAC address : 12000 MAC address support
- Must have L3 (IP Routing) and Layer 4 Support
- MAC Address support for 32000
- Built In 512 MB SDRAM
- Must support the following protocols:
- IEEE 802.3X (flow control)
- IEEE 802.1p (prioritisation)
- IEEE 802.1Q (V-LAN tagging)
- IEEE 802.1D (Spanning Tree Protocol)
- RIP-V.1 & RIP-V.2
- Should support access control list
- Should support Link Aggregation


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- Management- Should have built-in SNMP, RMON, Web based and Command Line Interface for Management. Switch should be supplied with Network Management Software (latest version)

12.2.7 L2 Switch (24 Port 10/100 BaseT + 2*Expansion Slots)

- a. Non-blocking, wire speed switching and routing.
- b. Configuration: 24 Nos. 10/100 Autosensing Ports + Two Module expansion slots which will accommodate the 1000 SX or 1000 Base LX or 1000Base-Long haul(70Km).
- c. MAC Address support: 8000 MAC Address min.
- d. Backplane: 8 Gbps min.
- e. Forwarding Rates: 6.5 Million PPS min. for supporting wirespeed switching.
- f. The switch should support QoS classification of incoming packets for QoS flows based on Layer 2, Layer 3 and Layer 4 fields.
- g. Standard Compliance- support IEEE 802.3 x (flow control), IEEE 802.1p), IEEE 802.1Q (V-LAN Trunking), IEEE 802.1d (spanning tree protocol)
- h. Weighted Round Robin (WRR) queuing algorithm to ensure that low priority queues are not starved.
- i. Power supply should have integrated IEEE 802.3 of compliant POE (Power over Ethernet)
- j. Stackable
- k. Management- Have built-in SNMP, Web based and Command Line Interface for Management. SNMP v1/v2/v3, RMON.
- l. Support link aggregation for increasing Backbone bandwidth.

12.2.8 LAN and Internet

It is proposed to deploy electronic data processing facilities for production planning, control and project management etc. The system envisages to play a key role in establishment of highly effective Data Base Management System (DBMS) and Management Information System (MIS) etc.

The type of computer would be small business computer with broad facilities and also have specific facilities to carry out:

- Pay rolls
- Financial accounting
- Inventory control
- Material management
- HEMM utilisation, breakdown analysis, idle time analysis etc.
- Production, despatch schedule and variances.
- Accident records etc.


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Before initiating action for installation and implementation of the above EDP system, a detailed system study would have to be carried out with clearly defined system objectives for identifying the data processing needs and management information system needs of the project. Based on the results and findings of the study, the system configuration and specification have to be decided.

A Local Area Network with 25/10 PCs is proposed for this project. The PCs will be connected to the L3/L2 switches. The proposed network structure will be that of a workgroup. Suitable OS and other application software will be provided. Suitable printers, plotters CD/DVD writer shall be provided. A server with Windows XP/Windows 2008 or higher shall also be provided.

1 Nos. of L3 & 2 Nos. of L2 switches are proposed.

Internet connection shall also be provided through a 2/4 Mbps leased line at project office and some residences.

12.2.9 VHF Communication System

VHF dialling type Walkie-Talkie sets/trunked radio will be provided to important personnel for communication in the mine as mentioned in (outsourcing) option (Appendix-B). These will work in the band 150-174 MHz. with a channel spacing of 12.5 KHz/25KHz, with an output of 2W. Type of operation will be FM, simplex. The system shall have telephone patch facility for interfacing with the exchange. It should also have control channels for trunking facilities.

12.2.10 Wireless Radio System

1 set of point to point and 2 nos. of Point to Multipoint Radio (Base-1, Remote-3) are proposed for connecting the proposed LAN with important locations where cabling will not be possible. Another point to point radio is also proposed for connecting Project office with Area office.

SPECIFICATION

| | | |
|----|-----------------------|--|
| a. | Wireless Radio Unit | : Point to Point links |
| b. | Fade Margin | : Min10db for each hop |
| c. | Operating Frequency | : 5.8 GHz |
| d. | Modulation Techniques | : OFDM |
| e. | Wired LAN protocol | : 802.3 10/100 Base T |
| f. | Operating speed | : Max. 54 Mbps Min. 6 Mbps |
| g. | Receiver sensitivity | : -70 dbm at 54Mbps -92 dbm at 6 Mbps |


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| | | |
|----|--|---|
| h. | Transmit power level | : + 24dbm max. |
| i. | Protocol | : 802.11a |
| j. | Configuration/Diagnostics | : Local/Remote configuration diagnostics, continuous signal quality Management. |
| k. | Operating Temperature | : 0°C - 55°C |
| l. | Humidity | : 0% to 100% |
| m. | Lightning protection | : Suitable surge suppressor should be included in the equipment |
| n. | Power supply | : 240 V AC +/- 10% |
| o. | Power over Ethernet | : Integrated IEEE 802.3 af compliant PoE. |
| p. | Management | : Web based, SNMP |
| q. | Security | : Radius, WEP, AES, 802.1x |
| r. | Safety Certifications | : UL 60950, CSA, CE Marking |
| s. | Electromagnetic Compatibility Certifications | : FCC part 15 Class B, CE Marking. |

12.2.11 GPS Based Truck Monitoring System

An Integrated GPS-GPRS based vehicle tracking system along with RFID and other accessories is proposed for the mine. The proposed system shall have the following features:

- The system shall help for real-time tracking of vehicles fixed with GPS-GPRS based VMU (Vehicle mounted unit) along with integrated RFID tags for tracking along the route as well as at the entry/exit points like Weigh Bridge, Railway Siding, Security gates etc. These fixed points shall be installed with RFID Reader and other accessories for Access Control.
- Different vehicle locations & routes for tracking the vehicles on Map.
- Automatic event logging (viz. start and end of trip(s), emergency halts, accidents, breakdown of vehicles etc.) along with Time Stamp.
- Provide alerts on unauthorized stoppage and /or non-stoppage of the vehicles at designated vehicle stops/weighbridges/dumping yards/ Railway sidings, the scheduled stoppage point and route deviation by vehicles etc.

12.2.12 Dumper Collision Avoidance System

Directorate General of Mines Safety (DGMS) has given a circular no. DGMS (Tech)/cir.no.009 dated 02-12-2008, to ensure the safety of dumpers and to protect loss of equipment and human life and also for ensuring safe and efficient coal mining. As per this circular dumper

should be equipped with anti-collision system to avoid head to tail collision between dumpers and proximity warning along with reverse safety system to avoid collision between dumpers and blind objects.

This system consists of a Display Unit, Control Unit, GPS, Proximity Sensors and Antenna Unit. This system provides following three layers of safety:-

1. **Layer 1** provides safety by detecting objects within 10 Meter range. This layer consists of proximity sensors mounted on Dumpers on three sides.
2. **Layer 2** provides Distance & Directional information of other dumpers present in the vicinity of 100 Meters thus enabling operator to have better view of the situation. This layer consists of GPS, RF Link and RS232 Interface.
3. **Layer 3** provides Positional information of the Dumper through GPRS to central base station by sending SMS. This layer consists of GPRS module and RS232 interface.

Antenna Assembly Unit consists of Tx Antenna, Rx Antenna, and GPS Antenna with frame base. Display Unit is placed in Driver's cabin in front of Driver. Control Unit is mounted on a bracket within Driver's cabin on rear side. Power supply is taken from Engine ignition available on Dumper. Local SIM card is inserted in Control Unit. Proximity sensors are mounted on the Dumpers to provide driver with awareness of the objects within 10 m range on the sides.

The system is also equipped with the following special additional features:

- i) **Proximity warning from other objects:** The dumpers are equipped with Pulsed Radar based proximity sensors at three sides to warn against impending collision with any other vehicle, human being and blind object entering in its coverage range of approx.0-10 meters.
- ii) **Reverse Safety System:** The System can also be used as a reverse safety system to prevent the dumpers from toppling down from the OB dump while unloading.
- iii) **Vehicle Tracking Interface:** With the help of GPRS module incorporated in the Control Unit, the location co-ordinates of a dumper can be readily known by simply sending an SMS to that particular dumper. The location co-ordinate is automatically sent back by the system. These co-ordinates can be superimposed on Google Map with a tailor-made software, to track the exact location of the dumpers within the mine.

12.2.13 IP SURVEILLANCE SYSTEM

To monitor the total mine working area from a centralised control room a surveillance system is proposed. All the important locations viz entry & exit points of mine., loading points, silos and working faces are to be visually monitored at a centralised location using day and night CCTV Cameras(IP enabled) and wireless network.

12.2.14 Biometric Attendance System

This system shall be for attendance monitoring and evaluation. The whole attendance system consists of Finger/Iris scanner and support software with inbuilt clock and timer and network connectivity through GSM and Wi-Fi.

12.2.15 UPS

Uninterrupted Power Supply (UPS) shall be used in case of main power failure for LAN and others.

SPECIFICATION OF UPS

- (1) Capacity: 10KVA, Single phase/3 Phase
- (2) AC Input voltage: 220/230V, $\pm 15-20\%$ variation
- (3) Frequency: 50 Hz $\pm 5\%$ (Auto sensing)
- (4) AC output voltage: 230 VAC, Single phase/3 Phase
- (5) Efficiency at Full Load 94%
- (6) Regulation: both line and load $\pm 1\%$
- (7) Wave form: Sinusoidal, $< 5\%$ THD
- (8) Equipped with Maintenance By pass
- (9) Charger: Constant voltage limited current type, charging time for 90% discharged battery maximum 10 hrs.
- (10) Battery Back-up: 4hrs at full load.
- (11) Certifications: EU/EN/UL/ISO 9001
- (12) Rack mount Design: 19" mountable with sliding guides.
- (13) Communication: RS232 interface port & Ethernet port with Web management supports.

Features:

- (1) The 10 KVA UPS with 4 hrs battery back-up & accessories shall have the facility of Input voltage cut off device to protect the 10 KVA UPS with 4 hrs battery back-up & accessories against excessive over/under voltage conditions at the input side.
- (2) The system shall have surge suppression to prevent hardware damage.
- (3) The system shall have facility for continuous display of load and battery charging conditions and automatic cut off device to avoid over loading and over charging.
- (4) The 10 KVA UPS with 4 hrs battery back-up & accessories system shall be true on-line state of the art based system capable of providing precise sine wave output to the load.


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CHAPTER – XIII

CIVIL CONSTRUCTION

13.1 INTRODUCTION

The life of the Chandragupta Opencast project has been estimated as 41 years. For service and residential buildings, permanent type of construction has been proposed.

13.2 BUILDINGS

13.2.1 Residential

It is proposed to provide a township for Chandragupt OCP.

13.2.2 Service Buildings

It is proposed to provide facilities for medical, educational, recreational & shopping facilities for Chandragupt Opencast Project. Provision has been made in this report for construction of Project Office, Site office; Excavation Workshop, E&M workshop, Store, substation, etc.

13.3 ROADS & CULVERTS

13.3.1 Colony Road

The length of roads inside the township has been estimated as 4.60 km.

13.3.2 Haul Road

The length of haul road has been estimated as 5.4 km..

13.3.3 Approach Road to the Project

It is proposed to construct a 4.0 km. long approach road to the project.

13.3.4 Approach Road to the Magazine

It is proposed to construct a 3.0 km. long approach road to magazine.

13.3.5 Approach Road to the Colony

It is proposed to construct a 4.0 km. long approach road to the colony.


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13.4 WATER SUPPLY AND SEWERAGE

13.4.1 Water Demand

The potable & industrial water requirement for the project has been assessed as follows:

- (i) Potable Water Demand : 0.139 MGD
- (ii) Industrial Water Demand : 0.596 MGD

13.4.2 Source of Water

Source of water for potable and industrial use will be existing nallas or mine water.


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CHAPTER-XIV SAFETY & CONSERVATION

14.1 INTRODUCTION

Safety of men and machine deployed in the mining area should be properly taken care of irrespective of whether the mining activities are performed by departmental or by outsourcing option.

All the regulations & schedules of Coal Mines Regulations 2017 relating to mining in general and opencast mining in particular have to be adhered to and implemented in order to maintain day to day safety as per stature.

14.2 SAFETY ASPECTS FOR OF HEMM / EQUIPMENT

Special precaution should be taken while deploying workers in the mine. Before employing any person to the mine proper vocation training should be imparted and recommendations of various Safety Conferences should be strictly followed. Some of the major aspects are as follows:-

A) For persons:

- i) No persons shall be deployed unless he is trained at VTC and holds VTC Certificates. A record of the same shall be maintained.
- ii) Records in Form-B and Form-D shall be maintained.
- iii) Records of driving license of operators shall be kept by competent authority and shall be made readily available for inspection by management.
- iv) Adequate supervision shall be maintained by competent persons, including officials and technicians.

B) **For Machineries:** Provisions of Regulation 109, 110, 216 & 217 of CMR 2017 and DGMS Cir. (Tech.) 1 of 1999 should be strictly adhered to along with the following:

- i) All machinery and plant used in connection with working of a mine shall be of good design, sound construction, and suitable material, adequate strength, free from patent defect and properly maintained.
- ii) The owner, agent and manager shall provide adequate training facilities and ensure proper training of persons employed for operation and maintenance of machinery and plant.
- iii) No person except an engineer or other competent person under his supervision shall undertake any work on machinery and plant in which technical knowledge or experience is required.

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- iv) All the machineries to be deployed in mines shall be so designed as to afford the operator clear and uninterrupted vision all around.
- v) Every heavy earth moving machineries, including trucks and tippers, used in mine shall be fitted with adequate safety features or devices as specified by DGMS. All equipment shall be provided with audiovisual alarms, proper light for use at night and fitted with suitable type of the fire extinguishers.
- vi) Truck mounted drill machines designed for tube well drilling for sources of water shall not be used and only proper type of blast hole drill machine, especially designed for mining purpose, shall be used in the mine.
- vii) Every heavy earth moving machinery shall be under the charge of a competent person (Operator or Driver), authorized in writing by the Manager.
- viii) All persons employed or to be employed to operate heavy earth moving machinery shall be trained and their competency shall be evaluated by a Board constituted by the management, who shall be persons who are not connected with imparting of training.
- ix) A proper record of repair and maintenance along with inspection done by competent authority and defect pointed out shall be maintained and signed by authorized person.
- x) Only such fitters or mechanics possessing driver's or operator's license, shall be allowed to carry out test-run of heavy earth moving machineries.
- xi) No person other than the operator or the driver or any person so authorised in writing by the manager shall be allowed to ride on a heavy earth moving machinery

C) General:

- i) Every person shall strictly adhere to the provisions of the Act and of the rules and regulations and to any order or direction issued by the manager or an official with a view to the safety or convenience of persons not being inconsistent with the Act, rules and these regulations; nor shall he neglect or refuse to obey such orders or directions.
- ii) Every person shall, immediately before proceeding to work and immediately after terminating work at the end of his shift have his name recorded in the appropriate register.
- iii) Risk Management Plan of tipper/pay loader shall be made and implemented.
- iv) All operators/drivers so authorised by the Manager shall observe the Regulation 62 and 63 of CMR 2017 and obey the systematic traffics rules prepared by management
- v) Before deploying workers they must be trained and briefed about safety aspects in opencast mine. However during course of execution of the work, if any accident occurs whether major or minor, the matter shall have to be immediately informed to mine management i.e. Colliery Manager/Agent/GM of Area so that Notices of accidents in a

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accordance of (Reg. 8 of CMR 2017) and Section 23 of The Mines Act 1952 may be given and other necessary steps may be taken in accordance with the Mines Act 1952.

- vi) Mine authority shall operate transport system in such a way so as to minimize pollution in the mine.

14.3 STABILITY OF BENCHES, QUARRY HIGHWALLS AND SPOIL DUMPS

During quarry operations, it is necessary to adopt required mining parameters for the stability of benches, highwalls and spoil dumps. It is also mandatory to examine systematically the fencing of mine workings, land slides and cracks between benches. It is required to maintain well-graded and wide roads on benches keeping the width of working areas sufficient for spreading of blasted rock and movement of the mining and transport equipment.

During actual mining operation, systematic observations of the condition of benches, high wall slopes and spoil dumps should be carried out and the dimensions be modified if necessary to suit the local conditions. To ascertain the optimum slope angles for stability of quarry benches, highwalls and spoil dumps, scientific study of slope stability along with hydro-geological study of the area needs to under taken.

During actual mining operation, systematic observations of the condition of benches, high wall slopes and spoil dumps should be carried out and the dimensions be modified if necessary to suit the local conditions.

Provisions laid down in Reg. 106 and 108 of the Coal Mines regulation 2017 shall be strictly adhered to for the safety of quarry and OB/ spoil dumps. In addition to this, the following precaution should be considered:

- i) The spoil dump height should not exceed 90m from immediate surface level with an overall slope of 28° or less. In the event of encountering steep floor gradient, floor blasting should be done and the area properly levelled by dozer before spoil dumping.
- ii) No working or construction should be allowed within the 60m toe of the OB dump.
- iii) Before dumping the OB on the floor of seam, at least 10m length all along the strike length should be made horizontal at every 50 meter by floor dinting/blasting.
- iv) Dump should be created in such a way that there is no chance of accumulation of water in and around the base of dump as it will adversely affect the shear strength of the base material of dump. It must be ensured that there is no stagnant water at the toe of dump and the top of the dump.
- v) The toe and face of the dump should not be eroded or cut at any point of time to avoid slope failure. A suitable toe wall should be created along the dump periphery.
- vi) Formation of dumping should be done in square or circular or any regular shape as far as possible.

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- vii) Proper drainage system should be provided to bring down rain water by construction of inclined drain on dump face and catch drain on all benches.
- viii) During active period of dump, all rain water should be diverted away from mining site as far as possible.
- ix) Sump and pumping capacity should be sufficient to accommodate peak surface run-off and seepage of water.
- x) Gabion wall and garland drain should be constructed and maintained to trap the surface run-off and sludge coming from dump.
- xi) Plantation and grassing should be done on top and slope of the dump respectively.
- xii) Regular monitoring is required for development of tension crack, gullies, movement of soil mass, stagnation of water and any other unusual occurrence. In case of dump movement, rate of movement of dump should be monitored. Special attention should be given at curve area/turning area of the dump.

14.4 PRECAUTIONS AGAINST DANGER OF INUNDATION FROM SURFACE WATER

- 1) Adequate protection against any danger of inrush of surface water into the mine or part shall be provided and maintained to the satisfaction of DGMS, whose decision shall be final.
- 2) The entrance into the mine shall be so designed, constructed and maintained that its lowest point (which means the point at which a body of rising water on surface can enter the mine) shall be not less than 3.0 meters above the highest flood level at that point.
- 3) Every year, during the rains constant watch shall be kept on the flood levels on the surface of the mine and if at any time the levels cross the highest levels earlier recorded, such levels shall be marked by permanent posts along the edges of water and the new highest levels thus observed shall be recorded with the date as the highest flood level on the plans by an actual survey.
- 4) If water dams or reservoirs are built across rivers and water courses on the upstream side of the mine, arrangements shall be made for communication between appropriate authorities for the purpose of ascertaining the quantity and timing of water released from the dams which is likely to endanger safety of the mine and arrangement for similar communication shall be made when water level rises on the upstream side which is likely to endanger the mine.
- 5) The highest flood levels and danger levels at least 1.2 meters below the highest flood level, shall be permanently marked at appropriate places on the surface and whenever water rises towards the danger level at any place, all persons shall be withdrawn from the mine sufficiently in advance and for this purpose adequate arrangements of quick

communication to all parts of the mine by effective systems shall be provided and maintained.

- 6) No working shall be made in the mine at any spot lying within a horizontal distance of 15 meters from either bank of a river or nala.
- 7) A competent person shall, once at least in every fourteen days during the rainy season and once at least in every thirty days during other periods of the year, examine every protective measure provided under regulations 149, whether in use or not, for their stability, and a report of every such examination shall be recorded. The protective measures and workings shall also be inspected, once at least in every quarter by the Manager personally.
- 8) A careful assessment is to be made against the danger from surface water before the onset of rainy season. The necessary precautions should be clearly laid down and implemented. A garland drain needs to be provided to drain away the surface rainwater from coming into the mine.
- 9) An embankment, 3.0m above the HFL, along the river/nala should be made. Inspections for any accumulation of rainwater, obstruction in normal drainage and weakening in the embankment should be made.
- 10) Standing order for withdrawal of working persons in case of apprehended danger. During heavy rain inspection of vulnerable points is essential. In case of any danger persons are to be withdrawn to safer places.

14.5 PROTECTION OF EQUIPMENT DEPLOYED AT BOTTOM HORIZONS FROM FLOODING:

During the heavy monsoon period, the mining operation in the lower-most bench may have to be stopped. Therefore, it is proposed to drown the lower-most bench, which would work as a sump. The water will be pumped out and discharged into the nearby River or nalla after proper sedimentation.

For ensuring safety of the equipment while working out bottom horizons-with no access to surface profile, the following measures should be taken:

- 1) Drivage of initial trenches if any and coal cutting on bottom benches should be done during the dry period of the year.
- 2) Ramps should be made for quick shifting of equipment from bottom horizons, liable to be flooded during monsoon period, to the top horizons.

14.6 PREVENTION OF ELECTRIC SHOCKS:

During mining operations, all the statutory provisions of the Indian Electricity Rules 1956, and Indian Standards for installation and maintenance of electrical equipment etc. should be observed.

- 1) For protection from electric shocks to persons, all electrical equipment with voltage up to 1000V should be provided with Earth Leakage Relay, which will automatically disconnect electrical circuits.
- 2) Closed mobile substations and switchgears should be mechanically interlocked which exclude the possibility of opening the door when oil switch and air circuit breakers are in operation.
- 3) All metal parts of electrical equipment should be properly earthed to avoid failure of insulation.
- 4) All H.T lines and cables located within the blasting zones should be disconnected during charging & blasting operations.

14.7 DUST SUPPRESSION & DILUTION OF EXHAUST FUMES :

For precaution against dust, Regulation 143, 144 and 145 of CMR 2017 should be observed. Beside this the following measures should be adopted for dust suppression at all quarry working places, dumps, haul roads, CHP and near other auxiliary mining operations.

- 1) Spraying with water on all working faces & haul roads, by special spraying machines or water-sprinkler.
- 2) While drilling holes, it is necessary to use dust extraction devices.
- 3) Installation of local dust suppression and air conditioning devices in cabins of excavators and drilling rigs may be considered.
- 4) Leveling of spoil dump surface.
- 5) Separate dust suppression arrangement should be provided for CHP.

To prevent collection of harmful mixtures in the atmosphere, from the different sections of quarry workings, it is recommended:-

To spread out the sources of dust formation and omission of harmful gases throughout the working area of the quarry, the following precautions should be taken:

- 1) Drilling & blasting operations should be timed for periods of maximum wind activity during the day.
- 2) Dumpers may be provided with purifiers for exhaust gases.

14.8 MEASURES TO BE TAKEN FOR FIRE FIGHTING AND FIRE PREVENTION:

In addition to statutory provisions as laid down in Reg 135, 139 and 140 of CMR 2017, the measures for fire fighting and prevention of fires are as follows:

- 1) Organisation of special cell for systematic observations to examine and prevent fire.

- 2) Removal of spillage of coal on benches and cleaning of coal horizons to prevent cases of coal heating.
- 3) Storage of lubricants and cotton waste in enclosed fireproof containers in working places.
- 4) Provision of fire extinguishers.

14.9 MEASURES TO BE TAKEN WHILE DRILLING BLASTING:

Following measures should be taken while drilling and blasting operations in the quarry beside the statutory requirements:

- 1) Drilling and Blasting in quarry should be done in accordance with the provisions of Mines Act, rules and regulations and based on the Standing Orders for the safe use of explosives.
- 2) Adequate safety measures have to be taken during blasting operation in the quarry so that men/machine is not affected.

14.10 CONSERVATION

Suitable measures should be taken to minimize coal loss during mining operations. Selective mining of in-seam dirt bands has been proposed. It is proposed not to dump any spoil material over coal bearing area, amenable for mining, at present or even at a future date.

14.11 SCIENTIFIC STUDIES

The slopes of the quarry and dumps have been proposed on the basis of experience in the adjoining areas. However, to ascertain optimum slope angles for stability of quarry batter and dumps a scientific study need be carried out. Similarly hydro-geological study of the area is to under taken as none is available at present. Studies should also be carried out to ascertain the pattern of surface drainage, the manner of diversion of water courses to other water courses away from the mining area and the dimension of diversion dams, garland drains and other protective structures to be constructed.


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CHAPTER – XV

ENVIRONMENTAL MANAGEMENT

15.1 INTRODUCTION

The Environment Management Plan is one of the most important subjects to deal with after the preparation of the Project Report. The EMP deals with present land status, land use during mining, post mining use of the land and its impact on the present environment scenario. During mining operation, degradation of land, air, water, soil, noise, flora and fauna etc. occurs. Socio economic, hydro-geological strata are also affected and these are taken into consideration at the time of preparation of EMP.

15.2 EXISTING ENVIRONMENT QUALITY

Pre-mining observation is to be done in the above mentioned field. A base line data in environmental study is to be done and accordingly Environmental Impact is assessed. These basic data are taken from Pre-feasibility report, PR, Terms of Reference (TOR) etc. It covers the core zone of project as well as Buffer zone, which is 10 km away from periphery of the core zone. This is a running project .So, all the parameters related with environment will be studied for preparation of Environment Management Plan.

15.3 ENVIRONMENTAL IMPACT ASSESSMENT

The mining operation in Chandragupt OCP will generate a series of activities, which will produce air pollutions, waste water and effluent. It generates high noise level, degrade land and also will have impact on flora fauna. The project activities would also have impact on socio-economic profile of the area. It is proposed to assess the likely impact of the mining in and around the surrounding of the project.

15.4 ENVIRONMENTAL CONTROL MEASURES

Mitigation measures are broadly divided into preventive measure and suppression measure. Stress is given on mitigation measure, which is well effective and economical and are discussed in detail in EMP report.

15.5 ENVIRONMENT MANAGEMENT PLAN

For effective implementation, mid-term corrective measures, monitoring and control measure of environmental management plan depends on time bound action programme. The success of environmental management plan depends on the well set-up organization with dedicated persons. The objectives for preparation of Environmental Management Plan are:

- To implement environmental control and protection measures;
- Subsequent environmental monitoring of the efficacy of various control measures;

- Plantation / Green Belt Development;
- Land restoration;

Keeping in view of the above, details of the organizational structure responsible for the implementation of environmental control and mitigation measures as well as monitoring of such implementation will be discussed in the EMP.

15.7 CORPORATE SOCIAL RESPONSIBILITY

Company also performs some social works such as opening of primary schools and higher secondary schools for providing the education to local people, establishment of dispensaries and hospitals, medical camps for providing better health facilities, vocational training to unemployed youth for better employment digging of wells and bore wells for drinking water facilities etc. for welfare of the local people. These works are done with the fund generated as per the policy of CCL /Coal India Limited under the head of corporate social responsibility scheme.

15.8 REHABILITATION AND RESETTLEMENT

Based on the available data from CCL, about 500 families would be affected by mining operation in Chandragupt OCP. Thus, provision has been made for rehabilitation of 500 families. This figure is tentative & may change after detailed survey of mining lease hold area. Resettlement and rehabilitation will be done according to R&R Policy of Coal India Limited.


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CHAPTER-XVI LAND REQUIREMENT

The total land requirement for Chandragupt Opencast Project has been estimated as 1495 Ha. It is divided into three Sections (Section-1, Section-2 & Section-3) consisting of 217.53, 471.40 & 644.22 Ha of land respectively.

The Forest land is 663.90 Ha.

| LAND IN THE CORE ZONE OF CHANDRAGUPT OCP | | | | |
|--|----------------------------------|----------------|----------------------|------------------------------------|
| SN | Particulars | *Forest in Ha. | *Non - Forest in Ha. | Total land in Ha. |
| 1 | Quarry (Section-1) | 67.72 | 149.81 | 217.53 |
| 2 | Quarry (Section-2) | 293.75 | 177.65 | 471.4 |
| 3 | Quarry (Section-3) | 226.03 | 418.19 | 644.22 |
| 4 | Infrastructure (Field- Workshop) | 17.14 | 20 | 37.14 |
| 5 | CHP | 4.46 | 11.74 | 16.2 |
| 6 | Green Belt | 52.3 | - | 52.3 |
| 7 | Safety zone | 2.50 | 53.71 | 56.21 |
| Sub- Total | | 663.90 | 831.10 | 1495.00 |
| LAND IN THE AMARPALI OPENCAST PROJECT | | | | |
| 1 | CHP | | | Land already taken in Amrapali OCP |
| 2 | Unit Workshop | | | |
| 3 | Colony | | | |

*The land details are tentative and likely to change after actual land survey.


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CHAPTER-XVII

MINE CLOSURE PLANNING

17.1 INTRODUCTION

Mine closure encompasses rehabilitation process as an ongoing programme designed to restore physical, chemical and biological quality disturbed by the mining to a level acceptable to all concerned. It aims at leaving the area in such a way that rehabilitation does not become a burden to the society after mining operation is over. It must also aim to create as self-sustained ecosystem.

Mine closure operation is a continuous series of activities starting from day one of the initiation of mining project. As progressive mine closure is a continuous series of activities, it is obvious that the proposals of scientific mining have included most of the activities in the progressive mine closure plan. Final mine closure plan as per statute, shall be considered to have its approval at least nine months before the date of proposed closure of mine. This period of nine months is reckoned as preparatory period for final mine closure operations.

Chandragupta OCP shall have mine closure plan, which shall be of two types:

- a) Progressive Mine Closure Plan and
- b) Final mine closure plan.

17.2 PROGRESSIVE MINE CLOSURE PLAN

17.2.1 Reclamation

A total of 1495.00 Ha. of Land is required for Chandragupt opencast project. This mining plan has been prepared based on the Geological Reports of Pachra and Pachra South geological blocks. The mining plan has been prepared to exploit 15.0 million te of coal per annum from opencast method by deploying shovel dumper combination and surface miner.

The plan envisages OB dumping in external dump in the initial years (first 5 years), thereafter internal dumping has been proposed in the voids of Chandragupt OCP. It is proposed to reclaim physically and biologically the excavated pit of Chandragupt mine after dumping by OB material. Reclamation of external OB dump shall be taken up concurrently with the Chandragupt opencast mine operation.

a) Phase-I: Physical / Technical Reclamation

In 1st phase OB dump shall be dozed and leveled to a bench slope angle of 37°. A layer of top soil is laid over this graded and leveled surface of OB dump.

The internal dump shall be dozed and leveled to a bench slope of 27° to safe guard any slope failure during mining operation.

b) Phase-II: Biological Reclamation

Biological reclamation is the Phase-II of reclamation process. Revegetation covers in terms of grass, trees of appropriate species are raised over physically reclaimed OB dump. The reclamation of OB dump shall be done concurrently with mine operation.

17.2.2 Air Quality Management Plan

Following mitigation measures are required to be done to control the air quality during mining operation:

- a) All blast hole drills are to be fitted with dust collection arrangements
- b) Water sprinklers are to be provided for dust suppression on haul roads and industrial area.
- c) Creation of green belt along roads and plantation in vacant land.
- d) Air Quality of mine shall be taken and analyzed on a regular interval.

17.2.3 Water Quality Management Plan

Following water Quality protection measures are suggested:

- a) Industrial effluent treatment plant
- b) Sedimentation pond for treatment of mine water
- c) Garland drains to arrest surface run-off flowing in to mine pit.
- d) Intercepting drains to collect water from external dumps
- e) Biological reclamation of disturbed land to arrest siltation.

17.2.4 Waste Management

Solid wastes that will be generated in course of coal mining are overburden material consisting of fragments of sandstone/shale of assorted size. They have not been found to generate acid mine drainage or leach high quantity of heavy metals.

A total of 995.34 MCum of OB will be removed and only 48.38 MCum of the OB is proposed to be dumped externally.

Several mitigation measures are proposed to for stabilization of external dump and prevent siltation and erosion.

- a) A Toe wall is proposed at the foot of the external dump.
- b) A series of open drains to be provided on dump body to arrest surface run-off and prevent siltation.
- c) Grasses are to be grown on dump slopes to minimize soil erosion.

17.2.5 Top Soil Management

It is proposed to dump and preserve top soil separately for use while reclaiming the land as well as external and internal dumps. No separate places have been proposed for keeping top soil.

However, the top of the area marked for external dump will be used for top soil preservation in rotational basis. Finished levels of the external dump may also be used if needed.

17.2.6 Safety & Security

While carrying out all kinds of mining and allied activities in the project, the safety rules in force as per Rules and Regulations made under Mines Act-1952 will be observed and required safety measures taken. Circulars issued time to time regarding safety to the personnel and equipment of the mine and to improve the working conditions of the mine, the mining plan envisages:

- Measures to prevent industrial accidents
- Measures to ensure stability of benches and OB dumps.
- Measures to ensure safety of equipment
- Measures to control fire
- Measures to control dust and emission of noxious gases
- Measures for pollution control.

17.3 FINAL MINE CLOSURE PLAN (CONCEPTUAL)

Mine closure operations is proposed to be undertaken after examination and detailed study that there is no further expansion possibility of the mine and the void is to be suitably filled up so that the land is utilized gainfully by the society. Intermediate stoppages of operations due to any reasons for a period of time do not come under the proposed scheme of mine closure. This chapter proposes following aspects:

- A. Technical Aspects
- B. Environmental Aspects
- C. Social Aspects
- D. Financial Aspects

17.3.1 Technical Aspects

- Safety aspects.
- Pit slopes and waste dumps.
- Hydrology and hydrogeology.
- Details of decommissioning of the infrastructures.
- Closure of entries like pits and entry to the mine.

17.3.2 Safety

After attaining the final stage dump the remaining portion between dump toe and final stage Quarry floor should be fenced properly so that no human being or stray animals should be trapped within. Internal dumps are proposed to be suitably re-graded to avoid deep trenches.

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17.3.3 Pit Slopes and Waste Dumps

The final pit slopes are designed to avoid any slope failure. Technical study is proposed to be conducted before deciding upon the final slope. Both the external and internal Dumps are designed in such a way that there are minimal chances of slope failure. The external Dump is sloped ultimately in the overall range of 25 degree to 28 degrees. The internal dump slopes are designed at milder gradient so that even with the percolation of water in the dip side of the quarry, the dumps remain stable. It is proposed that the internal and external dump must be provided with toe walls/ silt arrestors and garland drains. Vegetation cover on surface of these dumps is proposed to be ensured as a final closing operation.

17.3.4 Hydrology and Hydrogeology

In the mine closure plan, the surface flow pattern of precipitation and mine water drainage is envisaged to be examined and the water channel suitably laid down, so that this is acceptable to the local community and it do not disturb the general hydrology of the area. Efforts are proposed to be made to regenerate the ground water resources.

17.3.5 Decommissioning of the Infrastructures

The coal project develops lot of infrastructure for sustaining their operations. These include Workshop, Coal Handling Plant, Railway Siding, Office Complex, Residential Complex, Roads, Pipe Lines and Transmission Line. Decommissioning of the infrastructure should be planned in such a way that the Land occupied by these infrastructures is released. However these infrastructures are proposed to be reused for the neighboring projects /mine.

17.3.6 Closure of Entry to the Mine

All entries to the mine must be effectively sealed. This will prevent illegal mining, entry of fire and water etc.

17.4 ENVIRONMENTAL ASPECTS

- Air, water, dust.
- Reclamation of forest/vegetation.
- Management of recharge areas.
- Acceptable surface and ground water flows.
- Alternative use of land.

17.4.1 Air, Water and Dust

It is proposed that air quality; water quality and dust level is to be monitored. Necessary actions to check the pollution from the closed mine, if any, in respect of air, water and dust is to be taken after examining the local site conditions then prevailing.


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17.4.2 Reclamation of Forest / Vegetation

It is proposed that major portion of the project area is covered with vegetation. This will involve both forest land as well as non-forest land. Certain areas, mostly industrial areas, where service building are proposed to be located and to be used are not proposed for plantation.

17.4.3 Management of Recharge Area

It is proposed that the recharge areas are fully utilized with sufficient availability of water, if feasible, is ensured to enhance ground water availability.

17.4.4 Surface and Ground Water flows

In the final stage, wherever the mine water is likely to flow out to surface and meet the natural drainage system, the quality of water is proposed to be assessed and flow pattern for mine water be properly modified / redesigned. Alternately, the water treatment arrangements may be considered depending upon the local site conditions.

17.4.5 Alternative Use of Land

During the mining operation, the land usage changes from its pre-mining scenario. The final stage land use plan shows the use of land in a post-mining scenario when coal-mining operations have completed. Alternative use of land, specially released from infrastructure areas and vacant areas, as proposed to be planned and properly designated for post-mining land uses depending on the existing conditions prevailing at that point of time. While for OB dumps and acquired forest areas, vegetation and afforestation has been proposed as a final land use. While agriculture may be the best land use, if feasible, and if it is supported by some irrigation facilities.

17.5 SOCIAL ASPECTS

- Re-deployment of work force.
- Management of community facilities
- Canalization of available water

17.5.1 Re-deployment of Work Force

The peak work force required for mine operations is in the first few years of the mine when construction activities as well as operational activities achieved their peak.

This work force slowly goes down with completion of development and when only the operational work remains. Again near the end of the mine life, say 4-5 years before closure, the activity of the mine starts getting reduced and therefore management gets opportunity to taper the operational manpower. After closure, skeleton service people are proposed to be left for continuing with the actual closure operations. The reduction of manpower could be done as per the following options:

1. Natural retirement.
2. Implementation of VRS schemes for age group of +50.


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3. Retraining and redeployment of younger groups – 40.
4. Transfer of experienced middle-aged groups between 40-50 years to other projects.

Retrenchment of people with suitable compensation after exhausting all the above option may be introduced.

17.5.2 Management of Community Facilities

The community facilities are proposed to be developed by coal projects for betterment of the neighboring community. The project management provides or assists in developing educational facilities, health facilities, community halls and also some communication facilities. After the mine closure, these facilities are to be continued for the neighboring communities to the possible extent. The closure plan will envisage interaction of mining company with the state or local bodies who will take over these facilities and run the same for the community. The coal companies towards running these facilities, which is proposed to be taken care of by the local/state bodies, may make a onetime payment.

17.5.3 Canalization of Available Water

If it is found that the mine is having sufficient water and on closure, the mine water flows into the surface watercourses, canalizing this water for surrounding community for their irrigational/domestic uses may be taken up.

17.6 FINANCIAL ASPECTS

- Creation of a corpus fund for the final mine closure
- Cost of progressive closure activities.
- Cost towards organization for executing the closure activities.
- Cost of the post project monitoring
- Bond/insurance for the closure cost

17.6.1 Financial Assurance

As proposed above, many activities are to be undertaken for progressive mine closure plan concurrently with the mine operation and final closure plan after the closure of the mine, which naturally will involve expenditure. Some of the closure activities will, in fact, form part of normal mining operations. However, some activities are proposed to be addressed only after completion of the coal mining operations.

17.7 DISASTER MANAGEMENT PLAN & RISK MANAGEMENT:

There are various elements of risks in operation of the mine. They include following:-

- **Slope Failure of External OB Dump** – OB proposed is planned to be stacked in internal and external dumps having a total maximum height of 90m in three tiers of 30m each. The OB


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material consists of assorted size of sandstone fragments, other geological strata and sub-soil. It has to be ensured that slope of OB Dumps do not fail as it would cause damage to life & property.

- **Slope failure of Internal Dump** – The slope of the backfilled mass is dynamic i.e. it moves every day. It has to be ensured that slope of backfilled mass is safe otherwise it may pose risk to life & property and interrupt the mining operations.
- **Stability of High walls** – In course of opencast mining slopes if created on high wall sides in coal and OB / interburden formations unless properly planned, they may fail. It is proposed to undertake slope stability analysis to avoid slope failure.
- **Fire** – There may be fire in working, store, industrial installations and other service building provided for the mine.
- **Inundation** – The open pit will collect water from direct precipitation and surface run-off from surrounding areas. This may lead to inundation of the mine pit.
- **Seismic activities** – The project is located in low risk seismic zone area.

Ameliorative Measures

Following ameliorative measures have been envisaged to be taken to prevent the risks/accidents:

- Slope stability analysis is required to be conducted for high wall slopes, External Dumps and Internal Dump slopes.
- Adequate fire fighting arrangements to be made.
- For preventing mine inundation, sufficient pumping arrangements have been made to pump out the pit water continuously.
- Garland drains have been proposed around mine pit to intercept surface run-off.
- Medical facilities – A hospital with necessary infrastructure, doctors and paramedical staff and ambulance has been proposed to take care of emergency situation.

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CHAPTER – XVIII

MANPOWER & PRODUCTIVITY

18.0 INTRODUCTION

Manpower requirements are assessed on the basis of 7 days week and 330 days of annual working. The peak manpower of the project has been estimated as 1247.

18.1 **MANPOWER REQUIREMENT** for Chandragupt OCP -15.0 MTY has been given below.

DEPARTMENTAL

| SI No | Manpower Particulars | Category | Maximum | |
|-------|-----------------------|----------|------------|-------------|
| | | | No. | %age |
| 1 | Unskilled | I | 0 | 0.00 |
| 2 | Semi-skilled | II, E | 5 | 3.36 |
| 3 | Total Workers | | 5 | 3.36 |
| 4 | Monthly Paid | | 121 | 81.21 |
| 5 | Officers | | 23 | 15.44 |
| 6 | Total manpower | | 149 | 100 |

MDO

| SI No | Manpower Particulars | Category | Maximum | |
|-------|-----------------------|-------------------------|-------------|--------------|
| | | | No. | %age |
| 1 | Unskilled | I | 55 | 5.01 |
| 2 | Semi-skilled | II, E | 93 | 8.47 |
| 3 | Skilled | C, D, III, IV, V, VI | 275 | 25.05 |
| 4 | Highly skilled | A, B | 539 | 49.09 |
| 4 | Total Workers | | 962 | 87.61 |
| 5 | Monthly Paid | | 110 | 10.02 |
| 6 | Officers | | 26 | 2.37 |
| 7 | Total manpower | | 1098 | 100 |

Additionally 70 (45 unskilled and 25 semi-skilled) persons for MDO is proposed to be outsourced as Security Manpower.


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18.2 TRAINING

Newly recruited persons are to be trained as per the standing guidelines stipulated in the V.T Rules of DGMS and the existing Training Schedules of CIL prior to actual placement in the job/ mine. For periodical training and development need, a Group VTC for Area may be formed. If required, facilities at these training centres should be augmented periodically.


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ECONOMIC EVALUATION


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CHAPTER-XIX

BREAK-UP OF COST HEADS BETWEEN MDO & COMPANY

| Company - Scope | MDO Operator - Scope |
|--|---|
| <p>Capital Heads</p> <ul style="list-style-type: none"> • Land • Railway siding • Vehicles for Departmental Manpower • Prospection & Boring (GR) • R&R expenditure • PR & EMP preparation • Scientific research | <p>Capital Heads</p> <ul style="list-style-type: none"> • Residential & service building for MDO Manpower • Residential & service building for Departmental Manpower • HEMM • Other than HEMM • Furniture & Fittings for MDO Manpower • Furniture & Fittings for Departmental Manpower • Vehicles for MDO Manpower • Prospection & Boring (Production support) • Capital Outlay in Mines other than R&R part • Roads & culverts • Water supply & Sewerage |
| <p>Operating cost heads</p> <ul style="list-style-type: none"> • Salaries & wages for Departmental Manpower • Stores cost <ul style="list-style-type: none"> ○ Diesel for Vehicles ○ Misc. Items • Misc. expenditure for Departmental manpower <ul style="list-style-type: none"> ○ Provision for TA/DA ○ R&M of Civil items ○ Misc. Items • Mine closure cost • Administrative cost • Interest on Working capital on the above cost heads • Depreciation/amortization of Company side capital investment | <p>Operating cost heads</p> <ul style="list-style-type: none"> • Salaries & wages for MDO Manpower • Stores cost <ul style="list-style-type: none"> ○ Diesel & Lubricant cost ○ R&M cost of P&M ○ Explosives cost ○ Diesel for vehicles ○ Misc. items • Power cost • Misc. expenditure for MDO manpower & Other cost components <ul style="list-style-type: none"> ○ Provision for TA/DA ○ Workshop Debit for P&M ○ R&M of Civil items ○ R&M of vehicles ○ Haul road Maintenance ○ Contingency ○ Environment related costs ○ Watch & ward ○ Hiring charges of vehicles ○ Misc. Items • Interest on Working capital on the above cost heads • Depreciation/amortization of MDO side capital investment |


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CHAPTER-XX ECONOMICS

20.1 INTRODUCTION

The modified & updated cost estimates of Project Report of Chandragupt OCP has been prepared at the nominal rated capacity of 15.0 Mty of coal considering MDO operation. The estimated economics have been discussed in the subsequent paragraphs.

20.2 TOTAL CAPITAL INVESTMENT

The capital investment, both initial as well as beyond target year, has been proposed from the internal resources of the Company. The capital requirements is given below:

Table-20.1: Capital Requirement (Project Life)

| (Rs in Lakhs) | | | | |
|---------------|-------------------------|-----------------|------------------|------------------|
| SI No | Particulars | CCL | MDO | TOTAL |
| 1 | Land: | | | |
| | a) Freehold Land | | | |
| | b) Leasehold Land | 67293.26 | | 67293.26 |
| 2 | Buildings: | | | |
| | a) Service | | 13601.03 | 13601.03 |
| | b) Residential | | 14244.46 | 14244.46 |
| 3 | Plant & Machinery | | | |
| | a) H. E. M. M. | | 131303.37 | 131303.37 |
| | b) Others than HEMM | | 60186.01 | 60186.01 |
| 4 | Furniture & Fittings | | 60.60 | 60.60 |
| 5 | Railway Siding | 22790.00 | | 22790.00 |
| 6 | Vehicles | | | |
| 7 | Prospecting & Boring | | 152.00 | 152.00 |
| 8 | Development | | | |
| 8.1 | Capital Outlay in Mines | 5639.00 | 3023.38 | 8662.39 |
| 8.2 | Roads & Culverts | | 18083.60 | 18083.60 |
| 8.3 | Water Supply & Sewerage | | 3056.05 | 3056.05 |
| 8.4 | Scientific Research | | | |
| 8.5 | PR Prep Cost | 1627.91 | | 1627.91 |
| 9 | Land Reclamation | | 2653.64 | 2653.64 |
| | Total Capital | 97350.17 | 246364.15 | 343714.33 |

However, the capital requirement to be sanctioned is Rs 97350.17 lakhs

Over and above this, 70 persons for MDO has been outsourced as Security manpower. The cost is included in Other Outsourcing Cost.

b) Stores

Stores cost consists (1) diesel and lubricants, (2) explosives and detonator, (3) spares for routine repairs etc. Prevalent norms have been followed in estimating stores cost.

c) Power

The average Power cost per Tonne has been calculated based on the annual KWH consumed.

d) Miscellaneous Expenditure

This covers the expenditure on printing & stationery, postages, telephone, repairs and maintenance of assets other than P&M, workshop debits for annual servicing and overhauling of HEMM, insurance and taxes for vehicles, normative contractual cost of major maintenance of HEMM. The average Miscellaneous cost /Tonne has been shown in Table C below.

e) Final Mine closure Cost

A fund equal to Rs. 8.89 Lakhs/hectare of land (updated till Dec 2019 WPI) is proposed to be created towards a fund for final mine closure. The corpus required for mine closure, which has been distributed over the life of mine with a yearly escalation of 5%.

f) Administrative Charges

This includes area overhead, apex overhead etc. and the cost has been taken as per the actual administrative cost of CCL which is Rs. 191.03 per tonne. *With conformity to resolution of 317th CIL Board Meeting regarding Cost Provisioning in Project Report of CIL Projects, 10% of Administrative Overhead has been adopted as administrative cost for the calculation of IRR and for calculation of per tonne cost, actual administrative cost of CCL has been considered. The above mentioned administrative cost per tonne has been duly adjusted for incremental production. Rate of the interest on working capital is taken as 14.50% per annum.*

g) Interest on Working Capital:

The interest on working capital for calculating MDO cost has been considered with 1 month fund requirement.

h) Depreciation

Depreciation on assets is computed as per the prevalent norms. The straight-line method of charging depreciation has been adopted.


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i) **Cost & Profitability**

The details of the average cost and profitability estimates, at 100% capacity is given in **Appendix-C**. The CPT & profitability has been shown for the whole life of the project. These have been summarised in the table below:-

Table-20.2: Cost & Profitability

| (Cost in Rs/Te) | | | |
|-----------------|-------------------------------|---------------|-----------------|
| S.N. | PARTICULARS | COST/TE | % OF TOTAL COST |
| 1 | SALARY & WAGES | 37.48 | 6.22% |
| 2 | STORES | 221.33 | 36.71% |
| 3 | POWER | 15.34 | 2.55% |
| 4 | MISC EXP | 42.66 | 7.07% |
| 5 | ADMINSTRATIVE COST (CASH) | 15.81 | 2.62% |
| 6 | MINE CLOSURE COST | 4.56 | 0.76% |
| 7 | OTHER OUTSOURCING COST | 4.34 | 0.72% |
| 8 | INTEREST ON WORKING CAPITAL | 5.71 | 0.95% |
| 9 | TOTAL CASH COST | 347.22 | 57.59% |
| 10 | DEPRECIATION | 113.43 | 18.81% |
| 11 | ADMINSTRATIVE COST (NOTIONAL) | 142.26 | 23.59% |
| | TOTAL COST | 602.91 | 100.00% |

j) **Selling Price**

The declared Selling Price per tonne of ROM coal has been adopted for the grade G-11 (GCV 4000-4300) Coal for power sector, i.e. Rs. 955/-per tonne with additional charge of Rs 87/- per tonne for sizing of coal up to -100mm and RLS charges Rs. 29/- per tonne. The average selling price of ROM coal works out to Rs. 1023.25/- per tonne.

20.8 FINANCIAL ANALYSIS

The year-wise cash flows at 100% capacity utilisation has been estimated and is detailed in Appendix-D. The cash-flow excludes depreciation and interest on loan capital. The financial IRR on total capital of the project at 100% level of the rated output have been worked out based on the estimates of the aforesaid cash flow and is given below.

Table-20.3: Financial Analysis

| Particulars | IRR |
|------------------|---------------|
| At 100% Capacity | 39.70% |
| At 85% Capacity | 30.08% |

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20.9 INCLUSION OF GST IN PR

The prices of capital assets i.e., HEMMs, P&M, Civil constructions etc. have been considered inclusive of GST. A standard rate of GST @ 18% on HEMMs and P&M other than HEMMs has been considered. Input tax credit on GST paid on such capital assets will be available which can be utilized against output tax liability and hence due adjustment has been made on account of GST Credit on such capital assets for computation of cash flow analysis.

Calculations of operating expenditure have been made without considering impact of GST.


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APPENDICES

CCL-Part


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CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP (15.00 MTY)
STATEMENT OF ESTIMATED CAPITAL INVESTMENT AND YEARWISE PHASING
CCL

(Amount in Rs.lakhs)

| SL NO | PARTICULARS | TOTAL CAPITAL UP TO PROJECT LIFE | TOTAL CAPITAL UP TO TARGET YEAR | PHASING OF CAPITAL | | | | | | | | |
|-------|--|----------------------------------|---------------------------------|--------------------|-----------------|-----------------|----------------|----------------|---|---|---|---|
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | Land: | | | | | | | | | | | |
| | a) Freehold Land | | | | | | | | | | | |
| | b) Leasehold Land | 67293.26 | 67293.26 | 23088.34 | 23088.34 | 2116.59 | | | | | | |
| 2 | Buildings: | | | | | | | | | | | |
| | a) Service | | | | | | | | | | | |
| | b) Residential | | | | | | | | | | | |
| 3 | Plant & Machinery | | | | | | | | | | | |
| | a) H. E. M. M. | | | | | | | | | | | |
| | b) Others than HEMM | | | | | | | | | | | |
| 4 | Furniture & Fittings | | | | | | | | | | | |
| 5 | Railway Siding | 22790.00 | 22790.00 | 4870.00 | 13530.00 | 4390.00 | | | | | | |
| 6 | Vehicles | | | | | | | | | | | |
| 7 | Prospecting & Boring | | | | | | | | | | | |
| 8 | Development. | | | | | | | | | | | |
| 8.1 | Capital Outlay in Mines | 5639.00 | 5639.00 | 1135.00 | 1000.00 | 1000.00 | 1000.00 | 1504.00 | | | | |
| 8.2 | Roads & Culverts | | | | | | | | | | | |
| 8.3 | Water Supply & Sewerage | | | | | | | | | | | |
| 8.4 | Scientific Research | | | | | | | | | | | |
| 8.5 | P.R Prep.Cost | 1627.91 | 1627.91 | 1627.91 | | | | | | | | |
| | Upfront payment | | | | | | | | | | | |
| 9 | Revenue Exp.capitalised during Devel. Period | | | | | | | | | | | |
| 10 | Land Reclamation | | | | | | | | | | | |
| | INITIAL CAPITAL | 97350.17 | 97350.17 | 30721.25 | 37618.34 | 26506.59 | 1000.00 | 1504.00 | | | | |

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 CCL, AMRIPALI-CHANDRAGUPTA AREA

PR OF CHANDRAGUPTA OCP (15.0 MTY)
STATEMENT SHOWING THE ESTIMATED INVESTMENT ON LAND ACQUISITION

CCL
(Amount in Rs. Lakhs)

| Sl. No. | Particulars | Land Required (Ha) | Cost (Rs Lakh per Ha) | Cost & Phasing Rs. in lakhs | | | | |
|---------|--------------|--------------------|-----------------------|-----------------------------|------------------|-----------------|-----------------|--------------------|
| | | | | Total cost | Upto Target Year | | | Beyond Target year |
| | | | | | 1st yr. | 2nd yr. | 3rd Yr. | |
| 1 | Forest Land | 663.90 | 21.84 | 14501.79 | 7250.90 | 7250.90 | 0.00 | 0.00 |
| 2 | Tenancy Land | 498.66 | 89.20 | 44480.47 | 13344.14 | 13344.14 | 17792.19 | 0.00 |
| 3 | GMK Land | 332.44 | 25.00 | 8311.00 | 2493.30 | 2493.30 | 3324.40 | 0.00 |
| | TOTAL | 1495.00 | | 67293.26 | 23088.34 | 23088.34 | 21116.59 | 0.00 |

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CCL AMRAPALI

**UCE FOR CHANDRAGUPTA OCP (15.0 MTY)
DETAILS OF RESIDENTIAL BUILDINGS**

| SL.No. | CATEGORY/SCALE | TYPE OF QTRS. | NO.OF PERS-ONS | %age SATISFACTION | TOTAL QTRS. REQD. |
|--------|--|---------------------|----------------|-------------------|-------------------|
| 1 | CAT.I to VI, EX GR-B,C,D&E, MR-D to MR-H | A | 34 | 26.47 | 9 |
| 2 | MR-C to MR-A1 & EX GR- A & SPECIAL GRADE | HOSTEL/BARRACK B | 64 | 35.00 | 22 |
| 3 | E1 to E5 | C | 15 | 100.00 | 15 |
| 4 | E6 AND ABOVE | D | 7 | 100.00 | 7 |
| 5 | SECURITY Sr. OFFICER(SEcurity) WATCH & WARD INSP.,HEAD WATCHMAN, ARMED GUARD & SECURITY GUARD | C A | 1 28 | 100.00 100.00 | 1 28 |
| | TOTAL | | 149 | 55.00 | 82 |

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APPENDIX-A.2.2

UCE FOR CHANDRAGUPTA OCP (15.0 MTY)
DETAILS OF SERVICE BUILDINGS.

CCL

| SL.No. | PARTICULARS | NO. | PLINTH AREA (sq.mt) | PLINTH AREA RATE(Rs) | COST AT 100 C.I.(Rs) |
|--------|-------------|-----|---------------------------|----------------------------|----------------------------|
| A. | OFFICE | | | | |
| 1 | P.O. OFFICE | 1 | 500 | 446 | 223000 |


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CHANDRAGUPTA OCP (15.00 MTY)

STATEMENT SHOWING THE ESTIMATED CAPITAL EXPENDITURE ON RAILWAY SIDING

(Amount in Rs. Lakhs)

| SL. No. | PARTICULARS | TOTAL COST | PHASING | | |
|--------------|--|-----------------|----------------|-----------------|----------------|
| | | | 1 | 2 | 3 |
| 1 | Preliminary Work | 50.00 | 40.00 | 10.00 | 0.00 |
| 2 | Civil Engineering Cost including link & Yard Portion and bridges (17.5 KM.approx.) etc. | 17900.00 | 4480.00 | 10740.00 | 2680.00 |
| 3 | Signalling and Telecommunication | 900.00 | 90.00 | 540.00 | 270.00 |
| 4 | Electrical Engineering & Control | 2690.00 | 130.00 | 1610.00 | 950.00 |
| 5 | EMP Measures | 450.00 | 50.00 | 230.00 | 170.00 |
| 6 | Contengency (Including Lighting, approach road, drain, rail-weigh bridge etc.) | 800.00 | 80.00 | 400.00 | 320.00 |
| TOTAL | | 22790.00 | 4870.00 | 13530.00 | 4390.00 |


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 CCL ADMIN/CHANDRAGUPTA AREA

Appendix A.6

Provision of Hired Vehicles (CCL)

| MDO | Particulars | Total No |
|-----|--------------|----------|
| 1 | Jeep | 4 |
| 2 | Car | 3 |
| | Total | 7 |


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CCL AMRAPALI-CHANDRAGUPTA-198A

PR OF CHANDRAGUPTA OCP (15.0 MTY)
Estimated Capital for Capital Outlay in Mines

CCL

(AMOUNT IN RS. LAKH)

| Sl.No | Particulars | Total Provision | Phasing | | | | | |
|-------|---|-----------------|-------------------|----------------|----------------|----------------|----------------|-------------|
| | | | Up to Target Year | | | | | |
| | | | 1st yr. | 2nd yr. | 3rd Yr. | 4th. Yr. | 5th. Yr. | 6th. Yr. |
| 1 | Village rehabilitation for 500 families including cost of houses. | 5504.00 | 1000.00 | 1000.00 | 1000.00 | 1000.00 | 1504.00 | |
| 2 | Cost of EMP preparation & Baseline environmental data generation | 114.41 | 114.41 | | | | | |
| 3 | Total | 5618.41 | 1114.41 | 1000.00 | 1000.00 | 1000.00 | 1504.00 | 0.00 |
| 4 | GST except item no. 1 (18% OF Above) | 20.59 | 20.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 5 | GRAND TOTAL (IN Rs. LAKHS.) | 5639.00 | 1135.00 | 1000.00 | 1000.00 | 1000.00 | 1504.00 | 0.00 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL - AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUFT OCP (15.0 MTY)
MANPOWER (CCL)

| Particulars | Category | Max | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y10 |
|--|--------------|-----|----|----|----|----|----|----|----|----|----|-----|
| LOADING/DESPATCH | | | | | | | | | | | | |
| Loading Supervisor | 6724 - 10360 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Loading Munshi | 5952 - 8844 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Sub-Total of Loading & Despatch | | | 10 | 10 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| Total of Coal | | | 10 | 10 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| PROJECT / G.M.'S OFFICE | | | | | | | | | | | | |
| Project Officer (Mining)/ GM | 53500-72000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sr Manager (Sales) | 36800-62000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Private Secretary | 20600-46500 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| O.S | 7824-12054 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sr. Clerk | 7260-11184 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| LDC/Typist | 6219-9009 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Peon | 5691-8247 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Revenue Officer | 20600-46500 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Revenue Inspector | 7824-12054 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sub-Total of Project Office | | | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| TRAINING CENTRE | | | | | | | | | | | | |
| Training Officer/C.M | 32000-54000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Instructor | 7260-11184 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| LDC/Typist | 6219-9009 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Peon | 5691-8247 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sub-Total of Training Centre | | | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| MINING/SAFETY, DESPATCH & QUALITY CONTROL | | | | | | | | | | | | |
| Chief Manager (Mining) | 43200-66000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sr Manager (Mining) | 36800-62000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Manager (Mining)/Safety Officer | 32900-58000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Dy Manager /ACM | 29100-54500 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Asst Manager / JM | 24900-30500 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Sr. Overman | 7824-12054 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Overman | 7260-11184 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| Fire Fighting Supervisor | 7260-11184 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Blasting Overman | 7260-11184 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| O.S | 7824-12054 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| P.A | 7260-11184 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| LDC/Typist | 6219-9009 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Mining Sirdar | 6724-10360 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| MTK | 6219-9009 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Peon | 5690-8248 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Fire Fighting Mazdoor | II | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Sub-Total of MINING/SAF, DESP. & QUA. CONTRO. | | | 55 | 59 | 68 | 68 | 68 | 68 | 68 | 68 | 68 | 68 |
| WATCH & WARD | | | | | | | | | | | | |
| Security Officer | 20600-46500 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Watch & Ward Inspector | 6219-9009 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Head Watchman | 6219-9009 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Armed Guard | 6219-9009 | 10 | 5 | 8 | 8 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Security Guard | 5952-8844 | 15 | 8 | 10 | 12 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| Sub-Total of Watch and Ward | | | 17 | 23 | 24 | 28 | 29 | 29 | 29 | 29 | 29 | 29 |
| ACCOUNTS | | | | | | | | | | | | |
| Sr. Manager (Finance) | 36800-62000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Manager (Finance) | 32900-58000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Accountant | 7824-12054 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Sr. Cashier | 7260-11184 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Cashier | 6724-10360 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| LDC/Typist | 6219-9009 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Sub-Total of Accounts | | | 5 | 6 | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| PERSONNEL/WELFARE | | | | | | | | | | | | |
| Sr Manager (Admin) | 36800-62000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Manager (Personnel) | 32000-58000 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| LDC/Typist | 6219-9009 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Recreation Club Attendant | II | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sub-Total of Personnel/Welfare | | | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

SANJEEV KUMAR
MANAGER
CHANDRAGUFTA OPERATIONS
CCL AMRITAPUR

CHANDRAGUPT OCP (15.0 MTY)
MANPOWER (CCL)

| Particulars | Category | Max | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 | Y8 | Y9 | Y10 |
|--------------------------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| SURVEY | | | | | | | | | | | | |
| Manager (Survey) | 36000-63000 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Sr. Officer (Survey) | 24000-50500 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Head Surveyor | 7824 - 12054 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Surveyor (Incl. Revenue) | 6724 - 10360 | 3 | | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| DAMAN | 7260 - 11184 | 2 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Chairman | 5895 - 6542 | 7 | 2 | 3 | 4 | 6 | 7 | 7 | 7 | 7 | 7 | 7 |
| Sub-Total of Survey | | | 4 | 9 | 10 | 14 | 15 | 15 | 15 | 15 | 15 | 15 |
| TOTAL FOR COMMON | | | | 97 | 113 | 126 | 136 | 137 | 137 | 137 | 137 | 137 |
| GRAND TOTAL | | | 153 | 107 | 123 | 138 | 148 | 149 | 149 | 149 | 149 | 149 |

(Signature)
SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA JPCNCAS PROJECT
 CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED YEAR WISE OPERATING COST AT 100% CAPACITY UTILISATION
CCL

Appendix C.1

| Sl. No. | Particulars | Amount in Rs.Lakhs | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|--------------------------------|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | 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 | |
| 1 | Salary & Wages | 1134.93 | 1331.43 | 1496.26 | 1581.23 | 1592.17 | 1599.17 | 1588.17 | 1589.17 | 1589.17 | 1589.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 | 1590.17 |
| 2 | Stores | 14.00 | 22.50 | 40.00 | 55.00 | 65.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 |
| 3 | Power | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Misc. Expenses | 350.47 | 781.49 | 1155.91 | 1403.03 | 1583.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 | 1733.31 |
| 5 | Administrative Cost (Cash) | 513.94 | 808.60 | 1368.86 | 1811.39 | 2088.34 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 |
| 6 | Mine closure Cost | 324.12 | 340.33 | 357.35 | 375.21 | 393.06 | 412.87 | 434.56 | 458.08 | 478.88 | 502.82 | 524.98 | 544.36 | 582.08 | 611.38 | 641.74 | 673.83 | 707.52 | 742.80 | 780.04 | 819.05 | 860.00 | 903.00 | 948.15 | 995.58 | 1045.30 | |
| 7 | OS Outsourcing | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | COAL Outsourcing | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Other Outsourcing cost | 5.97 | 17.92 | 29.86 | 47.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | 41.80 | |
| 10 | Reserve Price | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Bank Guarantee Charges (I.S) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Interest on Working capital | 1571.75 | 159.12 | 215.00 | 254.60 | 278.40 | 292.91 | 300.91 | 301.96 | 303.05 | 304.22 | 305.48 | 305.77 | 304.47 | 305.50 | 306.97 | 308.53 | 310.15 | 311.86 | 313.66 | 315.54 | 317.52 | 319.60 | 321.70 | 323.86 | 325.48 | |
| 13 | Total cash Cost | 3673.25 | 3459.95 | 4563.26 | 5522.27 | 6040.88 | 6004.30 | 6526.91 | 6549.33 | 6573.23 | 6598.28 | 6624.75 | 6632.05 | 6620.92 | 6625.74 | 6633.15 | 6641.82 | 6727.14 | 6764.22 | 6803.16 | 6844.05 | 6882.98 | 6922.06 | 6975.30 | 7024.66 | 7091.28 | |
| 14 | Interest on loan | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Administrative Cost (Non-cash) | 4825.50 | 7261.14 | 12019.00 | 16302.51 | 16726.08 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 | 21168.57 |
| 16 | Depreciation | 844.70 | 2234.41 | 3218.94 | 3868.94 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 2782.50 | 2036.00 | 1700.50 | 1716.50 | 1641.30 | |
| | Total | 9493.50 | 12955.00 | 20002.16 | 24893.72 | 27819.21 | 30817.85 | 30830.33 | 30862.11 | 30889.07 | 30911.40 | 30937.46 | 30944.76 | 30918.03 | 30938.85 | 30970.80 | 31004.53 | 31036.65 | 31076.94 | 31115.80 | 31156.77 | 30818.05 | 30136.63 | 29914.46 | 29914.16 | 29891.13 | |
| | Cost/Ts. (Rs.) | | | 250.03 | 226.31 | 215.23 | 205.45 | 208.60 | 205.73 | 205.01 | 206.07 | 205.25 | 206.30 | 205.11 | 206.30 | 205.47 | 206.70 | 208.93 | 207.16 | 207.84 | 207.21 | 205.45 | 200.91 | 199.43 | 199.43 | 199.27 | |
| | Fixed Cost (Rs/Ts) | | | 88.54 | 70.81 | 63.18 | 55.88 | 57.02 | 57.17 | 57.33 | 57.50 | 57.67 | 57.72 | 57.54 | 57.68 | 57.90 | 58.12 | 58.35 | 58.60 | 58.86 | 59.14 | 59.58 | 62.34 | 62.65 | 60.85 | 60.70 | |
| | Variable Cost (Rs/Ts) | | | 161.49 | 155.70 | 152.05 | 149.59 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | 149.58 | |

Sanjeev Kumar
SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT DCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED YEAR WISE OPERATING COST AT 85% CAPACITY UTILISATION
CCL

| Sl. No. | Particulars | (Amount in Rs. Lakhs) | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|--------------------------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | 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 |
| 1 | Salary & Wages | 1134.03 | 1301.40 | 1496.28 | 1591.23 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 | 1599.17 |
| 2 | Stamps | 14.00 | 22.50 | 40.00 | 55.00 | 65.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 |
| 3 | Power | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Misc. Expenses | 328.07 | 781.49 | 1071.91 | 1287.33 | 1445.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 | 1575.81 |
| 5 | Administrative Cost (Cash) | 513.91 | 806.80 | 1358.80 | 1811.39 | 2088.34 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 |
| 6 | Misc. electric Cool | 324.12 | 340.33 | 357.38 | 375.21 | 393.96 | 413.67 | 434.36 | 456.08 | 478.88 | 502.82 | 527.96 | 554.36 | 582.04 | 611.11 | 641.71 | 673.83 | 707.52 | 742.90 | 780.04 | 818.95 | 859.60 | 903.00 | 948.15 | 995.26 | 1045.33 |
| 7 | Oil Contingency | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | CCAL Contingency | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Other Outsourcing cost | 5.00 | 15.87 | 28.12 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 | 39.37 |
| 10 | Reserve Price | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Bank Guarantee Charges (LS) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Interest on Working capital | 112.22 | 150.47 | 210.86 | 248.90 | 271.76 | 295.11 | 293.16 | 294.23 | 295.33 | 296.49 | 297.70 | 298.94 | 299.74 | 300.77 | 302.24 | 303.80 | 305.43 | 307.13 | 308.90 | 310.75 | 312.67 | 314.65 | 316.69 | 318.79 | 320.95 |
| 13 | Total cash Cost | 2438.91 | 3698.05 | 4573.37 | 5398.64 | 5924.47 | 6337.21 | 6368.96 | 6381.71 | 6405.82 | 6430.72 | 6467.08 | 6494.38 | 6496.25 | 6498.47 | 6497.51 | 6524.15 | 6595.47 | 6596.53 | 6633.49 | 6676.38 | 6719.31 | 6764.39 | 6811.72 | 6861.42 | 6913.61 |
| 14 | Interest on Loan | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Administrative Cost (Non-cash) | 4525.50 | 7261.26 | 12919.98 | 18302.51 | 18705.08 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 | 21195.57 |
| 16 | Depreciation | 944.76 | 2334.41 | 3018.94 | 3088.94 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 | 3144.14 |
| | Total | 8004.16 | 12954.51 | 19912.30 | 24770.06 | 27835.65 | 30649.96 | 30671.86 | 30684.43 | 30718.33 | 30743.44 | 30768.79 | 30777.89 | 30748.96 | 30771.19 | 30803.23 | 30830.86 | 30872.16 | 30909.27 | 30948.21 | 30889.10 | 30850.38 | 29968.96 | 29748.79 | 29748.49 | 29723.48 |
| | Cost/Tc. (Rs.) | 336.51 | 338.88 | 262.63 | 254.92 | 251.89 | 249.26 | 249.26 | 249.74 | 249.93 | 249.12 | 249.33 | 249.39 | 249.17 | 249.34 | 249.59 | 249.86 | 249.13 | 249.43 | 249.73 | 249.05 | 249.40 | 235.05 | 233.31 | 233.31 | 233.12 |
| | Fixed Cost (Rs./Tc) | 111.81 | 177.16 | 131.34 | 108.22 | 88.84 | 91.80 | 91.99 | 92.16 | 92.36 | 92.55 | 92.73 | 92.81 | 92.99 | 92.77 | 93.00 | 93.28 | 93.56 | 93.85 | 94.14 | 94.43 | 94.72 | 95.02 | 95.32 | 95.62 | 95.92 |
| | Variable Cost (Rs./Tc) | 224.70 | 161.72 | 131.29 | 146.70 | 163.05 | 157.46 | 157.27 | 157.58 | 157.39 | 156.57 | 156.38 | 156.58 | 156.38 | 156.58 | 156.59 | 156.58 | 155.57 | 155.57 | 155.57 | 155.57 | 155.57 | 155.57 | 155.57 | 155.57 | 155.57 |

SARJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED CASH FLOW ANALYSIS AT 100% CAPACITY UTILISATION
CCL

| SN | Particulars | Amount in Rs. Lakhs | | | | | | | | | | | | | | | | | | | | | | | | |
|----|--|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| | | 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 |
| 1 | Initial Capital (Equity) | 30721.28 | 37618.34 | 26504.99 | 1800.00 | 1504.00 | | | | | | | | | | | | | | | | | | | | |
| 2 | Debt Service | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Replacement Capital | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Less: GST credit on Capital Goods | | | | | | | | | | | | | | | | | | | | | | | | | -27853.99 |
| 5 | Cash Operating Expenses | 3823.25 | 3459.96 | 4641.26 | 6522.27 | 6040.08 | 6584.03 | 6326.61 | 6040.33 | 5573.29 | 5286.39 | 6624.75 | 6632.95 | 6103.62 | 6526.14 | 6858.18 | 6584.62 | 6727.14 | 6764.22 | 6803.16 | 6844.06 | 6886.98 | 6932.66 | 6979.39 | 7029.06 | 7081.28 |
| 6 | Total Cash Outflow | 34644.48 | 41978.29 | 31161.85 | 6522.27 | 7344.08 | 6584.03 | 6326.61 | 6040.33 | 5573.29 | 5286.39 | 6624.75 | 6632.95 | 6103.62 | 6526.14 | 6656.18 | 6894.82 | 6727.14 | 6764.22 | 6803.16 | 6844.06 | 6886.98 | 6932.66 | 6979.39 | 7029.06 | -20772.72 |
| 7 | Inflow from Sales | 28651.00 | 48946.25 | 81880.00 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Net Cash Flow | -9993.48 | 4967.96 | 69990.15 | -6522.27 | -7344.08 | -6584.03 | -6326.61 | -6040.33 | -5573.29 | -4996.39 | -6624.75 | -6632.95 | -6103.62 | -6526.14 | -6858.18 | -6591.82 | -6727.14 | -6764.22 | -6803.16 | -6844.06 | -6886.98 | -6932.66 | -6979.39 | -7029.06 | 20772.72 |
| 9 | Desired Selling Price to Yield 12% IRR (Rs./t) | | | 134.62 | | | | | | | | | | | | | | | | | | | | | | |


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OF INCAST PROJECT
CCL, AMARKANTAK-CHANDRAGUPTA

CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED CASH FLOW ANALYSIS AT 83% CAPACITY UTILISATION
CCL

| S.N | Particulars | (Amount in Rs. Lakhs) | | | | | | | | | | | | | | | | | | | | | | | | |
|-----|--|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | | 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 |
| 1 | Initial Capital | 30721.25 | 37618.34 | 26509.59 | 1002.00 | 1504.00 | | | | | | | | | | | | | | | | | | | | |
| 2 | Debt Service | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Replacement Capital | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Less: GST credit on Capital Goods | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Cash Operating Expenses | 2433.91 | 2458.86 | 4573.37 | 5394.64 | 5894.43 | 6337.26 | 6358.95 | 6381.71 | 6405.62 | 6430.72 | 6457.08 | 6484.38 | 6512.25 | 6540.47 | 6490.51 | 6524.15 | 6558.47 | 6593.55 | 6630.40 | 6678.38 | 6729.31 | 6784.39 | 6841.72 | 6901.42 | 6963.61 |
| 6 | Total Cash Outflow | 33155.16 | 41077.20 | 31079.96 | 6358.64 | 7398.43 | 6337.26 | 6358.95 | 6381.71 | 6405.62 | 6430.72 | 6457.08 | 6484.38 | 6512.25 | 6540.47 | 6490.51 | 6524.15 | 6558.47 | 6593.55 | 6630.40 | 6678.38 | 6729.31 | 6784.39 | 6841.72 | 6901.42 | 6963.61 |
| 7 | Inflow from Sales | 24353.35 | 38139.31 | 69581.00 | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Net Cash Flow | -8801.81 | -1937.89 | 38501.04 | -6366.64 | -7398.43 | -6337.26 | -6358.95 | -6381.71 | -6405.82 | -6430.72 | -6457.08 | -6484.38 | -6512.25 | -6540.47 | -6490.51 | -6524.15 | -6558.47 | -6593.55 | -6630.40 | -6678.38 | -6729.31 | -6784.39 | -6841.72 | -6901.42 | -6963.61 |
| 9 | Desired Selling Price to Yield 12% WRR (Rs./t) | | | 157.56 | | | | | | | | | | | | | | | | | | | | | | |

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OCP/NEAREST PROJECT
CCL, ANUPALI, CHANDRAGUPTA AREA

APPENDICES

MDO-Part


SANJEEV KUMAR
MANAGER
CHANDRASUPTA OF ENCAST PROJECT
CCL, AMRAPALI-CHANDRASUPTA AREA

PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT OF ESTIMATED CAPITAL INVESTMENT AND YEARWISE PHASING
MDO

| SL NO | PARTICULARS | TOTAL CAPITAL UP TO PROJECT LIFE | TOTAL CAPITAL UP TO TARGET YEAR | PHASING OF CAPITAL | | | | | | | | | | | | | | | |
|-------|---|----------------------------------|---------------------------------|----------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|---------------|---------------|----------------|----------------|-----------------|---------------|-----------------|----------------|--|
| | | | | (Amount in Rs.lakhs) | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 13 | 14 | 15 | 16 | |
| 1 | Land: | | | | | | | | | | | | | | | | | | |
| | a) Freehold Land | | | | | | | | | | | | | | | | | | |
| | b) Leasehold Land | | | | | | | | | | | | | | | | | | |
| 2 | Buildings: | | | | | | | | | | | | | | | | | | |
| | a) Service | 13601.03 | 13601.03 | 20.00 | 60.00 | 3680.00 | 3810.00 | 6031.03 | | | | | | | | | | | |
| | b) Residential | 14244.46 | 13280.00 | 7848.00 | 1487.00 | 1838.00 | 847.00 | 1033.00 | 227.00 | 954.46 | | | | | | | | | |
| 3 | Plant & Machinery | | | | | | | | | | | | | | | | | | |
| | a) H. E. M. M. | 131303.37 | 71876.36 | 29448.09 | 8868.94 | 16954.40 | 5364.30 | 8799.11 | 2441.52 | 296.19 | 296.19 | | 296.19 | 3490.93 | 25431.05 | 296.19 | 25003.71 | 2835.64 | |
| | b) Others than HEMM | 60186.01 | 58913.81 | 5674.44 | 13736.61 | 20831.14 | 18080.50 | 120.54 | 470.58 | 61.48 | 564.74 | | | | 385.20 | | | | |
| 4 | Furniture & Fittings | 60.60 | 60.60 | | | | 30.30 | 30.30 | | | | | | | | | | | |
| 5 | Railway Siding | | | | | | | | | | | | | | | | | | |
| 6 | Vehicles | | | | | | | | | | | | | | | | | | |
| 7 | Prospecting & Boring | 152.00 | 152.00 | | | 76.00 | 76.00 | | | | | | | | | | | | |
| 8 | Development. | | | | | | | | | | | | | | | | | | |
| 8.1 | Capital Outlay in Mines | 3023.38 | 1824.89 | 760.55 | 267.69 | 389.68 | 164.34 | 182.17 | 60.46 | 58.29 | 59.00 | 114.87 | 966.33 | | | | | | |
| 8.2 | Roads & Culverts | 18083.60 | 18020.55 | 6635.65 | 6718.40 | 1647.77 | 2961.63 | 46.80 | 10.30 | 63.06 | | | | | | | | | |
| 8.3 | Water Supply & Sewerage | 3056.05 | 2978.73 | 506.80 | 336.55 | 456.99 | 499.29 | 1165.88 | 13.22 | 77.32 | | | | | | | | | |
| 8.4 | Scientific Research | | | | | | | | | | | | | | | | | | |
| 8.5 | P.R. Prep. Cost | | | | | | | | | | | | | | | | | | |
| | Upfront payment | | | | | | | | | | | | | | | | | | |
| 9 | Revenue Exp. capitalised during Devel. Period | | | | | | | | | | | | | | | | | | |
| 10 | Land Reclamation | 2653.64 | 2653.64 | | 2357.46 | 296.19 | | | | | | | | | | | | | |
| 11 | Washery | | | | | | | | | | | | | | | | | | |
| | INITIAL CAPITAL | 246364.15 | 183361.62 | 50893.53 | 33832.66 | 46170.16 | 31833.36 | 17408.83 | 3223.07 | 1520.80 | 919.93 | 114.87 | 1262.51 | 3490.93 | 25816.25 | 296.19 | 25003.71 | 2835.64 | |

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SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA

**CHANDRAGUPT OCP (15.0 MTY)
SUMMARY OF THE CAPITAL INVESTMENT ON BUILDINGS.**

APPENDIX-A.2

MDO

| Sl.No. | PARTICULARS | TOTAL PROV. | P H A S I N G | | | | | | | REFERENCE |
|--------|-----------------------|-----------------|-------------------|----------------|----------------|----------------|----------------|---------------|--------------------|------------|
| | | | UP TO TARGET YEAR | | | | | | BEYOND TGT. YR. | |
| | | | Y.1 | Y.2 | Y.3 | Y.4 | Y.5 | Y.6 | | |
| 1. | RESIDENTIAL BUILDINGS | 14244.46 | 7848.00 | 1487.00 | 1838.00 | 847.00 | 1033.00 | 227.00 | 965.20 | APP.A.2.1. |
| 2. | SERVICE BUILDINGS | 13601.03 | 20.00 | 60.00 | 3680.00 | 3810.00 | 6031.03 | | | APP.A.2.2. |
| | T O T A L | 27845.50 | 7868.00 | 1547.00 | 5518.00 | 4657.00 | 7064.03 | 227.00 | 965.20 | |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OCP PHASE PROJECT
 CCL, AMBAPUR CHANDRAGUPTA OCP

CHANDRAGUPT OCP (15.0 MTY)
STATEMENT SHOWING THE CAPITAL INVEST ON
RESIDENTIAL BUILDINGS.

MDO
UPTO TARGET YEAR
(AMOUNT IN Rs. '000')

| SL.No. | CATEGORY/SCALE | TYPE OF QTRS. | NO.OF PERSONS | %age SATISFACTION | TOTAL QTRS. REQD. | UNIT COST AT 100 CI IN RS. | UNIT COST AT 4025 CI(IN RS.) | TOTAL COST |
|--------|--|-------------------|---------------|-------------------|-------------------|----------------------------|------------------------------|---------------|
| 1 | CAT.I to VI, EX GR-B,C,D&E, MR-D to MR-H | A | 990 | 50.00 | 495 | 36301 | 1461115 | 723252 |
| 2 | MR-C to MR-A1 & EX GR- A & SPECIAL GRADE | STEL/BARRACK B | 102 | 70.00 | 71 | 46420 | 1868389 | 132656 |
| 3 | E1 to E5 | C | 34 | 100.00 | 34 | 69287 | 2788806 | 94819 |
| 4 | E6 AND ABOVE | D | 14 | 100.00 | 14 | 97357 | 3918635 | 54861 |
| 5 | SECURITY Sr. OFFICER(SEcurity) WATCH & WARD INSP.,HEAD WATCHMAN, ARMED GUARD & SECURITY GUARD | C A | 1 28 | 100.00 100.00 | 1 28 | 69287 36301 | 2788806 1461115 | 2789 40911 |
| | SUB-TOTAL | | 1169 | 55.00 | 643 | | | 1049288 |
| | CONTINGENCIES 3% OF ABOVE | | | | | | | 31479 |
| | Design Engg. @ 3.75% | | | | | | | 39348 |
| | Survey @ 0.5% | | | | | | | 5246 |
| | TOTAL (IN Rs. LAKHS.) | | | | | | | 11253.61 |
| | Add GST @ 18% | | | | | | | 2026 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | | | | 13279.26 |


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMR, IPRA, CHANDRAGUPTA

**CHANDRAGUPTA OCP(15.8 MTY)
STATEMENT SHOWING THE CAPITAL INVEST ON
RESIDENTIAL BUILDINGS.**

MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs. '000')

| SL.No. | CATEGORY/SCALE | TYPE OF QTRS. | NO.OF PERSONS | %age SATISFACT ION | TOTAL QTRS. REQD. | UNIT COST AT 100 CI IN RS. | UNIT COST AT 4825 CI(IN RS.) | TOTAL COST |
|--------|---|---------------------|---------------|--------------------|-------------------|----------------------------|------------------------------|---------------|
| 1 | CAT.I to VI, EX GR-B,C,D&E, MR-D to MR-H | A | 1021 | 49.46 | 505 | 36301 | 1461115 | 737863 |
| 2 | MR-C to MR-A1 & EX GR- A & SPECIAL GRADE | HOSTEL/BARRACK B | 149 | 70.00 | 104 | 46420 | 1868389 | 194312 |
| 3 | E1 to E5 | C | 34 | 100.00 | 34 | 69287 | 2788906 | 94819 |
| 4 | E6 AND ABOVE | D | 14 | 100.00 | 14 | 97357 | 3918635 | 54861 |
| 5 | SECURITY Sr. OFFICER(SECURITY) WATCH & WARD INSP,HEAD WATCHMAN, ARMED GUARD & SECURITY GUARD | C A | 1 28 | 100.00 100.00 | 1 28 | 69287 36301 | 2788906 1461115 | 2789 40911 |
| | SUB-TOTAL | | 1247 | 55.00 | 685 | | | 1125556 |
| | CONTINGENCIES 3% OF ABOVE | | | | | | | 33767 |
| | Design Engg. @ 3.75% | | | | | | | 42208 |
| | Survey @ 0.5% | | | | | | | 5628 |
| | TOTAL (IN Rs. LAKHS.) | | | | | | | 12071.58 |
| | Add GST @ 18% | | | | | | | 2173 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | | | | 14244.46 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
ESTIMATED CAPITAL EXPENDITURE ON SERVICE BUILDINGS.**

MDO
(AMOUNT IN Rs.'000')

| SL.No. | PARTICULARS | NO. | PLINTH AREA (sq.mt) | PLINTH AREA RATE(Rs) | COST AT 100 C.I.(Rs) | COST AT 4025 C.I. |
|------------|----------------------------|-----|---------------------|----------------------|----------------------|-------------------|
| A. | OFFICE | | | | | |
| 1 | P.O. OFFICE | 1 | 1450 | 445 | 646700 | 260.30 |
| 2 | SITE OFFICE | 1 | 100 | 445 | 44500 | 17.95 |
| 3 | TOWN ADMINISTRATION OFFICE | 1 | 50 | 445 | 22300 | 8.98 |
| 4 | BOUNDARY WALL(IN METRE) | | 310 | 150 | 46500 | 18.72 |
| | SUB TOTAL(1 TO 4) | | | | | 305.94 |
| B | WORKSHOPS | | | | | |
| B.1 | EXCAVATION WORKSHOP | | | | | |
| 1 | WORKSHOP OFFICE | 1 | 432 | 446 | 192672 | 77.55 |
| 2 | SECURITY POST | 2 | 9 | 446 | 8028 | 3.23 |
| 3 | DOZER REPAIR SHOP | 1 | 1560 | 740 | 1154400 | 464.65 |
| 4 | FACE EQUIPMENT REPAIR SHOP | 1 | 864 | 740 | 639360 | 257.34 |
| 5 | BUCKET REPAIR SHOP | 1 | 1152 | 740 | 852480 | 343.12 |
| 6 | SETTLING TANK | 2 | 1830 | 260 | 951600 | 383.02 |
| 7 | DOZER WASHING STN. | 1 | 180 | 650 | 117000 | 47.09 |
| 8 | DOZER PARKING | 1 | 360 | 115 | 41400 | 16.66 |
| 9 | PUMP HOUSE | 1 | 175 | 260 | 45500 | 18.31 |
| 10 | DUMPER WASHING STN. | 1 | 864 | 740 | 639360 | 257.34 |
| 11 | OPEN SERVICE GROUND | 1 | 960 | 45 | 43200 | 17.39 |
| 12 | DUMPER REPAIR SHOP | 1 | 10080 | 1100 | 11088000 | 4462.92 |
| 13 | FUEILING STATION | 1 | LS | | | 42.88 |
| 14 | FUELING STATION BUILDING | 1 | 50 | 446 | 22300 | 8.98 |
| 15 | CRANE PARKING BAYS | 1 | 550 | 45 | 24750 | 9.96 |
| 16 | WATER RESERVOIR | 1 | 650 | 650 | 422500 | 170.06 |
| 17 | CONC.ROAD FOR DOZER | 1 | 2600 | 115 | 299000 | 120.35 |
| 18 | CONC. ROAD FOR DUMPERS | 1 | 25360 | 115 | 2916400 | 1173.85 |
| 19 | SCRAP YARD | 1 | 1800 | 45 | 81000 | 32.60 |
| 20 | BOUNDARY WALL(IN METRE) | 1 | 1028 | 150 | 154200 | 62.07 |
| | SUB TOTAL(1 TO 20) | | | | | 7969.37 |
| B.2 | E & M WORKSHOP | | | | | |
| 1 | LMV PARKING SPACE | 1 | 600 | 45 | 27000 | 10.87 |
| 2 | M.C. STR.SHOP & STORE | 1 | 828 | 650 | 538200 | 216.63 |
| 3 | ELECTRICAL & LMV SHOP | 1 | 648 | 650 | 421200 | 169.53 |
| 4 | LMV WASHING STATION | 1 | 100 | 100 | 10000 | 4.03 |
| 5 | PUMP HOUSE | 1 | 50 | 260 | 13000 | 5.23 |
| 6 | CONC. ROAD FOR L.MVs. | 1 | 1850 | 45 | 83250 | 33.51 |
| 7 | BOUNDARY WALL (IN METER) | 1 | 215 | 150 | 32250 | 12.98 |
| | SUB TOTAL(1-7) | | | | | 452.77 |
| B.3 | COMMON FACILITIES | | | | | |
| 1 | SECURITY POST | 1 | 9 | 446 | 4014 | 1.62 |
| 2 | TIME OFFICE | 1 | 100 | 446 | 44600 | 17.95 |
| 3 | FIRE FIGHTING STATION | 1 | 300 | 550 | 165000 | 66.41 |
| 4 | CAR PARKING | 1 | 150 | 235 | 35250 | 14.19 |
| 5 | CYCLE STAND | 1 | 300 | 200 | 60000 | 24.15 |
| 6 | CANTEEN | 1 | 240 | 380 | 91200 | 36.71 |
| 7 | REST SHELTER | 1 | 25 | 380 | 9500 | 3.82 |
| 8 | W.C. | 1 | 25 | 685 | 17125 | 6.89 |
| 9 | TOILET | 1 | 15 | 685 | 10275 | 4.14 |
| 10 | SUB STATION | 1 | 540 | 550 | 297000 | 119.54 |
| 11 | BITUMINOUS PAVEMENT | 1 | 1775 | 33 | 58575 | 23.58 |
| 12 | CONC. PAVEMENT | 1 | 1366 | 45 | 61470 | 24.74 |
| 13 | BOUNDARY WALL (IN METER) | 1 | 110 | 150 | 16500 | 6.64 |
| | SUB TOTAL(1-13) | | | | | 350.38 |


SANJEEV KUMAR
 MA NADER
 CHANDRAGUPTA OCP (15.0 MTY) PROJECT
 CCL AMBAPUR-CHANDRAGUPTA AREA

MDO
(AMOUNT IN Rs.'000)

| SL.No. | PARTICULARS | NO. | PLINTH AREA (sq.mt) | PLINTH AREA RATE(Rs) | COST AT 100 C.I.(Rs) | COST AT 4025 C.I. |
|------------|----------------------------|-----|---------------------|----------------------|----------------------|-------------------|
| B.4 | STORE COMPLEX | | | | | |
| 1 | SECURITY POST | 2 | 9 | 446 | 8928 | 3.23 |
| 2 | LIGHTING TOWER | 5 | | 14229 | 71145 | 28.64 |
| 3 | STORE OFFICE | 1 | 100 | 446 | 44600 | 17.95 |
| 4 | STORE SHED | 1 | 1800 | 550 | 990000 | 398.48 |
| 5 | SCRAP YARD | 1 | 2400 | 45 | 108000 | 43.47 |
| 6 | POL STORE | 1 | 600 | 413 | 247800 | 99.74 |
| 7 | STORE YARD | 1 | 2500 | 45 | 112500 | 45.28 |
| 9 | CONC. PAVEMENT | 1 | 1670 | 45 | 84150 | 33.87 |
| 10 | BOUNDARY WALL (IN METER) | 1 | 550 | 150 | 82500 | 33.21 |
| | SUB TOTAL(1 TO 9) | | | | | 703.86 |
| E | MAGAZINE | | | | | |
| 1. | MAGAZINE BUILDING | 1 | 152 | 550 | 83600 | 33.65 |
| 2. | BOUNDARY WALL (IN METER) | | 100 | 150.00 | 15000 | 6.04 |
| | SUB TOTAL(1-2) | | | | | 39.69 |
| F | SUB STATIONS | | | | | |
| 1. | SUB STATION BUILDINGS | 2 | 240 | 550 | 264000 | 105.25 |
| 2 | OUTER SWITCHYARD | 2 | | L.S. | | 265.00 |
| 3 | BOUNDARY WALL | 2 | 300 | 150 | 90000 | 36.23 |
| | SUB TOTAL(1-3) | | | | | 407.49 |
| G | STATUTORY BUILDINGS | | | | | |
| 1. | FIRST AID CENTRE | 1 | 17 | 467 | 7939 | 3.20 |
| 2. | REST SHELTER | 1 | 39 | 380 | 14820 | 5.97 |
| 3. | TOILET | 1 | 52 | 685 | 35620 | 14.34 |
| 4. | CANTEEN | 1 | 245 | 380 | 93100 | 37.47 |
| 5 | FIRE FIGHTING STATION | 1 | 200 | 550 | 110000 | 44.28 |
| 6 | BOUNDARY WALL (IN METRE) | | 470 | 150 | 70500 | 28.36 |
| | SUB TOTAL(1-6) | | | | | 133.62 |
| H | COMMUNITY BUILDINGS | | | | | |
| 1. | COMMUNITY HALL | 1 | 450 | 380 | 171000 | 68.83 |
| 2. | OFFICERS' CLUB | 1 | 380 | 380 | 144400 | 58.12 |
| 3. | SHOPPING CENTRE | 1 | 1110 | 380 | 421800 | 169.77 |
| 4. | GARRAGE | 1 | 536 | 235 | 125843 | 50.65 |
| 5. | CYCLE STAND | 1 | 704 | 200 | 140800 | 56.67 |
| 6. | DISPENSARY | 1 | 280 | 467 | 130760 | 52.63 |
| 7. | BUS SHEDS | 1 | 92 | 235 | 21620 | 8.70 |
| 8. | WORKERS' INSTITUTE | 1 | 341 | 380 | 129580 | 52.16 |
| 9 | POST OFFICE | 1 | 56 | 446 | 24976 | 10.05 |
| 10 | BANK | 1 | 202 | 446 | 90092 | 36.25 |
| 11 | SCHOOL | 1 | 484 | 380 | 183920 | 74.03 |
| 12 | OFFICERS' REST HOUSE | 1 | 276 | 380 | 104880 | 42.21 |
| 13 | STAFF REST HOUSE | 1 | 284 | 380 | 107920 | 43.44 |
| 14 | TRAINING CENTER | 1 | 246 | 446 | 109716 | 44.16 |
| 15 | BOUNDARY WALL (IN METRE) | | 990 | 150 | 148500 | 59.77 |
| | SUB TOTAL(1-15) | | | | | 827.46 |
| | TOTAL | | | | | 11190.58 |
| | CONTINGENCIES @ 3% | | | | | 335.72 |
| | TOTAL | | | | | 11526.30 |
| | Add GST @ 18% | | | | | 2074.73 |
| | GRAND TOTAL | | | | | 13601.03 |

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE BUILDING COST INDEX.
AT CCL'S PROJECTS IN MARCH 2019
 (With Ref. to 100 base in Delhi as on 1.10.76)

| SL. NO. | DESCRIPTION | UNIT | RATES AS ON 1.10.76 AT DELHI | RATES AT SITE | RATIO BET. Col.5 & Col.4 | WEIGHTAGE | COST INDEX |
|---------|--|---------|------------------------------|---------------|--------------------------|-----------|------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1. | BRICKS | 1000.00 | 106.15 | 4600.00 | 43.33 | 16.00 | 693.36 |
| 2. | SAND: 67% Coarse Sand 33% Fine Sand | Cu.m. | 21.92 | 413.45 | 18.86 | 5.00 | 94.31 |
| 3. | CEMENT | Quintal | 35.28 | 560.00 | 15.87 | 21.00 | 333.33 |
| 4. | STONE AGGREGATE 50% 20 mm Size 50% 50 mm Size | Cu.m. | 27.10 | 1485.00 | 54.80 | 6.50 | 356.18 |
| 5. | TIMBER(Second class teak & local timber) | Cu.m. | 2021.00 | 75000.00 | 37.11 | 18.00 | 667.99 |
| 6. | STEEL Mild/Tor/structural steel | Quintal | 183.20 | 4950.00 | 27.02 | 10.00 | 270.20 |
| 7. | LABOUR: (a) Mason 50% 1st. Class 50% 2nd. Class | Each | 9.89 | 504.00 | 50.96 | 8.50 | 433.16 |
| | (b) Carpenter 50% 1st. Class 50% 2nd. Class | Each | 9.89 | 504.00 | 50.96 | 4.00 | 203.84 |
| | (c) Coolie/Beldar | Each | 4.41 | 390.00 | 88.44 | 11.00 | 972.79 |
| | TOTAL | | | | | | 4025.16 |
| | i.e. COST INDEX | | | | | SAY | 4025.00 |

CHANDRAGUPTA DEENKANT PROJECT
 AREA
 MANAGER
 SANJEEV KUMAR

CHANDRAGUPT OC (15.00 MTY)

SUMMARY OF ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M MDO

APPENDIX A-I-3.2(I)

| Sl. No. | DESCRIPTION | TOTAL CAPITAL | Base Date-March'20 | | | | | | | |
|---------|-----------------------------------|----------------|-----------------------------|---------------|--------------|---------------|--------------|--------------|--------------|--------------------|
| | | | YEARWISE PHASING OF CAPITAL | | | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Beyond Target Year |
| A | Substation- I | 587.02 | 324.64 | 262.38 | | | | | | |
| B | Substation- II | 545.97 | 299.78 | 246.19 | | | | | | |
| C | Incoming Power Supply Arrangement | 280.00 | 280.00 | | | | | | | |
| D | Quarry Power Distribution | 725.95 | 217.03 | 18.78 | 18.78 | 51.35 | 32.57 | 65.26 | 18.78 | 303.40 |
| E | Cables | 119.99 | 64.07 | | | 8.90 | | | 5.00 | 42.03 |
| F | Illumination | 448.70 | 196.38 | | 20.70 | 31.98 | 20.70 | 5.21 | 30.48 | 143.25 |
| G | Colony Electrification | 250.05 | 101.93 | 61.02 | 26.96 | 23.73 | 31.06 | | | 5.36 |
| H | Miscellaneous | 263.44 | 77.06 | 43.61 | 28.84 | 15.42 | 11.22 | 9.37 | 7.22 | 70.71 |
| | Total | 3221.12 | 1560.89 | 631.99 | 95.27 | 131.38 | 95.54 | 79.84 | 61.48 | 564.74 |

CHANDRAGUPTA OC (15 MTY)
MDO

APPENDIX A.3.20

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March/25

In Rs/000

| Sl.No. | PARTICULARS | TOTAL PROVISION | | | | EXISTING | ADDITIONAL | | |
|----------|---|-----------------|------|------|--------------|----------|------------|------|--------------|
| | | Unit | Qty. | Rate | Amount | | Qty. | Rate | Amount |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A | SUBSTATION - I | | | | | | | | |
| | P&M for Main Substation | | | | | | | | |
| 1.1 | Circuit Breaker, VCB, 33 kV, 750 MVA, 1250 Amps with remote control panel | Nos. | 5 | 609 | 3045 | | 5 | 609 | 3045 |
| 1.2 | Isolator Off Load type, 33 kV, OD type, 1600 A | Nos. | 8 | 80 | 640 | | 8 | 80 | 640 |
| 1.3 | Isolator Off Load type, 33 kV, OD type, 1600 A with earthing switch | Nos. | 2 | 85 | 170 | | 2 | 85 | 170 |
| 1.4 | Isolator Off Load type, 33 kV, OD type, 800A with drop out fuse | Nos. | 4 | 80 | 320 | | 4 | 80 | 320 |
| 1.5 | Lightning Arrestor, 35 kV Grade, 10 kA | Nos. | 6 | 17 | 102 | | 6 | 17 | 102 |
| 1.6 | C.T. 33 kV with CT ratio, 200-100 /1 A/ 1 A/ 1 A for metering & protection. | Nos. | 5 | 100 | 500 | | 5 | 100 | 500 |
| 1.7 | Potential Transformer, 33 kV/110 V for metering & Protection | Nos. | 2 | 74 | 148 | | 2 | 74 | 148 |
| 1.8 | Power Transformer, 10 MVA, 33/6.6 kV, out door type, 50 Hz., 3 ph, DY-11 (Cu) | Nos. | 2 | 4386 | 8772 | | 2 | 4386 | 8772 |
| 1.9 | Station Transformer, 160 kVA, 33 kV/415 V, out door type, 50 Hz., 3 ph, DY-11 (Cu) | No. | 1 | 228 | 228 | | 1 | 228 | 228 |
| 1.10 | Lighting Transformer, 100 kVA, 33 kV/230 V (L-L), out door type, 50 Hz (Cu) | No. | 1 | 150 | 150 | | 1 | 150 | 150 |
| 1.11 | Lightning Arrestor suitable for 6.6 kV, 10 kA | Nos. | 18 | 11 | 198 | | 18 | 11 | 198 |
| 1.12 | Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1600 Amps, with remote control panel | Nos. | 3 | 500 | 1500 | | 3 | 500 | 1500 |
| 1.13 | Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1250 Amps, with remote control panel | Nos. | 18 | 450 | 8100 | | 18 | 450 | 8100 |
| 1.14 | Isolator, 6.6 kV, outdoor type, 1600 A | Nos. | 6 | 45 | 270 | | 6 | 45 | 270 |
| 1.15 | Isolator, 6.6kV, outdoor type, 1250 A | Nos. | 34 | 30 | 1020 | | 34 | 30 | 1020 |
| 1.16 | Isolator with earthing switch, 6.6 kV, 1250 Amps. | Nos. | 2 | 50 | 100 | | 2 | 50 | 100 |
| 1.17 | Neutral grounding Resistor, 6.6 kV, 76 Ohm 50 A | Nos. | 2 | 160 | 320 | | 2 | 160 | 320 |
| 1.18 | Capacitor Bank outdoor type complete with remote control panel and automatic power factor correction relay, 6.6 kV, 2175 kVar | Set | 2 | 2664 | 5327 | | 2 | 2664 | 5327 |
| 1.19 | 415 V indoor Switch board for Station Transformer | Set | 1 | 180 | 180 | | 1 | 180 | 180 |
| 1.20 | 230V(L-L), indoor distribution switch board for Lighting | Set | 1 | 110 | 110 | | 1 | 110 | 110 |
| 1.21 | DC Distribution Board | Set | 1 | 100 | 100 | | 1 | 100 | 100 |
| 1.22 | Battery and battery Charging Set | Set | 1 | 350 | 350 | | 1 | 350 | 350 |
| 1.23 | Substation lighting, indoor & outdoor, Lamps with fittings and accessories, Ceiling Fan, Exhaust fan, including cables, Poles, switch boards etc. | LS | | | 500 | | | | 500 |
| 1.24 | Earthing System including earth pits, Connection of GI Strips for S/S including lightning Masts. | LS | | | 500 | | | | 500 |
| 1.25 | Fire fighting arrangement including automatic fire-fighting System for transformer | LS | | | 5000 | | | | 5000 |
| 1.26 | Conductors, Cables (Power & Control) for S/S including cable trays, insulators etc. | LS | | | 1000 | | | | 1000 |
| 1.27 | Bus bar arrangement | LS | | | 1200 | | | | 1200 |
| 1.28 | Miscellaneous items including Measuring & Testing Equipments for substation, Furniture & Fittings, Tools And Tackles etc. | LS | | | 800 | | | | 800 |
| A.1 | Sub-total P&M | | | | 40650 | | | | 40650 |


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA DC (15 MTY)
MDO

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March'20

In Rs'000

| BLNo. | PARTICULARS | TOTAL PROVISION | | | | EXISTING | ADDITIONAL | | |
|-------|---|-----------------|------|------|--------------|----------|------------|------|--------------|
| | | Unit | Qty. | Rate | Amount | | Qty. | Rate | Amount |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A. 2 | Erection & commissioning | | | | 4065 | | | | 4065 |
| A. 3 | Design and Engineering | | | | 2236 | 2843 | | | 2236 |
| A. 4 | Overhead construction cost | | | | 7043 | | | | 7043 |
| A. 5 | Insurance | | | | 335 | | | | 335 |
| A. 6 | Contingency | | | | 1620 | | | | 1620 |
| A. 7 | GST @ 18 % of (A2, A3, A4, A5, A6) | | | | 2754 | | | | 2754 |
| | Sub-total [A] (Substation-I) | | | | 58702 | | | | 58702 |
| B | SUBSTATION - II | | | | | | | | |
| | P&M for Main Substation | | | | | | | | |
| 2.1 | Circuit Breaker, VCB, 33 kV, 750 MVA, 1250 Amps with remote control panel | Nos. | 5 | 600 | 3045 | | 5 | 600 | 3045 |
| 2.2 | Isolator Off Load type, 33 kV, OD type, 1600 A | Nos. | 8 | 80 | 640 | | 8 | 80 | 640 |
| 2.3 | Isolator Off Load type, 33 kV, OD type, 1600 A with earthing switch | Nos. | 2 | 85 | 170 | | 2 | 85 | 170 |
| 2.4 | Isolator Off Load type, 33 kV, OD type, 800A with drop out fuse | Nos. | 4 | 80 | 320 | | 4 | 80 | 320 |
| 2.5 | Lightning Arrester, 30 kV Grade, 10 kA | Nos. | 6 | 17 | 102 | | 6 | 17 | 102 |
| 2.6 | C.T. 33 kV with CT ratio, 200-100 /1 A / 1 A / 1 A for metering & protection. | Nos. | 5 | 100 | 500 | | 5 | 100 | 500 |
| 2.7 | Potential Transformer, 33 kV/110 V for metering & Protection | Nos. | 2 | 74 | 148 | | 2 | 74 | 148 |
| 2.8 | Power Transformer, 10 MVA, 33/6.6 kV, out door type, 50 Hz., 3 ph, DY-11 (Cu) | Nos. | 2 | 4386 | 8772 | | 2 | 4386 | 8772 |
| 2.9 | Station Transformer, 160 kVA, 33 kV/15 V, out door type, 50 Hz., 3 ph, DY-11 (Cu) | No. | 1 | 228 | 228 | | 1 | 228 | 228 |
| 2.10 | Lighting Transformer, 100 kVA, 33 kV/230 V (L-L), out door type, 50 Hz (Cu) | No. | 1 | 150 | 150 | | 1 | 150 | 150 |
| 2.11 | Lightning Arrester, suitable for 6.6 kV, 10 kA | Nos. | 14 | 11 | 154 | | 14 | 11 | 154 |
| 2.12 | Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1600 Amps with remote control panel | Nos. | 3 | 500 | 1500 | | 3 | 500 | 1500 |
| 2.13 | Circuit Breaker, VCB, 6.6 kV, 150 MVA, 1250 Amps with remote control panel | Nos. | 14 | 450 | 6300 | | 14 | 450 | 6300 |
| 2.14 | Isolator, 6.6 kV, outdoor type, 1600 A | Nos. | 6 | 45 | 270 | | 6 | 45 | 270 |
| 2.15 | Isolator, 6.6kV, outdoor type, 1600 A | Nos. | 26 | 30 | 780 | | 26 | 30 | 780 |
| 2.16 | Isolator with earthing switch, 6.6 kV, 1600 Amps. | Nos. | 2 | 50 | 100 | | 2 | 50 | 100 |
| 2.17 | Neutral grounding Resistor, 6.6 kV, 76 Ohm 50 A | Nos. | 2 | 160 | 320 | | 2 | 160 | 320 |
| 2.18 | Capacitor Bank outdoor type complete with remote control panel and automatic power factor correction relay, 6.6 kV, 180kVAR | Set | 2 | 2384 | 4768 | | 2 | 2384 | 4768 |
| 2.19 | 415 V indoor Switch board for Station Transformer | Set | 1 | 180 | 180 | | 1 | 180 | 180 |
| 2.20 | 230V(L-L), indoor distribution switch board for Lighting | Set | 1 | 110 | 110 | | 1 | 110 | 110 |
| 2.21 | DC Distribution Board | Set | 1 | 100 | 100 | | 1 | 100 | 100 |
| 2.22 | Battery and battery Charging Set | Set | 1 | 350 | 350 | | 1 | 350 | 350 |
| 2.23 | Substation lighting, indoor & outdoor, Lamps with fittings and accessories, Ceiling Fan, Exhaust fan, including cables, Poles, switch boards etc. | LS | | | 500 | | | | 500 |
| 2.24 | Earthing System including earth pits, Connection of GI Strips For S/S including lightning Masts. | LS | | | 500 | | | | 500 |
| 2.25 | Fire fighting arrangement including automatic fire-fighting System for transformer | LS | | | 5000 | | | | 5000 |
| 2.26 | Conductors, Cables (Power & Control) for S/S including cable trays, insulators etc. | LS | | | 1000 | | | | 1000 |
| 2.27 | Bus bar arrangement | LS | | | 1000 | | | | 1000 |
| 2.28 | Equipments for substation, Furniture & Fittings, Tools | LS | | | 800 | | | | 800 |
| B. 1 | Sub-total P&M | | | | 37807 | | | | 37807 |

Sanjeev Kumar
SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
OCL, AMRAPALI-CHANDRAGUPTA AI
RI-3, CMPDI

CHANDRAGUPTA OC (15 MTY)
MDO

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March'20

In Rs'000

| Sl.No. | PARTICULARS | TOTAL PROVISION | | | | EXISTING | ADDITIONAL | | |
|--------|---|-----------------|------|------|--------------|----------|------------|------|--------------|
| | | Unit | Qty. | Rate | Amount | | Qty. | Rate | Amount |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| B. 2 | Erection & commissioning | | | | 3781 | | | | 3781 |
| B. 3 | Design and Engineering | | | | 2079 | | | | 2079 |
| B. 4 | Overhead construction cost | | | | 6550 | | | | 6550 |
| B. 5 | Insurance | | | | 312 | | | | 312 |
| B. 6 | Contingency | | | | 1507 | | | | 1507 |
| B. 7 | GST @ 18 % of [B2, B3, B4, B5, B6] | | | | 2561 | | | | 2561 |
| | Sub-total (B) (Substation-II) | | | | 54597 | | | | 54597 |
| C | Incoming Power Supply Arrangement | | | | | | | | |
| 1 | 33 kV Double Circuit overhead transmission line in double pole structure with 'WOLF' conductor including erection for Sub-station-I | km. | 10 | 2600 | 26000 | | 10 | 2600 | 26000 |
| 2 | 33 kV Double Circuit overhead transmission line in double pole structure with 'WOLF' conductor including erection for Sub-station-II | km. | 6 | 2600 | 15600 | | 6 | 2600 | 15600 |
| 3 | Power receiving arrangement at Proposed DVC Switching station | LS | | | 2000 | | LS | 2000 | 2000 |
| | Sub-total (Incoming Power supply) | | | | 28000 | | | | 28000 |
| D | Quarry Power Distribution | | | | | | | | |
| 1 | Field switch, 6.6 kV, 800 Amps, 150 MVA, skid mounted, outdoor type | Nos. | 34 | 321 | 10914 | | 34 | 321 | 10914 |
| 2 | 6.6 kV OHTL with ACSR 'WOLF' conductor | km. | 50 | 900 | 45000 | | 50 | 900 | 45000 |
| 3 | Isolator, 6.6 kV, outdoor type, 800 A | Nos. | 52 | 20 | 1040 | | 52 | 20 | 1040 |
| 4 | Lightning Arrestor, available for 6.6 kV, 10 kA | Set | 34 | 9 | 306 | | 34 | 9 | 306 |
| 5 | 400 kVA, 6.6/0.433 kV, 50 Hz, DY-11, outdoor type unibased substation | Set | 4 | 1379 | 5516 | | 4 | 1379 | 5516 |
| 6 | 9- Panel 6.6 kV, outdoor type Switchboard, Comprising 2 no. 800A VCB for incoming, 1 no. coupler and six nos. 400 A VCB for 6 nos outgoing feeder control (for pumping). | Set | 2 | 2615 | 5229 | | 2 | 2615 | 5229 |
| 6 | 7- Panel 6.6 kV, outdoor type Switchboard, Comprising 2 no. 800A VCB for incoming, 1 no. coupler and four nos. 400 A VCB for 4 nos outgoing feeder control (for pumping). | Set | 1 | 2034 | 2034 | | 1 | 2034 | 2034 |
| 7 | 11 - Panel 415 V, outdoor type Switchboard, Comprising 1 no. 800A ACB for incoming and ten nos. 250 A MCCB for outgoing . feeder control (for pumping) | Set | 3 | 852 | 2556 | | 3 | 852 | 2556 |
| | Sub-total (Quarry Power Distribution) | | | | 72595 | | | | 72595 |
| E | Cables | | | | | | | | |
| 1 | 6.6 kV grade, PVC/DWA mining type, Copper conductor cable of following sizes: | | | | | | | | |
| a | 3 X 150sq. mm | km | 0.3 | 4450 | 1335 | | 0.3 | 4450 | 1335 |
| b | 3 X 120sq. mm | km | 0.3 | 3523 | 1057 | | 0.3 | 3523 | 1057 |
| c | 3 X 50 sq. mm | km | 2.1 | 2078 | 4260 | | 2.1 | 2078 | 4260 |
| d | 3 x 35 sq. mm | km | 1.8 | 1582 | 2848 | | 1.8 | 1582 | 2848 |
| 2 | 1.1 kV grade, PVC/DWA mining type, Copper conductor cable of different sizes. | LS | | | 2500 | | LS | | 2500 |
| | Sub-total (Cable) | | | | 11999 | | | | 11999 |

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, ANKAPALLI-CHANDRAGUPTA AREA

CHANDRAGUPTA DC (15 MTY)
MDO

ESTIMATED CAPITAL EXPENDITURE ON ELECTRICAL P&M

Base Date-March'20

In Rs'000

| Sl.No. | PARTICULARS | TOTAL PROVISION | | | | EXISTING | ADDITIONAL | | |
|--------|---|-----------------|------|------|---------------|----------|------------|------|---------------|
| | | Unit | Qty. | Rate | Amount | | Qty. | Rate | Amount |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| F | Illumination | | | | | | | | |
| 1 | Lighting transformer, 25 KVA, pole mounted 6.6 / 0.23 kV (L-L) | Nos. | 12 | 75 | 900 | | 12 | 75 | 900 |
| 2 | Lighting transformer, 10 KVA, pole mounted 6.6 / 0.23 kV (L-L) | Nos. | 28 | 35 | 980 | | 28 | 35 | 980 |
| 3 | Skid mounted Flood lighting towers 15m high | Set | 26 | 150 | 3900 | | 26 | 150 | 3900 |
| 4 | Flood light fixtures with 250 watts LED lamps, switch fuse units, switches, cable etc. | LS | | | 2875 | | | | 2875 |
| 5 | Mobile Lighting Tower with light fittings and fixtures, power generators, cables, switches etc. | Set | 16 | 1000 | 16000 | | 16 | 1000 | 16000 |
| 6 | 230 (L-L) Volts OHTL with ACSR 'Mink' Conductor | km | 16 | 700 | 11200 | | 16 | 700 | 11200 |
| 7 | Street lighting fixture with 80 / 150 W LED lamps, isolation fuses, switches, Cables, bracket, clamp etc. | LS | | | 9015 | | | | 9015 |
| | Sub-total (Illumination) | | | | 44870 | | | | 44870 |
| G | Colony Electrification and Street Lighting | | | | | | | | |
| 1 | 6.6 kV overhead transmission line DC with 'WOLF' conductor | km | 4.0 | 1500 | 6000 | | 4.0 | 1500 | 6000 |
| 2 | 6.6 kV overhead transmission line with 'DOG' conductor | km | 3.0 | 1000 | 3000 | | 3.0 | 1000 | 3000 |
| 3 | 415 kV overhead transmission line with RABIT conductor | km | 6.0 | 750 | 4500 | | 6.0 | 750 | 4500 |
| 4 | 250 kVA, 6.6kV/415V Distribution Transformer, Switchgear, Cable, Conductor, Insulator and earthing arrangement etc for Transformers | Nos. | 15 | 210 | 3150 | | 15 | 210 | 3150 |
| 5 | Service connection to quarters and service buildings with cable etc. | LS | | | 3000 | | LS | | 3000 |
| 6 | Street lighting with 80W LED lamp fittings | LS | | | 955 | | LS | | 955 |
| 7 | Street lighting with 150W LED lamp fittings | LS | | | 4400 | | LS | | 4400 |
| | Sub Total (Colony Electrification and Street Lighting) | | | | 25805 | | | | 25005 |
| H | Miscellaneous | | | | | | | | |
| 1 | Power supply OH Line to CHP Substation | LS | | | 2000 | | LS | | 2000 |
| 2 | Power supply OH Line to workshop Substation | LS | | | 800 | | LS | | 800 |
| 3 | Power supply arrangement to office etc. | LS | | | 1000 | | LS | | 1000 |
| 4 | Measuring & Testing equipment | LS | | | 1000 | | LS | | 1000 |
| 5 | Energy Conservation Measures | LS | | | 1000 | | LS | | 1000 |
| 6 | Erection & Commissioning | LS | | | 15447 | | LS | | 15447 |
| 7 | Contingencies | LS | | | 5097 | | LS | | 5097 |
| | Sub-total (Miscellaneous) | | | | 26344 | | | | 26344 |
| | GRAND TOTAL | | | | 322112 | 0 | | | 322112 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 DCL, ANRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP [15.0 MTY]
ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - WORKSHOP
MDO
SUMMARY SHEET

(AMT. IN RS. LAKH)

| SL.NO. | DESCRIPTION | TOTAL COST | PHASING | | |
|--------|---------------------|------------|---------|--------|--------|
| | | | 1 | 3 | 6 |
| A | EXCAVATION WORKSHOP | 1335.27 | 914.35 | 309.82 | 111.10 |
| B | E&M WORKSHOP | 117.44 | 67.08 | 50.36 | 0 |
| C | PROJECT STORE | 59.61 | 49.30 | 10.31 | 0 |
| D | GRAND TOTAL | 1512.32 | 1030.73 | 370.49 | 111.10 |


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP (S.MTY)
MDO

APPENDIX - A.11

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - EXCAVATION WORKSHOP

(AMOUNT IN Rs. 000)

| SL. NO. | ITEM CODE | DESCRIPTION | UNIT CODE | TOTAL QTY | TOTAL COST | PHASING | | | | | |
|------------------------------------|-----------|--|-----------|-----------|----------------|---------|----------------|------|----------------|------|--------------|
| | | | | | | 1 | 2 | 3 | 4 | | |
| | | | | | | QTY. | COST | QTY. | COST | QTY. | COST |
| MACHINE SHOP | | | | | | | | | | | |
| 1 | 104 | HEAVY DUTY CENTRE LATHE C.H. - 250 mm, D.B.C. - 2000 mm, POWER-11kW | | 1 | 1836.00 | | | 1 | 1836.00 | | |
| 2 | 105 | MEDIUM DUTY CENTRE LATHE C.H. - 220 mm, D.B.C. - 1500 mm, POWER-6kW | | 1 | 1454.00 | 1 | 1454.00 | | | | |
| 3 | 106 | LIGHT DUTY CENTRE LATHE C.H. - 200 mm, D.B.C. - 1800 mm, POWER - 3kW | | 1 | 1200.00 | 1 | 1200.00 | | | | |
| 4 | 204 | POWER HACKSAW TO CUT ROUND UP TO 305mm DIA, POWER-1.5kW | | 1 | 192.00 | 1 | 192.00 | | | | |
| 5 | 301 | RADIAL DRILL, DRILLING CAPACITY IN STEEL 50mm, RADUIS 1500mm, POWER-4.5kW | | 1 | 1173.00 | | | 1 | 1173.00 | | |
| 6 | 302 | PILLER DRILL, DRILLING CAPACITY IN STEEL-25mm, POWER-2.5 kW | | 1 | 187.00 | 1 | 187.00 | | | | |
| 7 | 402 | DOUBLE ENDED PEDESTAL GRINDER, WHEEL DA-300mm, POWER-0.5kW | | 1 | 45.00 | 1 | 45.00 | | | | |
| 8 | 406 | ANGLE GRINDER POWER-0.55kW | | 1 | 24.00 | | | 1 | 24.00 | | |
| 9 | 405 | PORTABLE HAND GRINDER 100mm, POWER-0.51kW | | 1 | 17.00 | 1 | 17.00 | | | | |
| 10 | 1812 | NON STANDARD ITEMS-SURFACE PLATES, TOOLS, TACKLES, CABINET, PARTS, RACKS, ETC. | | 1.5 | 38.00 | | 38.00 | | | | 25.00 |
| SUB-TOTAL | | | | | 8171.00 | | 7120.00 | | 3098.00 | | |
| ELECTRICAL REPAIR SHOP | | | | | | | | | | | |
| 1 | 505 | AUTOMATIC BATTERY CHARGING SET WITH CONTROL DEVICE 14V VOLT | | 1 | 94.00 | 1 | 94.00 | | | | |
| 2 | 506 | AUTOMATIC BATTERY CHARGING SET WITH CONTROL DEVICE 72 VOLT | | 2 | 94.30 | 1 | 47.00 | | | 1 | 47.00 |
| 3 | 507 | DISTILLED WATER PLANT CAPACITY 15 LITER/HR. | | 2 | 144.00 | 1 | 72.00 | 1 | 72.00 | | |
| 4 | 510 | SET OF ELECTRICAL MEASURING AND TESTING INSTRUMENTS | | 1.5 | 25.00 | | 25.00 | | | | |
| 5 | 502 | TABLE FOR TAPPING OF COMMUTATOR | | 1 | 4.00 | 1 | 4.00 | | | | |
| 6 | 504 | CABLE VIX CAMBER | | 1 | 168.00 | 1 | 168.00 | | | | |
| 7 | 510 | SET OF ELECTRICAL MEASURING AND TESTING INSTRUMENTS | | 1.5 | 50.00 | | 25.00 | | | | 25.00 |
| 8 | 511 | HYDRAULIC CRIMPING TOOL FOR TRAMING CABLE | | 1 | 82.00 | | | 1 | 82.00 | | |
| 9 | 514 | PORTABLE RELAY AND MOTOR TESTING EQUIPMENT | | 1 | 74.00 | | | 1 | 74.00 | | |
| 10 | 516 | UNIT FOR TESTING AC ELECTRIC MOTORS VOLTAGE-415V | | 1 | 126.00 | | | 1 | 126.00 | | |
| 11 | 515 | APPARATUS FOR TESTING ELECTRIC INSULATION CIRCUIT VOLTAGE-415V, TESTING VOLTAGE-1000V | | 1.5 | 50.00 | | 50.00 | | | | |
| 12 | 520 | CABLE FAULT DETECTOR | | 1 | 28.00 | 1 | 28.00 | | | | |
| 13 | 1811 | MISC. TOOLS AND TACKLES FOR DIFFERENT SHOPS | | 1.5 | 40.00 | | 25.00 | | | | 15.00 |
| 14 | 518 | H.V. TESTING KIT | | 1 | 36.00 | 1 | 36.00 | | | | |
| SUB-TOTAL | | | | | 840.00 | | 598.00 | | 317.00 | | 47.00 |
| ENGINE REPAIR SHOP | | | | | | | | | | | |
| 1 | 601 | VALVE SEAT GRINDER | | 2 | 75.00 | 1 | 38.00 | 1 | 38.00 | | |
| 2 | 602 | VALVE REFACTOR | | 2 | 102.00 | 1 | 51.00 | 1 | 51.00 | | |
| 3 | 604 | PISTON RING GROOVE CLEANER WITH ADJUSTABLE BLADE | | 2 | 8.00 | 1 | 4.00 | 1 | 4.00 | | |
| 4 | 5013 | HYDRAULIC BEARING PULLER KIT, 100 L | | 2 | 122.00 | 1 | 61.00 | 1 | 61.00 | | |
| 5 | 304 | PORTABLE HAND DRILL, 25mm, POWER-0.55 kw | | 2 | 122.00 | 1 | 61.00 | 1 | 61.00 | | |
| 6 | 405 | PORTABLE HAND GRINDER-100mm, POWER-0.55 kw | | 2 | 34.00 | 1 | 17.00 | 1 | 17.00 | | |
| 7 | 606 | PORTABLE STEAM JENNEY ELECTRICALLY HEATED WITH HEATER, POWER 2.7 kW (DEGREASING EQUIPMENT) | | 1 | 228.00 | | | 1 | 228.00 | | |
| 8 | 1004 | WASTER TOOL KIT (IN SETS) | | 3 | 234.00 | 1 | 78.00 | 2 | 156.00 | | |
| 9 | 1811 | MISC. TOOLS AND TACKLES FOR DIFF. SHOPS | | 1.5 | 40.00 | | 25.00 | | | | 15.00 |
| 10 | 507 | SURFACE PLATES | | 1 | 38.00 | | 38.00 | 1 | 38.00 | | |
| 11 | 1812 | NON STANDARD ITEMS-SURFACE PLATES, TOOLS, TACKLES, CABINET, PARTS, RACKS, ETC. | | 1.5 | 30.00 | | 15.00 | | | | 15.00 |
| SUB-TOTAL | | | | | 1158.00 | | 492.00 | | 747.00 | | |
| RADIATOR REPAIR SHOP | | | | | | | | | | | |
| 1 | 701 | GAS TORCH FOR BRAZING OF RADIATOR | | 2 | 84.00 | 1 | 42.00 | | | 1 | 42.00 |
| 2 | 702 | DERIVATIONALS PLANT FOR CUMMER AND DOZER | | 1.5 | 805.00 | | 805.00 | | | | |
| 3 | 706 | FASTENING DEVICE FOR RADIATORS | | 2 | 48.00 | 1 | 24.00 | 1 | 24.00 | | |
| 4 | 307 | HIGH PRESSURE PIPE AND OTHER APPLIANCES | | 1.5 | 25.00 | | 25.00 | | | | |
| 5 | 1811 | MISC. TOOLS AND TACKLES FOR DIFF. SHOPS | | 1.5 | 40.00 | | 20.00 | | | | 20.00 |
| SUB-TOTAL | | | | | 887.00 | | 716.00 | | 44.00 | | 47.00 |
| WELDING AND STRUCTURAL SHOP | | | | | | | | | | | |
| 1 | 901 | HAND OPERATED PLATE SHEARING (MC THICKNESS OF PLATE-3mm) | | 1 | 68.00 | | | 1 | 68.00 | | |
| 2 | 902 | M.G. WELDING SET 400A | | 1 | 129.00 | 1 | 129.00 | | | | |
| 3 | 903 | TRANSFORMER WELDING SET 600A | | 1 | 172.00 | 1 | 172.00 | | | | |
| 4 | 905 | MOBILE DIESEL DRIVEN GENERATOR OR WELDING SPT-400A | | 1 | 867.00 | | | 1 | 867.00 | | |
| 5 | 904 | TRANSFORMER WELDING SET 400A | | 2 | 260.00 | 1 | 130.00 | | | 1 | 130.00 |
| 6 | 906 | DIY ACETYLENE GAS CUTTING AND BRAZING SET | | 2 | 32.00 | 1 | 16.00 | | | 1 | 16.00 |
| 7 | 011 | MARKING PLATE | | 1 | 24.00 | | | 1 | 24.00 | | |
| 8 | 1501 | HYDRAULIC JACK WITH PULLER ATTACHMENT, CAPACITY-100 L | | 2 | 554.00 | 1 | 477.00 | 1 | 477.00 | | |
| 9 | 1004 | HYDRAULIC JACK, CAPACITY-100 L | | 2 | 154.00 | 2 | 154.00 | | | | |
| 10 | 1502 | HYDRAULIC JACK, CAPACITY- 50 L | | 2 | 124.00 | 2 | 124.00 | | | | |

SANJEEV KUMAR
MANAGER

CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA DCP (11.8 MTY)
MCO
ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - EXCAVATION WORKSHOP

(AMOUNT IN Rs. 000)

| Sl. No. | ITEM CODE | DESCRIPTION | UNIT COST | TOTAL QTY | TOTAL COST | PHASE | | | | | |
|--|-----------|--|-----------|-----------|------------|-------|----------|-----|---------|-----|---------|
| | | | | | | 1 | | 2 | | 3 | |
| | | | | | | QTY | COST | QTY | COST | QTY | COST |
| 11 | 305 | PORTABLE HAND DRILL - 13mm, POWER-0.55 kw | 26.00 | 2 | 52.00 | 1 | 26.00 | 1 | 26.00 | | |
| 12 | 304 | PORTABLE HAND DRILL 25 mm, POWER-0.55 kw | 51.00 | 2 | 102.00 | 1 | 51.00 | 1 | 51.00 | | |
| 13 | 434 | FLEXIBLE SHAFT GRINDER, 100mm, POWER-0.55kW | 36.00 | 1 | 36.00 | 1 | 36.00 | | | | |
| 14 | 435 | PORTABLE HAND GRINDER 100mm, POWER - 0.55 kW | 17.00 | 1 | 17.00 | | | 1 | 17.00 | | |
| 15 | 406 | ANGLE GRINDER 6" POWER 0.55 KW | 24.00 | 1 | 24.00 | | | 1 | 24.00 | | |
| 16 | 310 | PORTABLE AIR BLOWER | 26.00 | 1 | 26.00 | 1 | 26.00 | | | | |
| 17 | 1811 | MISC. TOOLS AND TACKLES FOR DIFF. SHOPS | | LS | 35.00 | | 15.00 | | 20.00 | | |
| SUB-TOTAL | | | | | | | 1254.90 | | 1713.00 | | 161.00 |
| DUMPER REPAIR SHOP | | | | | | | | | | | |
| 1 | 1001 | AIR-COMPRESSOR 3.8 Cu.M/Min. WORKING PRESSURE - 7kg/5sq. Cm., POWER - 30 hp. | 205.00 | 2 | 410.00 | 1 | 205.00 | 1 | 205.00 | | |
| 2 | | TYRE PRESS FOR UP TO 150 T DUMPER | 3000.00 | 1 | 3000.00 | 1 | 3000.00 | | | | |
| 3 | | SPECIAL TOOLS & TACKLES FOR DUMPER | | LS | 200.00 | | 200.00 | | | | |
| 4 | 1004 | MASTER TOOL KIT (IN SETS) | 78.00 | 3 | 234.00 | 1 | 78.00 | 2 | 156.00 | | |
| 5 | 1005 | HEAVY DUTY IMPACT SOCKETS (IN SETS) | 134.00 | 2 | 268.00 | 1 | 134.00 | 1 | 134.00 | | |
| 6 | 1006 | TORQUE WRENCHES & MULTIPLIERS (IN SETS) | 31.00 | 2 | 62.00 | 1 | 31.00 | 1 | 31.00 | | |
| 7 | 1507 | UNIVERSAL TEST RIG FOR TESTING BRAKE COMPONENTS | 276.00 | 1 | 276.00 | 1 | 276.00 | | | | |
| 8 | 1010 | HYDRAULIC HOSE CRIMPING MACHINE | 37.00 | 1 | 37.00 | | | 1 | 37.00 | | |
| 9 | 1402 | POWER OPERATED HYDRAULIC PRESS FOR DEMANTALING AND ASSEMBLY WORK, CAP-100 | 532.00 | 1 | 532.00 | | | 1 | 532.00 | | |
| 10 | 1501 | HYDRAULIC JACK WITH PULLER ATTACHMENT, CAPACITY-100 L | 477.00 | 2 | 954.00 | 1 | 477.00 | 1 | 477.00 | | |
| 11 | 304 | PORTABLE HAND DRILL - 25mm, POWER-0.55 kw | 51.00 | 2 | 102.00 | 1 | 51.00 | 1 | 51.00 | | |
| 12 | 403 | DOUBLE ENDED PEDESTAL GRINDER, WHEEL DIA-300mm, POWER-0.66 kw | 45.00 | 1 | 45.00 | | | 1 | 45.00 | | |
| 13 | 304 | TRANSFORMER WELDING SET 400A | 130.00 | 1 | 130.00 | 1 | 130.00 | | | | |
| 14 | 306 | OXY-ACETYLENE GAS CUTTING AND BRAZING SET | 31.00 | 2 | 62.00 | 1 | 31.00 | 1 | 31.00 | | |
| 15 | 1812 | WORKING TABLE, BENCHES, CABINETS, PART STORING RACKS, HAND TROLLEYS ETC. FOR SHOP FLOORS | | LS | 75.00 | | 50.00 | | 25.00 | | |
| SUB-TOTAL | | | | | | | 2167.04 | | 1734.00 | | |
| DUMPER DAILY & SHEDULE MAINT. | | | | | | | | | | | |
| 1 | | BAY LUBRICATION SYSTEM | 4700.00 | 1 | 4700.00 | 1 | 4700.00 | | | | |
| 2 | | USED OIL TRANSFER SYSTEM FOR COLLECTION OF WASTE OIL | | LS | 400.00 | | 400.00 | | | | |
| 3 | 1001 | AIR-COMPRESSOR 3.8 Cu.M/Min. WORKING PRESSURE - 7kg/5sq. Cm., POWER - 30 hp. | 205.00 | 2 | 410.00 | 1 | 205.00 | 1 | 205.00 | | |
| 4 | 1004 | MASTER TOOL KIT (IN SETS) | 78.00 | 3 | 234.00 | 2 | 156.00 | 1 | 78.00 | | |
| 5 | 1103 | DIAGNOSTIC TOOLS AND INSTRUMENTS | | LS | 50.00 | | 25.00 | | 25.00 | | |
| SUB-TOTAL | | | | | | | 5794.00 | | 5485.00 | | 368.00 |
| HEAVY REPAIR SHOP | | | | | | | | | | | |
| 1 | 305 | PORTABLE HAND DRILL, 13 mm, POWER-0.55kw | 26.00 | 2 | 52.00 | 1 | 26.00 | 1 | 26.00 | | |
| 2 | 404 | FLEXIBLE SHAFT GRINDER 100mm, POWER-0.55 kw | 36.00 | 2 | 72.00 | 1 | 36.00 | 1 | 36.00 | | |
| 3 | 904 | TRANSFORMER WELDING SET 400A | 130.00 | 2 | 260.00 | 1 | 130.00 | 1 | 130.00 | | |
| 4 | 800 | OXY-ACETYLENE GAS CUTTING AND BRAZING SET | 31.00 | 2 | 62.00 | 1 | 31.00 | 1 | 31.00 | | |
| 5 | 1004 | MASTER TOOL KIT (IN SETS) | 78.00 | 2 | 156.00 | 1 | 78.00 | 1 | 78.00 | | |
| 6 | 1006 | TORQUE WRENCHES & MULTIPLIERS (IN SETS) | 31.00 | 1 | 31.00 | | | 1 | 31.00 | | |
| 7 | 1504 | HYDRAULIC JACK, CAPACITY - 100 L | 77.00 | 1 | 77.00 | | | 1 | 77.00 | | |
| 8 | 1005 | HEAVY DUTY IMPACT SOCKETS (IN SETS) | 134.00 | 1 | 134.00 | | | 1 | 134.00 | | |
| 9 | 1515 | HYDRAULIC BEARING PULLER KIT | 40.00 | 1 | 40.00 | 1 | 40.00 | | | | |
| 10 | 1811 | MISC. TOOLS AND TACKLES FOR DIFF. SHOPS | | LS | 75.00 | | 50.00 | | 25.00 | | |
| 11 | 1812 | WORKING TABLE, BENCHES, CABINETS, PART STORING RACKS, HAND TROLLEYS ETC. FOR SHOP FLOORS | | LS | 50.00 | | 25.00 | | 25.00 | | |
| SUB-TOTAL | | | | | | | 951.00 | | 885.00 | | |
| FIELD SERVICE EQUIPMENT | | | | | | | | | | | |
| 1 | 1701 | MOBILE WORKSHOP VAN COMPLETE WITH ACCESSORIES (FOR SMALL & MEDIUM REPAIRS) | 5036.00 | 2 | 10072.00 | | | 1 | 5036.00 | 1 | 5036.00 |
| 2 | 1202 | TOOLS & ELECTRICAL MEASURING INSTRUMENT | | LS | 40.00 | | 25.00 | | 15.00 | | |
| 3 | 1703 | MOBILE SERVICE VAN (FOR FIELD LUBRICATION WORK) | 1425.00 | 1 | 1425.00 | 1 | 1425.00 | | | | |
| 4 | 1704 | PORTABLE AIR COMPRESSOR COUPLED WITH DIESEL ENGINE 4.55 CU.M/Min. WORKING PRESSURE 7KG/5sq. cm, POWER-64HP/Passor- | 831.00 | 1 | 831.00 | 1 | 831.00 | | | | |
| SUB-TOTAL | | | | | | | 12972.00 | | 5951.00 | | 5936.00 |
| DOZER REPAIR SHOP | | | | | | | | | | | |
| 1 | 305 | PORTABLE HAND DRILL, 13mm, POWER-0.55 kW | 26.00 | 2 | 52.00 | 1 | 26.00 | 1 | 26.00 | | |
| 2 | 435 | PORTABLE HAND GRINDER 100mm, POWER-0.55 kw | 17.00 | 1 | 17.00 | | | 1 | 17.00 | | |
| 3 | 406 | ANGLE GRINDER 6" POWER-0.55kw | 24.00 | 1 | 24.00 | 1 | 24.00 | | | | |
| 4 | 1104 | PRESSURISED LUBRICATION SYSTEM WITH AIR COMPRESSOR | 954.00 | 1 | 954.00 | | | | 954.00 | | |
| 5 | 1004 | MASTER TOOL KIT (IN SETS) | 78.00 | 2 | 156.00 | 1 | 78.00 | 1 | 78.00 | | |
| 6 | 1005 | HEAVY DUTY IMPACT SOCKETS (IN SETS) | 134.00 | 1 | 134.00 | | | 1 | 134.00 | | |
| 7 | 1006 | TORQUE WRENCHES & MULTIPLIERS (IN SETS) | 31.00 | 1 | 31.00 | | | 1 | 31.00 | | |
| 8 | 302 | M.G. WELDING SET 400A | 129.00 | 1 | 129.00 | | | | 129.00 | | |
| 9 | 304 | TRANSFORMER WELDING SET 400A | 130.00 | 2 | 260.00 | 1 | 130.00 | 1 | 130.00 | | |
| 10 | 306 | OXY-ACETYLENE GAS CUTTING AND BRAZING SET | 31.00 | 2 | 62.00 | 1 | 31.00 | 1 | 31.00 | | |
| 11 | 1202 | OIL LEAK TESTER | 40.00 | 1 | 40.00 | | | 1 | 40.00 | | |
| 12 | 1204 | EXLER BEARING REMOVER | 40.00 | 1 | 40.00 | | | 1 | 40.00 | | |
| 13 | 1205 | BUSH ASSEMBLY TOOLS | | LS | 30.00 | | 30.00 | | | | |
| 14 | 1811 | MISC. TOOLS AND TACKLES FOR DIFF. SHOPS | | LS | 40.00 | | 25.00 | | 15.00 | | |
| 15 | 1812 | WORKING TABLE, BENCHES, CABINETS, PART STORING RACKS, HAND TROLLEYS ETC. FOR SHOP FLOORS | | LS | 40.00 | | 25.00 | | 15.00 | | |
| SUB-TOTAL | | | | | | | 3094.00 | | 1340.00 | | 663.00 |

CHANDRAGUPT OCP (E&MT)
MOU

APPENDIX - A.3.3

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - EXCAVATION WORKSHOP

| SL. NO | ITEM CODE | DESCRIPTION | UNIT COST | TOTAL QTY | TOTAL COST | PHASING | | | | | |
|------------------------------------|-----------|---|-----------|-----------|------------|---------|----------|-----|---------|--------|---------|
| | | | | | | 1 | | 2 | | 3 | |
| | | | | | | QTY | COST | QTY | COST | QTY | COST |
| WASHING STATION | | | | | | | | | | | |
| 1 | 1384 | HIGH PRESSURE MULTJET WASHING UNIT (14 NOZZLES) FOR DUMPER | 1180.00 | 4 | 4720.00 | 1 | 1180.00 | 1 | 1180.00 | 2 | 2360.00 |
| 2 | 1302 | HIGH PRESSURE WATER AND STEAM JET WASHING UNIT FOR DOZER | 483.00 | 1 | 483.00 | 1 | 483.00 | | | | |
| 3 | 1365 | TROLLEY MOUNTED SLURRY PUMP | 410.00 | 1 | 410.00 | 1 | 410.00 | | | | |
| SUB-TOTAL | | | | | | | | | 1180.00 | | 2360.00 |
| MATERIAL HANDLING EQUIPMENT | | | | | | | | | | | |
| 1 | | DIESEL OPERATED FORK LIFT TRUCK-5 L | 2002.00 | 1 | 2002.00 | 1 | 2002.00 | | | | |
| 2 | | EDT CRANE, 455 lb SPAN - 18 m. (FOR DUMPER REPAIR SHOP) | 8015.00 | 2 | 16030.00 | 1 | 8015.00 | 1 | 8015.00 | | |
| 3 | | EDT CRANE, 450 lb SPAN - 24m. (FOR DUMPER REPAIR SHOP) | 2184.00 | 1 | 2184.00 | 1 | 2184.00 | | | | |
| 4 | | EDT CRANE, 150 lb SPAN - 24m. (FOR DOZER REPAIR SHOP) | 2804.00 | 1 | 2804.00 | 1 | 2804.00 | | | | |
| 5 | | EDT CRANE, 300 lb SPAN-24m (FOR FACE EQUIPMENT REPAIR SHOP) | 2184.00 | 1 | 2184.00 | 1 | 2184.00 | | | | |
| 6 | 1032 | CHAIN PULLEY BLOCK CAP-10 L | 37.00 | 1 | 37.00 | 1 | 37.00 | | | | |
| SUB-TOTAL | | | | | | | 2184.00 | | 8015.00 | | |
| STORES AND COMMON EQUIPMENT | | | | | | | | | | | |
| 1 | 1804 | FIRE FIGHTING EQUIPMENT & FIRE DETECTION SYSTEM | | 1.5 | 1700.00 | | 1700.00 | | | | |
| 2 | | FIRE FIGHTING WITH HYDRANT SYSTEM | | 1.5 | 2000.00 | | 2000.00 | | | | |
| 3 | 1805 | FUELLING STATION | 581.00 | 1 | 581.00 | 1 | 581.00 | | | | |
| 4 | 1806 | EXHAUST VENTILATION FAN | | 1.5 | 300.00 | | 300.00 | | | 100.00 | |
| 5 | 1807 | TIME CLOCK AND CARD PUNCHING MC | 25.00 | 2 | 50.00 | 1 | 25.00 | 1 | 25.00 | | |
| 6 | 1808 | ELECTRIC BURN RANGE-5 Km | 25.00 | 1 | 25.00 | 1 | 25.00 | | | | |
| 7 | 1809 | FURNITURE AND FITTING | | 1.5 | 30.00 | | 30.00 | | | 30.00 | |
| 8 | 1810 | CLEANING EQUIPMENT FOR WELDED FLOOR | | 1.5 | 100.00 | | 100.00 | | | | |
| SUB-TOTAL | | | | | | | 4727.00 | | 6922.00 | | 145.00 |
| SUM OF SUB-TOTAL | | | | | | | 10270.00 | | 7282.00 | | 701.00 |
| MISCELLANEOUS | | | | | | | | | | | |
| 1 | | ELECTRICAL (15%) | | 1.5 | 1500.00 | | 750.00 | | 320.40 | | 231.60 |
| 2 | | INSTALLATION(20%) | | 1.5 | 1507.50 | | 728.50 | | 272.20 | | 75.30 |
| 3 | | CONTINGENCIES(5%) | | 1.5 | 5136.00 | | 2568.00 | | 1112.00 | | 302.00 |
| SUB-TOTAL | | | | | | | 3581.50 | | 1624.60 | | 608.90 |
| TOTAL | | | | | | | 13851.50 | | 8906.60 | | 1109.90 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA PROJECT REPORT

CHANDRAGUPT DCP [15.0 MTY]
MDO
ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - E&M WORKSHOP

(AMOUNT IN Rs.1000)

| SL. NO. | ITEM CODE | DESCRIPTION | UNIT COST | TOTAL QTY. | TOTAL COST | PHASING | | | | |
|-------------------------------|-----------|--|-----------|------------|------------|----------------|---------|----------------|---------|----------------|
| | | | | | | 1 | | 3 | | |
| | | | | | | QTY. | COST | QTY. | COST | |
| MACHINE SHOP | | | | | | | | | | |
| 1 | 102 | HEAVY DUTY CENTRE LATHE, CH-260 mm, D.B.C. - 2000 mm, POWER - 11 KW. | 1836.00 | 1 | 1836.00 | | | 1 | 1836.00 | |
| 2 | 104 | LIGHT DUTY CENTRE LATHE, C.H.-200mm, D.B.C.-1000mm, POWER-3KW | 1200.00 | 1 | 1200.00 | 1 | 1200.00 | | | |
| 3 | 201 | SHAPING MACHINE STROKE-630mm, POWER-2.25kw. | 261.00 | 1 | 261.00 | | | 1 | 261.00 | |
| 4 | 204 | POWER HACKSAW TO CUT ROUND UP TO 300mm DIA, POWER-1.5kw | 192.00 | 1 | 192.00 | 1 | 192.00 | | | |
| 5 | 402 | DOUBLE ENDED PEDESTAL GRINDER, WHEEL DIA-300mm, POWER-0.66KW | 45.00 | 1 | 45.00 | 1 | 45.00 | | | |
| 6 | 302 | FILLER DRILLING MACHINE, CAP. IN STEEL-25 mm., POWER - 2.5 KW. | 187.00 | 1 | 187.00 | 1 | 187.00 | | | |
| 7 | 304 | PORTABLE HAND DRILL, CAP. IN STEEL - 25 mm. | 61.00 | 1 | 61.00 | 1 | 61.00 | | | |
| 8 | 404 | PORTABLE HAND GRINDER, WHEEL DIA-100mm, POWER-0.55KW | 17.00 | 1 | 17.00 | 1 | 17.00 | | | |
| 9 | 1208 | STEEL RACKS, BENCHES, TABLES AND CABINETS ETC. | | LS | 50.00 | | 25.00 | | 25.00 | |
| 10 | 1209 | STANDARD TOOLS, GAUGES AND INSTRUMENTS | | LS | 30.00 | | 20.00 | | 10.00 | |
| SUB-TOTAL | | | | | | 3879.00 | | 1747.00 | | 2132.00 |
| STRUCTURAL REPAIR SHOP | | | | | | | | | | |
| 1 | 303 | BENCH DRILL, CAP. IN STEEL-13mm, POWER-0.55KW | 41.00 | 1 | 41.00 | | | 1 | 41.00 | |
| 2 | 305 | PORTABLE HAND DRILL, CAP. IN STEEL-13mm | 26.00 | 1 | 26.00 | 1 | 26.00 | | | |
| 3 | 402 | DOUBLE ENDED PEDESTAL GRINDER WHEEL DIA-300mm,POWER-0.66 KW | 45.00 | 1 | 45.00 | | | 1 | 45.00 | |
| 4 | 404 | PORTABLE HAND GRINDER, WHEEL DIA.-100mm, POWER-0.55 KW | 17.00 | 1 | 17.00 | 1 | 17.00 | | | |

Sanjeev Kumar
SANJEEV KUMAR
MANAGER

CHANDRAGUPTA TOTE RI-3, CMPDI TOTE

**CHANDRAGUPTA OCP [15.0 MTY]
MDO
ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - E&M WORKSHOP**

(AMOUNT IN Rs.'000)

| SL. NO. | ITEM CODE | DESCRIPTION | UNIT COST | TOTAL QTY. | TOTAL COST | PHASING | | | |
|-------------------------------|-----------|--|-----------|------------|------------|---------------|-------|---------------|---------------|
| | | | | | | 1 | | 3 | |
| | | | | | | QTY. | COST | QTY. | COST |
| 5 | 501 | POWER OPERATED HYDRAULIC PRESS FOR DISMANTLING AND ASSEMBLY WORK, CAP-50L. | 238.00 | 1 | 238.00 | | | 1 | 238.00 |
| 6 | 503 | SURFACE PLATE | 39.00 | 1 | 39.00 | | | 1 | 39.00 |
| 7 | 504 | TEST STAND FOR PUMPS(HYD.) | 203.00 | 1 | 203.00 | | | 1 | 203.00 |
| 8 | 510 | TEST BENCH, FITTER STAND WITH VICE ETC. | | LS | 70.00 | | 35.00 | | 35.00 |
| 9 | 1104 | HYDRAULIC JACK, CAP.-10 t | 28.00 | 1 | 28.00 | | | 1 | 28.00 |
| 10 | 1109 | HYDRAULIC BEARING PULLER KIT | 40.00 | 1 | 40.00 | 1 | 40.00 | | |
| 11 | 1211 | WORKING TABLES, BENCHES, CABINETS, PARTS, STORING RACKS, HAND TROLLEYS ETC. | | LS | 45.00 | | 25.00 | | 20.00 |
| SUB-TOTAL | | | | | | 792.00 | | 143.00 | 649.00 |
| ELECTRICAL REPAIR SHOP | | | | | | | | | |
| 1 | 404 | PORTABLE HAND GRINDER, WHEEL DIA.-100mm, POWER-0.55 KW | 17.00 | 1 | 17.00 | 1 | 17.00 | | |
| 2 | 603 | TRANSFORMER OIL DIELECTRIC STRENGTH KIT WITH GLASS TEST CELL | 61.00 | 1 | 61.00 | | | 1 | 61.00 |
| 3 | 604 | TRANSFORMER OIL FILTRATION MC., CAP. - 500 GPH. | 186.00 | 1 | 186.00 | | | 1 | 186.00 |
| 4 | 605 | PORTABLE AIR BLOWER WITH SUCTION ATTACHMENT | 26.00 | 1 | 26.00 | 1 | 26.00 | | |
| 5 | 606 | CABLE VULCANISER | 108.00 | 1 | 108.00 | | | 1 | 108.00 |
| 6 | 607 | PORTABLE MOTOR AND RELAY TESTING EQUIPMENT | | LS | 40.00 | | | | 40.00 |
| 7 | 608 | APPARATUS FOR TESTING ELECTRIC INSULATOR CIRCUIT VOLTAGE - 220 V (IN SETS) | 64.00 | 1 | 64.00 | | | 1 | 64.00 |
| 8 | 609 | SET OF ELECTRICAL MEASURING & TESTING EQUIPMENT. | | LS | 35.00 | | 25.00 | | 10.00 |
| 9 | 1104 | HYDRAULIC JACK, CAP.-10 t | 28.00 | 2 | 56.00 | 1 | 28.00 | 1 | 28.00 |
| 10 | 1109 | HYDRAULIC BEARING PULLER KIT | 40.00 | 1 | 40.00 | | | 1 | 40.00 |
| 11 | 1211 | WORKING TABLES, BENCHES, CABINETS, PARTS, STORING RACKS, HAND TROLLEYS ETC. | | LS | 50.00 | | 25.00 | | 25.00 |
| SUB-TOTAL | | | | | | 663.00 | | 121.00 | 562.00 |

**CHANDRAGUPT OCP [15.0 MTY]
MDO**

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - E&M WORKSHOP

(AMOUNT IN Rs.'000)

| SL. NO. | ITEM CODE | DESCRIPTION | UNIT COST | TOTAL QTY. | TOTAL COST | PHASING | | | | |
|---------------------------|-----------|--|-----------|------------|------------|----------------|--------|---------------|--------|---------------|
| | | | | | | 1 | | 3 | | |
| | | | | | | QTY. | COST | QTY. | COST | |
| L.M.V. REPAIR SHOP | | | | | | | | | | |
| 1 | 303 | BENCH DRILL, CAP. IN STEEL-13mm, POWER-0.59KW | 41.00 | 1 | 41.00 | | | 1 | 41.00 | |
| 2 | 305 | PORTABLE HAND DRILL, CAP. IN STEEL-13mm | 26.00 | 1 | 26.00 | 1 | 26.00 | | | |
| 3 | 404 | PORTABLE HAND GRINDER, WHEEL DIA-100mm, POWER-0.55 KW | 17.00 | 1 | 17.00 | 1 | 17.00 | | | |
| 4 | 702 | TRANSFORMER WELDING SET, 400A | 130.00 | 1 | 130.00 | | | 1 | 130.00 | |
| 5 | 704 | OXY-ACETYLENE GAS CUTTING AND BRAZING SET | 31.00 | 1 | 31.00 | | | 1 | 31.00 | |
| 6 | 902 | HYDRO-MECHANICAL WASHING PLATFORM TO LIFT CAR, TRUCK, BUS ETC. CAP-10 TE WITH WASHING UNIT | 408.00 | 1 | 408.00 | 1 | 408.00 | | | |
| 7 | 903 | AIR COMPRESSOR, 2.9 CUMMIN., WORKING PRESSURE 7 KG/SQ.CM | 195.00 | 1 | 195.00 | 1 | 195.00 | | | |
| 8 | 904 | BATTERY CHARGING SET - 24 VOLT | 46.00 | 1 | 46.00 | 1 | 46.00 | | | |
| 9 | 905 | BATTERY CHARGING SET - 12 VOLT | 36.00 | 1 | 36.00 | 1 | 36.00 | | | |
| 10 | 906 | SPRAY GUN FOR PAINTING | 36.00 | 1 | 36.00 | | | 1 | 36.00 | |
| 11 | 907 | VALVE GRINDING AND LAPPING MC | 97.00 | 1 | 97.00 | | | 1 | 97.00 | |
| 12 | 908 | MOBILE GREASING UNIT CAP. 10 LITS. | | LS | 50.00 | | 50.00 | | | |
| 13 | 909 | ELECTRIC VULCANISER UNIT | 41.00 | 1 | 41.00 | | | 1 | 41.00 | |
| 14 | 910 | WATER DISTILLATION PLANT, 5 LTRS.HR. | 18.00 | 1 | 18.00 | 1 | 18.00 | | | |
| 15 | 1103 | HYDRAULIC JACK, CAP-20 t | 40.00 | 1 | 40.00 | 1 | 40.00 | | | |
| 16 | 1109 | HYDRAULIC BEARING PULLER KIT | 40.00 | 1 | 40.00 | 1 | 40.00 | | | |
| 17 | 1210 | MISC.TOOLS & TAGKLES | | LS | 20.00 | | 10.00 | | 10.00 | |
| 18 | 1211 | WORKING TABLES, BENCHES, CABINETS, PARTS, STORING RACKS, HAND TROLLEYS ETC. | | LS | 45.00 | | 25.00 | | 20.00 | |
| SUB-TOTAL | | | | | | 1317.00 | | 911.00 | | 406.00 |

AREA


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA
 CCL, CMPDI

CHANDRAGUPT OCP [15.0 MTY]

MDO

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - E&M WORKSHOP

(AMOUNT IN Rs.'000)

| SL. NO. | ITEM CODE | DESCRIPTION | UNIT COST | TOTAL QTY. | TOTAL COST | PHASING | | | | |
|------------------------------------|-----------|--|-----------|------------|------------|----------|---------|---------|--------|---------|
| | | | | | | 1 | | 3 | | |
| | | | | | | QTY. | COST | QTY. | COST | |
| STORES AND COMMON EQUIPMENT | | | | | | | | | | |
| 1 | 1202 | WEIGHING MIC CAP-10 T | 98.00 | 1 | 98.00 | | | 1 | 98.00 | |
| 2 | 1205 | ELECTRIC SIREN RANGE-5KM | 26.00 | 1 | 26.00 | 1 | 26.00 | | | |
| 3 | 1206 | TIME CLOCK AND CARD PUNCHING MIC | 25.00 | 1 | 25.00 | 1 | 25.00 | | | |
| 4 | 1207 | EXHAUST FANS/ VENTILATION REQUIRED FOR ALL SHOPS | | LS | 60.00 | | 30.00 | | 30.00 | |
| 5 | 1208 | | | LS | 90.00 | | 50.00 | | 40.00 | |
| 6 | | EOT CRANE CAP-10/2 te, SPAN-18m | 1964.00 | 1 | 1964.00 | 1 | 1964.00 | | | |
| 7 | | FIRE FIGHTING EQUIPMENT | | LS | 100.00 | | 50.00 | | 50.00 | |
| SUB-TOTAL | | | | | | 2363.00 | | 2145.00 | | 218.00 |
| SUM OF SUB TOTAL | | | | | | 9034.00 | | 5067.00 | | 3967.00 |
| MISCELLANEOUS | | | | | | | | | | |
| 1 | | ELECTRICAL(15%) | | LS | 1355.10 | | 880.02 | | 474.29 | |
| 2 | | INSTALLATION(10%) | | LS | 903.40 | | 506.70 | | 396.70 | |
| 3 | | CONTINGENCIES(5%) | | LS | 451.70 | | 253.35 | | 198.35 | |
| SUB-TOTAL | | | | | | 2710.20 | | 1640.07 | | 1069.34 |
| TOTAL | | | | | | 11744.20 | | 6707.07 | | 5036.34 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPT OCP [15.0 MTY]

MDO

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M - PROJECT STORE

(AMOUNT IN Rs.'000)

| SL. NO. | DESCRIPTION | UNIT COST | TOTAL QTY. | TOTAL COST | PHASING | | | |
|----------------------|--|-----------|------------|----------------|---------|----------------|------|----------------|
| | | | | | 1 | | 3 | |
| | | | | | QTY. | COST | QTY. | COST |
| PROJECT STORE | | | | | | | | |
| 1 | DIESEL OPERATED FORK LIFT TRUCK, CAP-3t | 1234 | 1 | 1234 | 1 | 1234 | | |
| 2 | EOT CRANE 10/2 te SPAN-18m | 1964 | 1 | 1964 | 1 | 1964 | | |
| 3 | STORAGE STEEL RACKS | | LS | 300 | | 200 | | 100 |
| 4 | CARDEX CABINET | | LS | 65 | | 40 | | 25 |
| 5 | CABINET, MOVABLE LADDERS, TROLLEYS ETC., | | LS | 60 | | 60 | | |
| 6 | FIRE FIGHTING EQUIP. | | LS | 200 | | 100 | | 100 |
| 7 | WEIGHING M/C | 150 | 1 | 150 | | | 1 | 150 |
| 8 | PERSONAL COMPUTER | 50 | 1 | 50 | | | 1 | 50 |
| 9 | EXHAUST & VENTILATION FAN | | LS | 300 | | 200 | | 100 |
| 10 | FURNITURE & FITTINGS | | LS | 200 | | 100 | | 100 |
| 11 | CHAIN PULLEY BLOCK CAP-10 t | 37 | 1 | 37 | | | 1 | 37 |
| 12 | TIME CLOCK & CARD PUNCHING M/C | 25 | 1 | 25 | | | 1 | 25 |
| SUB-TOTAL | | | | 4585 | | 3898 | | 687 |
| MISCELLANEOUS | | | | | | | | |
| 1 | ELECTRICAL(15%) | | | 687.75 | | 447.04 | | 240.71 |
| 2 | INSTALLATION(10%) | | | 458.50 | | 389.80 | | 68.70 |
| 3 | CONTINGENCIES(5%) | | | 229.25 | | 194.90 | | 34.35 |
| SUB-TOTAL | | | | 1375.50 | | 1031.74 | | 343.76 |
| TOTAL | | | | 5960.50 | | 4929.74 | | 1030.76 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPTA OCP (15.80 MY)
ESTIMATED CAPITAL EXPENDITURE ON P&M - PUMPS, PIPES & FITTINGS
₹00

Am. In Rs. Lakhs

| SL.NO. | PARTICULARS | PROVISION UP TO TARGET YEAR | | | PHASING OF PROVISION UP TO TARGET YEAR | | | | | | BEYOND TARGET YEAR | | | | | | | | | |
|--------|--|-----------------------------|-----------|--------------|--|-------|------|-------|------|--------|--------------------|------|-----|------|-----|------|-----|------|--|------|
| | | QTY | UNIT COST | TOTAL AMOUNT | 1 | | 5 | | 6 | | 10 | | 15 | | 20 | | 25 | | | |
| | | | | | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | | |
| A1 | PUMPS (Nos.) | | | | | | | | | | | | | | | | | | | |
| | RT-1 | | | | | | | | | | | | | | | | | | | |
| 1 | 120 LPS X 120 M HEAD/FLP/250 KW, TSPC - 415 V, WITH MOTOR & STARTER & ELECTRICAL | 3 | 15.00 | 45.00 | 1 | 15.00 | 1 | 15.00 | 1 | 15.00 | | | | | | | | | | |
| 2 | 24 LPS X 60 M HEAD/FLP/37 KW, TSPC - 415V, WITH MOTOR, STARTER & ELECTRICAL | 2 | 4.30 | 8.60 | 1 | 4.30 | 1 | 4.30 | | | | | | | | | | | | |
| 3 | 80 LPS X 120 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN) | 1 | 13.00 | 13.00 | | | | | 1 | 13.00 | | | | | | | | | | |
| 4 | 22 LPS X 45 M HEAD/FLP/35 KW, TSPC - 415 V, WITH MOTOR, STARTER & ELECTRICAL (SLURRY PUMP) | 2 | 5.00 | 10.00 | 2 | 10.00 | | | | | | | | | | | | | | |
| 5 | 15 LPS X 60 M HEAD/FLP/22.5 KW, TSPC - 415 V WITH ELECTRICAL/FACE PUMP | 2 | 2.50 | 5.00 | 2 | 5.00 | | | | | | | | | | | | | | |
| | Sub Total - A1 | | | 84.60 | | 35.30 | | 20.30 | | 28.00 | | 8.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| B1 | PIPES (in KM) & FITTINGS | | | | | | | | | | | | | | | | | | | |
| | RT-1 | | | | | | | | | | | | | | | | | | | |
| 6 | M.S.P.P.E OF NOMINAL DIAMETER 300MM (IN KM) | 0.30 | 28.00 | 8.40 | 0.10 | 2.80 | 0.10 | 2.80 | 0.10 | 2.80 | | | | | | | | | | |
| 7 | M.S.P.P.E OF NOMINAL DIAMETER 250MM (IN KM) | 4.00 | 22.10 | 88.40 | 1.00 | 22.10 | 1.00 | 22.10 | 2.00 | 44.20 | | | | | | | | | | |
| 8 | M.S.P.P.E OF NOMINAL DIAMETER 200MM (IN KM) | 2.00 | 17.40 | 34.80 | | | | | 2.00 | 34.80 | | | | | | | | | | |
| 9 | M.S.P.P.E OF NOMINAL DIAMETER 150 MM (IN KM) | 1.00 | 18.01 | 18.01 | 0.50 | 9.01 | 0.50 | 9.01 | | | | | | | | | | | | |
| 10 | GI PIPE OF NOMINAL DIAMETER 100MM (IN KM) | 1.00 | 7.91 | 7.91 | 0.00 | 3.96 | 0.50 | 3.96 | | | | | | | | | | | | |
| 11 | MISCELLANEOUS ITEM VALVES, FITTINGS, BENDS, ARMOURD SUCTION AND DELIVERY HOSES, PONTOON ETC. | 1.0 | | 34.35 | | 3.28 | | 13.20 | | 8.18 | | 0.00 | | 3.00 | | 0.00 | | 0.00 | | 0.00 |
| | Sub Total - B1 | | | 174.47 | | 37.25 | | 47.25 | | 89.58 | | 8.00 | | 3.00 | | 0.00 | | 0.00 | | 0.00 |
| | Installation Charge | 1.0 | | 30.80 | | 10.80 | | 18.13 | | 17.85 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| | TOTAL RT-1 | | | 207.33 | | 81.47 | | 77.88 | | 126.87 | | 8.00 | | 3.00 | | 0.00 | | 0.00 | | 0.00 |


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL 400-4000-04-001-001

PROJECT REPORT FOR CHANDRAGUPTA OCP (1.0 MTPA)
ESTIMATED CAPITAL EXPENDITURE ON P&I - PUMPS, PIPES & FITTINGS
MDO

MYDOR - A.2.4

| S.NO. | PARTICULARS | PROVISION UP TO TARGET YEAR | | | DRAWS OF PROVISION UP TO TARGET YEAR | | | | | | BEYOND TARGET YEAR | | | | | | | | | |
|----------------------|---|-----------------------------|-----------|--------------|--------------------------------------|-------|------|--------|------|-------|--------------------|--------|------|-------|------|------|------|------|------|------|
| | | QTY | UNIT COST | TOTAL AMOUNT | 1 | | 3 | | 4 | | 15 | | 18 | | 23 | | 28 | | 33 | |
| | | | | | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST |
| A2 | PUMPS (Nos.) | | | | | | | | | | | | | | | | | | | |
| PT-2 | | | | | | | | | | | | | | | | | | | | |
| 1 | 120 LPS X 220 M HEAD/NFLP,450 KW, TEFC - 6.6 KV, WITH MOTOR & STARTER & ELECTRICAL | 0 | 25.00 | 0.00 | | | | | | | 5 | 120.00 | | | | | | | | |
| 2 | 120 LPS X 130 M HEAD/NFLP,350 KW, TEFC - 6.6 KV, WITH MOTOR & STARTER & ELECTRICAL | 3 | 16.00 | 48.00 | 1 | 16.00 | 2 | 32.00 | | | | | | | | | | | | |
| 3 | 24 LPS X 60 M HEAD/NFLP,27 KW, TEFC - 415V, WITH MOTOR, STARTER & ELECTRICAL | 3 | 4.30 | 12.90 | 1 | 4.30 | 2 | 8.60 | | | | | | | | | | | | |
| 4 | 80 LPS X 220 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN) | 0 | 25.00 | 0.00 | | | | | | | 1 | 25.00 | | | | | | | | |
| 5 | 22 LPS X 45 M HEAD/NFLP,25 KW, TEFC - 415 V, WITH MOTOR, STARTER & ELECTRICAL (BATTERY PUMP) | 3 | 5.00 | 15.00 | 2 | 10.00 | 1 | 5.00 | | | 1 | 5.00 | | | | | | | | |
| 6 | 15 LPS X 60 M HEAD/NFLP-22.5 KW, TEFC - 415 V WITH ELECTRICAL TAPE PLANT | 3 | 2.50 | 7.50 | 2 | 5.00 | 1 | 2.50 | | | 1 | 2.50 | | | | | | | | |
| Sub Total- A2 | | | | 82.40 | | 25.30 | | 48.16 | | | 8.00 | 158.00 | | | 0.00 | | 0.00 | | 0.00 | 0.00 |
| B2 | PIPES (in YR) & FITTINGS | | | | | | | | | | | | | | | | | | | |
| PT-2 | | | | | | | | | | | | | | | | | | | | |
| 7 | M.S.PIPE OF NOMINAL DIAMETER 300MM (N KM) | 0.30 | 28.00 | 8.40 | 0.18 | 2.80 | 0.30 | 8.40 | | | 0.28 | 8.40 | | | | | | | | |
| 8 | M.S.PIPE OF NOMINAL DIAMETER 250MM (N KM) | 4.30 | 22.10 | 95.00 | 1.08 | 22.10 | 2.00 | 44.20 | 1.00 | 22.10 | 3.00 | 66.30 | 1.00 | 22.10 | | | | | | |
| 9 | M.S.PIPE OF NOMINAL DIAMETER 200MM (N KM) | 0.80 | 17.40 | 13.92 | | | | | | | 2.00 | 34.80 | | | | | | | | |
| 10 | M.S.PIPE OF NOMINAL DIAMETER 150MM (N KM) | 1.80 | 10.01 | 18.02 | 0.50 | 9.01 | 0.50 | 9.01 | | | | | | | | | | | | |
| 11 | GI PIPE OF NOMINAL DIAMETER 100MM (N CM) | 3.30 | 7.91 | 26.10 | 1.00 | 7.91 | 1.80 | 14.24 | 1.00 | 7.91 | | | | | | | | | | |
| 12 | MISCELLANEOUS ITEMS VALVES, FITTINGS, BONDS, ARMORED SUCTION AND DELIVERY HOSES, PONTOON ETC. | LS | | 23.85 | | 3.76 | | 6.27 | | 13.08 | | 40.67 | | 2.21 | | 0.00 | | 0.00 | | 0.00 |
| Sub Total- B2 | | | | 173.29 | | 41.80 | | 81.89 | | 40.01 | | 117.37 | | 24.31 | | 0.00 | | 0.00 | | 0.00 |
| Installation Charges | | LS | | 30.55 | | 11.55 | | 17.56 | | 6.45 | | 40.56 | | 3.65 | | 0.00 | | 0.00 | | 0.00 |
| TOTAL PT-2 | | | | 273.54 | | 88.41 | | 154.85 | | 46.46 | | 215.25 | | 27.96 | | 0.00 | | 0.00 | | 0.00 |

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
OCL, AMRAPALI-CHANDRAGUPTA AREA

ESTIMATED CAPITAL EXPENDITURE ON PSM - PUMPS, PIPES & FITTINGS

MDO

(Amount in Rupees)

| SL.NO | PARTICULARS | PROVISION UP TO TARGET YEAR | | | PHASING OF PROVISION UP TO TARGET YEAR | | | | | | BEYOND TARGET YEAR | | | | | | | | | |
|--|---|-----------------------------|-----------|---------------|--|--------------|------|--------------|------|---------------|--------------------|--------------|------|---------------|------|--------------|-------|--------------|-----|---------------|
| | | QTY | UNIT COST | TOTAL AMOUNT | 1 | | 3 | | 5 | | 15 | | 18 | | 23 | | 25 | | 32 | |
| | | | | | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST | QTY | COST |
| A2 | PUMPS (Nos.) | | | | | | | | | | | | | | | | | | | |
| PT-1 | | | | | | | | | | | | | | | | | | | | |
| 1 | 120 LPS X 200 M HEAD, NLP, 500 KW, TSPC - 66 KV, WITH MOTOR & STARTER & ELECTRICAL | 3 | 27.00 | 81.00 | | | | | | | | | | | | | | | 3 | 135.00 |
| 2 | 120 LPS X 180 M HEAD, NLP, 350 KW, TSPC - 66 KV, WITH MOTOR & STARTER & ELECTRICAL | 3 | 24.75 | 74.25 | | | | | | | | | 3 | 74.25 | | 3 | 49.50 | | | |
| 3 | 120 LPS X 130 M HEAD, NLP, 250 KW, TSPC - 66 KV, WITH MOTOR & STARTER & ELECTRICAL | 4 | 19.50 | 78.00 | 1 | 19.50 | 1 | 19.50 | 2 | 39.00 | | | | | | | | | | |
| 4 | 38 LPS X 80 M HEAD, NLP, 37 KW, TSPC - 415V, WITH MOTOR, STARTER & ELECTRICAL | 3 | 4.30 | 12.90 | 2 | 8.60 | 1 | 4.30 | | | | | | | | | | | | |
| 5 | 80 LPS X 120 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN) | 3 | 13.00 | 39.00 | | | | | | | 1 | 13.00 | | | | | | | | |
| 6 | 80 LPS X 200 M HEAD WITH ALL ACCESSORIES (DIESEL DRIVEN) | 3 | 27.30 | 81.90 | | | | | | | | | | | 1 | 27.30 | | | | |
| 7 | 22 LPS X 45 M HEAD, NLP, 35 KW, TSPC - 415 V, WITH MOTOR, STARTER & ELECTRICAL (SLURRY PUMP) | 2 | 5.00 | 10.00 | | | | | | | 1 | 5.00 | | | | | | | 2 | 10.00 |
| 8 | 15 LPS X 80 M HEAD, NLP, 22.5 KW, TSPC - 415 V WITH ELECTRICAL (FACE PUMP) | 2 | 2.50 | 5.00 | | | | | | | 1 | 2.50 | | | | | | | 2 | 5.00 |
| Sub Total - A2 | | | | 91.80 | | 38.60 | | 24.30 | | 52.00 | | 2.00 | | 74.25 | | 19.30 | | 0.00 | | 135.00 |
| B2 | PIPES (in KM) & FITTINGS | | | | | | | | | | | | | | | | | | | |
| PT-2 | | | | | | | | | | | | | | | | | | | | |
| 9 | H.S. PIPE OF NOMINAL DIAMETER 300MM (IN KM) | 2.40 | 28.00 | 67.20 | 0.10 | 2.80 | 0.10 | 2.80 | 0.20 | 5.60 | | | 0.10 | 2.80 | | | | | | |
| 10 | H.S. PIPE OF NOMINAL DIAMETER 250MM (IN KM) | 3.00 | 22.10 | 66.30 | 1.00 | 22.10 | 1.00 | 22.10 | 1.30 | 28.73 | 1.00 | 22.10 | 1.00 | 22.10 | 1.00 | 22.10 | 1.00 | 22.10 | | |
| 11 | H.S. PIPE OF NOMINAL DIAMETER 200MM (IN KM) | 1.00 | 17.40 | 17.40 | | | | | | | | | 2.00 | 34.80 | | | | | | |
| 12 | H.S. PIPE OF NOMINAL DIAMETER 150MM (IN KM) | 1.00 | 18.21 | 18.21 | 0.50 | 8.61 | 0.50 | 8.61 | | | | | | | | | | | | |
| 13 | GI PIPE OF NOMINAL DIAMETER 100MM (IN KM) | 2.00 | 7.31 | 14.62 | 0.50 | 3.66 | 0.50 | 3.66 | 1.00 | 7.31 | 1.00 | 7.31 | | | | | | | | |
| 14 | MISCELLANEOUS ITEMS, VALVES, FITTINGS, BENCH, ARMOUR, REZ, SUCTION AND DELIVERY HOSES, PONDON, ETC. | LS | | 20.30 | | | | | | | | | 5.80 | 2.49 | | | | 2.21 | | |
| Sub Total - B2 | | | | 123.84 | | 37.25 | | 37.25 | | 46.17 | | 32.58 | | 27.39 | | 24.31 | | 22.10 | | 0.00 |
| Installation Charges | | LS | | 30.00 | | 11.50 | | 11.50 | | 12.18 | | 8.38 | | 15.20 | | 15.10 | | 3.32 | | 20.25 |
| TOTAL PT-2 | | | | 153.84 | | 48.75 | | 48.75 | | 58.35 | | 40.96 | | 42.59 | | 39.41 | | 25.42 | | 20.25 |
| GRAND TOTAL (PT-1, PT-2 & PT-3) | | | | 245.64 | | 87.35 | | 73.05 | | 110.35 | | 22.98 | | 116.84 | | 58.71 | | 25.42 | | 155.25 |

CHANDRAGUPTA OPENCAST PROJECT
 DCL, AMBAPALLI-CHANDRAGUPTA AREA
 SANJEEV K. GUPTA
 MANAGER

**PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]
SUMMARY STATEMENT OF CAPITAL EXPENDITURE ESTIMATE**

**Chandragupta OCP (MDO Mode)
COAL HANDLING PLANT
[CRUSHING UP TO - 100 mm]**

[Amount in Rs.Lakhs]

| Sl. No. | PARTICULARS | Total Cost | P H A S I N G | | | |
|---------|-----------------------------|-----------------|----------------|-----------------|-----------------|-----------------|
| | | | 1 | 2 | 3 | 4 |
| A | Mechanical System | | | | | |
| | i) P & M / Equipment | 6199.50 | 62.50 | 272.50 | 3112.50 | 2752.00 |
| | ii) Conveyors | 11417.00 | 335.70 | 3648.80 | 5708.50 | 1724.00 |
| | iii) Belting | | | | | |
| | a) Nylon Nylon Belting | 1454.00 | 0.00 | 291.00 | 436.00 | 727.00 |
| | b) Steel Cord Belting | 1939.00 | 0.00 | 388.00 | 485.00 | 1066.00 |
| 1 | Total of ' A' | 21009.50 | 398.20 | 4600.30 | 9742.00 | 6269.00 |
| 2 | Electrical & Control System | 2262.85 | 47.67 | 498.85 | 1141.27 | 575.06 |
| 3 | Erection and Commissioning | 2327.23 | 44.59 | 509.91 | 1088.33 | 684.41 |
| 4.1 | Civil & Structural Works | 14862.70 | 674.50 | 3923.50 | 3777.50 | 6487.20 |
| 4.2 | Survey and Soil Testing | 44.00 | 35.20 | 8.80 | 0.00 | 0.00 |
| 5 | Design & Engineering | 1279.98 | 24.52 | 280.45 | 598.58 | 376.42 |
| 6 | Over Head Construction Cost | 4031.93 | 77.25 | 883.43 | 1885.53 | 1185.73 |
| 7 | Insurance | 192.00 | 3.68 | 42.07 | 89.79 | 56.46 |
| 8 | Contingencies | 927.34 | 17.77 | 203.19 | 433.67 | 272.72 |
| 9 | Training of O&M Staff | 12.80 | 0.25 | 2.80 | 5.99 | 3.76 |
| 10 | Spares | 465.45 | | | | 465.45 |
| 11 | GST 18% on (3+4+5+6+8+9) | 4060.56 | 154.13 | 1009.60 | 1324.07 | 1572.75 |
| | Grand Total | 51476.34 | 1477.75 | 11962.91 | 20086.71 | 17948.96 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]
[C] STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON P&M:CHP
[P & M]

[Amount in Rs.'000']

| Sl. No. | PARTICULARS | TOTAL QTY. | UNIT COST | TOTAL COST | P H A S I N G | | | |
|--------------|---|------------|-----------|---------------|---------------|--------------|---------------|---------------|
| | | | | | 1 | 2 | 3 | 4 |
| 1 | Twin Shaft Sizer (Primary) of 1500 tph nominal capacity, Feed size 1200mm, Product Size 200/300 mm | 1 | 65000 | 65000 | | | 65000 | 0 |
| 2 | Twin Shaft Sizer (Secondary) of 1500 tph nominal capacity, Feed size 300 mm, Product Size (-) 100mm | 1 | 60000 | 60000 | | | 60000 | 0 |
| 3 | Apron Feeder | 1 | 17500 | 17500 | | | 17500 | 0 |
| 4 | Electro Mech.Vibrating Feeder | 10 | 700 | 7000 | | | 7000 | 0 |
| 5 | Magnetic Separator | 3 | 1600 | 4800 | | | 4800 | 0 |
| 6 | Metal Detector | 3 | 500 | 1500 | | | 1500 | 0 |
| 7 | Rapid Loadout with 2 nos.P.W.Hopper & Auto.Sampler. | 4 | 40000 | 160000 | | | 53600 | 106400 |
| 8 | Plough Feeder (1500 tph) | 8 | 23000 | 184000 | | | 61600 | 122400 |
| 9 | Flap or Sector Gate | 8 | 600 | 4800 | | 1200 | 3600 | 0 |
| 10 | Motorised Hoist, Chain pulley etc., 5 / 10 t | 10 | 600 | 6000 | 0 | 1200 | 2400 | 2400 |
| 11 | Wear Resistent liner, Chute etc. | LS | | 20000 | 0 | 2000 | 8000 | 10000 |
| 12 | Plant Safety and Fire Fighting System | LS | | 20000 | 0 | 2000 | 8000 | 10000 |
| 13 | Dust Suppresion & Dust Extraction | LS | | 28000 | 0 | 2800 | 8400 | 16800 |
| 14 | E.O.T Crane,Cap 30/20 t With Structure | 1 | 7400 | 7400 | 0 | 3700 | 3700 | 0 |
| 15 | Road Weigh bridge with all accessories | 5 | 1550 | 7750 | 3100 | 4650 | 0 | 0 |
| 16 | Belt Weighing Scale | 8 | 650 | 5200 | | 1300 | 1950 | 1950 |
| 17 | Misc.items, tools,tackles etc. | LS | | 21000 | 3150 | 8400 | 4200 | 5250 |
| TOTAL | | | | 619950 | 6250 | 27250 | 311250 | 275200 |


SANJEEV KUMAR
MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]

[A].STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON P&M :CHP

[CONVEYOR]

[Amount in Rs.'000]

| SL. NO. | PARTICULARS | TOTAL QTY. | UNIT COST | TOTAL COST | P H A S I N G | | | |
|--------------|--|------------|-----------|----------------|---------------|---------------|---------------|---------------|
| | | | | | 1 | 2 | 3 | 4 |
| 1 | Conveyor Dgn. : 1 C1&2 Width in mm : 1600 Length in m : 90 Power in kW : 2X90 | 2 | 14500 | 29000 | 2900 | 11600 | 14500 | 0 |
| 2 | Conveyor Dgn. : 1 C3 Width in mm : 1600 Length in m : 145 Power in kW : 2X90 | 1 | 15200 | 15200 | 1520 | 6080 | 7600 | 0 |
| 3 | Conveyor Dgn. : 2 C1&2 Width in mm : 1600 Length in m : 620 Power in kW : 2X200 | 2 | 54000 | 108000 | 10800 | 43200 | 54000 | 0 |
| 4 | Conveyor Dgn. : 2 C3 Width in mm : 1600 Length in m : 730 Power in kW : 2X150 | 1 | 62000 | 62000 | 6200 | 24800 | 31000 | 0 |
| 5 | Conveyor Dgn. : CT Width in mm : 1600 Length in m : 50 Power in kW : 1X110 | 1 | 9500 | 9500 | 950 | 3800 | 4750 | 0 |
| 5 | Conveyor Dgn. : 3C1,2,3&4 Width in mm : 1600 Length in m : 300 Power in kW : 2X150 | 4 | 28000 | 112000 | 11200 | 33600 | 56000 | 11200 |
| 6 | Conveyor Dgn. : 4C1,2,3&4 Width in mm : 1600 Length in m : 500 Power in kW : 2X250 | 4 | 41500 | 166000 | 0 | 49800 | 83000 | 33200 |
| 7 | Conveyor Dgn. : 5C1,2,3&4 Width in mm : 1600 Length in m : 2050 Power in kW : 2X500 | 4 | 160000 | 640000 | 0 | 192000 | 320000 | 128000 |
| TOTAL | | | | 1141700 | 33570 | 364880 | 570850 | 172400 |

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]

[B].STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON P&M :CHP

[BELTING]

[Amount in Rs.'000]

| SL. No. | PARTICULARS | TOTAL QTY. (m) | UNIT COST | TOTAL COST | PHASING | | | |
|--------------|---|----------------|-----------|---------------|----------|--------------|--------------|---------------|
| | | | | | 1 | 2 | 3 | 4 |
| | Width of Belt,mm : 1600 | | | | | | | |
| 1 | Type of Belt : NN Type of Carcass : 1400/4 | 20630 | 7.05 | 145400 | 0 | 29100 | 43600 | 72700 |
| | Width of Belt,mm : 1600 | | | | | | | |
| 2 | Type of Belt : SC Type of Carcass : ST1400 | 17630 | 11.00 | 193900 | 0 | 38800 | 48500 | 106600 |
| TOTAL | | | | 339300 | 0 | 67900 | 92100 | 179300 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT FOR CHANDRAGUPT OCP [15.0 MTY]
[D].STATEMENT SHOWING THE PHASED CAPITAL EXPENDITURE ON : CHP
[CIVIL & STRUCTURALS]

[Amount in Rs.'000]

| SL. No. | PARTICULARS | TOTAL QTY | TOTAL COST | P H A S I N G | | | |
|--------------|---|-----------|----------------|---------------|---------------|---------------|---------------|
| | | | | 1 | 2 | 3 | 4 |
| 1 | Conveyor Gentries Inclined Roof Type | LS | 435120 | 43500 | 108800 | 130500 | 152320 |
| 2 | Transfer Houses / Drive House | LS | 48950 | 0 | 9790 | 14690 | 24470 |
| 3 | Receiving Pits and hoppers | LS | 80000 | 12000 | 16000 | 20000 | 32000 |
| 4 | Ground Bunker, Cap.20,000 te | 2 | 587400 | 0 | 176200 | 117480 | 293720 |
| 5 | Silo with sampler house for Rapid Loading, Capacity 4000 Te | 2 | 209000 | 0 | 41800 | 62700 | 104500 |
| 6 | Civil structure for sizers & other equipments | LS | 15000 | 100 | 500 | 7700 | 6700 |
| 7 | General Development in CHP Area | LS | 5400 | 1350 | 2160 | 1080 | 810 |
| 8 | Survey, Soil Investigation & Hydrogeological Data | LS | 4400 | 3520 | 880 | | 0 |
| 9 | CHP Office & service Building, Road, Drain, bridge, Tunnel, Water supply, Sanitation etc. | LS | 55000 | 5500 | 22000 | 11000 | 16500 |
| 10 | Contingencies & Misc. | LS | 50400 | 5000 | 15100 | 12600 | 17700 |
| TOTAL | | LS | 1490670 | 70970 | 393230 | 377750 | 648720 |


SANJEEV KUMAR
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 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT OF CHANDRAGUPTOCP (15.00 MTY)
ESTIMATED CAPITAL REQUIREMENT ON OTHER P&M
MDO

| SI No | Description | No. | Unit Cost | Cost | Amount in Rs. Lakh. | | | | | | | | | |
|--------------|--|-----|-----------|--------|---------------------|-------|--------------|---------------|-----|-------------|-----|-------------|-----|--------------|
| | | | | | 1 | | 2 | | 3 | | 4 | | 5 | |
| | | | | | No. | Amt. | No. | Amt. | No. | Amt. | No. | Amt. | No. | Amt. |
| 1 | Exploder with continuity tester for 200 Shots | 3 | 0.16 | 0.48 | | | 1 | 0.16 | 1 | 0.16 | 1 | 0.16 | | |
| 2 | Road Roller (10T) & Tar Boiler | | 15.00 | | | | | | | | | | | |
| 3 | Mechsnised explosive handler | | | 10.00 | | | LS | 10.00 | | | | | | |
| 4 | F.E. Loader 0.5 Cum. | 1 | 15.00 | 15.00 | | | | | | | | | | |
| 8 | Miscellaneous Equipment | | | 10.00 | | | | | | | | | 1 | 15.00 |
| 12 | Mobile Light Plants | 1 | 15.00 | 15.00 | | | 1 | 15.00 | | | | | LS | 10.00 |
| 13 | Total Station(short Range 2 km with Accessories) | 1 | 21.00 | 21.00 | 1 | 21.00 | | | | | | | | |
| 14 | Smart Station | 1 | 40.00 | 40.00 | 1 | 40.00 | | | | | | | | |
| 15 | Terrestrial Laser Scanner | 1 | 150.00 | 150.00 | | | 1 | 150.00 | | | | | | |
| 16 | Digital Level | 1 | 3.00 | 3.00 | | | 1 | 3.00 | | | | | | |
| 17 | DGPS | 1 | 30.00 | 30.00 | | | 1 | 30.00 | | | | | | |
| 18 | Hand held GPS | 1 | 0.50 | 0.50 | 1 | 0.50 | | | | | | | | |
| 19 | Miscellaneous office automation equipment for survey | | | 20.00 | | | LS | 20.00 | | | | | | |
| 20 | Slope Stability monitoring device | 1 | 635.00 | 635.00 | | | 1 | 635.00 | | | | | | |
| Total | | | | | 949.98 | | 61.50 | 863.16 | | 0.16 | | 0.16 | | 25.00 |

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CHANDRAGUPTA OPTICAST PROJECT
CCL, AMHAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OPENCAST PROJECT (15MTY)

CMPDI

ESTIMATED PHASED CAPITAL EXPENDITURE ON P&M-ELECTRICALS (MDO)

APPENDIX -A-3.7

Amount in Rs.'000

| SLNO. | Particulars | Qty. | Unit Cost | Total Cost | Year Wise Phasing | | | | |
|----------------------|--|------|-----------|---------------|-------------------|---------------|----------|--------------|--|
| | | | | | 4th Year | | 5th Year | | |
| | | | | | Qty. | Cost | Qty. | Cost | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| COMMUNICATION | | | | | | | | | |
| 1 | Surface Mine Communication | | | | | | | | |
| | a. IP Exchange 500 lines with accessories | 1 | 4000 | 4000 | LS | 3000 | LS | 1000 | |
| | b. BSNL fixed lines | 20 | 4 | 80 | 15 | 60 | 5 | 20 | |
| | c. Mobile Connection with sets | 30 | 5 | 150 | 20 | 100 | 10 | 50 | |
| 2 | Tetra Based OITDS including Transciever Mobile fixed sets with base towers | LS | | 120000 | LS | 100000 | LS | 20000 | |
| 3 | Internet & LAN for 40 PCs, Hardware and Software | LS | | 2500 | LS | 1500 | LS | 1000 | |
| 4 | L3 Switch | 2 | 300 | 600 | 1 | 300 | 1 | 300 | |
| 5 | L2 Switch | 4 | 100 | 400 | 2 | 200 | 2 | 200 | |
| 6 | Point to point Radio | 2 | 150 | 300 | 1 | 150 | 1 | 150 | |
| 7 | Point to Multi Point Radio (Base-1, Remote-5) | LS | 600 | 600 | LS | 400 | LS | 200 | |
| 8 | 2/4 Mbps leased lines | LS | 250 | 250 | LS | 250 | | | |
| 9 | Plant Comm. System, etc. | LS | | 500 | LS | 300 | LS | 200 | |
| 10 | GPS Based Truck Monitoring System | LS | | 1000 | LS | 1000 | | | |
| 11 | IP Surveillance System | LS | 1500 | 1500 | LS | 1000 | LS | 500 | |
| 12 | Biometric Attendance System | LS | | 200 | LS | 200 | | | |
| 13 | UPS 20 KVA | 1 | 800 | 800 | 1 | 800 | | | |
| 14 | Cables & Accessories along with laying | LS | | 3000 | LS | 2500 | LS | 500 | |
| 15 | Furniture fitting with Air Conditioning etc. | LS | | 300 | LS | 200 | LS | 100 | |
| 16 | Testing & Measuring Equipment | LS | | 100 | | | LS | 100 | |
| 17 | Installation and commissioning | LS | | 13273 | | 10916 | | 2357 | |
| 18 | Spares | LS | | 6637 | | 5458 | | 1179 | |
| | SubTotal | | | 156190 | | 128334 | | 27856 | |


SANJEEV KUMAR
 MANAGER

MDO- 33X

CHANDRAGUPTA OPENCAST PROJECT
 GCL, AMRAPALI-CHANDRAGUPTA AREA

Appendix A.6

Provision of Hired Vehicles

| S N' | Particulars | Total No |
|------|-----------------------------------|-----------|
| | Jeep | 5 |
| 2 | Car | 4 |
| 3 | Fire Tender | 2 |
| 4 | Ambulance | 2 |
| 5 | School Bus | 5 |
| 6 | Shift Bus | 4 |
| 7 | Explosive Van | 2 |
| 8 | Service Truck | 1 |
| 9 | Line Man Truck | 1 |
| 10 | Pick-up Van | 2 |
| 11 | Mobile Canteen Van | 2 |
| 12 | 50 T Low Bed Trailor | 1 |
| 13 | Water Tanker (For Drinking water) | 2 |
| 14 | Cash Van | 1 |
| | Total | 34 |


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CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALLCHANDRAGUPTA AREA

CHANDRAGUPT OCP(15.00 MTY)

Estimated Investment On Prospecting and Boring

VARIANT-II

(Amount in Rs. Lakhs)

| Particulars | Total Provision | BALANCE PROVISION | Yearwise Phasing | | | | |
|------------------------|-----------------|-------------------|------------------|---|-------|-------|---|
| | | | 1 | 2 | 3 | 4 | 5 |
| Prospecting and Boring | 152.00 | 152.00 | | | 76.00 | 76.00 | |


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CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
Estimated Capital for Capital Outlay in Mines

Appendix-A.8.1

MDO

(AMOUNT IN RS. LAKH)

| Sl.No | Particulars | Total Provision | Phasing | | | | | | | | | | | |
|-------|---|-----------------|-------------------|---------------|---------------|---------------|---------------|--------------|----------------|--------------|---------------|---------------|--------|--------|
| | | | Up to Target Year | | | | | | Beyond Tgt.Yr. | | | | | |
| | | | 1st yr. | 2nd yr. | 3rd Yr. | 4th. Yr. | 5th. Yr. | 6th. Yr. | 7th Yr. | 8th Yr. | 9th Yr. | 10th Yr. | | |
| 1 | Biological reclamation of OB dump | 586.65 | | 5.00 | 10.00 | 10.00 | 10.00 | | | | | | 50.00 | 501.65 |
| 2 | Arboriculture | 10.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | | | | | | | |
| 3 | Rain water harvesting scheme | 20.00 | 10.00 | 10.00 | | | | | | | | | | |
| 4 | Progressive green belt development & other development | 75.00 | 10.00 | 10.00 | 15.00 | 15.00 | 15.00 | | | | | | 5.00 | 5.00 |
| 5 | Cost of land development in mine & Industrial area i.e. Nala Diversion, Sedimentation Tank, Lagoon, Check Dam etc | 250.00 | 34.00 | 34.00 | 34.00 | 34.00 | 34.00 | 20.00 | 20.00 | 40.00 | | | | |
| 6 | Development of land for township | 389.32 | 215.66 | 40.86 | 50.51 | 23.27 | 28.38 | 6.24 | 24.40 | | | | | |
| 7 | Development of land for industrial infrastructures | 393.73 | 100.00 | 100.00 | 193.73 | | | | | | | | | |
| 8 | Cost of embankment against River | 150.00 | 20.00 | 25.00 | 25.00 | 25.00 | 25.00 | 25.00 | 5.00 | | | | | |
| 9 | Nalla diversion , length 1700 meter at the rate of Rs 6290/- per meter at DSR' 2007 escalated to CI 4025 | 252.88 | 252.88 | | | | | | | | | | | |
| 10 | Barki Nadi diversion, length 100 meter at the rate of Rs 9450/- per meter at DSR' 2007 escalated to CI 4025 | 22.35 | | | | | | | | 10.00 | 12.35 | | | |
| 11 | Toe wall/Retaining wall along OB dumps, 2100 m @Rs.3900/-per m. at DSR'2007 escalated to CI 4025 | 276.69 | | | | 20.00 | 20.00 | | | | | 20.00 | 216.69 | |
| 12 | Storm Water drain along OB dumps @Rs.104/-per m. at 100 CI for 2100 m escalated to CI 4025 | 125.58 | | | | 10.00 | 10.00 | | | | | 10.00 | 95.58 | |
| 13 | Hydrological studies | 10.00 | | | | | 10.00 | | | | | | | |
| 14 | Total | 2562.19 | 644.54 | 226.86 | 330.24 | 139.27 | 154.38 | 51.24 | 49.40 | 50.00 | 97.35 | 818.92 | | |
| 15 | GST except item no. 1 (18% OF Above) | 461.19 | 116.02 | 40.83 | 59.44 | 25.07 | 27.79 | 9.22 | 8.89 | 9.00 | 17.52 | 147.41 | | |
| 16 | GRAND TOTAL (IN Rs. LAKHS.) | 3023.38 | 760.55 | 267.69 | 389.68 | 164.34 | 182.17 | 60.46 | 58.29 | 59.00 | 114.87 | 966.33 | | |

MDO - 38X

RI-3. CMPDI

SANJEEV KUMAR

MANAGER

CHANDRAGUPTA OPENCAST PROJECT
COAL MINING-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
SUMMARY OF THE CAPITAL INVESTMENT ON ROADS & CULVERTS.**

MDO

| SI. NO. | PARTICULARS. | TOTAL PROV. | UP TO TARGET YEAR | | | | | | BEYOND TGT. YR. | REFERENCE |
|---------|-------------------------------|-----------------|-------------------|----------------|----------------|----------------|--------------|--------------|-----------------|-------------|
| | | | Y.1 | Y.2 | Y.3 | Y.4 | Y.5 | Y.6 | | |
| 1 | COLONY ROADS | 664.85 | 355.65 | 67.39 | 83.30 | 38.37 | 46.80 | 10.30 | 63.06 | APP.A.8.2.1 |
| 2 | HAUL ROAD | 5661.92 | 1000.00 | 1000.00 | 1000.00 | 2661.92 | | | | APP.A.8.2.2 |
| 3 | APPROACH ROAD TO THE PROJECT | 761.34 | 100.00 | 200.00 | 200.00 | 261.34 | | | | APP.A.8.2.3 |
| 4 | APPROACH ROAD TO COLONY | 764.47 | 100.00 | 300.00 | 364.47 | | | | | APP.A.8.2.4 |
| 5 | APPROACH ROAD TO THE MAGAZINE | 231.02 | 80.00 | 151.02 | | | | | | APP.A.8.2.5 |
| 6 | BRIDGE | 10000.00 | 5000.00 | 5000.00 | | | | | | |
| | TOTAL | 18083.60 | 6635.65 | 6718.40 | 1647.77 | 2961.63 | 46.80 | 10.30 | 63.06 | |

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 CHANDRAGUPTA OCP PROJECT

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON COLONY ROADS.**

**MDO
UPTO TARGET YEAR
(AMOUNT IN Rs.'000')**

| Sl. NO. | PARTICULARS | LENGTH/ NO./KM | COST AT 100 CI | COST AT 4025 CI | TOTAL COST |
|------------|---|-----------------------|--|--|--|
| 1. | COLONY ROADS 7.50 mt wide 225 mm boulder soling 7.50 mt wide 75 mm W.B.M.(50-63 mm) 7.50 mt wide 75 mm W.B.M.(40-50 mm) 7.50 mt. wide 40 mm premix carpet including cycle track | 4.30 | 261.00 | 10505.25 | 45172.58 |
| 2. | CULVERTS. 4.57 mt. span R.C.C. culvert 3.05 mt. span R.C.C. culvert 1.83 mt. span R.C.C. culvert 1.22mt. span R.C.C. culvert 0.61 mt.dia hume pipe culvert | 1 1 1 1 4 | 49.50 33.00 19.80 13.20 4.10 | 1992.38 1328.25 796.95 531.30 165.03 | 1992.38 1328.25 796.95 531.30 660.10 |
| 3. | TREE GUARDS (@ 40/Km.) | 172 | 0.03 | 1.21 | 207.69 |
| 4. | R.C.C. DRAIN CROSSING SLABS 40% of the total nos. of quarters. | 257 | 0.03 | 1.21 | 310.57 |
| 5. | TOTAL | | | | 50999.81 |
| 6. | TOTAL AMOUNT IN Rs. LAKHS. | | | | 510.00 |
| 7. | Add GST @ 18% | | | | 91.80 |
| 8. | GRAND TOTAL (IN Rs. LAKHS.) | | | | 601.80 |

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON COLONY ROADS.**

**MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs.'000')**

| Sl. NO. | PARTICULARS | LENGTH/ NO./KM | COST AT 100 CI | COST AT 4025 CI | TOTAL COST |
|---------|---|-----------------------|--|--|--|
| 1. | COLONY ROADS 7.50 mt wide 225 mm boulder soling 7.50 mt wide 75 mm W.B.M.(50-63 mm) 7.50 mt wide 75 mm W.B.M.(40-50 mm) 7.50 mt. wide 40 mm premix carpet including cycle track | 4.60 | 261.00 | 10505.25 | 48324.15 |
| 2. | CULVERTS. 4.57 mt. span R.C.C. culvert 3.05 mt. span R.C.C. culvert 1.83mt. span R.C.C. culvert 1.22mt. span R.C.C. culvert 0.61 mt.dia hume pipe culvert | 2 1 1 1 5 | 49.50 33.00 19.80 13.20 4.10 | 1992.38 1328.25 796.95 531.30 165.03 | 3984.75 1328.25 796.95 531.30 825.13 |
| 3. | TREE GUARDS (@ 40/Km.) | 184 | 0.03 | 1.21 | 222.18 |
| 4. | R.C.C. DRAIN CROSSING SLABS 40% of the total nos. of quarters. | 274 | 0.03 | 1.21 | 330.86 |
| 5. | TOTAL | | | | 56343.56 |
| 6. | TOTAL AMOUNT IN Rs. LAKHS. | | | | 563.44 |
| 7. | Add GST @ 18% | | | | 101.42 |
| 8. | GRAND TOTAL (IN Rs. LAKHS.) | | | | 664.85 |

MDO - 39X


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CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON HAUL ROAD (100/120 T).**

MDO
(AMOUNT IN Rs. '000')

| Sl. NO. | PARTICULARS | LENGTH/ NO./KM | COST AT 100 CI | COST AT 4025 CI | TOTAL COST |
|-----------|---|-------------------|----------------------|-----------------------|------------------|
| A. | HAUL ROAD SPECIFICATION | | | | |
| 1. | 30.0 mt wide 400 mm moorum | | | | |
| 2. | 30.0mt wide 400 mm moorum + sand | 5.4 | 1778.00 | 71564.50 | 386448.30 |
| 3. | 30.0 mt wide 700 mm WBM | | | | |
| | SUB-TOTAL | | | | 386448.30 |
| B. | CULVERTS | | | | |
| 1. | Cost of 4.57 mt span R.C.C culvert | 3 | 169.00 | 6802.25 | 20406.75 |
| 2. | Cost of 3.05 mt span R.C.C culvert | 2 | 113.00 | 4548.25 | 9096.50 |
| 3. | Cost of 0.61 mt span R.C.C culvert | 5 | 14.00 | 563.50 | 2817.50 |
| C. | DRAIN | 10 | 57.00 | 2294.25 | 22942.50 |
| D. | FIXED WATER SPRINKLER | | L.S. | | 20000.00 |
| E. | Cost of 10m long bridge on Chutua Nala | 1 | 450.00 | 18112.50 | 18112.50 |
| | GRAND TOTAL | | | | 479824.05 |
| | TOTAL AMOUNT IN RS. LAKHS | | | | 4798.24 |
| | Add GST @ 18% | | | | 863.68 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | 5661.92 |


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 CCL, AMRAPALH-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON APPROACH ROAD TO THE PROJECT**

**MDO
(AMOUNT IN Rs.'000')**

| SL. NO. | PARTICULARS | LENGTH KM/NO. | COST AT 100 CI | COST AT 4025 CI | TOTAL COST |
|---------|--|---------------|----------------|-----------------|------------|
| 1. | APPROACH ROAD TO THE PROJECT | | | | |
| | 7.50 mt wide 225 mm boulder soling | | | | |
| | 7.50 mt wide 75 mm W.B.M.(50-63 mm) | | | | |
| | 7.50 mt wide 75 mm W.B.M.(40-50 mm) | | | | |
| | 7.50 mt. wide 40 mm premix carpet | 4 | 290.00 | 11672.50 | 46690.00 |
| 2. | CULVERTS | | | | |
| | 4.57 mt. span R.C.C. culvert | 1 | 49.50 | 1992.38 | 1992.38 |
| | 3.05 mt. span R.C.C. culvert | 1 | 33.00 | 1328.25 | 1328.25 |
| | 1.83 mt. span R.C.C. culvert | 1 | 19.80 | 796.95 | 796.95 |
| | 1.22 mt. span R.C.C. culvert | 1 | 13.20 | 531.30 | 531.30 |
| | 0.61 mt.dia hume pipe culvert | 4 | 4.10 | 165.03 | 660.10 |
| 3 | TREE GUARDS (@ 40 /KM) | 160 | 0.03 | 1.21 | 193.20 |
| 4 | DRAIN | 4 | 57.00 | 2294.25 | 9177.00 |
| 5 | E/W in excavation & banking | 20000 | | 157.55 | 3151 |
| | TOTAL | | | | 64520.18 |
| | TOTAL AMOUNT IN Rs. LAKHS. | | | | 645.20 |
| | Add GST @ 18% | | | | 116.14 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | 761.34 |

MDO - 41X


SANJEEV KUMAR
 MANAGER
 RI-3, CMPDI
 CHANDRAGUPTA OPEN
 CCL, AMRAPALI-CHANDR

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON APPROACH ROAD TO COLONY**

MDO
(AMOUNT IN Rs. '000')

| SL. NO. | PARTICULARS | LENGTH KM/NO. | COST AT 100 CI | COST AT 4025 CI | TOTAL COST |
|---------|--|---------------|----------------|-----------------|---------------|
| 1. | APPROACH ROAD TO THE COLONY | | | | |
| | 7.50 mt wide 225 mm boulder soling | | | | |
| | 7.50 mt wide 75 mm W.B.M.(50-63 mm) | | | | |
| | 7.50 mt wide 75 mm W.B.M.(40-50 mm) | | | | |
| | 7.50 mt. wide 40 mm premix carpet | 4 | 290.00 | 11672.50 | 46690.00 |
| 2. | CULVERTS | | | | |
| | 4.57 mt. span R.C.C. culvert | 1 | 49.50 | 1992.38 | 1992.38 |
| | 3.05 mt. span R.C.C. culvert | 1 | 33.00 | 1328.25 | 1328.25 |
| | 1.83 mt. span R.C.C. culvert | 2 | 19.80 | 796.95 | 1593.90 |
| | 0.61 mt.dia hume pipe culvert | 4 | 4.10 | 165.03 | 660.10 |
| 3. | TREE GUARDS (@ 40 /KM) | 160 | 0.03 | 1.21 | 193.20 |
| 4. | DRAIN | 4 | 57.00 | 2294.25 | 9177.00 |
| 5 | E/W in excavation & banking | 20000 | | 157.55 | 3151 |
| | TOTAL | | | | 64785.83 |
| | TOTAL AMOUNT IN Rs. LAKHS. | | | | 647.86 |
| | Add GST @ 18% | | | | 116.61 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | 764.47 |

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL
INVESTMENT ON APPROACH ROAD TO THE MAGAZINE**

**MDO
(AMOUNT IN Rs.'000')**

| SL. NO. | PARTICULARS | LENGTH KM/NO. | COST AT 100 CI | COST AT 4025 CI | TOTAL COST |
|---------|---------------------------------------|---------------|----------------|-----------------|------------|
| 1. | APPROACH ROAD TO THE MAGAZINE. | | | | |
| | 3.75 mt wide 150 mm boulder soling | | | | |
| | 3.75 mt wide 75 mm Sand/Moorum | | | | |
| | 3.75 mt wide 150 mm W.B.M. | | | | |
| | 3.75 mt. wide 20 mm premix carpet | 3 | 132.00 | 5313.00 | 15939.00 |
| 2. | CULVERTS | | | | |
| | 4.57 mt. span R.C.C. culvert | 1 | 37.50 | 1509.38 | 1509.38 |
| | 3.05 mt. span R.C.C. culvert | 1 | 25.00 | 1006.25 | 1006.25 |
| | 1.83 mt. span R.C.C. culvert | 1 | 15.00 | 603.75 | 603.75 |
| | 0.61 mt.dia hume pipe culvert | 3 | 3.10 | 124.78 | 374.33 |
| 3. | TREE GUARDS (@ 40 /KM) | 120 | 0.03 | 1.21 | 144.90 |
| | TOTAL | | | | 19577.60 |
| | TOTAL AMOUNT IN Rs. LAKHS. | | | | 195.78 |
| | Add GST @ 18% | | | | 35.24 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | 231.02 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OCP
 AMRAPALI-CHANDRAGUPTA

CHANDRAGUPTA OCP(15.0 MTY)
SUMMARY OF THE CAPITAL INVESTMENT ON WATER SUPPLY & SEWERAGE.

MDO

| SI. NO. | PARTICULARS. | TOTAL PROV. | UP TO TARGET YEAR | | | | | | BEYOND TGT. YR. | REFERENCE |
|---------|-------------------------|----------------|-------------------|---------------|---------------|---------------|----------------|--------------|-----------------|--------------|
| | | | Y.1 | Y.2 | Y.3 | Y.4 | Y.5 | Y.6 | | |
| 1. | SOURCE OF WATER | 424.07 | 50.00 | 50.00 | 50.00 | 50.00 | 224.07 | | | APP.A.8.3.1. |
| 2. | COLONY WATER SUPPLY | 487.39 | 255.96 | 48.50 | 59.95 | 27.62 | 33.68 | 7.41 | 54.28 | APP.A.8.3.2. |
| 3. | COLONY SEWERAGE | 362.89 | 200.84 | 38.05 | 47.04 | 21.67 | 26.43 | 5.81 | 23.05 | APP.A.8.3.3. |
| 4. | INDUSTRIAL WATER SUPPLY | 1063.42 | | 100.00 | 200.00 | 300.00 | 463.42 | | | APP.A.8.3.4. |
| 5. | INDUSTRIAL SEWERAGE | 718.28 | | 100.00 | 100.00 | 100.00 | 418.28 | | | APP.A.8.3.5. |
| | T O T A L | 3056.05 | 506.80 | 336.55 | 456.99 | 499.29 | 1165.88 | 13.22 | 77.32 | |


SANJEEV KUMAR
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 CHANDRAGUPTA OPENCAST PROJECT
 CCL, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON SOURCE OF WATER SUPPLY

MDO
(AMOUNT IN Rs.'000')

| SL. NO. | PARTICULARS | UNIT OF MEASURE | UNIT COST(RS) | QUANTITY | COST AT 100 CI | COST AT 4025 CI |
|---------|---|-----------------|---------------|----------|----------------|-----------------|
| 1. | INTAKE WELL AND RAW WATER PUMP HOUSE | | | | | |
| a. | 1354.00 INDUSTRIAL WATER | KL | 170.00 | 1354 | 230.18 | 9264.75 |
| b. | 317.00 POTABLE WATER | KL | 170.00 | 317 | 53.89 | 2169.07 |
| 2. | RAW WATER BOOSTING PUMPING STATION | | | | | |
| a. | INDUSTRIAL WATER | LS | | | | 1000.00 |
| b. | POTABLE WATER | LS | | | | 500.00 |
| 3. | RAW WATER RISING MAINS | | | | | |
| a. | INDUSTRIAL WATER(150 MM) | RM | 240.80 | 1000 | 240.80 | 9692.20 |
| b. | POTABLE WATER(100 MM) | RM | 124.06 | 500 | 62.03 | 2496.71 |
| 4 | FOR POTABLE WATER | | | | | |
| a. | 317.00 WATER TREATMENT PLANT | KL | 280.00 | 317 | 88.76 | 3572.59 |
| b. | 59.00 CLEAR WATER RESERVOIR | KL | 650.00 | 59.00 | 38.35 | 1543.59 |
| c. | CLEAR WATER RISING MAINS | RM | 124.06 | 500.00 | 62.03 | 2496.71 |
| d. | CLEAR WATER PUMP AND PUMP HOUSE | LS | | | | 1000.00 |
| 5 | VALVES & SPECIALS (@15% OF THE COST OF PIPES) | | | | | 2202.84 |
| | TOTAL COST | | | | | 35938.45 |
| | TOTAL (IN Rs.LAKHS.) | | | | | 359.38 |
| | Add GST @ 18% | | | | | 64.69 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | | 424.07 |

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 CHANDRAGUPTA OPENCAST PROJECT
 CCL, ANAPALI-CHANDRAGUPTA ARE.

CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY WATER SUPPLY SCHEME.

MDO
 UPTO TARGET YEAR
 (AMOUNT IN Rs.'000')

| SL. NO. | PARTICULARS | UNIT OF MEASURE | UNIT COST(RS) | QUANTITY | COST AT 100 CI | COST AT 4025 CI |
|---------|---|-----------------|---------------|----------|----------------|-----------------|
| 1. | GROUND RESERVOIR 1.20 0.90 LAKHS GALLON CAPACITY | GALLON | 3.00 | 90000 | 270.00 | 10867.50 |
| 2. | OVERHEAD TANK 0.60 0.40 LAKHS GALLON CAPACITY | GALLON | 5.00 | 40000 | 200.00 | 8050.00 |
| 3. | PUMP HOUSE ,2 NOS. | SQ.METER | 260.00 | 20 | 10.40 | 418.60 |
| 4. | PUMPS & MOTORS | L.S. | | | | 300.00 |
| 5. | 4300 PIPE LINE | | | | | |
| a. | 2150 M (DIA. 100 MM.) | R.M. | 78.70 | 2150 | 169.21 | 6810.50 |
| b. | 1075 M (DIA. 80 MM.) | R.M. | 62.70 | 1075 | 67.40 | 2712.95 |
| c. | 1075 M (DIA. 50 MM.) | R.M. | 44.90 | 1075 | 48.27 | 1942.77 |
| 6. | VALVES & SPECIALS (15%OF THE ABOVE ITEM) | | | | | 1719.93 |
| 7. | COLONY DISTRIBUTION SYSTEM(@ RS.150/UNIT) | | 150.00 | 643 | 96.45 | 3882.11 |
| | TOTAL COST | | | | | 36704.36 |
| | TOTAL (IN Rs.LAKHS.) | | | | | 367.04 |
| | Add GST @ 18% | | | | | 66.07 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | | 433.11 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OCP PROJECT
 EPL, AREA OFFICE, CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY WATER SUPPLY SCHEME.**

**MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs. '000')**

| SL. NO. | PARTICULARS | UNIT OF MEASURE | UNIT COST(RS) | QUANTITY | COST AT 100 CI | COST AT 4025 CI |
|---------|---|-----------------|---------------|----------|----------------|-----------------|
| 1. | GROUND RESERVOIR 1.30 1.00 LAKHS GALLON CAPACITY | GALLON | 3.00 | 100000 | 300.00 | 12075.00 |
| 2. | OVERHEAD TANK 0.60 0.50 LAKHS GALLON CAPACITY | GALLON | 5.00 | 50000 | 250.00 | 10062.50 |
| 3. | PUMP HOUSE ,2 NOS. | SQ.METER | 260.00 | 20 | 10.40 | 418.60 |
| 4. | PUMPS & MOTORS | L.S. | | | | 500.00 |
| 5. | 4600 PIPE LINE | | | | | |
| a. | 2300 M (DIA. 100 MM.) | R.M. | 78.70 | 2300 | 181.01 | 7285.65 |
| b. | 1150 M (DIA. 80 MM.) | R.M. | 62.70 | 1150 | 72.11 | 2902.23 |
| c. | 1150 M (DIA. 50 MM.) | R.M | 44.90 | 1150 | 51.64 | 2078.31 |
| 6. | VALVES & SPECIALS (15%OF THE ABOVE ITEM) | | | | | 1839.93 |
| 7. | COLONY DISTRIBUTION SYSTEM(@ RS.150/UNIT) | | 150.00 | 686 | 102.90 | 4141.73 |
| | TOTAL COST | | | | | 41303.94 |
| | TOTAL (IN Rs.LAKHS.) | | | | | 413.04 |
| | Add GST @ 18% | | | | | 74.35 |
| | GRAND TOTAL (IN Rs. LAKHS.) | | | | | 487.39 |

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OFENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY SEWERAGE .**

**MDO
UPTO TARGET YEAR
(AMOUNT IN Rs. '000')**

| SL. NO. | PARTICULARS | UNIT OF MEASURE | UNIT COST(RS) | QUANTITY | COST AT 100 CI | COST AT 4025 CI |
|---------|-----------------------------------|-----------------|---------------|----------|----------------|-----------------|
| 1. | COMBINED OPEN SURFACE DRAIN | | | | | |
| | a)MAIN DRAIN (60CMx90CM) | R.M. | 104.00 | 1075 | 111.80 | 4499.95 |
| | b)CONNECTING DRAIN (30CMx45CM) | R.M. | 57.00 | 1075 | 61.28 | 2466.32 |
| | c) SMALL DRAIN (22.5CMx30CM) | R.M. | 28.00 | 2150 | 60.20 | 2423.05 |
| 2. | SEWAGE TREATMENT PLANT | NO. | 750.00 | 643 | 482.25 | 19410.56 |
| | TOTAL COST | | | | | 28799.88 |
| | TOTAL (IN Rs.LAKHS.) | | | | | 288.00 |
| | Add GST @ 18% | | | | | 51.84 |
| | GRAND TOTAL (IN Rs.LAKHS.) | | | | | 339.84 |


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON COLONY SEWERAGE .**

**MDO
BEYOND TARGET YEAR
(AMOUNT IN Rs.'000')**

| SL. NO. | PARTICULARS | UNIT OF MEASURE | UNIT COST(RS) | QUANTITY | COST AT 100 CI | COST AT 4025 CI |
|---------|--------------------------------|-----------------|---------------|----------|----------------|-----------------|
| 1. | COMBINED OPEN SURFACE DRAIN | | | | | |
| | a)MAIN DRAIN (60CMx90CM) | R.M. | 104.00 | 1150 | 119.60 | 4813.90 |
| | b)CONNECTING DRAIN (30CMx45CM) | R.M. | 57.00 | 1150 | 65.55 | 2638.39 |
| | c) SMALL DRAIN (22.5CMx30CM) | R.M. | 28.00 | 2300 | 64.40 | 2592.10 |
| 2. | SEWAGE TREATMENT PLANT | NO. | 750.00 | 686 | 514.50 | 20708.63 |
| | TOTAL COST | | | | | 30753.01 |
| | TOTAL (IN Rs.LAKHS.) | | | | | 307.53 |
| | Add GST @ 18% | | | | | 55.36 |
| | GRAND TOTAL (IN Rs.LAKHS.) | | | | | 362.89 |


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

CHANDRAGUPTA OCP(15.0 MTY)
CAPITAL INVESTMENT ON INDUSTRIAL WATER SUPPLY

MDO
Amount in Rs.'000'

| Sl.No. | Particulars | Unit | Quantity | rate | Amount at Cl 100 | Amount at Cl 4025.00 |
|--------|---|---------|----------|--------|---------------------|-------------------------|
| A | WORKSHOP | | | | | |
| 1 | Industrial water reservoir | Gallon | 298000 | 3.00 | 894.00 | 35983.50 |
| 2 | 100-150mm dia pipe line from bulk reservoir to workshop, CHP and overhead tank | m | 2000 | 124.06 | 248.12 | 9986.83 |
| 3 | Valves and specials | | | | | 1498.02 |
| 4 | Extra for masonry anchor blocks | LS | | | | 250.00 |
| 5 | Internal distribution system | LS | | | | 250.00 |
| 6 | Overhead tank | Gallons | 40000 | 5.00 | 200.00 | 8050.00 |
| 7 | Ground sump | Gallons | 4000 | 3.00 | 12.00 | 483.00 |
| 8 | Pump house | sqm | 50 | 260.00 | 13.00 | 523.25 |
| 9 | Water supply pump at storage reservoir | LS | | | | 1000.00 |
| 10 | 100-150mm dia fire fighting pipe line | m | 500 | 78.70 | 39.35 | 1583.84 |
| 11 | Valves and specials | | | | | 237.58 |
| 12 | Fire fighting pumps | LS | | | | 300.00 |
| | Sub total (A) | | | | | 69148.02 |
| B | QUARRIES | | | | | |
| 1 | Pipe line 100-150mm dia | m | 1000 | 124.06 | 124.06 | 4993.42 |
| 2 | Valves & specials | | | | | 749.01 |
| | Sub total (B) | | | | | 5742.43 |
| C | ADMINISTRATIVE COMPLEX | | | | | |
| 1 | Distribution system | m | 500 | 44.90 | 22.45 | 903.61 |
| 2 | Valves and specials | | | | | 135.54 |
| | Sub total (C) | | | | | 1039.15 |
| D | QUARRY FIRE FIGHTING | | | | | |
| 1 | Central sump | Gallons | 20000 | 3.00 | 60.00 | 2415.00 |
| 2 | Pipe line for quarry | m | 5000 | 78.70 | 393.50 | 15838.38 |
| 3 | Valves and specials | | | | | 2375.76 |
| 4 | Pumps | LS | | | | 2000.00 |
| 5 | Pump house | sqm | 30 | 260.00 | 7.80 | 313.95 |
| 6 | Electricals | LS | | | | 250.00 |
| | Sub total (D) | | | | | 23193.08 |
| | Grand Total (A to D) | | | | | 90120.68 |
| | Total in Rs. Lakhs | | | | | 901.21 |
| | Add GST @ 18% | | | | | 162.22 |
| | GRAND TOTAL (IN Rs.LAKHS.) | | | | | 1063.42 |

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CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

**CHANDRAGUPTA OCP(15.0 MTY)
STATEMENT SHOWING THE ESTIMATED CAPITAL INVESTMENT
ON INDUSTRIAL SEWAGE.**

MDO
(AMOUNT IN Rs.'000')

| SL. NO. | PARTICULARS | UNIT OF MEASURE | UNIT COST(RS) | QUANTITY | COST AT 100 CI | COST AT 4025 CI |
|---------|-----------------------------|-----------------|---------------|----------|----------------|-----------------|
| 1. | COMBINED OPEN SURFACE DRAIN | | | | | |
| a. | 60 CM. X 90 CM. | METER | 104.00 | 500 | 52.00 | 2093.00 |
| b. | 30 CM. X 45 CM. | METER | 57.00 | 500 | 28.50 | 1147.13 |
| 2. | EFFLUENT TREATMENT PLANT | | L.S. | | | 57631.00 |
| | TOTAL COST | | | | | 60871.13 |
| | TOTAL (IN Rs.LAKHS.) | | | | | 608.71 |
| | Add GST @ 18% | | | | | 109.57 |
| | GRAND TOTAL (IN Rs.LAKHS.) | | | | | 718.28 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 CCL AMRAPALI-CHANDRAGUPTA AREA

PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED YEAR WISE OPERATING COST AT 100% CAPACITY UTILISATION
MDO

| S.No | Particulars | 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 |
|-------|-------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1 | Salary & Wages | 2087.81 | 2484.04 | 2988.98 | 3222.00 | 3521.42 | 3886.65 | 4288.60 | 4906.74 | 5201.83 | 5602.19 | 5825.91 | 6345.68 | 6721.27 | 7151.90 | 7607.77 | 8088.09 | 8485.11 | 8935.28 | 9336.58 | 9836.58 | 10446.67 | 10858.75 | 11508.75 | 12008.75 | 12657.94 |
| 2 | Stores | 9426.64 | 12168.08 | 16862.04 | 21849.05 | 25152.84 | 26824.41 | 27394.85 | 27281.47 | 27211.48 | 27440.08 | 27026.25 | 27015.89 | 32549.86 | 31935.42 | 30380.95 | 35787.48 | 36786.80 | 36789.88 | 36789.88 | 36647.63 | 36888.00 | 39198.00 | 39998.67 | 41088.15 | 37206.37 |
| 3 | Power | 379.58 | 379.58 | 617.64 | 1504.14 | 1778.10 | 1887.99 | 1941.90 | 1996.00 | 2027.04 | 2446.22 | 2180.86 | 2283.79 | 2383.73 | 2400.89 | 2825.42 | 2621.19 | 2621.19 | 2621.19 | 2621.17 | 2620.77 | 2619.48 | 2617.35 | 2363.38 | 2357.91 | 2363.38 |
| 4 | Misc. Expenses | 1141.18 | 1792.29 | 2705.02 | 3380.81 | 3858.37 | 4061.18 | 4389.75 | 4086.09 | 4108.97 | 4128.84 | 4192.24 | 4192.84 | 4043.49 | 4621.50 | 5008.81 | 5042.83 | 5042.88 | 5043.86 | 5043.30 | 5041.31 | 5048.60 | 5048.60 | 5052.47 | 5052.47 | 5062.50 |
| 5 | Administrative Cost (Cash) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Mine closure Cost | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | OB Outsourcing | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | COAL Outsourcing | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Other Outsourcing cost | 136.08 | 242.67 | 359.98 | 548.33 | 568.63 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 | 595.27 |
| 10 | Reserve Price | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Bank Guarantee Charges (L5) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Interest on Working capital | 198.28 | 248.23 | 310.62 | 368.72 | 421.88 | 447.90 | 450.80 | 453.91 | 453.33 | 461.71 | 464.24 | 466.22 | 530.14 | 523.38 | 583.17 | 590.85 | 590.77 | 590.84 | 590.71 | 588.98 | 588.74 | 588.71 | 588.20 | 588.54 | 593.11 |
| 13 | Total cash Cost | 13334.30 | 18278.52 | 25967.18 | 30881.64 | 35318.05 | 37515.40 | 37758.30 | 38018.48 | 37979.02 | 39072.12 | 38884.48 | 39048.70 | 44481.76 | 43837.53 | 40904.10 | 49472.26 | 48482.12 | 48496.50 | 48477.14 | 48330.51 | 48386.73 | 48262.60 | 48325.44 | 48269.79 | 48678.38 |
| 14 | Interest on Loan | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | Administrative Cost (Advance) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | Depreciation | 3633.14 | 8706.30 | 8510.80 | 18122.26 | 11200.51 | 11492.30 | 11006.80 | 11822.26 | 11627.99 | 11712.17 | 12817.88 | 12017.88 | 13923.73 | 13801.80 | 15370.30 | 13519.80 | 15510.80 | 15026.72 | 15026.72 | 15023.13 | 15106.37 | 14740.24 | 14883.04 | 14487.07 | 14489.85 |
| Total | | 19957.45 | 23987.86 | 34495.98 | 41015.89 | 49511.66 | 49937.76 | 48215.18 | 49640.73 | 49338.01 | 50384.29 | 50932.48 | 51067.68 | 58327.49 | 57839.33 | 64278.40 | 64992.16 | 65002.02 | 65023.84 | 65003.68 | 64883.54 | 64582.12 | 64133.84 | 63978.89 | 63737.76 | 64148.31 |

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CHANDRAGUPTA OPENCAST PROJECT
PCL, AMRAPATI-CHANDRAGUPTA AREA

FINANCIAL RESULT


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MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

**PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED AVERAGE COST OF PRODUCTION AND PROFITABILITY
COMBINED**

COST IN RS/TE

| | | | |
|--------------------------------|-------|----------------|--------|
| TARGET OUTPUT(M.TE) | 15.00 | MANPOWER | 149 |
| PEAK OUTPUT(M.TE) | 15.00 | | |
| PEAK OB (M M3) | 32.60 | INVESTMENT | |
| AVERAGE STRIPPING RATIO(M3/TE) | 1.86 | (Rs in Crores) | 973.50 |

| SR.NO | PARTICULARS | COST/TE | FIXED | VARIABLE | %GE ON TOTAL COST |
|-------|--|---------------|---------------|---------------|-------------------|
| 1 | SALARY & WAGES | 37.48 | 37.48 | | 6.22% |
| 2 | STORES | 221.33 | 0.50 | 220.83 | 36.71% |
| 3 | POWER | 15.34 | | 15.34 | 2.55% |
| 4 | MISC EXP | 42.66 | 4.86 | 37.80 | 7.07% |
| 5 | ADMINSTRATIVE COST (CASH) | 15.81 | 15.81 | | 2.62% |
| 6 | MINE CLOSURE COST | 4.56 | 4.56 | | 0.76% |
| 7 | CONTRACTUAL OB REMOVAL | | | | |
| 8 | CONTRACTUAL COAL COST | | | | |
| 9 | OTHER OUTSOURCING COST RESERVE PRICE | 4.34 | | 4.34 | 0.72% |
| 10 | BANK GUARANTEE CHARGES (Is) INTEREST ON WORKING CAPITAL | 5.71 | 3.05 | 2.65 | 0.95% |
| | TOTAL CASH COST | 347.22 | 66.26 | 280.96 | 57.59% |
| 11 | 11.5% INTEREST ON LOAN CAPITAL | | | | |
| 12 | DEPRECIATION | 113.43 | 113.43 | | 18.81% |
| 13 | ADMINSTRATIVE COST (NOTIONAL) | 142.26 | 142.26 | | 23.59% |
| | TOTAL COST | 602.91 | 321.95 | 280.96 | 100.00% |

| B-PROFITABILITY | | AT 100% | AT 85% |
|-----------------|-----------------------------------|---------|---------|
| 1 | RATED OUTPUT (MTY) | 15.00 | 12.75 |
| 2 | COST OF PRODUCTION (RS/TE) | 602.91 | 699.66 |
| 3 | SELLING PRICE (RS/TE) | 1023.25 | 1023.25 |
| 4 | PROFIT/LOSS (RS/TE) | 420.34 | 323.59 |
| 5 | BREAK EVEN POINT (%) | 43.37% | 56.41% |
| 6 | BREAK EVEN POINT (M.te) | 6.506 | 8.461 |
| 7 | ANNUAL PROFIT/LOSS (Rs in Crores) | 630.51 | 412.58 |
| 8 | COST/CUM | 238.62 | 276.91 |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA DEPCAST PROJECT
 CCL, ANAPALLI-CHANDRAGUPTA AREA

Project Report for Chandragupt OCP (15.0MTY), CCL MDO MODE-March 2020

PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED YEAR WISE OPERATING COST AT 100% CAPACITY UTILISATION
COMBINED

Appendix C.1

| Sl. No. | Particulars | 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 | | | | |
|---------|--------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|
| 1 | Salary & Wages | 3232.74 | 3816.24 | 4485.82 | 4802.82 | 5119.59 | 5177.82 | 5177.82 | 5187.51 | 5171.10 | 5191.27 | 5214.58 | 5215.89 | 5216.26 | 5271.18 | 5217.25 | 5344.31 | 5354.39 | 5364.48 | 5345.86 | 5345.86 | 5355.95 | 5355.95 | 5366.03 | 5366.03 | 5366.03 | 5367.23 | | | |
| 2 | Stores | 904.44 | 1315.33 | 1982.94 | 2194.16 | 25217.34 | 26906.41 | 27105.89 | 27356.47 | 27286.48 | 27515.98 | 27911.25 | 27966.89 | 28242.85 | 32318.42 | 36465.95 | 36862.48 | 36861.89 | 36864.88 | 36865.01 | 36722.83 | 36773.09 | 36773.49 | 36943.67 | 36944.15 | 37281.07 | | | | |
| 3 | Power | 379.59 | 379.59 | 617.64 | 1934.34 | 1779.10 | 1697.99 | 1941.90 | 1990.60 | 2027.04 | 2446.22 | 2116.86 | 2233.79 | 2383.73 | 2409.03 | 2525.42 | 2625.19 | 2631.19 | 2621.17 | 2621.17 | 2620.77 | 2619.48 | 2617.29 | 2663.38 | 2387.91 | 2363.31 | | | | |
| 4 | Misc. Expenses | 1405.63 | 2551.33 | 3826.93 | 4748.63 | 5367.89 | 5719.49 | 5748.10 | 5757.48 | 5759.29 | 5794.15 | 5830.65 | 5850.68 | 6299.29 | 6277.83 | 6607.13 | 6666.84 | 6699.29 | 6703.17 | 6699.71 | 6697.82 | 6702.91 | 6702.21 | 6708.78 | 6718.78 | 6718.90 | | | | |
| 5 | Administrative Cost (Cash) | 513.94 | 886.80 | 1368.89 | 1811.39 | 2068.34 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | 2352.06 | |
| 6 | Mine closure Cost | 324.12 | 346.33 | 367.35 | 375.21 | 390.99 | 413.67 | 434.36 | 456.18 | 478.88 | 502.82 | 527.99 | 554.35 | 582.09 | 611.19 | 641.74 | 673.83 | 707.52 | 742.90 | 780.04 | 819.05 | 860.00 | 903.00 | 948.00 | 995.56 | 1045.32 | | | | |
| 7 | DB Outsourcing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | COAL Outsourcing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Other Outsourcing cost | 142.06 | 291.26 | 308.82 | 595.14 | 618.43 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | 637.08 | |
| 10 | Interest on Working capital | 272.19 | 375.66 | 523.06 | 626.67 | 698.62 | 744.16 | 748.16 | 752.24 | 752.76 | 763.39 | 766.02 | 768.26 | 830.99 | 825.23 | 887.22 | 895.20 | 897.20 | 896.18 | 900.73 | 900.88 | 903.64 | 905.69 | 907.04 | 908.69 | 915.97 | | | | |
| 11 | Total cash Cost | 15784.72 | 20714.89 | 30589.47 | 36348.25 | 41262.93 | 42641.71 | 44206.29 | 44686.23 | 44464.65 | 45191.89 | 45438.69 | 45933.12 | 50929.26 | 55365.05 | 55482.65 | 56285.45 | 56130.03 | 56161.91 | 56311.83 | 56045.94 | 56254.11 | 56247.00 | 56286.21 | 56238.20 | 56631.01 | | | | |
| 12 | Interest on Loan | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | Administrative Cost (Non-cash) | 4635.50 | 7261.24 | 12319.90 | 16302.51 | 18795.08 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 | 21168.67 |
| 14 | Depreciation | 4577.92 | 7943.79 | 11628.79 | 13191.19 | 14344.65 | 14636.00 | 14701.00 | 14766.45 | 14772.14 | 14898.31 | 15162.12 | 15102.13 | 15057.87 | 15043.34 | 15114.45 | 15064.84 | 15064.04 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 | 15073.86 |
| | Total | 34066.14 | 46916.89 | 64447.10 | 82650.76 | 94022.62 | 97746.79 | 99073.86 | 99424.26 | 99465.36 | 101216.77 | 101613.30 | 102333.82 | 109185.50 | 114096.57 | 114566.67 | 114518.16 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | 114528.24 | |
| | Cost/Ta. (Rs.) | | 866.99 | 598.56 | 572.48 | 531.85 | 533.84 | 536.16 | 536.04 | 541.45 | 545.88 | 546.23 | 554.84 | 566.00 | 634.44 | 639.45 | 639.75 | 640.14 | 640.27 | 639.55 | 634.34 | 627.86 | 625.43 | 623.82 | 625.41 | | | | | |
| | Fixed Cost (Rs./Ta.) | | 88.54 | 71.61 | 63.18 | 56.88 | 57.22 | 57.17 | 57.33 | 57.50 | 57.67 | 57.72 | 57.84 | 57.89 | 57.86 | 58.12 | 58.31 | 58.60 | 58.86 | 59.14 | 59.18 | 59.24 | 59.85 | 59.85 | 59.78 | | | | | |
| | Variable Cost (Rs./Ta.) | | 778.45 | 526.85 | 509.30 | 474.77 | 476.62 | 478.89 | 478.71 | 483.95 | 488.19 | 489.10 | 497.00 | 508.15 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | 508.14 | |

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPEN
CCL, SRIPAL CHANDRA

Project Report for Chandragupt OCP (15.0MTY), CCL MDO MODE-March 2020

**PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED CASH FLOW ANALYSIS AT 100% CAPACITY UTILISATION
COMBINED**

Appendix-D

| SLNo. | Particulars | 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 | |
|-------|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | Initial Capital (Equity) | 81016.77 | 71451.00 | 72679.75 | 32933.96 | 19912.83 | 3223.07 | 1520.80 | 919.00 | 119.87 | 1262.51 | 3490.93 | | 25918.25 | 296.19 | 20803.71 | 2035.84 | | 164.84 | | 296.19 | 296.19 | | 412.12 | | 592.37 | |
| 2 | Debt Service | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Replacement Capital | | | | | 291.90 | 438.06 | 727.00 | 3172.79 | 2341.38 | 17173.79 | 28381.39 | 11790.53 | 13249.01 | 8566.59 | 8917.80 | 1911.75 | 3281.18 | 2213.12 | 20999.21 | 18348.51 | 29887.42 | 17432.42 | 17088.99 | | | |
| 4 | Less: CDF credit on Capital Goods | 5203.87 | 2510.52 | 4992.84 | 2330.87 | 1491.20 | 496.02 | 185.46 | 482.77 | 357.16 | 2964.91 | 3643.97 | 1784.83 | 5841.67 | 894.32 | 4888.43 | 734.18 | 515.77 | 353.11 | 3061.40 | 2528.62 | 4804.28 | 2558.18 | 2142.15 | 872.17 | 1547.42 | |
| 5 | Cash Operating Expenses | 10794.72 | 21774.85 | 20598.47 | 36348.26 | 41282.89 | 43941.71 | 44206.29 | 45489.23 | 44464.88 | 45191.89 | 45430.90 | 45903.12 | 50929.08 | 59385.25 | 55483.85 | 58885.45 | 58130.83 | 58181.81 | 58201.88 | 58985.94 | 58204.11 | 58247.03 | 58226.21 | 58228.25 | 58881.81 | |
| 6 | Total Cash Outflow | 92185.83 | 80255.37 | 98272.38 | 80893.76 | 59066.52 | 47102.75 | 48288.43 | 47119.18 | 48563.79 | 49963.27 | 49669.85 | 55518.62 | 84052.70 | 55353.51 | 82035.88 | 88108.88 | 86986.00 | 88188.76 | 73259.49 | 70291.61 | 88387.71 | 73879.45 | 74237.00 | 58228.25 | 58881.81 | |
| 7 | Inflow from Sales | 29921.90 | 48648.25 | 81996.89 | 112557.90 | 133022.90 | 153487.90 | 163487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 | 153487.90 |
| 8 | Net Cash Flow | -62544.83 | -42208.12 | -16412.38 | 46706.74 | 73936.38 | 106384.75 | 107199.87 | 106368.32 | 106823.71 | 92824.23 | 87817.65 | 97988.88 | 89434.88 | 96133.98 | 70851.64 | 63378.84 | 64491.59 | 66390.74 | 60279.62 | 63285.88 | 87098.79 | 79908.05 | 79250.48 | 87287.25 | 184386.50 | |
| 9 | Pre Tax internal rate of return | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Desired Selling Price to Yield 12% IRR (Rs./t) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Net Present Value (Rs. Lakhs) | | | | | | | | | | | | | | | | | | | | | | | | | | |

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL ABHINAVLI-CHHINDI

Project Report for Chandragupt OCP (15.0MTY), CCL MDO MODE-March 2020

**PROJECT REPORT OF CHANDRAGUPT OCP (15.00 MTY)
STATEMENT SHOWING ESTIMATED CASH FLOW ANALYSIS AT 85% CAPACITY UTILIZATION
COMBINED**

Appendix-D.1

| Sl.No. | Particulars | 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 | | |
|--------|--|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| 1 | Initial Capital | 81614.77 | 71451.00 | 73678.75 | 32833.36 | 18912.83 | 3223.07 | 1520.83 | 818.83 | 114.87 | 1262.51 | 3496.53 | | 25816.25 | 206.19 | 25003.71 | 2839.84 | | 144.84 | | 299.39 | 299.19 | | 412.12 | | 892.37 | | |
| 2 | Debt Service | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Replacement Capital | | | | | 291.00 | 436.00 | 727.00 | 2172.79 | 2341.29 | 17173.28 | 20291.29 | 11700.53 | 12249.01 | 5588.58 | 6917.90 | 1911.75 | 3381.14 | 2213.12 | 20909.21 | 16348.51 | 29687.42 | 17432.42 | | | | | |
| 4 | Less: GST credit on Capital Goods | 5263.87 | 2590.52 | 4992.84 | 2339.81 | 1401.20 | 498.03 | 165.46 | 462.77 | 357.19 | 2604.91 | 3643.07 | 1704.83 | 5961.82 | 894.32 | 4893.60 | 734.18 | 595.77 | 353.11 | 3961.48 | 2520.02 | 4604.28 | 2659.18 | | | | | |
| 5 | Cash Operating Expenses | 15465.45 | 11413.47 | 29951.59 | 35580.47 | 40389.55 | 42940.13 | 43206.89 | 43477.84 | 43868.90 | 44178.11 | 44395.81 | 44558.09 | 44714.82 | 44914.86 | 44985.09 | 44881.38 | 44726.03 | 44776.46 | 44797.51 | 44909.93 | 44817.89 | 44810.93 | 44838.40 | 44830.55 | 44814.00 | | |
| 6 | Total Cash Outflow | 91878.55 | 89553.99 | 97137.59 | 69082.97 | 58182.18 | 48101.17 | 45283.20 | 48107.58 | 45568.51 | 59947.49 | 64635.06 | 54473.78 | 82038.26 | 54132.52 | 81148.15 | 59704.01 | 57592.30 | 56783.30 | 71805.31 | 68805.60 | 88805.87 | 74852.52 | 85248.51 | 64830.55 | 55874.00 | | |
| 7 | Inflow from Sales | 24353.35 | 33132.31 | 66601.09 | 96673.89 | 112069.13 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | 130464.38 | |
| 8 | Net Cash Flow | -67525.20 | -56421.68 | -30536.50 | 29590.91 | 54676.95 | 84303.20 | 85181.17 | 84358.79 | 84904.37 | 78516.89 | 65829.31 | 75990.90 | 47629.11 | 76331.86 | 48316.18 | 71709.87 | 72972.89 | 73681.07 | 59609.09 | 61658.77 | 49559.50 | 55511.85 | 70215.86 | 70633.83 | 74998.37 | | |
| 9 | Pre Tax Internal rate of return | | | 39.85% | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | Desired Selling Price to Yield 12% IRR (Rs/cu) | | | 708.29 | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Net Present Value (Rs. Lakhs) | | | 240207.35 | | | | | | | | | | | | | | | | | | | | | | | | |


SANJEEV KUMAR
 MANAGER
 CHANDRAGUPTA OPENCAST PROJECT
 DCL, ANRAPALI-CHANDRAGUPTA AREA

ANNEXURES


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, ANRAPALI-CHANDRAGUPTA AREA

Subject:- Finalization of bifurcation of scope of work of Authority and Mine developer and Operator(MDO) in respect of Model Contract Agreement(MCA) prepared for Kotre-Basantpur-Pachmo OCP

Reference:- Committee constituted by Director (P&P) CCL vide Office Order No. DTPP-CCL/2019 dated 10.09.2019.

Committee meeting on the captioned subject held on 09.03.2020 at the conference room of DT(P&P) along with RD (RI-III) and other representatives of CMPDIL. The meeting was also addressed by DT(P&P) CCL.

Minutes of the meeting:-

1. The committee discussed the above subject and in-principally agreed to bifurcate the scope of work of Authority and Mine developer and Operator (MDO) in line of approved Model Contract Agreement(MCA) by CIL Board.
2. During discussion various issues raised by committee members which was cleared by CMPDIL representatives.

Finally, a detail bifurcation of scope of work was prepared by the committee, which is as under:-

A. Scope of work of CCL (Authority) :-

The Authority shall provide support to the Mine Operator and undertakes to observe, comply with and perform, subject to and in accordance with the provisions of this Agreement and Applicable Laws, the following:

- (a) procure access to the Site,
- (b) depute its representatives for participation in public hearings for the purposes of procuring environmental and forest clearance in accordance with Applicable Laws;
- (c) procure issuance of notification for land acquisition for the Project under section 11 of Coal Bearing Areas (Acquisition & Development) Act, 1957 or section 11 of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, as applicable, in accordance with the provisions of this Agreement,
- (d) reimburse to the Mine Operator in accordance with the applicable R&R Policy all direct and documented R&R Costs incurred by the Mine Operator in undertaking the Rehabilitation and Resettlement in accordance with the Agreement;
- (e) upon written request from the Mine Operator, and subject to the Mine Operator complying with Applicable Laws, provide all reasonable support and assistance to the Mine Operator in procuring Applicable Permits required by the Mine Operator for performance of its obligations under Agreement.
- (f) Provide statutory manpower for mining activities.


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MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMBAPALU-CHANDRAGUPTA AREA

- (g) Procurement and maintenance of vehicles for use of statutory and other persons deployed by authority.
- (h) support, cooperate with and facilitate the Mine Operator in the implementation and operation of the Project in accordance with and subject to the provisions of the Agreement.
- (i) Payment of additional fixed amount to MOC as per allotment agreement with them.
- (j) Payment of balance upfront amount to nominated authority as per existing agreement with nominated authority.
- (k) CSR activities as per applicable laws.

B. Scope of work of Mine developer and Operator(MDO):-

(a) Land :-

(1) The Mine operator shall facilitate ^{in state possession of} to acquire all the land and will take physical possession of land by keeping liaisoning with district administration / state government and tenants

(2) R&R :-

The Mine operator shall construct R&R colony including development of basic infrastructure as per approved R&R plan of CCL under applicable laws The scope of work shall include, but not limited to, following:

1. To engage PAPs in discussion and to win them over as partners of the R&R plan.
2. Mine operator shall make arrangement for shifting of PAPs to the colony.
3. The mine operator shall provide assistance to PAPs in relocation ^{with amicably}
4. The Mine operator shall follow all the guidelines/instructions issued by state Government/CCL, from time to time, in regard to R&R Colony ^{Policy}
5. The Mine operator shall have interaction with PAPs for disbursement of compensation ^{as per applicable provisions and applicable} on account of R&R including Annuity, Self-Resettlement Grant; Cattle shed Grant, Shifting Grant etc.
6. Preference of Employment to PAPs as per approved R&R Plan/CCL/CCL R&R Policy to the extent possible.
7. To evolve and assist CCL in carrying out community development activities ^{meeting the} needs of local population as well as meeting the statutory provisions. ^{CSR}
8. At all time, the Mine Operator shall ensure to complete at least such facilities as per applicable Act, which are sufficient to accommodate PAPs likely to be shifted in next five year.

(3) Forest Land Clearance:-

Procure issuance of the forest clearance from the Ministry of Environment, Forests and Climate Change, Government of India; On line application for issuance of FC has been submitted on 22.01.2019 for forest land falling in Ramgarh district) and on 18.03.2019 for forest land falling in Bokaro district.

SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OFFCAST PROJECT
CCL AMRAPALI CHANDRAGUPTA

(b) Environment Clearance:-

Procure issuance of the environmental clearance from the Ministry of Environment, Forests and Climate Change, Government of India. Term of reference (TOR) has been issued on 28.04.19 by Ministry of Environment, Forests and Climate Change, Government of India.

Baseline data generation work is in progress. Draft EMP is under preparation at CMPDIL.

(c) Development of Infrastructure and Operation :-

(i) The mine operator will construct Coal Handling Plant, Coal Depot, Power sub station, workshop, roads, laboratory and testing facilities, fire hydrant system, security equipment including CCTV etc. as per MCA and Mining plan.

(ii) Subject to, and on the terms and conditions of Agreement, the Mine Operator shall, at its own cost and expense, procure, finance for, and undertake the design, engineering, procurement, construction and operation of the Mines for excavation and Delivery of Coal at delivery point and shall observe, fulfill, comply with and perform all its obligations set out in Agreement or arising hereunder. Delivery point of coal will be at Kedla washery and upcoming Basantpur Tapin Washery as per mining plan. In case of unforeseen circumstances, MDO may be asked to deliver the coal at alternate point as decided by the authority.

(iii) Procure that all equipment and facilities at the Mines are operated and maintained in accordance with the Specifications and Standard, Maintenance Requirements, Safety Requirements and Standard Industry Practice.

(iv) All infrastructure required for removal of OB, extraction of coal and delivery of coal at specified delivery point will be responsibility of mine developer and operator (MDO)

(v) MDO will Construct and maintain Rail track from Daniya station to Kedla Washery as per mining plan.

(vi) The Mine Operator shall comply with all Applicable Laws and Applicable Permits (including renewals as required) in the performance of its obligations under Agreement.

(vii) There is switching station located at Ghato, from where MDO will draw, operate and maintain a double circuit feeder at 33 KV to provide power to mine and other domestic use.

(d) Development of Township and Infrastructure :-

(i) The mine operator will construct and maintain for use of authority administrative building such as PO Office, site office, town administration office with furniture and fittings, boundary wall, residential buildings, service building etc as per Mining plan.

(ii) He will be responsible to construct and maintain common facilities like security post, car parking, cycle stand, fire fighting station, canteen, rest shelter, toilet, substation building, time office, pavement, boundary wall as per Mining plan.

(iii) It will be responsibility of MDO to construct and maintain Magazine Building and boundary wall, substations, statutory buildings such as first aid centre, rest shelter, toilet, canteen with their boundary wall and community buildings as per Mining plan.

(iv) MDO will construct and maintain Community Buildings as per mining plan.

(v) MDO will construct approach road between the boundary of the Mines and the nearest existing road.

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SANJEEV KUMAR
MANAGER
KUMAR GUPTA SPENCER PROJECT
ANRUPALL CHANDRABUPTA AGENT

The scope elaborated as above is only the indicative scope of activities expected to be performed by Mine Operator for reliable and efficient mining operation and to fulfill the associated statutory and other obligations. Any other activity which is necessary for the discharge of Mine Operator's obligations under this Contract and to fulfill statutory requirements is deemed to be included in the scope unless excluded specifically in the Project Agreement.

Put up to DT(P&P) for approval please.

[Signature]
09/03/20
GM(KBP OC Project)

[Signature]
GM(Civil) CCL

GM(L&R) CCL

[Signature]
09/03/2020
GM(Legal) CCL

[Signature]
09/03/20
GM(CMC) CCL

[Signature]
09/03/20
HOD(E&F) CCL

GM (Fin)(FC) CCL

[Signature]
09/03/2020
GM(E&M) CCL

[Signature]
09/03/2020
GM(Operation) CCL

GM(P&P)

In the same line, the scope of work of MDO operator should be same in respect of Chandragupta OC (15 MTPA) and Sanganika OC (20 MTPA) excluding jaw work of EC and FC, which has already been done in case of Kotra - Bansoutpur - Pachwa OCP.

Submitted for approval.

[Signature]
DT(P&P)

[Signature]
09/03/2020.

[Signature]
SANJEEV KUMAR
MANAGER
CHANDRAGUPTA PROJECT

From: "Manoj Kumar" <rdri3.cmpdi@coalindia.in>
To: "JAYANT CHAKRAVARTY" <jayant.chakravarty@coalindia.in>
Sent: Friday, March 27, 2020 2:58:04 PM
Subject: Fw:Request for preparation & submission of Revised Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP in MDO mode.

Sent from my Huawei Mobile

----- Original Message -----

Subject: Request for preparation & submission of Revised Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP in MDO mode.

From: Bhola Singh

To: Manoj Kumar

CC: Kaushlendra Kumar Mishra ,Devendra Prasad

Dear Sir,

During deliberation with competent authority , it has been decided that the Railway siding (10.25 km) should be removed from the scope of work of MDO. It should be in the scope of work of CCL/ Authority. The change in scope of work is very marginal.

In view of above, it is requested to kindly revise the Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP prepared in MDO mode.

As the deadline for floating of tender is 31.03.2020 and it has to be put up before CCL Board through RBC by today evening, Hence it is requested to kindly arrange to submit Revised Abridged PR, Mining Plan and Modified & Updated Cost Estimate of KBP OCP prepared in MDO mode by today evening i.e. by 5.00 PM on 27.03.20.

Matter is most urgent.

Regards,

भोला सिंह

निदेशक तकनीकी (यो. एवं. प.)

सेंट्रल कोलफील्ड्स लिमिटेड, राँची

झारखण्ड-834001


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA DEPCAST PROJECT
OCL, AMRAPALI-CHANDRAGUPTA AREA

REGISTERED OFFICE
Gondwana Place, Kanke Road
Ranchi -834 031
(Jharkhand)

REGIONAL INSTITUTES

क्षेत्रीय संस्थान-I
वेस्ट एंड, जी.टी.रोड
आसनसोल-713 301
(पश्चिम बंगाल)

क्षेत्रीय संस्थान-II
कोयला भवन, कोयला नगर
धनबाद- 826 005
(झारखंड)

क्षेत्रीय संस्थान-III
गोंदवाना प्लेस,कांके रोड
राँची- 834 031
(झारखंड)

क्षेत्रीय संस्थान-IV
जरीपटका, कास्तूरबा नगर
नागपुर-440 014
(महाराष्ट्र)

क्षेत्रीय संस्थान-V
सीपत रोड
बिलासपुर-495 001
(छत्तीसगढ़)

क्षेत्रीय संस्थान-VI
पोस्ट जयंत कोलरी,
जिला : सिंगरौली
पिन नं०- 486 890
(मध्य प्रदेश)

क्षेत्रीय संस्थान-VII
गृह निर्माण भवन
सचिवालय मार्ग
भुवनेश्वर-751001
(उड़ीसा)

Regional Institute - I
West End, G.T Road
Asansol - 713 301
(West Bengal)

Regional Institute - II
Koyla Bhawan, Koyla Nagar
Dhanbad - 826 005
(Jharkhand)

Regional Institute - III
Gondwana Place, Kanke Road
Ranchi- 834 031
(Jharkhand)

Regional Institute - IV
Jaripathka, Kasturba Nagar
Nagpur - 440 014
(Maharashtra)

Regional Institute - V
Seepat Road
Bilaspur - 495 001
(Chattisgarh)

Regional Institute - VI
P.O Jayant Colliery
Dist. - Singrauli
PIN - 486 890
Madhya Pradesh

Regional Institute - VII
Grih Nirman Bhawan
Sachivalaya Marg
Bhubneswar - 751 001
(Orissa)


SANJEEV KUMAR
MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL AMRAPALI-CHANDRAGUPTA AREA

सेन्ट्रल माईन प्लानिंग एंड डिजाइन इन्स्टीच्यूट लिमिटेड

(कोल इंडिया की अनुषंगी कम्पनी)
एक निजी रतन कम्पनी

Central Mine Planning & Design Institute Limited

(A Subsidiary of Coal India Limited)

A Mini Ratna Company

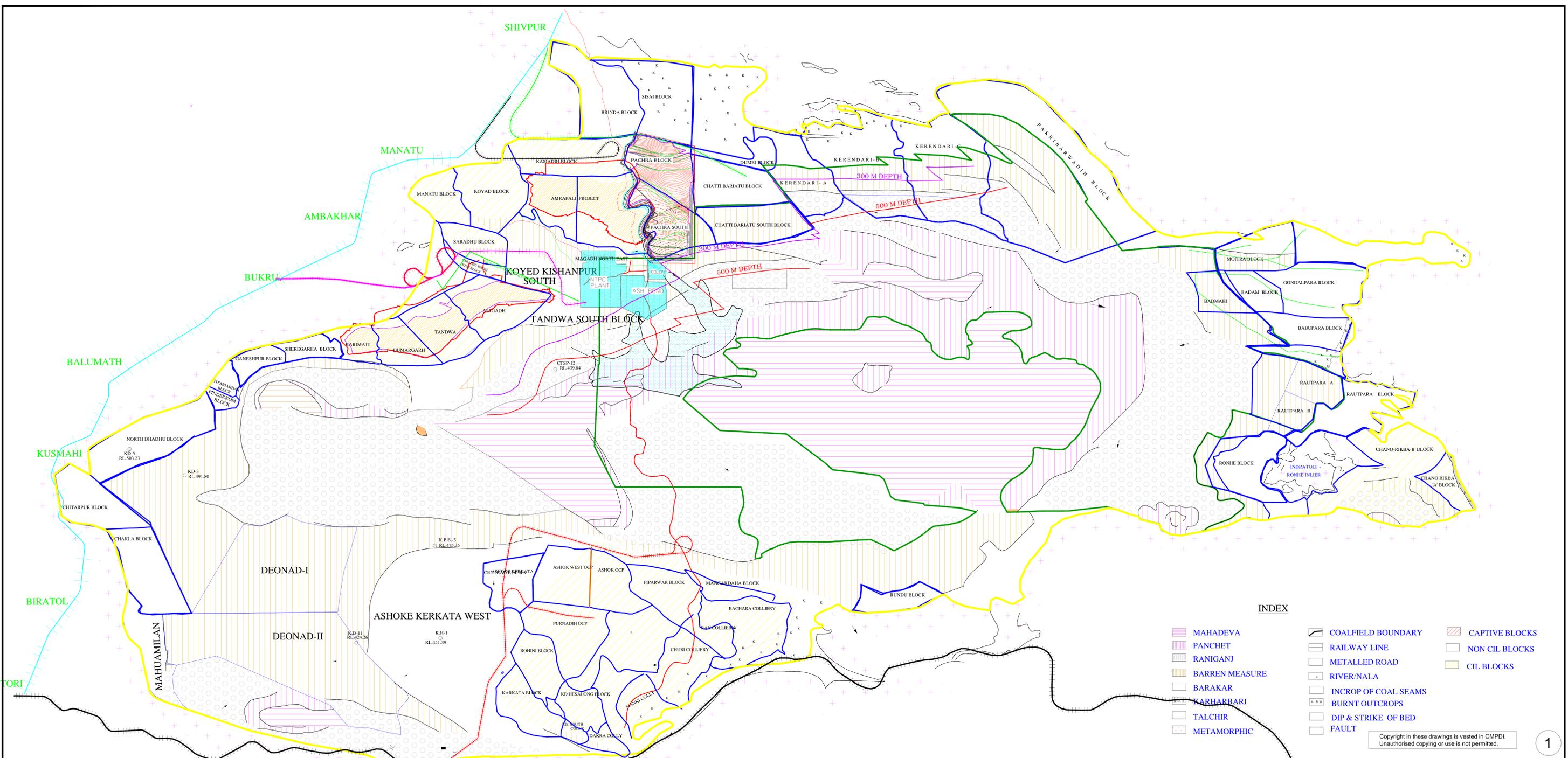
गोंदवाना प्लेस, कांके रोड, राँची - 834 031, भारत
दूरभाष : (91-0651) 2230002, 2230483
फैक्स : (91-0651) 2231447
वेबसाइट : www.cmpdi.co.in



Gondwana Place, Kanke Road, Ranchi - 834 031, INDIA
Phone : (91 - 0651) 2230002, 2230483
Fax : (91 - 0651) 2231447
website : www.cmpdi.co.in

List of Plates

| Sl No | Particulars | Drawing no. | Scale |
|------------------------------------|--|---------------|----------|
| GEOLOGY | | | |
| 1 | Location Plan | R3/OCM/001364 | NTS |
| 2 | Geological Plan of Combined Block. | R3/OCM/001365 | 1 : 5000 |
| MINING | | | |
| 3 | Final stage Quarry Plan | R3/OCM/001366 | 1 : 5000 |
| 4 | Final stage Dump plan | R3/OCM/001367 | 1 : 5000 |
| 5 | Box cut plan | R3/OCM/001368 | 1 : 5000 |
| 6 | 10 th Year Stage Plan | R3/OCM/001369 | 1 : 5000 |
| 7 | Combined cross-section along A-A', B-B', C-C' & D-D' | R3/OCM/001370 | 1 : 2000 |
| 8 | Combined cross-section along E-E', F-F' & G-G' | R3/OCM/001371 | 1 : 2000 |
| 9 | Combined cross-section along 'H-H' & I-I' | R3/OCM/001372 | 1 : 2000 |
| 10 | Iso Excavation Plan | R3/OCM/001373 | 1 : 5000 |
| 11 | Bore Section | R3/OCM/001374 | NTS |
| 12 | Land Use Plan | R3/OCM/001375 | 1 : 5000 |
| ELECTRICAL & MECHANICAL | | | |
| 13 | Key Plan of CHP | R3/E&M/M03145 | NTS |
| 14 | Flow Diagram of CHP | R3/E&M/M3146 | NTS |
| 15 | Single Line Diagram of Sub Station-I | R3/E&M/0E2970 | NTS |
| 16 | Single Line Diagram of Sub Station-II | R3/E&M/0E2971 | NTS |
| 17 | Layout of Unit Workshop | R3/E&M/M03005 | NTS |



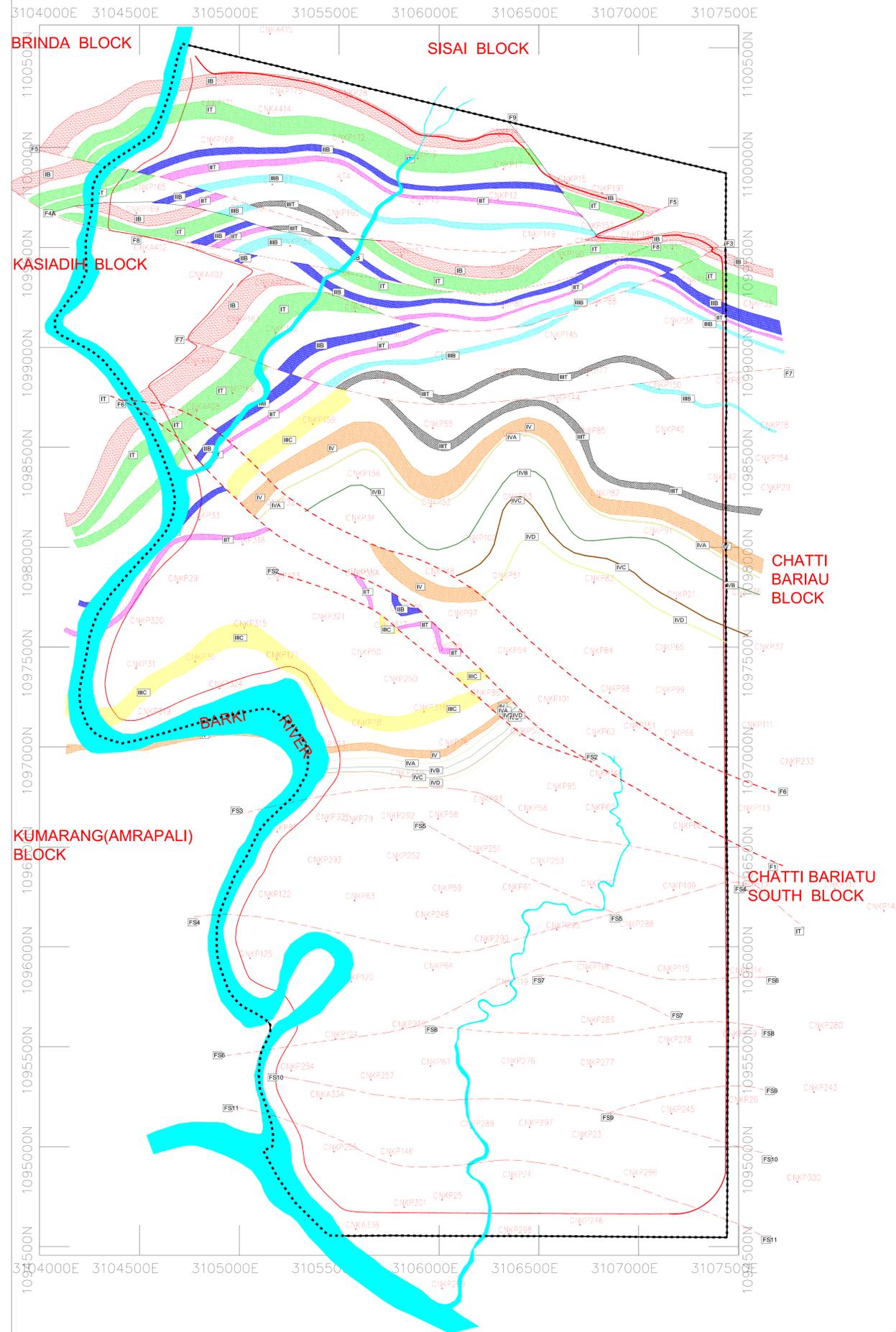
INDEX

- MAHADEVA
- COALFIELD BOUNDARY
- CAPTIVE BLOCKS
- PANCHET
- RAILWAY LINE
- NON CIL BLOCKS
- RANIGANJ
- METALLED ROAD
- BARREN MEASURE
- RIVER/NALA
- BARAKAR
- INCROP OF COAL SEAMS
- KARHARBARI
- BURNT OUTCROPS
- TALCHIR
- DIP & STRIKE OF BED
- METAMORPHIC
- FAULT

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| | | | | |
|---|----------|------------------------------|--------------|-----------------------|
| Customer CENTRAL COALFIELDS LIMITED | | | | |
| Subject FINAL PROJECT REPORT OF CHANDRAGUPTA OCP | | | | Job No. 341610 |
| Job Title LOCATION PLAN | Activity | Name | Designation | Signature |
| | Created | Sonu Pandey | Clerk Gr.III | |
| | Created | A.K.Sinha | S.E.(EXCVN.) | |
| | Checked | J. Chakravarty | H.O.D. OC | |
| | Approved | A. K. Das | R.D. RI-III | |
| Scale N.T.S. | | Sheet 1 of 1 | | |
| | | Drg.No. R3 OCM 001364 | REV. No. | |

GEOLOGICAL PLAN



Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|-----------------|---------|
| 01 | Incrop of Seams | --- --- |
| 02 | Block boundary | --- --- |
| 03 | Blockline | --- --- |
| 04 | Fault | --- --- |
| 05 | River | --- --- |

Customer: **CENTRAL COALFIELDS LIMITED**

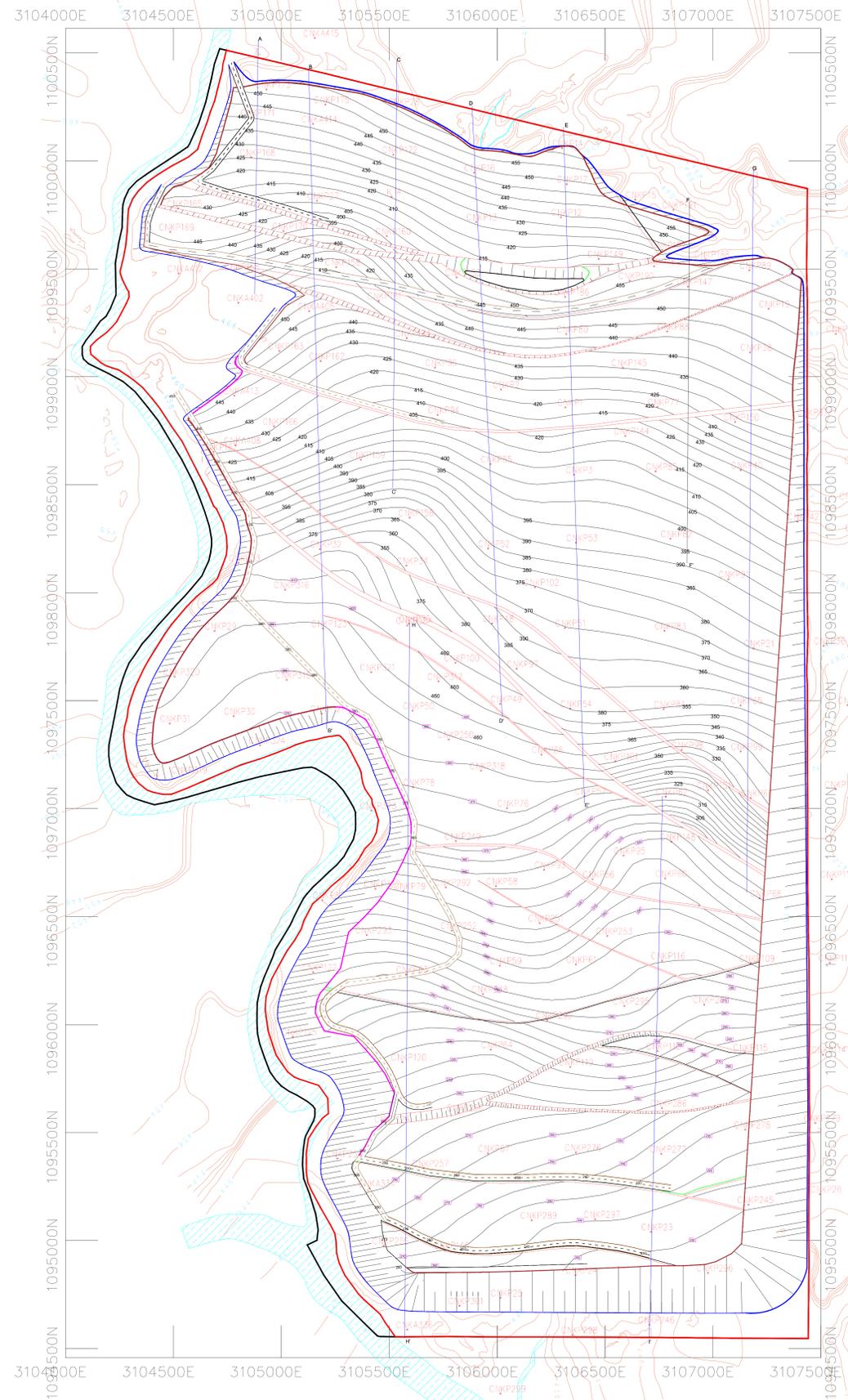
Project: **FINAL PROJECT REPORT OF CHANDRAGUPTA OCP**

Activity: **GEOLOGICAL PLAN**

Scale: 1:5000

Sheet: 1 of 1

Company: **CMPDI-RI-III**



Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|-------------------------|--------|
| 01 | Quarry Surface Boundary | — |
| 02 | Quarry Floor Boundary | — |
| 03 | Lease Hold Boundary | — |
| 04 | Block Boundary | — |
| 05 | Borehole | ○ |
| 06 | Fault | — |
| 07 | Floor Contour Of Bottom | — |
| 08 | River | — |
| 09 | Cross-Section Alignment | — |

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CENTRAL COALFIELDS LIMITED

FINAL PROJECT REPORT OF CHANDRADUPT OCP

FINAL STAGE QUARRY PLAN

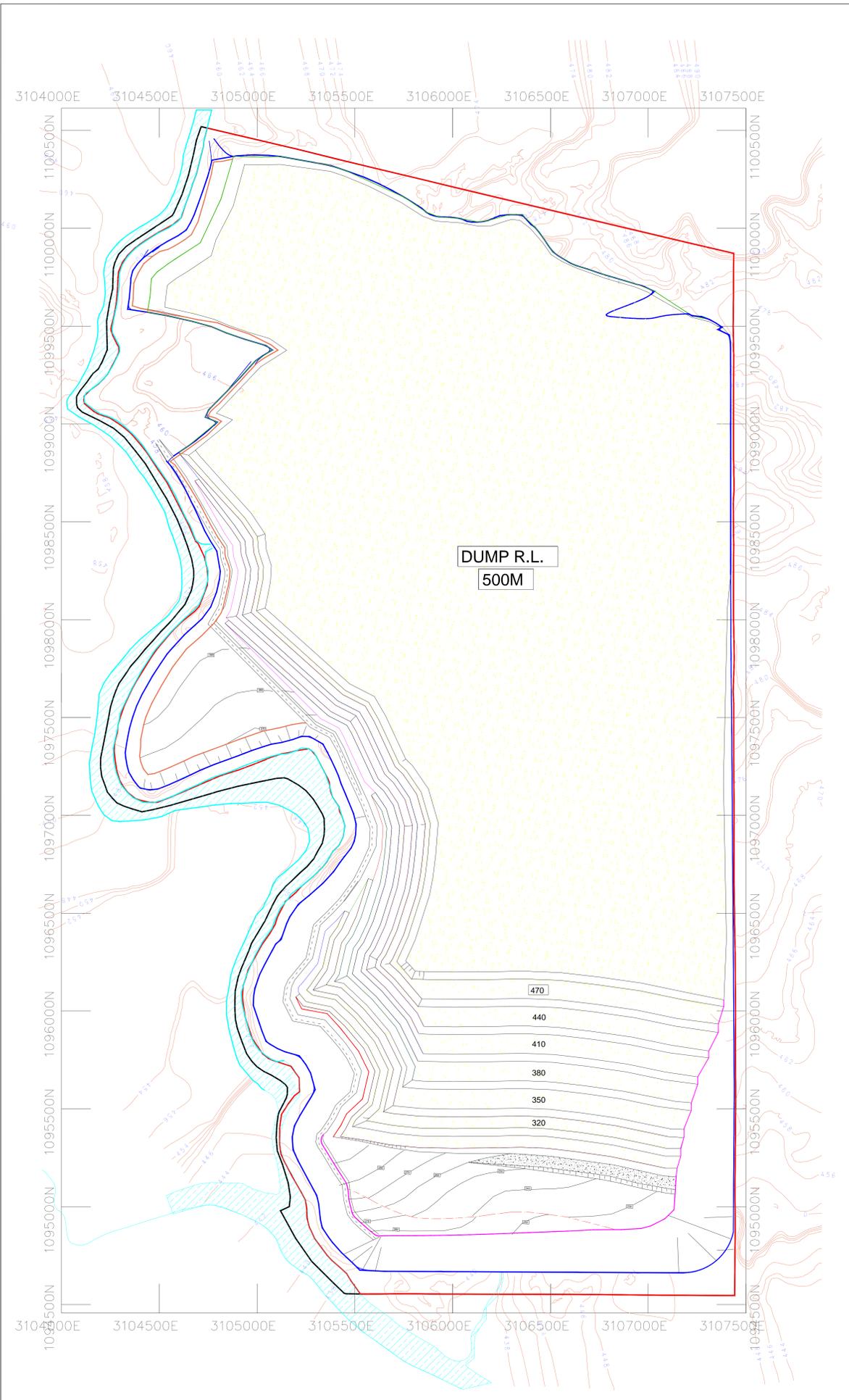
| | | | | |
|------------|----------|-------------|--------|--------|
| Checked by | Drawn by | Reviewed by | Scale | Sheet |
| | | | 1:5000 | 1 of 1 |

Approved by

Scale: 1:5000

Sheet: 1 of 1

Project No: 00113/86



Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|------------------|-------------------------|
| 01 | Stage Dump level | Yellow shaded area |
| 02 | Block boundary | Black line |
| 03 | Borehole | Red circle with cross |
| 04 | Fault | Red dashed line |
| 05 | River | Blue line with hatching |

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CENTRAL COALFIELDS LIMITED

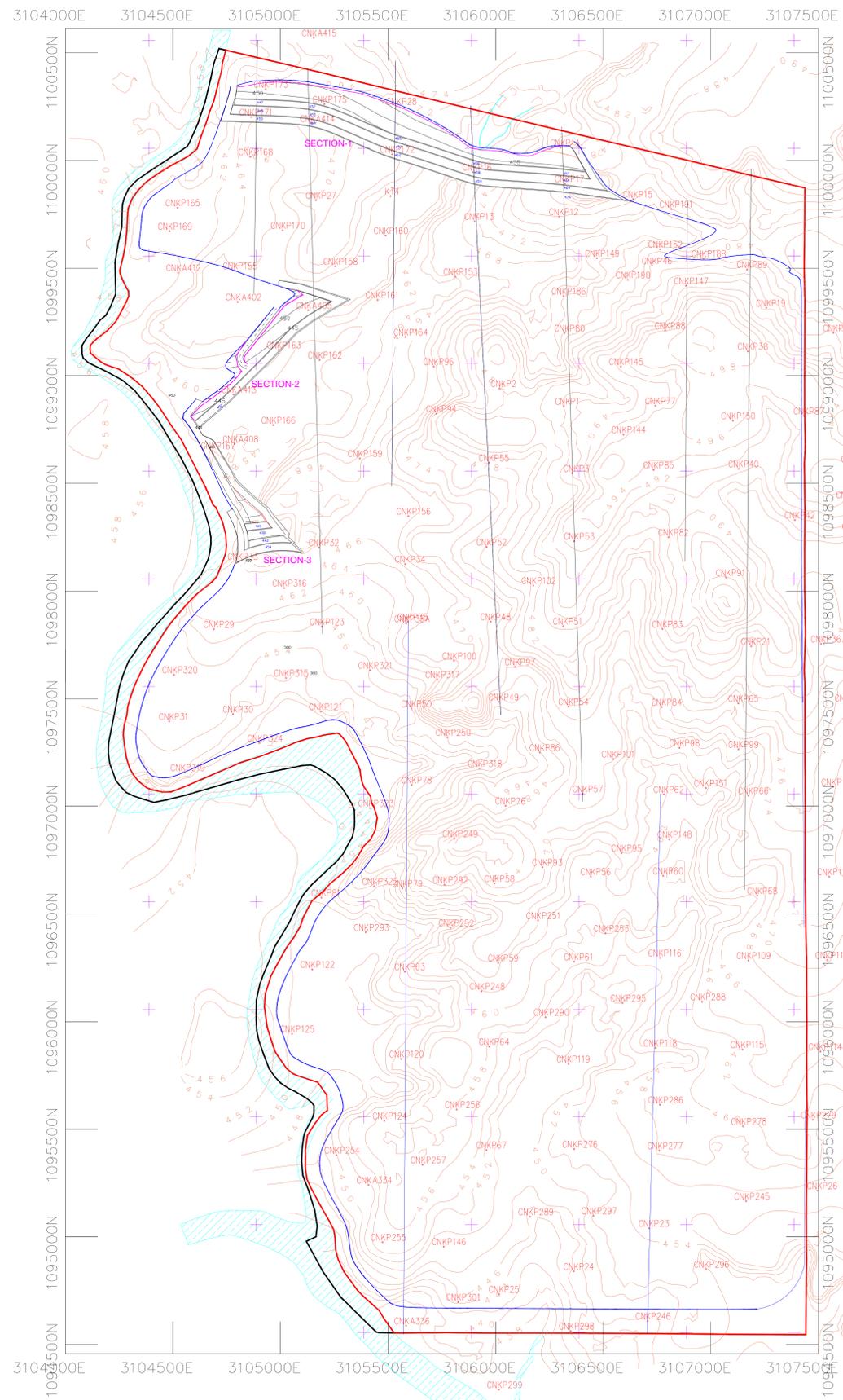
FINAL PROJECT REPORT OF CHANDRAGUPT COP

FINAL STAGE DUMP PLAN

Scale: 1:5000

Sheet: 1 of 1

Project No: OCM 001387



Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|--------------------------|------------|
| 01 | Quality Surface Boundary | — |
| 02 | Quality Floor Boundary | — |
| 03 | Lease Hold Boundary | — |
| 04 | Block Boundary | — |
| 05 | Borehole | ○ CNK/P112 |
| 06 | Fault | — |
| 06 | Floor Contour Of Bottom | — |
| 07 | River | — |
| 08 | Cross-Section Alignment | — |

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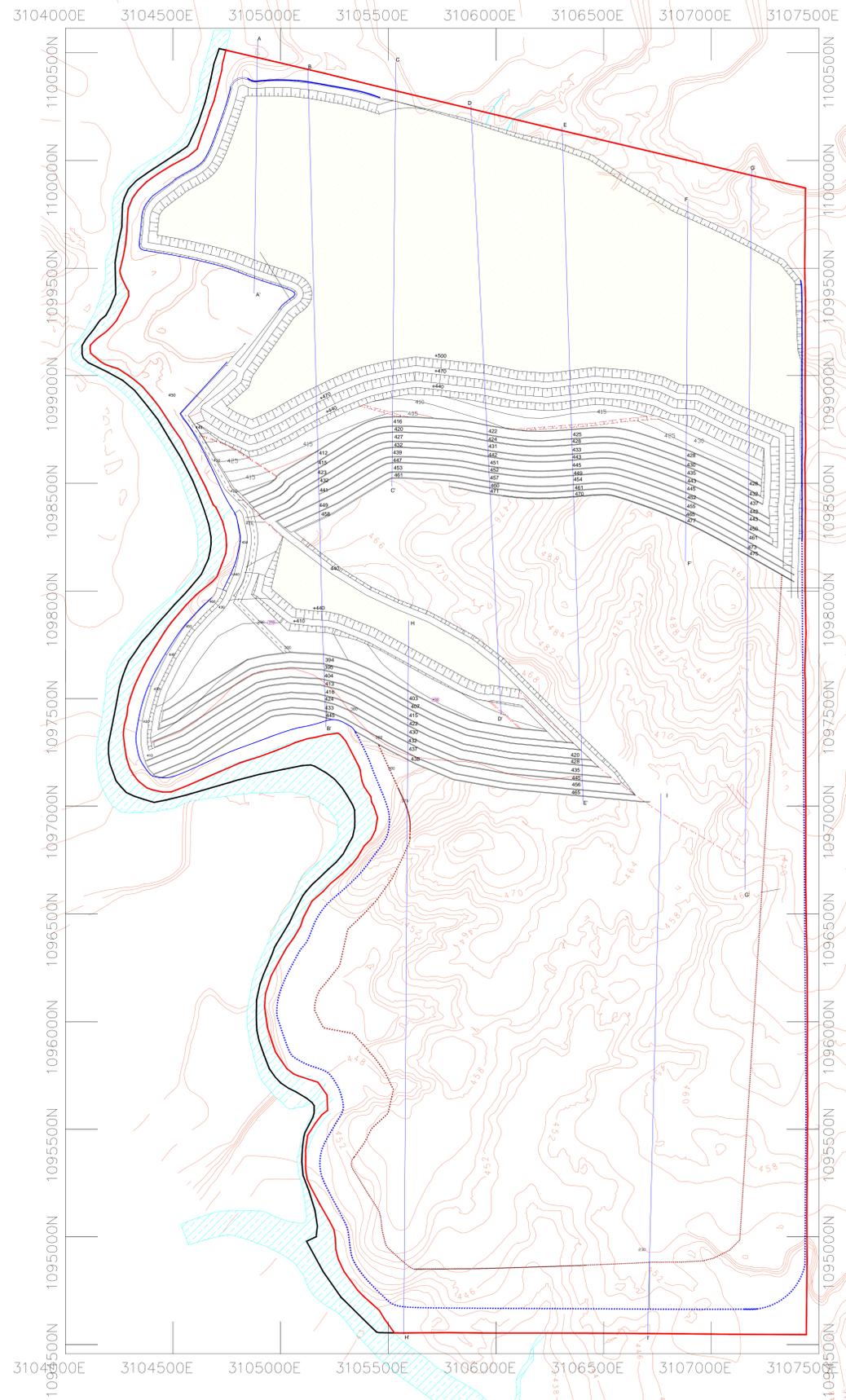
CENTRAL COALFIELDS LIMITED

FINAL PROJECT REPORT OF CHANDRAGUPPT QOP

| | | | | |
|---------|----------------------------|-------|---------|----------|
| Scale | 1:5000 | Drawn | Checked | Approved |
| Author | Design | Drawn | Checked | Approved |
| Project | Box Cut Plan | Scale | 1:5000 | Sheet |
| Client | Central Coalfields Limited | Drawn | Checked | Approved |
| Project | Chandraguppt QOP | Scale | 1:5000 | Sheet |
| Author | Design | Drawn | Checked | Approved |

CMPDI, R-II
A MINI RATNA COMPANY

Date: 15/05/2018



Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|-------------------------|------------------------------------|
| 01 | Quarry Surface Boundary | [Red dashed line] |
| 02 | Quarry Floor Boundary | [Blue dashed line] |
| 03 | Lease Hold Boundary | [Black solid line] |
| 04 | Block Boundary | [Black solid line] |
| 05 | Fault | [Red dashed line with cross-ticks] |
| 06 | Floor Contour Of Bottom | [Black solid line] |
| 07 | Road | [Red dashed line] |
| 08 | Cross-Section Alignment | [Blue solid line] |

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CENTRAL COALFIELDS LIMITED

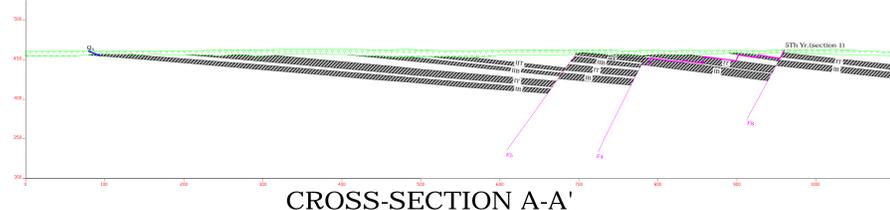
FINAL PROJECT REPORT OF CHANDRAGUFT OCP

10th YEAR QUARRY STAGE PLAN

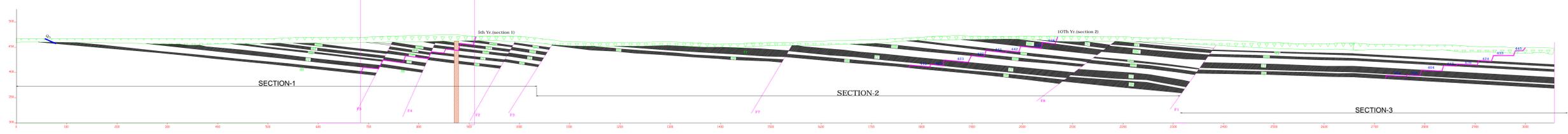
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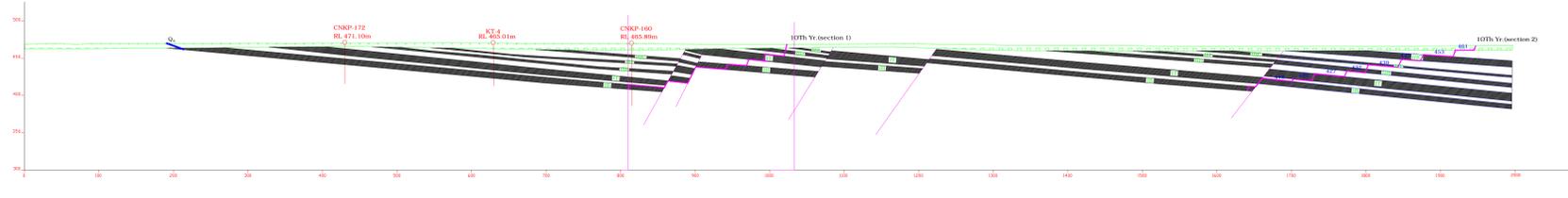
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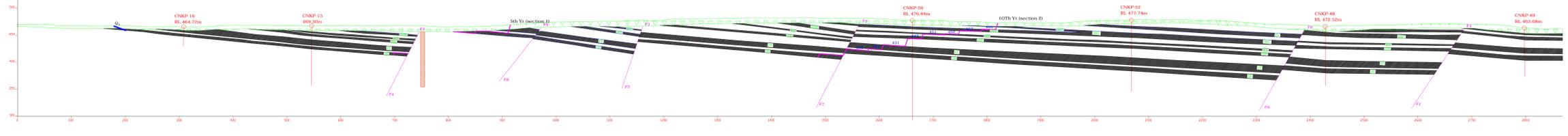
CROSS-SECTION A-A'



CROSS-SECTION B-B'



CROSS-SECTION C-C'



CROSS-SECTION D-D'

Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

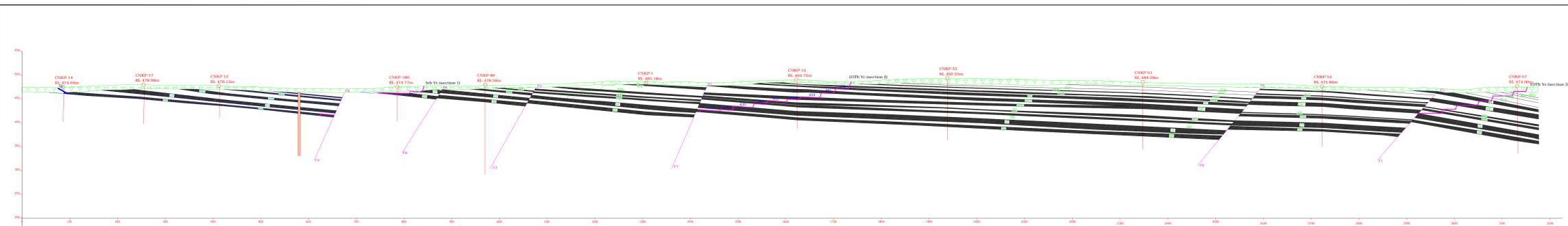
Legend

| Sl No. | Particulars | Symbol |
|--------|----------------|--------|
| 01 | Quarry Surface | QS |
| 02 | Seams | |
| 03 | Weather Mantle | |
| 03 | Borehole | |
| 04 | Fault | |

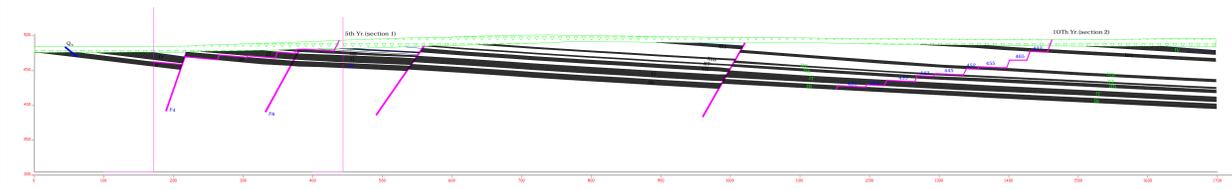
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| | | | | | |
|-----------|---|---|------------|--------------|-----------|
| Customer | | CENTRAL COALFIELDS LIMITED | | Job No. | 341610 |
| Subject | | FINAL PROJECT REPORT OF CHANDRAGUPT OCP | | | |
| Job Title | CROSS-SECTION ALONG A-A', B-B', C-C' & D-D' | Activity | Name | Designation | Signature |
| Created | Sonu Pandey | Created | A.K. Sinha | S.E. (ECON.) | |
| Checked | Chaitanyam | Checked | | I.N.D. D.C. | |
| Approved | A. K. Das | Approved | | R.D. Bhatt | |
| Scale | 1:2000 | Sheet | 1 of 1 | | |
| Dwg No. | R3 OCM 0013170 | REV No. | | | |

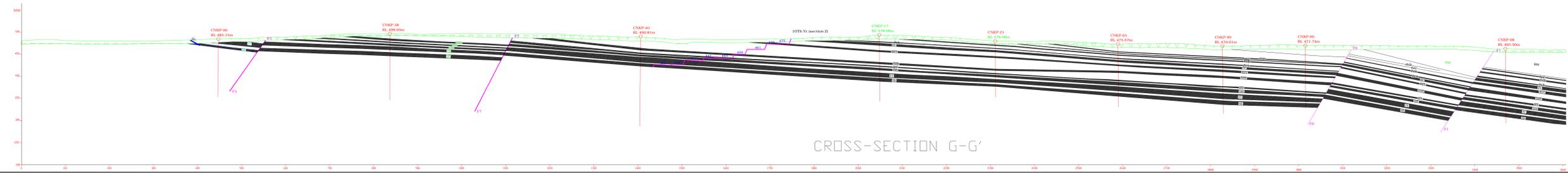
cmpdi CMPDI, RI-III
A MINI RATNA COMPANY



CROSS-SECTION E-E'



CROSS-SECTION F-F'



CROSS-SECTION G-G'

Notes

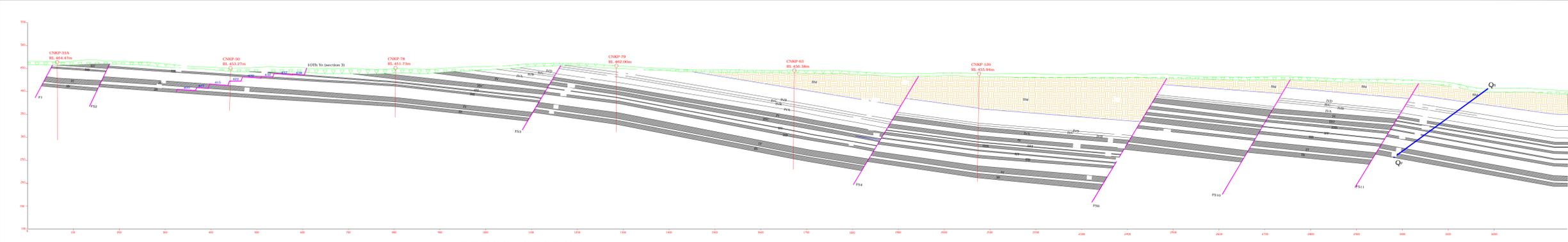
| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

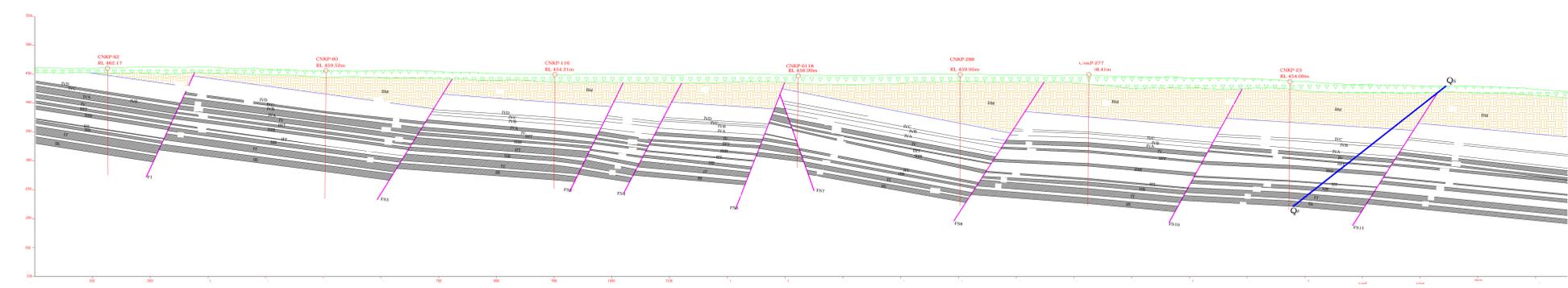
| Sl No. | Particulars | Symbol |
|--------|----------------|--------|
| 01 | Quarry Surface | OS |
| 02 | Seams | |
| 03 | Weather Mantle | |
| 03 | Borehole | |
| 04 | Fault | |

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| Customer: CENTRAL COALFIELDS LIMITED | | Job No. | | | | | | | | | | | | | | | | | | | | |
|---|---|---|-----------|-------------|-----------|------|---------|--------------------|------------|--|--|---------|------------|---------------|--|--|----------|----------------|---------|--|--|--|
| Subject: FINAL PROJECT REPORT OF CHANDRAGUPT OCP | | | | | | | | | | | | | | | | | | | | | | |
| Job Title: CROSS-SECTION ALONG E-E', F-F' & G-G' | <table border="1"> <thead> <tr> <th>Activity</th> <th>Name</th> <th>Designation</th> <th>Signature</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>Created</td> <td>Srinu Parthasarthy</td> <td>Chief D.P.</td> <td></td> <td></td> </tr> <tr> <td>Checked</td> <td>A.X. Sirha</td> <td>S.E. (EAC/IN)</td> <td></td> <td></td> </tr> <tr> <td>Approved</td> <td>J. Chakravarty</td> <td>W.O. DC</td> <td></td> <td></td> </tr> </tbody> </table> | Activity | Name | Designation | Signature | Date | Created | Srinu Parthasarthy | Chief D.P. | | | Checked | A.X. Sirha | S.E. (EAC/IN) | | | Approved | J. Chakravarty | W.O. DC | | | |
| Activity | Name | Designation | Signature | Date | | | | | | | | | | | | | | | | | | |
| Created | Srinu Parthasarthy | Chief D.P. | | | | | | | | | | | | | | | | | | | | |
| Checked | A.X. Sirha | S.E. (EAC/IN) | | | | | | | | | | | | | | | | | | | | |
| Approved | J. Chakravarty | W.O. DC | | | | | | | | | | | | | | | | | | | | |
| Scale: 1: 2000 | | Sheet: 1 of 1 | | | | | | | | | | | | | | | | | | | | |
| CMPDI, RI-III A MINI RATNA COMPANY | | Dig No. R3 OCM 0013/11 REV No. | | | | | | | | | | | | | | | | | | | | |



CROSS-SECTION H-H'



CROSS-SECTION I-I'

Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|----------------|----------|
| 01 | Quarry Surface | QS |
| 02 | Seams | [Symbol] |
| 03 | Weather Mantle | [Symbol] |
| 03 | Borehole | CNKP112 |
| 04 | Fault | F1 |
| 05 | Barren Measure | [Symbol] |

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Customer: **CENTRAL COALFIELDS LIMITED**

Subject: **FINAL PROJECT REPORT OF CHANDRAGUPT OCP**

| Activity | Name | Designation | Signature | Date |
|----------|----------------|-------------|-----------|------|
| Created | Sonu Phansy | Chk Gr III | | |
| Checked | A.K. Das | S.E. (GCM) | | |
| Checked | J. Chakravarty | H.O.D. OC | | |
| Approved | A. K. Das | R.D. III | | |

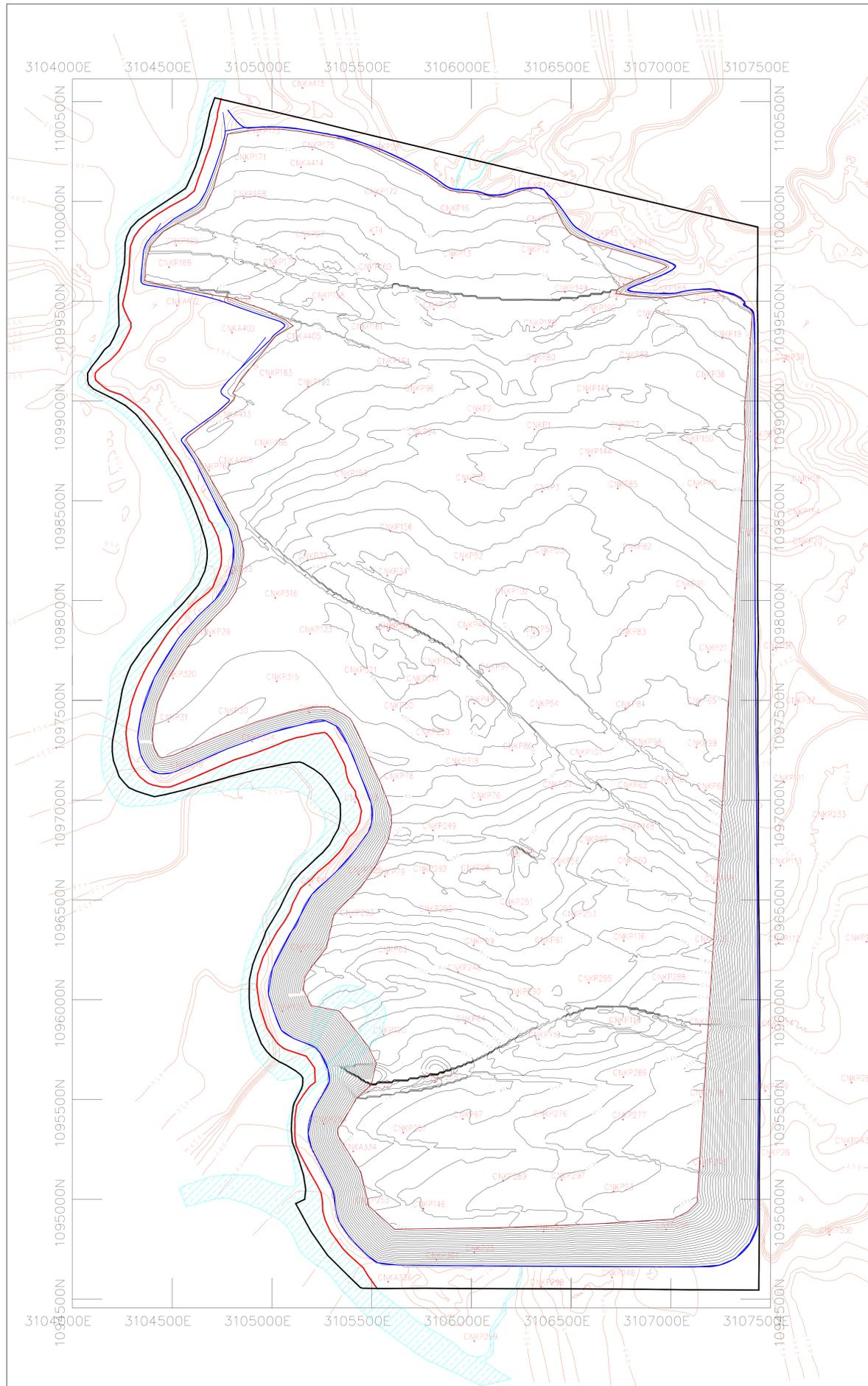
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Sheet: 1 of 1

Dig.No: R3 OCM 0011372

REV: No.





Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|-------------------------|----------|
| 01 | Quarry Surface Boundary | [Symbol] |
| 02 | Quarry Floor Boundary | [Symbol] |
| 03 | Lease Hold Boundary | [Symbol] |
| 04 | Block Boundary | [Symbol] |
| 05 | ISO Excavation Line | [Symbol] |
| 06 | River | [Symbol] |

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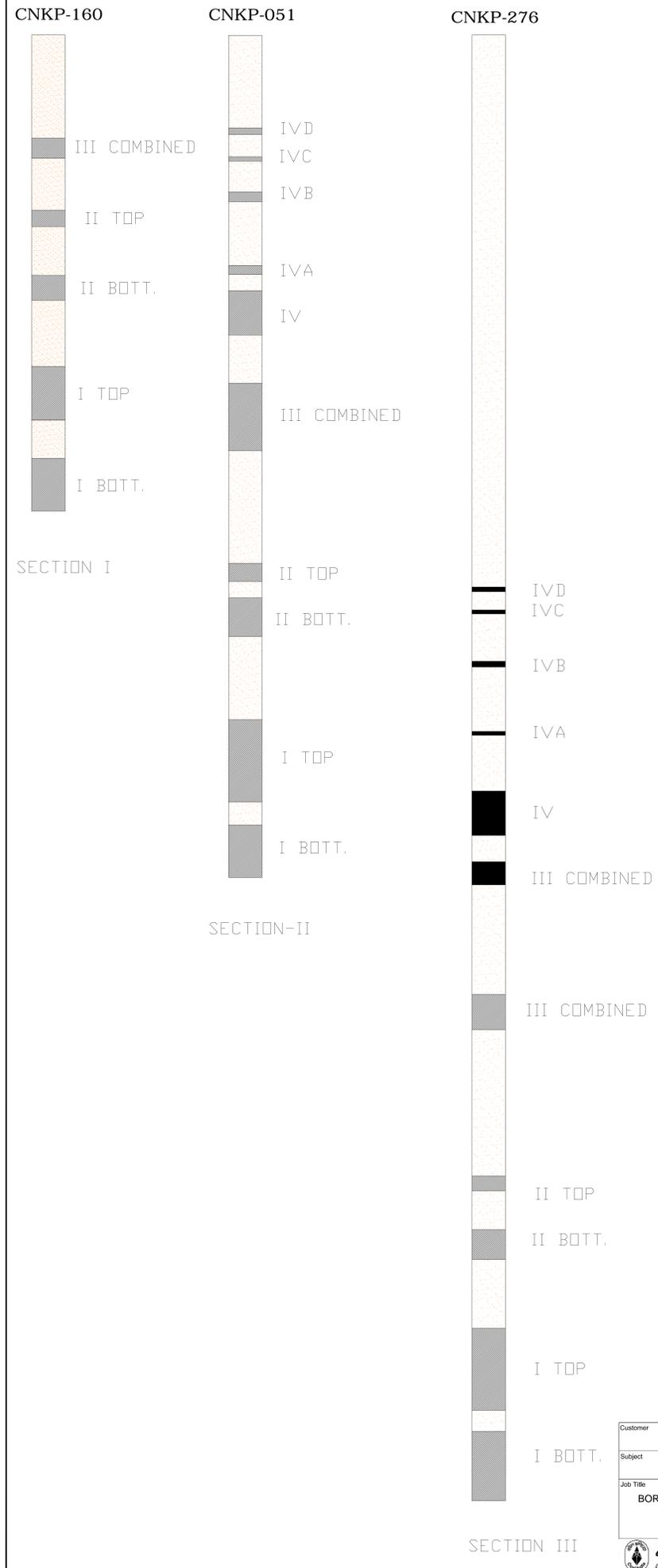
CENTRAL COALFIELDS LIMITED

FINAL PROJECT REPORT OF CHANDRAGUFT OCP

| | | | | | |
|----------|---------------------|-------------|---------------|-------------|--------|
| Customer | ISO EXCAVATION PLAN | Scale | 1:5000 | Sheet | 1 of 1 |
| Project | ISO EXCAVATION PLAN | Drawn By | [Name] | Checked By | [Name] |
| Author | [Name] | Designation | [Designation] | Approved By | [Name] |
| Checked | [Name] | Checked | [Name] | Scale | 1:5000 |
| Drawn | [Name] | Drawn | [Name] | Scale | 1:5000 |

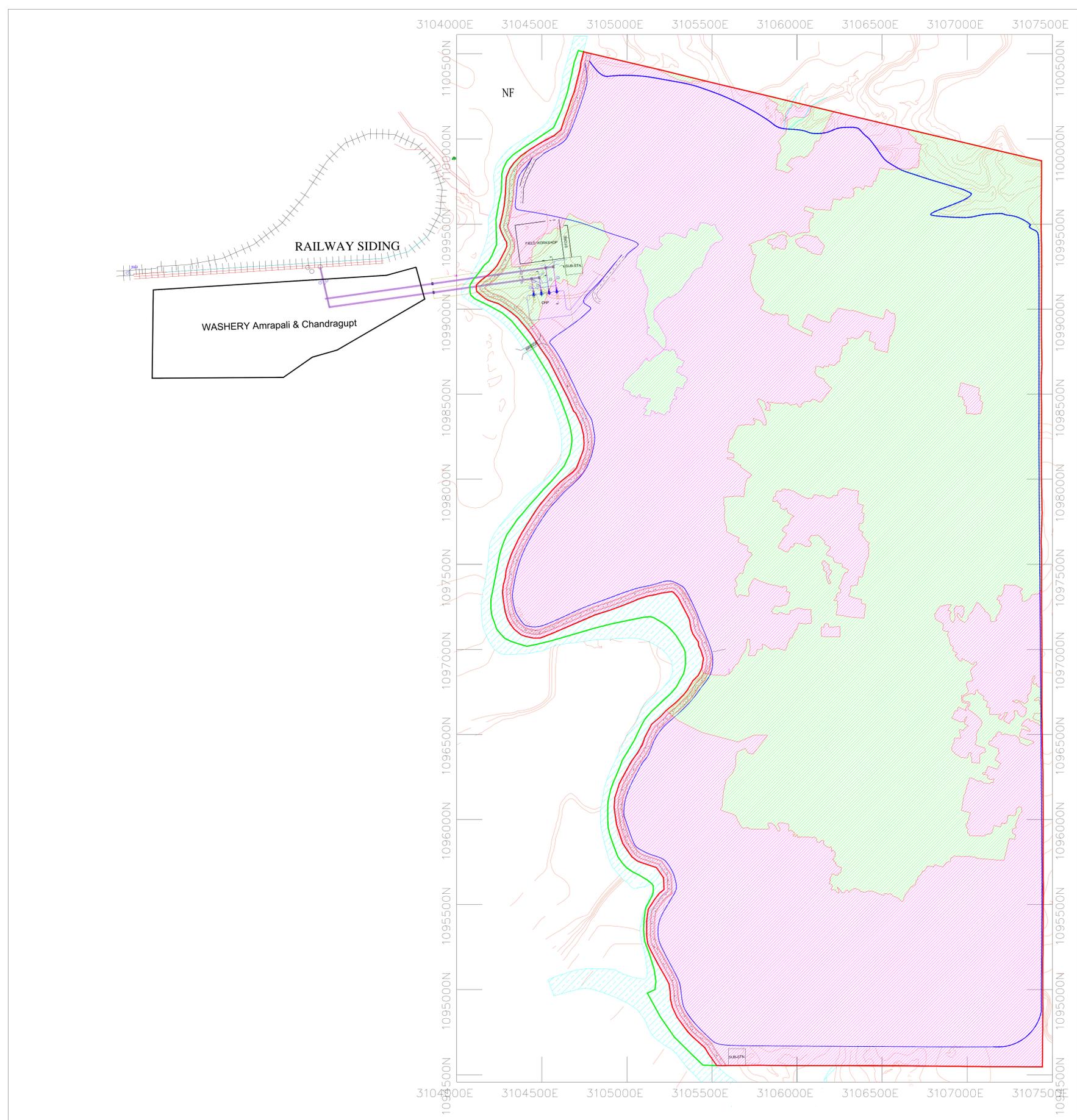
CMPDL-III
 A MINDI RATNA COMPANY

BOREHOLE SECTION



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| | | | | | |
|---|----------------|--|---------------|----------|--|
| Customer | | CENTRAL COALFIELDS LIMITED | | | |
| Subject | | FINAL PROJECT REPORT OF CHANDRAGUPT OCP | | | |
| Job Title | | BOREHOLE SECTION OF BOREHOLE NOS. CNKP 281, 51 & 276 | | | |
| Activity | Name | Designation | Signature | Date | |
| Created | Sonu Pandey | Clerk Gr.III | | | |
| Created | A.K.Sinha | S.E.(EXCVN.) | | | |
| Checked | J. Chakravarty | H.O.D. OC | | | |
| Approved | A. K. Das | R.D. RH-III | | | |
| Scale | NTS | | Sheet | 1 of 1 | |
| CMPDI,RI-III A MINI RATNA COMPANY | | Dwg No. | R3 OCM 001374 | REV. No. | |



Notes

| Sl No. | Particulars |
|--------|---------------------------|
| 1 | All values are in meters. |

Legend

| Sl No. | Particulars | Symbol |
|--------|-------------------------|---------------|
| 01 | Quarry Surface Boundary | --- |
| 02 | Lease Hold Boundary | --- |
| 03 | Block Boundary | --- |
| 04 | River | Blue hatched |
| 05 | Forest Land | Green hatched |
| 06 | Non-Forest Land | Pink hatched |

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CENTRAL COALFIELDS LIMITED

FINAL PROJECT REPORT OF CHANDRAGUPT OCP

| Sl No. | Activity | Name | Description | Signature | Date |
|--------|----------|-----------------|--------------|-----------|------|
| 01 | Checked | Srini Prasad | Gen. MGR | | |
| 02 | Created | A. K. Saha | PLG (SR/201) | | |
| 03 | Checked | J. Chandrasekar | PLG (SR/201) | | |
| 04 | Approved | A. K. Saha | PLG (SR/201) | | |

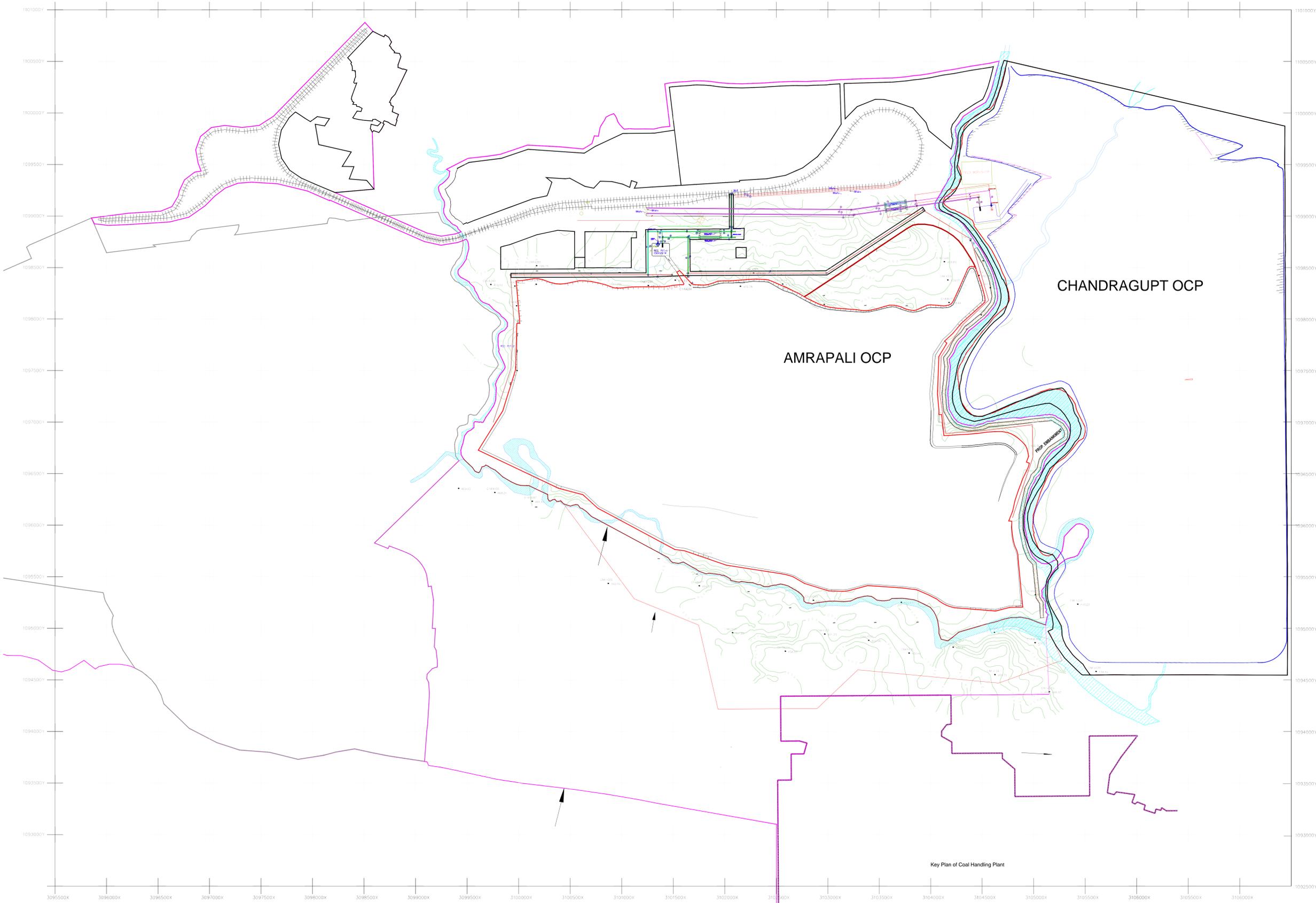
LAND USE PLAN

Scale: 1:10000

Sheet: 1 of 1

Date: 08/13/25

REV. No.:



CHANDRAGUPT OCP

AMRAPALI OCP

RIVER CHANNEL

NOTES

| SL. No. | PARTICULARS |
|---------|------------------------------|
| | ALL DIMENSIONS ARE IN METERS |

LEGENDS

| SL. No. | PARTICULARS | SYMBOL |
|---------|---------------------|--------|
| 01 | BORE HOLE | |
| 02 | QUARRY BOUNDARY | |
| 03 | FLOOR CONTOUR | |
| 04 | SURFACE CONTOUR | |
| 05 | RIVER CHANNEL | |
| 06 | LEASE HOLD BOUNDARY | |
| 07 | | |
| 08 | | |
| 09 | | |
| 10 | | |

Key Plan of Coal Handling Plant

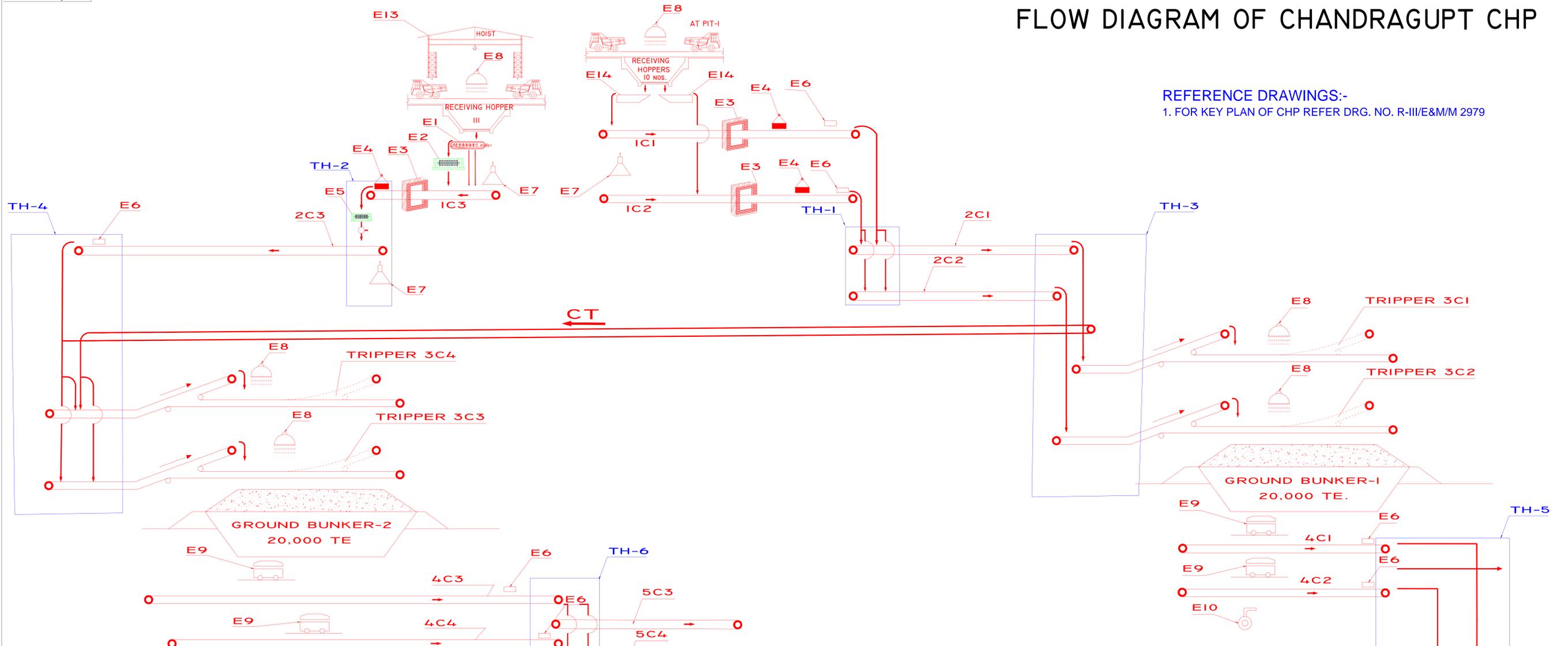
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| | | | | | |
|--|-------------|---|----------------------|-------------|-------------|
| Customer | | CENTRAL COALFIELDS LIMITED | | Job No. | |
| Job Title | | PROJECT REPORT OF CHANDRAGUPT OCP (15.0 MTY) | | Signature | |
| Subject | | Key Plan of Coal Handling Plant (Surface Miner) | | Date | 03/06/20 |
| Designed by | Vinod Kumar | Name | Vinod Kumar | Designation | Ch. Manager |
| Checked by | R. K. M. | Name | HODGEMAN | Designation | Ch. Manager |
| Approved by | Mans Kumar | Name | R.D. | Designation | R.D. |
| Scale | N. T. S. | Sheet | | | |
| CMPDI, R.I.-III A MINI RATNA COMPANY | | Proj. No. | R/III/E&M/MG/13/14/5 | REV. No. | |

FLOW DIAGRAM OF CHANDRAGUPT CHP

REFERENCE DRAWINGS:-

1. FOR KEY PLAN OF CHP REFER DRG. NO. R-III/E&M/M 2979

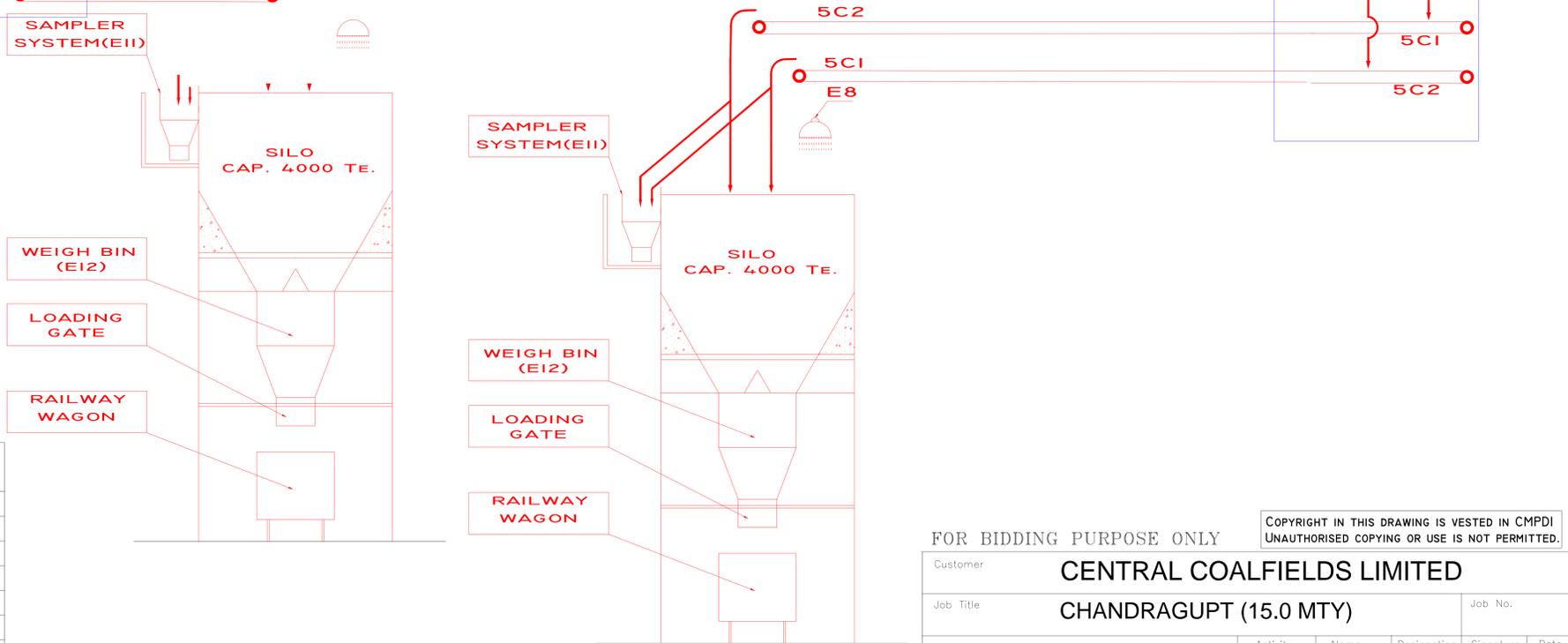


Schedule of Major Equipment

| EQPT. NO. | DESCRIPTION | QUANTITY | CAPACITY T P H |
|-----------|------------------------------|----------|----------------|
| E1 | APRON FEEDER | 1 | 1500 |
| E2 | TWIN SHAFT SIZER (PRIMARY) | 1 | 1500 |
| E3 | METAL DETECTOR | 3 | -- |
| E4 | MAGNETIC SEPERATOR | 3 | -- |
| E5 | TWIN SHAFT SIZER (SECONDARY) | 1 | 1500 |
| E6 | BELT WEIGHER | 7 | 1500 |
| E7 | DUST EXTRACTION | | -- |
| E8 | DUST SUPPRESSION | 8 LOTS | -- |
| E9 | PLOUGH FEEDER | 8 | 1800 |
| E10 | PUMP | LOT | -- |
| E11 | SAMPLER SYSTEM | 1 | -- |
| E12 | WEIGH-BIN | 4 | 100 t |
| E13 | HOIST | 8 | -- |
| E14 | VIBRO FEEDER | 10 | 500 |

Schedule of Belt Conveyor

| CONV. NO. | DESCRIPTION | WIDTH MM | LENGTH M | CAPACITY T P H | POWER KW | REMARKS |
|-----------|-----------------------------------|----------|----------|----------------|----------|---------|
| 1C1&2 | VIBRO FEEDER TO TRANSFER CONVEYOR | 1600 | 90 | 2000 | 2x90 | |
| 1C3 | PRIMARY SIZER TO SECONDARY SIZER | 1600 | 145 | 1500 | 2x90 | |
| 2C1&2 | TRANSFER CONVEYOR TO TRIPPER | 1600 | 620 | 2000 | 2x200 | |
| 2C3 | SECONDARY SIZER TO TRIPPER | 1600 | 730 | 1500 | 2x150 | |
| 3C1&2 | TRIPPER CONVEYOR AT BUNKER | 1600 | 300 | 2000 | 2x150 | |
| 3C3&4 | TRIPPER CONVEYOR AT BUNKER | 1600 | 300 | 2000 | 2x150 | |
| 4C1&2 | RECLAIM CONVEYOR | 1600 | 520 | 1500 | 2x200 | |
| 4C3&4 | RECLAIM CONVEYOR | 1600 | 520 | 1500 | 2x200 | |
| 5C1&2 | LOADING CONVEYOR | 1600 | 2020 | 3000 | 2x500 | |
| CT | TRANSFER CONVEYOR | 1600 | 50 | 2000 | 1x110 | |

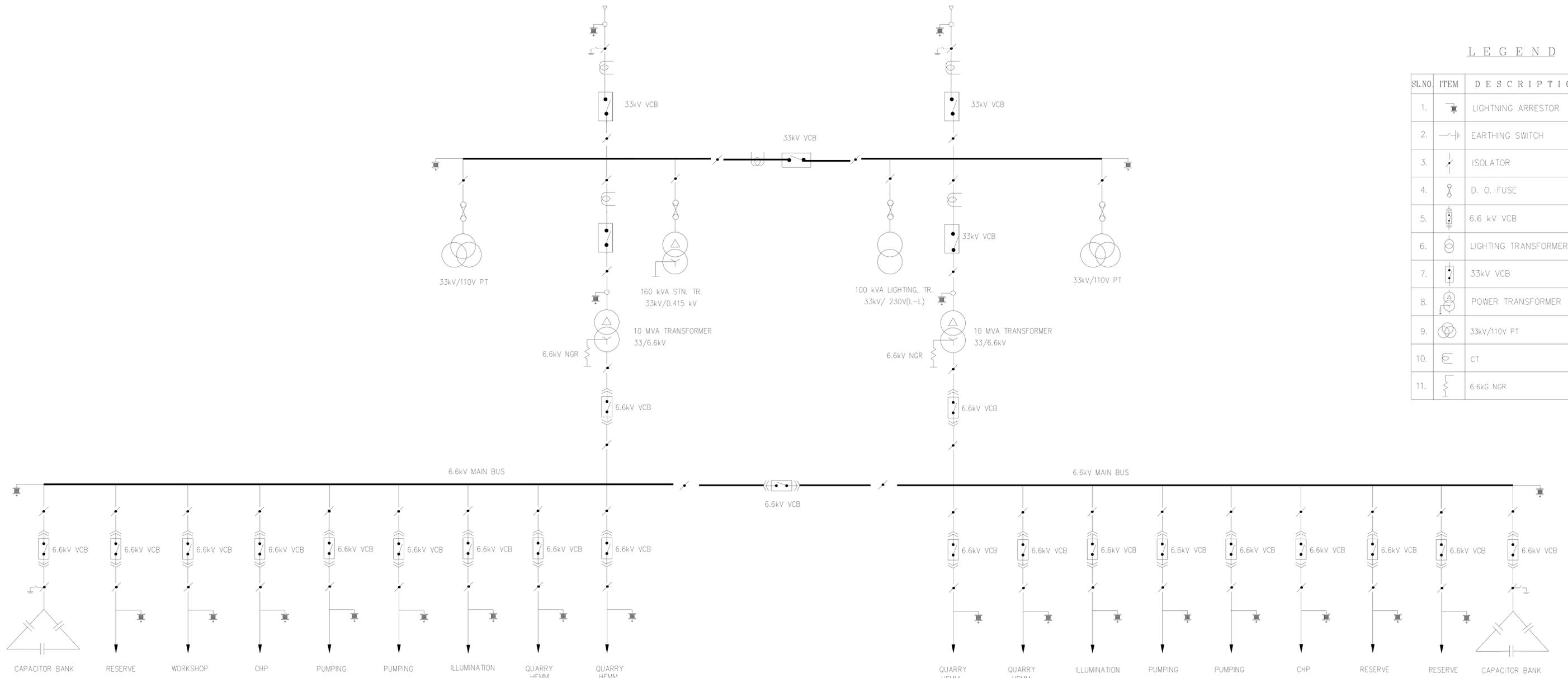


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| | | | | |
|-----------|---|--------------|-------------|--------------|
| Customer | CENTRAL COALFIELDS LIMITED | | | |
| Job Title | CHANDRAGUPT (15.0 MTY) | | | Job No. |
| Subject | Flow Diagram of Coal Handling Plant (SURFACE MINER) | Activity | Name | Designation |
| | | Designed by | VK | Ch.Manager |
| | | Processed by | Vinod Kumar | Ch.Manager |
| | | Checked by | RKM | HOD |
| | | Approved by | Manoj Kumar | R.D. |
| Scale | N T S | | | Sheet 1 OF 1 |
| Org.No. | R III | E & M | M 3 1 4 6 | REV. No. 1 |

33 kV INCOMING SUPPLY FROM PROPOSED DVC SWITCHING STATION



L E G E N D

| SL.NO. | ITEM | DESCRIPTION |
|--------|------|----------------------|
| 1. | | LIGHTNING ARRESTOR |
| 2. | | EARTHING SWITCH |
| 3. | | ISOLATOR |
| 4. | | D. O. FUSE |
| 5. | | 6.6 kV VCB |
| 6. | | LIGHTING TRANSFORMER |
| 7. | | 33kV VCB |
| 8. | | POWER TRANSFORMER |
| 9. | | 33kV/110V PT |
| 10. | | CT |
| 11. | | 6.6kV NGR |

| | | | | | | | | | | | | | |
|--------------|--|-------------|--|-------------|--|--|--|------|--|--------|--|----------------|--|
| Customer | | | | | | CENTRAL COALFIELDS LIMITED | | | | | | | |
| Job Title | | | | | | PROJECT REPORT OF CHANDRAGUPTA OCP (15.0 MTY) | | | | | | Job No. | |
| Subject | | | | | | SINGLE LINE DIAGRAM OF MAIN SUBSTATION-I, 33/6.6 kV 2 X 10 MVA | | | | | | Signature Date | |
| Activity | | Name | | Designation | | Signature | | Date | | Sheet | | REV. No. | |
| Prepared by | | NIKET KUMAR | | A.M. (E&M) | | | | | | 1 OF 1 | | 0 | |
| Processed by | | A. SEN | | SR. M (E&M) | | | | | | | | | |
| Checked by | | SUJATA PAL | | HOD(E&M) | | | | | | | | | |
| Approved by | | Dr. ASINHA | | R.D | | | | | | | | | |
| Scale | | | | | | N.T.S. | | | | | | Sheet | |
| Drg.No. | | | | | | R3 E & M 0 E 2 9 7 0 | | | | | | REV. No. | |

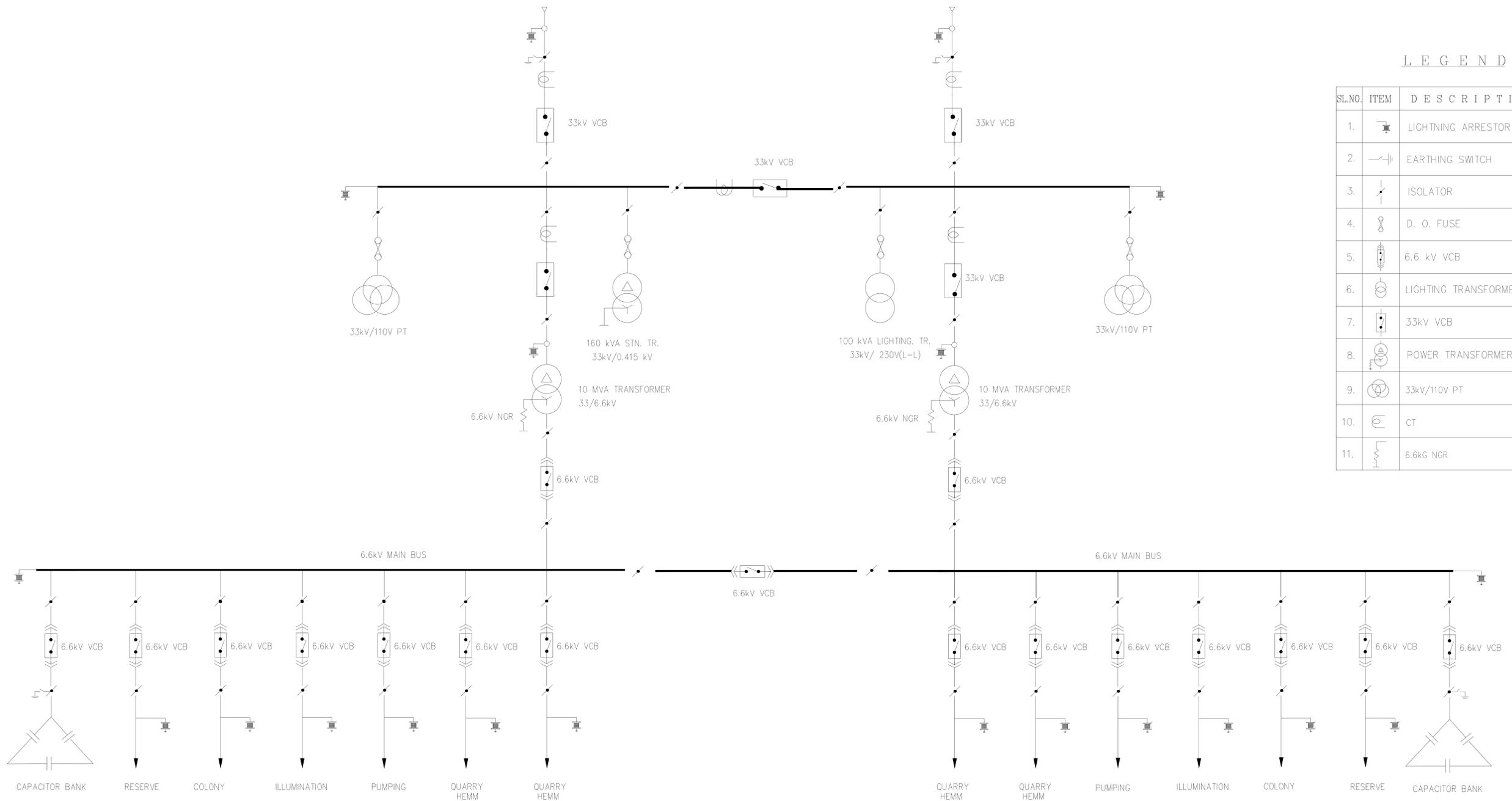


RI-III
A Mini-Ratio Company

33 kV INCOMING SUPPLY FROM PROPOSED DVC SWITCHING STATION

LEGEND

| SL.NO. | ITEM | DESCRIPTION |
|--------|------|----------------------|
| 1. | | LIGHTNING ARRESTOR |
| 2. | | EARTHING SWITCH |
| 3. | | ISOLATOR |
| 4. | | D. O. FUSE |
| 5. | | 6.6 kV VCB |
| 6. | | LIGHTING TRANSFORMER |
| 7. | | 33kV VCB |
| 8. | | POWER TRANSFORMER |
| 9. | | 33kV/110V PT |
| 10. | | CT |
| 11. | | 6.6kV NGR |



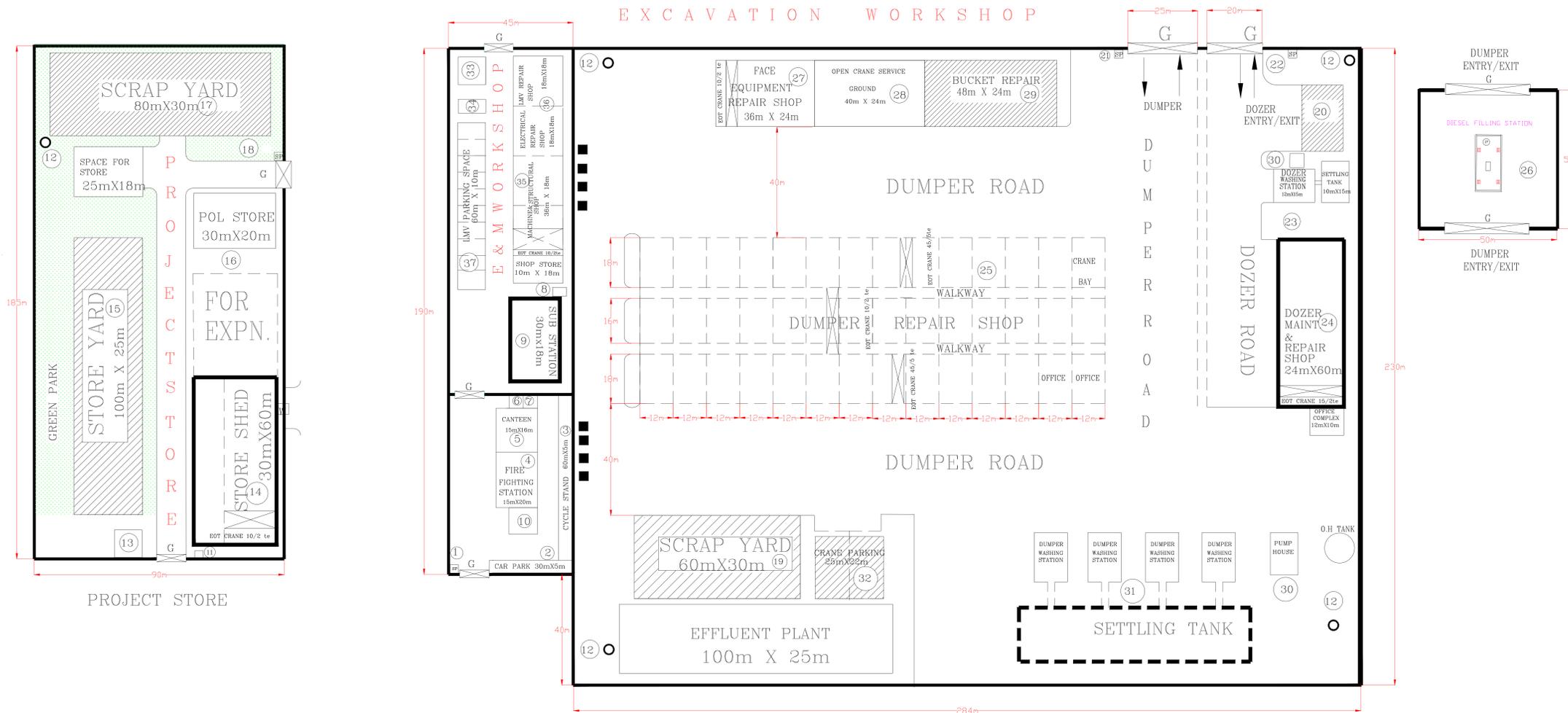
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| | | | | | | | |
|--|--------------|-------------|-------------|---|------|--------------|--|
| Customer | | | | CENTRAL COALFIELDS LIMITED | | | |
| Job Title | | | | PROJECT REPORT OF CHANDRAGUPTA OCP (15.0 MTY) | | | |
| Job No. | | | | | | | |
| Subject | Activity | Name | Designation | Signature | Date | | |
| SINGLE LINE DIAGRAM OF SUBSTATION-II, 33/6.6 kV 2 X 10 MVA | Prepared by | NIKET KUMAR | A.M. (E&M) | | | | |
| | Processed by | A. SEN | SR. M (E&M) | | | | |
| | Checked by | SUJATA PAL | HOD(E&M) | | | | |
| | Approved by | Dr. A.SINHA | R.D | | | | |
| Scale | | | | N.T.S. | | Sheet 1 OF 1 | |
| Drg.No. | | | | R3 E&M 0E2971 | | REV. No. 0 | |



LEGEND

| S.NO. | DESCRIPTION | AREA(MxM) |
|-------|----------------------------|-----------------|
| 1 | SECURITY POST | (3 X 3) |
| 2 | CAR PARKING | 30 X 5 |
| 3 | CYCLE STAND | 60 X 5 |
| 4 | FIRE FIGHTING | 15 X 20 |
| 5 | CANTEEN | 15 X 16 |
| 6 | REST SHELTER | 5 X 5 |
| 7 | WC | 5 X 5 |
| 8 | TOILET | 5 X 3 |
| 9 | SUB-STATION | 30 X 18 |
| 10 | TIME OFFICE | 10 X 10 |
| 11 | SECURITY POST | 3 X 3 |
| 12 | LIGHT TOWER | 5 NOS. |
| 13 | STORE OFFICE | 10 X 10 |
| 14 | STORE SHED | 30 X 60 |
| 15 | STORE YARD | 100X25 |
| 16 | POL STORE | 30 X 20 |
| 17 | SCRAP YARD | 80 X 30 |
| 18 | SECURITY POST | 3 X 3 |
| 19 | SCRAP YARD | 60 X 30 |
| 20 | DOZER PARKING | 15 X 24 |
| 21 | SECURITY POST | 3 X 3 |
| 22 | SECURITY POST | 3 X 3 |
| 23 | DOZER WASHING STN. | 12 X 15 |
| 24 | DOZER REPAIR SHOP | (24X60)+(12X10) |
| 25 | DUMPER REPAIR SHOP | 168 X 60 |
| 26 | FUEL STATION | |
| 27 | FACE EQUIPMENT REPAIR SHOP | 36 X 24 |
| 28 | OPEN SERVICE GROUND | 40 X 24 |
| 29 | BUCKET REPAIR SPACE | 48 X 24 |
| 30 | PUMP HOUSE | (10X15)+(5X5) |
| 31 | DUMPER WASHING STN. | 4(12 X 18) |
| 32 | CRANE PARKING BAYS | 25 X 22 |
| 33 | LMV WASHING STATION | 10 X 10 |
| 34 | PUMP HOUSE | 5 X 10 |
| 35 | STORE, M/C&STR. SHOP | 46 x 18 |
| 36 | ELECT. & LMV SHOP | 36 X 18 |
| 37 | LMV. PARK SPACE | 60 X 10 |



| S.NO. | SYMBOL | ABBREVIATIONS |
|-------|--------|---------------|
| 1. | | SHED/BUILDING |
| 2. | | PAVEMENT |
| 3. | | GATE |
| 4. | | STOPPER |
| 5. | | GREEN LAND |
| 6. | | E.O.T. CRANE |
| 7. | | OPEN SPACE |
| 8. | | LIGHT TOWER |

NOTE:

1. ALL DIMENSIONS ARE IN METRE IF UNIT NOT MENTIONED.
2. SUITABLE RAMPS SHOULD BE PROVIDED AT DUMPER, DOZER & LMV REPAIR SHOP .
3. PLANTATION OF TREES SHOULD BE DONE THROUGHOUT THE BOUNDARY.
4. WORKSHOP OFFICE SHALL BE ON MEZZ. FLOOR OF FUNCTIONAL SHOPS.
5. STORE SHED IS PROVIDED WITH COUNTER FOR WORKSHOP.
6. A TENTATIVE SPACE FOR EFFLUENT PLANT & SETTLING TANKS IS PROVIDED IN LAYOUT.
7. THIS DRAWING MAY REQUIRE MODIFICATION AT THE TIME OF DETAILED DESIGN.

Signature Not Verified
Digitally signed by DWARKA PRASAD MISRA
Date: 2023.07.01 11:18:25 IST
Location: Coal India Limited-CIL



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| | | | | | |
|-----------|--|--|--|------------------------------------|--------------|
| Customer | | CENTRAL COALFIELDS LIMITED | | | |
| Job Title | | CHANDRAGUPT OCP (15.0 MTY) | | Job No. | |
| Subject | | GENERAL LAYOUT OF UNIT WORKSHOP & STORE SUITABLE FOR 190 T DUMPER | | Activity | Name |
| | | | | Created | Rahul Gopal |
| | | | | Created | Subodh Kumar |
| | | | | Checked | R.K. Mishra |
| | | | | Approved | Manoj Kumar |
| | | | | Scale | N.T.S |
| | | | | Sheet | |
| | | | | Drg.No. R III E & M M03005 Rev.No. | |

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