MINING PLAN

&

MINE CLOSURE PLAN

FOR

MANOHARPUR COAL MINE

(8 MTPA)

IB-VALLEY COAL FIELDS

DIST: SUNDARGARH, ODISHA

REVISION – II

ORIGINAL SUBMISSION DATE : JULY 2017

PRESENT SUBMISSION DATE : FEB 2018

(with cost base of January 2018 & after complying the observations of technical members of Standing Committee for approval of Mining Plan)

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OCPL Odisha Coal and Power Limited

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ODISHA COAL AND POWER LIMITED

ZONE– A, GROUND FLOOR, FORTUNE TOWER,

CHANDRASEKHAR PUR, BHUBANESWAR 751023, ODISHA, INDIA.

R.Q.P.: SANJAY KUMAR BHAR

REGD. NO. 34011/ (22)/2005 –CPAM, DATED: 02.12.2010

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CONSULTANT:

CENTRAL MINE PLANNING & DESIGN INSTITUTE LIMITED

(A Subsidiary of Coal India Ltd.)

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BHUBANESWAR- 751 013.

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GENERAL INFORMATION

1.	NAME AND ADDRESS OF THE APPLICANT	ODISHA COAL AND POWER LIMITED
2.	ADDRESS OF THE APPLICANT	ZONE-A, GROUND FLOOR, FORTUNE TOWER, CHANDRASEKHARPUR, BHUBANESWAR-751023, ODISHA, INDIA.
3.	STATUS OF THE APPLICANT	GOVT COMPANY OF STATE OF ODISHA
4.	NAME OF THE MINERAL WHICH THE APPLICANT INTENDS TO MINE	COAL
5.	NAME, ADDRESS AND REGISTRATION NO OF THE RQP WHO PREPARED MINING PLAN	SHRI SANJAY KUMAR BHAR CENTRAL MINE PLANNING AND DESIGN INSTITUTE LIMITED, REGIONAL INSTITUTE-VII, PLOT NO.E4, NEAR GANDHI PARK, SAMANTAPURI, BHUBANESWAR-751013 (ODISHA). TQP/ RQP REF.NO.-No. 34011/(22)/2005-CPAM, DTD. 02.12.2010 for CMPDI assignments.
6.	NAME AND ADDRESS OF PROSPECTING AGENCY	DIRECTORATE OF MINING & GEOLOGY, GOVT OF ODISHA
7.	NAME AND ADDRESS OF AGENCY WHO PREPARED THE GEOLOGICAL REPORT	CMPDI, RANCHI THROUGH DIRECTORATE OF MINING & GEOLOGY, GOVT OF ODISHA
8.	PERIOD OF MINING LEASE	30 Years

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POINT-WISE COMPLIANCES TO THE OBSERVATIONS OF TECHNICAL MEMBERS OF THE STANDING COMMITTEE FOR APPROVAL OF MINING PLAN
As per Letter No. F.No.34011-04-2017-CPAM, dtd. 27.09.2017

Compliances			
Sl. No.	**Reference Para**	**Observation of MoC**	**Compliance**
1	Check list Para – 5 (p)	Average Grade has been shown as G, which is UHV based. In the present scenario GCV, based grade should be shown.	The GR has been prepared by Directorate of Geology (Government of Odisha) in the year 1998 considering UHV data as per the prevailing practice. The prior allocate OPGC had procured the GR in the year 2007 from CMPDIL. First Mine plan & revision-I were prepared in the year 2008 & 2013 respectively based on this GR and approved by MoC. This revision to mine plan is also prepared based on the same GR where no GCV data is available. However, the converted average GCV is 3100 to 3400 K. Cal/Kg and the grade of coal is G-14 (Mentioned in Check list 5 (p),7(l), Ch-IV page-7, Summarised Data page-viii)
2	Check list Para – 5 (v)	The land use pattern differently at different places in the Mining Plan. At Para – 5 (v) of the checklist land has been shown against nala diversion, whereas no land has been shown under nala diversion at Para – 11 (a) of the checklist, instead land under road diversion has been shown. Further, the land use shown in check list does not match with that shown in Table – 9.6 of Mining Plan, wherein no land has been shown under green belt, water body, diversions and top soil dump.	In table 11(a) of checklist. 5.36 Ha shown under road diversion was wrongly mentioned which should be under nala diversion and the same has been corrected. All the sub details of land usage under green belt, water body, diversions and top soil dump have been re-examined and summarized now in Para – 5 (v) & 11 (a) of the checklist in similar manner. Table-9.6 of Mining Plan has been accordingly modified in line with Para – 5 (v)/ 11(a) of the checklist.
3	Check list Para – 7 (k)	The mining Losses should be shown in Mt instead of %.	Checklist modified. Mining Losses have been now shown in Mt, (mentioned in Check list para-7(k) and Ch-V, table-5.02)

4	Check list Para – 9	Although it is mentioned that an earthen embankment shall be provided against Garia Nala, but while fixing the surface boundary at Page – 5 of Chapter – V of Mining Plan no space has been left for embankment. Further, in order to protect the nala from safety as well as environmental point of view embankment should be designed from Institution of repute with proper provisioning of de-silting arrangement so that silting of the adjacent nala could be ruled out.	Provision has been made for an earthen embankment against Garia Nala while fixing surface boundary at page-5 of Chapter-V. A distance of 30m (varying between 30-50m depending on nala course) is being maintained as a barrier from surface boundary to the bank of Garia nala along North & East side of the block. Within this barrier zone this embankment will be provided alongside nala complying the statutory requirement and a road may be designed on top of it. However, as suggested a study will be carried out through an institution of repute with proper provisioning of de-silting.
5	Check list Para – 10 (f)	It is mentioned that the required lease area is 652.885 Ha. However, the EC letter mentions the lease area as 977.875 Ha and it has been specified in the EC letter that the OB should be kept within ML area. The available lease area of 652.885 Ha does not include the proposed OB dump area falling outside the Block area. This aspect may be looked into.	ML execution has been done based on the prior approval obtained from MoC. However, the Lease for remaining land will be executed for external OB dump and other infrastructure with state Govt. in compliance thereof (mentioned in Check list Para – 10 (f)).
6	Check list Para – 11 (a)	The required forest land has been shown as 272.803, whereas Page – 5 of Chapter – II shows the quantum of diverted land as 276.655 Ha and about 15.26 Ha of forest land is yet to be diverted for accommodating external OB. Further, it appears that land for rehabilitation has also not been included in the project area. Further, the quantum of the land shown at Checklist Para – 11 (a) under Tenancy and govt. Land is not matching with that shown in Table 9.1 & 9.2 of Mining Plan. These points may be looked into	The earlier allocate OPGC had Stage-I &II forest clearance for 200.465Ha of Forest land based on prevailing Record of Rights (RoR) & 76.19Ha non-forest Govt. land which is to be treated as Forest as per dictionary meaning by MoEF&CC; thus total diversion becoming 276.655Ha. The forestland requirement has been corrected and finalized in this Mining Plan as 273.288 Ha against 200.465 Ha as per earlier mining plan. Out of this additional forest land, approval of diversion of 57.08 Ha of forest land has

		in deciding the total project area and required lease area.	already been obtained separately by OPGC for MGR & same has been transferred in favour of OCPL. Remaining additional 15.70 Ha of forest land in OB dump area will have to be diverted as per present mining plan. As per existing Odisha R&R policy; the land acquired for rehabilitation is to be recorded with rights in favour of the land loosers and common infrastructure area will be surrendered to Govt. of Odisha. The R&R Colony has been treated as separate project and Environment Clearance, Consent to Establish & Consent to Operate has been obtained separately from Odisha State Pollution Control Board. Therefore, R&R land is not included to Project area considered for Mine Closure. The quantum of land shown at checklist Para – 11 (a) under Tenancy, Govt. Land & forest land has been corrected with that shown in Table 9.1 & 9.2 of mining plan.
7	Check list Para – 12.4	The area under external dump has been shown as plantation area in the very first year, whereas the external dump has been shown active in the 1st year stage plan. The plantation programme may be reviewed.	This has been reviewed and accordingly modified (modified in Check list para 12.4 and Ch-XI, table no.11.04).
8	Check list Para – 12.13	Length of barbed wire fencing around dump mentioned under progressive closure is not matching with that mentioned under safety and security. Further, the area (mined out area and OB dump) considered for technical and biological reclamation may be reviewed.	Length of barbed wire fencing around dump mentioned under progressive closure has been corrected and matched with that mentioned under safety and security as suggested. Area for technical and biological reclamation of mined out land and dump has been reviewed and modified accordingly in table 11.04 & 11.11.

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9	Chapter – III Page – 4	About 85.50 Ha of land has been shown as required for Ash Storage and other connected infrastructure. Such land use has not been shown in the checklist. Whether land for such use is required to be included in the Project area of mine?	The land in question will be required for coal stock, CHP & allied infrastructure, Railway wagon loading, silo etc. & the text and table has been modified accordingly. The land for such use has been included in the Project Area of Mine (mentioned in table-9.1 & 9.2 in Ch-IX)
10	Chapter – V of Mining Plan	It seems that the reserves have been calculated based on UHV grade. In the present situation, when UHV based classification has been replaced by GCV based classification, will not be better to calculate the reserves based on Iso-GCV lines.	The Mining Plan is prepared based on Geological report (GR) published in June'1998 (The base document). In the said GR the reserve were estimated on the basis of UHV; norms prevailing at that point of time, so mineable reserve has also been estimated on same UHV basis, however tentative GCV range has been mentioned in chapter and checklist. Now the norms for estimation of coal quality have been changed from UHV to GCV and therefore the GCV based reserve estimation will be taken care of during preparation of integrated Geological Report of Manoharpur & dip side Manoharpur coal block.
11	Chapter – V Page – 15 & 16 of Mining Plan	It is mentioned that coal thickness of less than 1m has been considered un-extractable and included in OB. It is also mentioned that the Surface Miners would be able to extract portion of seam / bands less than 1m also, hence the estimated reserves may vary. Further, it is mentioned that on adoptions of GCV based concept of reserve estimation, the reserves may change. It would be better if the reserves are estimated on a firm basis as per present scenario and proposed extraction machineries.	At present coal quantity has been calculated considering UHV basis and excluded coal of thickness less than 1m. In the available Geological report, the reserves have been estimated for coal seams having thickness $\geq$ 1m on I_{100} basis and UHV basis, estimation beyond this is not possible as per present available GR.
12	Plate No. – VIII	The material handling table is showing different figures in respect of coal and OB. The	Figures in the material handling table in Plate No. VIII has been corrected. Sufficient safety

		left between toe of the internal dump and central haul road may be indicated.	distance between toe of the internal dump and central haul road has been kept.
13	Chapter – X of Mining Plan	Mining parameters mentioned in the existing EC have been modified in the present Mining Plan. Total OBR has increased and so does the area under external OB dump. Depth of mining has also been increased. Total land requirement has also increased in comparison to that mentioned in the EC. These aspects have not been covered.	The EC has been issued based on the approved mine plan (rev-I). OPGC, the previous allocate had acquired some land for creating mine head infrastructure which is now being transferred in favour of OCPL, thus increasing the total land requirement. From the conservation point of view; the lowermost seams Rampur-IA & IB are proposed to be extracted which resulted increase in depth, OBR and external OB dump area. However, after approval of this mining plan; a copy will be submitted with MoEF & CC to inform about the technical changes and the changes made in the total land requirement. Enhanced OB handling & dump area have been mentioned in chapter-X
14	Progressive MCP	The stage plans of excavation and mine closure submitted with the Mine Plan do not show the proposed progressive mine closure activities.	Plans modified as desired (correction done in plate No.MIN-I to MIN-VI).
15	Table 11.08 of MP	The entries in this table may be reconciled with various reclamation and post closure land use data submitted in the checklist.	Table 11.08 (Ch-XI) has been modified & included in text and checklist.
16	Para – 11.24 of MP	It is observed that various mine development activities has already been started in the Project area and therefore annual mine closure cost needs to be deposited in the Escrow Account from the day any activity on land is started for the mine. This aspect need to be looked into.	Mine closure cost has been re estimated for total mine life incl. construction period with present cost base. Escrow account has been opened and annual mine closure cost shall be deposited shortly after execution of the Escrow agreement with the coal controller.
17		Hydrological study report and water balance chart should be provided in the water quality management para of the mine closure plan.	Concerned text and chart included in the report (included in Ch-XI, page 21 to 23).

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18		Bar chart should indicate fourth phase from 16th to 20th and fifth phase from 21st to 23rd year.	The Bar chart has been modified as advised (included in Ch-XI, page 40 to 41).
19		The project proponent should ensure to come up with revised mining plan within 6 months for the entire block after formulation of GR.	The exploration of dip side coal block has been completed and GR has been received from CMPDIL. ML application will be made for the dip side coal block. However, mining plan will be prepared based on the requirement of Coal by the EUP of OPGC and after obtaining approval of Govt. of Odisha. As per the Efficiency Parameters stipulated in the allotment agreement executed with Nominated Authority, MoC, GoI; mining plan will be submitted within six months from the date of completion of GR.
20		Against Rs. 156.30 Crs of amount to be deposited in Escrow as a security for carrying out mine closure activities, only Rs. 86.77 Crs have been envisaged for taking up mine closure activities. The amount provisioned for mine closure activities should be at par with the amount to be deposited in Escrow account.	The revised estimated mine closure cost to be deposited as on base date Jan 2018 is 89.07 Crores. Based on the calculation made in accordance with the Mine closure guidelines issued by MoC considering annual escalation @ 5%. The total mine closure cost comes to 165.17 Crores over a period of 24 years incl construction period. Cost of mine closure activities have been kept as per with the amount to be deposited in Escrow account. The amount provisioned for mine closure activities, duly reflected in table 11.11 at relevant chapters and in the checklist. The closure cost would be deposited in the Escrow account as per the guidelines of MoC (included in Ch-XI, page 36 to 37, 42 to 43, Check list 12.13 & 12.14).

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CHECKLIST FOR MINING PLAN AND MINE CLOSURE PLAN

	Parameters	Details		Observation
1	**DETAILS OF THE BLOCK**			
a.	Name of Coal / Lignite Block	Manoharpur Coal Mine		
b.	Name of the Coalfield/ Coal belt	Ib-Valley Coalfield		
c.	Particulars of adjacent blocks: North, South, East, West	**North :** Meenakshi coal block, separated by Garia Nalla **South:** Dulunga coal block, NTPC	**East:** Incrop line, Non coal area **West:** Dip side of Manoharpur coal block	
d.	Topo sheet No with latitude and longitude	**Vesting Order**	**Mining Plan & Mine Closure**	
	Topo sheet No		Toposheet No,.F44–R/13	
	Latitudes (N):	21° 55'52.168" N – 21° 58' 16.871" N	21° 55'52.168" N – 21° 58' 16.871" N	
	Longitude (E):	83° 44'41.287"E - 83° 47'42.750" E	83° 44'41.287"E - 83° 47'42.750" E	
e.	Location of the Block District / State	Village: Manoharpur Taluka: Hemgiri District: Sundargarh , State: Odisha.		
f.	CMPDIL Certificate of the project boundary of the Mining Plan	Obtained. Attached as Enclosure-15		
g.	Type of the Project (Operating / under Implementation)	Under Implementation		
2	**DETAILS OF THE PRESENT PROPOSAL**			
a.	**BASE DATE OF MINING PLAN/MINE CLOSURE PLAN**	January 2018 (originally submitted in JULY 2017) (Resubmitted in February2018 after complying & incorporating the reply to the comments of technical members of Standing Committee)		
b.	**Scope of The mining plan**	To develop the coal block for extraction of coal seam, with major thrust on maintaining and restoring environment and conservation of energy resources		
3	**ALLOTTEE COMPANY DETAILS**			
a.	Name the Mine Allottee	Odisha Coal And Power Limited, Zone-A, Ground Floor, Fortune Tower, Chandrasekharpur, Bhubaneswar-751023, Odisha, India Coal		
b.	Status of the Applicant Company	Govt. Company of State of Odisha.		

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c.	Details of allotment/vesting order	Allotment order no 103/25/2015/NA dated 31st August 2015 by Govt. of India, Ministry of coal, O/o the nominated Authority & it's corrigendum		
d.	Name and address of the applicant	Regd Office **Odisha Coal and Power Limited**, Zone-A, Ground Floor, Fortune Tower, Chandrasekharpur, Bhubaneswar-751023, Odisha, India	Principal Place of Business Village: Manoharpur Taluka: Hemgiri District: Sundargarh State: Odisha.	
e.	Relationship between the applicant and allottee company	Same		
	Parameters	***Details***		***Observation***
f.	Name and address of RQP with registration No	**Sanjay Kumar Bhar** **Central Mine Planning & Design Institute Limited,** Plot No E4(Near Gandhi Park), At: Samantapuri, Bhubaneswar		
g.	Name of the Previous allottee of the Block	**Odisha Power Generation Corporation Limited**, Zone-C, Seventh Floor, Fortune Tower, Chandrasekharpur, Bhubaneswar-751023, Odisha, India		
4	**Details of the Previous approval of Mining plan**			
a.	Date of Approval	11th December 2013,No.13016/28/2012-CA-I 11th August,2008, No.13016/26/2008-CA-I		
b.	Conditions, if any	Following conditions were there in the Mining Plan approved in 11December 2013: Condition: The mining company shall take all necessary precautions regarding safety of mine working, persons deployed therein. Compliance: Agreed. Details in chapter-VI Condition: Coal extracted from Manoharpur block should be utilisesd exclusively for Phase 2 (2x660 MW) only. Compliance: Agreed Condition: Mining Lease of this block shall not encroach into any other coal block. Compliance: Agreed. Certificate from CMPDI enclosed as Enclosure-15 Condition: The approval of the Mining Plan is without prejudice to the requirement of approvals from competent/ prescribed authority under the relevant rules/ regulations/ etc. Compliance: Agreed Condition: This may be revoked if a legal cause of action is brought against the allocate in the light of legal proceedings including judgement of court or result of lawful investigation by the authority empowered in the behalf. Compliance; Agreed		

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c.	Scheduled year of start of production	2015-16
d.	Proposed year of achieving the targeted production	2018-19
e.	Date of actual commencement of mining operations, if operations already started	Mining Operation not yet started.
f.	Likely date of mining operations, if operations not yet started & reasons for non- commencement of operations	As per earlier Approved Mining Plan the Operations were to start in the year 2015. The non-commencement of operations is due to delay in Forest Clearance (categorized as No-Go by MoEF), Environment Clearance, processing of ML and Land acquisition and subsequently Cancellation of Coal Block by the Government of India as per the order by the Honorable Supreme Court.
g.	Planned production and actual levels achieved in last 3 years (Coal in Mte, OB in MM3, SR in M3/te)	(see table below)

		Planned		Actual Coal Production "Mte"			
	Calendar year	Coal	OB	OC	Total "Mte"	OB "MM3"	SR
Y-1	2015-16	1.00	5.67	nil			
Y-2	2016-17	2.50	11.43	nil			
Y-3	2017-18	5.00	16.34	nil			
	Total						

h.	Reasons for difference between the planned and actual production levels	Mining has not started because of the reasons stated as in (f)

5	**Details of changes in the new mining plan compared to earlier approval**			
		Previous Mining Plan	**Current Mining Plan**	
a.	Lease area "Ha"	653.509Ha	1064.402 Ha (652.885 Ha within block+411.517 Ha outside block)	(modified as per land record and DGPS survey)
b.	Project Area "Ha"	1100.325 Ha (653.509 Ha within block+324.367 Ha outside block & 122.45 Ha for dispatch system)	1064.402 Ha	
c.	Life of the Project	23 Years	23 Years+1 year of construction	
d.	Minimum and Maximum Depth of working "m"	Minimum Depth:8m Maximum Depth :205m	Minimum Depth:8m Maximum Depth :214m	
e.	Geological Block "Ha"	651Ha	651Ha	
f.	Production Target "MTPA"	8 MTPA	8 MTPA	

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g.	Seams Available "As per GR"	Number of seams -2 Lajkura (6 sections) Rampur(3 sections) Total horizons -9	Number of seams -2 Lajkura (6 sections) Rampur(5 sections) Total horizons -11	In this revised mining plan lower two sections of Rampur seam have been included in mining wherever they are found to be consistent and workable
h.	Seams not considered for Mining with Reasons	Rampur 1-A Rampur 1-B	Nil	
i.	Net Geological Reserve "Mt"	181.68 Mt	188.07 Mt	Including reserves of Rampur IA & IB
j.	Blocked Reserve "Mt"	20.10 Mt	22.00 Mt	
k.	Minable Reserve "Mt"	161.58 Mt	166.07 Mt	
l.	Extractable Reserves "Mt"	152.12 Mt	155.91Mt	
m.	% of Extraction/ recovery	83.6%	83 %	
n.	Reserve Depleted (till the base date) Reserves " Mt"	Nil	Nil	
o.	Balance Extractable reserve "Mt"	152.12 Mt	155.91Mt	
p.	Average Grade	G	G (average GCV around G14)	
q.	OB in MM3	432.11 Mcum	466.03 Mcum	
r.	SR MM3/te	2.84	2.99	
s.	Mining Technology	34 cum shovel with 320T dumper 10 cum shovel with 100T dumper 3800mm surface miner + 13 cum Front end loader + 100T dumper.	10-12cum hydraulic shovel/backhoe with 100T dumper in top overburden & thick parting 5-7cum hydraulic shovel/ backhoe with 60T dumper in thin to moderately thick parting 3800mm surface miner + 6-7cum Front end loader + 60T dumper for coal.	
t.	Coal Beneficiation envisaged	Final decision in this regard shall be taken after feeding coal to power plant and analyzing quality of ROM coal.	Beneficiation requirement not considered in this proposal, however final decision in this regard shall be taken after feeding coal to power plant and analyzing quality of ROM coal.	
u.	Handling of Rejects		Not applicable	

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v.	Land use pattern " Ha"			
1	Excavation Area	550.95 Ha	550.95 Ha	
2	Top Soil Dump	3 Ha	8 Ha	
3	External Dump	193.568 Ha	229.70 Ha	
4	Safety Zone	355.807 Ha (incl 122.45 Ha for despatch system)	7.85 Ha	
5	Nala diversion		5.36 Ha	
6	Road &,Infrastructure area		155.308 Ha(incl 86.527 Ha for despatch system)	
7	Garland drain		6.27 Ha	
8	Embankment		9.35 Ha	
9	Green Belt		50 Ha	
10	Water body		8.56Ha	
11	Colony		16.959 Ha	
12	Undisturbed area		16.095 Ha	
	Total	1100.325 Ha	1064.402 Ha	
w.	Geological coordinate of the block	Latitudes 21° 56'19"N to 21 °58'04"N Longitudes 83° 46'00"E to 83 °47'26" E	Latitudes 21° 55'52.168"N to 21 °58'16.871"N Longitudes 83° 44'41.287"E to 83 °47'42.750" E	

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W.	Reasons for Revision	
		1. Manoharpur & dip side of Manoharpur blocks have been allotted to OCPL for phase II and phase III expansion of the OPGC power plant. Workings of Dip side of Manoharpur block will be extended from that of Manoharpur block and both of these blocks will be worked as one opencast mine. Single quarry operation with central haul road is proposed in this revised mining plan unlike earlier mining plan where two quarry operations were proposed. This will facilitate increased strike length to sustain and enhance the production further in later years and also working dip side of the block. So stage plans during different years for this revision-II are different from revision-I and mostly aimed to maximize production and facilitate deployment of inpit conveying along central haul road through belt conveyor. 2. There are several left out small forest patches lying within and around the External dump-3 as per earlier mining plan. Without acquiring these small patches it will not be possible to continue with the external dumping and also it will be very difficult to save these patches as they will be trapped inside and around the external dump without any approach road. So this forest lands are included in the revised mining plan. 3. Two lower horizons of Rampur seam occurring towards dip side and southwestern part has been considered for mining with updation of reserve and overburden. 4. Location of railway siding and transport corridor from mine site to Power plant has been finalized and included in this revision. 5. Locations of Infrastructure like workshop, coal receiving hopper and conveyor system have been modified as per modified silo and dispatch system. 6. Modification of equipment configuration considering proposed outsourcing of mining operations by OCPL. 7. Updating mine closure cost 8. Change in geological bounding coordinate

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6	END USE OF COAL/LIGNITE		
a.	End Use of Coal/Lignite as per approval by the Competent Authority	2X 660MW coal fired thermal power plant of OPGC	
b.	Norms adopted for calculating ROM quantity requirement based in the allotment order		

	Clinker "MTPA"		Power Plant "KW"		Blast Furnace "MTPA"	
Capacity of the End Use Plant			2X660			
Capacity of the Project "MTPA"			8			
Raw Coal availability from this project "MTPA"			8			
Washed coal availability "MTPA"			Nil			
Reject "MTPA"			Nil			
Station Heat Rate "K Cal/ Kwhr"			2200			
Avg Calorific Value of Coal " Kcal/Kg"			3200			
Raw Coal						
Washed Coal						
Rejects						
Specific Consumption "Kg/Kwhr"			0.69			
Consumption Norms "Kg/Tonne"						
Plant Load Factor/ Capacity Utilisation			90%			
Coal Requirement "MTPA"			8			
Total Requirement for the "End Use Plant"			8			

Coal from this project "MTPA"	8	
Lingkages/ E-auction from CIL "MTPA"	3.616 (Bridge Linkage)	
Other block of the Company "MTPA"	Nil	
Total availability "MTPA"	8	

c.	Percentage of end use requirement to be met from this mine	100%

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d.	If washing / beneficiation of the coal/ lignite is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the beneficiation and recovery rate, consumption of water etc.	Final decision in this regard shall be taken after feeding coal to power plant and analyzing quality of ROM coal. Coal washing is proposed in future keeping in view the maximum presence of low grade coal with high ash. The location of washery will be decided at a later stage Nature of Beneficiation: HM Cyclone process. Tentative Recovery Rate: 80%	
e.	Proposed Use of Rejects/Middling's	Not Applicable	
f.	Distance of End use plant from the pit head of the project in "km"	47 Km	
g.	Mode of Coal Transport	Through dedicated Rail Line and MGR system	
7	**EXPLORATION AND GEOLOGY**		
a.	Geological Block Area " Ha"	651 Ha	
b.	Status of Exploration of the block	Manoharpur Block is fully explored and GR is available and prepared by Directorate of Mining & Geology, Govt. Of Orissa I (year of preparation: 1998).	
c.	Area covered by 'detailed' exploration within the block (sq. km)	6.51 sq km	
d.	Whether entire lease area has been covered by 'detailed' exploration.	Yes	
e.	No. of boreholes drilled within the block		
f.	Whether any further exploration/study is required or suggested and time frame in which it is to be completed	No	

Agency	Meterage	No. of BHs
G.S.I	173.03	2
CMPDI	200.65	2
DMG	8224.00	74
Total	8597.68	78

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g.	Overall borehole density within the block (no./ sq. km) approx	11.9	
h.	No of Seams available as per GR	Number of seams -2 namely Lajkura and Rampur Coal sections -11 Rampur seam thickness -6 to 34m with 5 sections Lajkura seam thickness- 30 to 45m with 6 sections	
i.	Seams not considered for Mining with Reasons	All seams are considered	
j.	Dip of the Seam	6°-8°	

k. Seam wise Thickness and Depth with Reserve assessment(reserve in Mt)

SEAM	THICKNESS RANGE	DEPTH RANGE	Net geological reserve	Slope/ batter	Barrier	Total blocked	MINEABLE RESERVE	Mining loss	Extractable reserve	depletion
Lajkura Top III	2.67-4.60	8.64-66.71	**7.87**	0.06	0.2	0.26	**7.61**	0.68	**6.93**	-
Lajkura Top II	0.55-3.56	12.48-72.52	**7.29**	0.2	0.22	0.42	**6.87**	0.50	**6.37**	-
Lajkura Top I	4.37-9.68	0.5-76.26	**16.69**	0.67	0.5	1.17	**15.52**	0.54	**14.98**	-
Lajkura Middle	2.59-11.14	6.15-131.53	**36.56**	2.13	1.04	3.17	**33.39**	0.99	**32.4**	-
Lajkura Bottom II	2.63-5.85	11.11-177.85	**31.24**	2.34	0.93	3.27	**27.97**	1.67	**26.3**	-
Lajkura Bottom I	0.75-2.92	5.20-187.58	**14.75**	1.18	0.45	1.63	**13.12**	1.60	**11.52**	-
Rampur III	0.36-4.16	4.6-191.80	**17.58**	2.0	0.76	2.76	**14.82**	1.63	**13.19**	-
Rampur II	0.18-1.89	6.35-198.96	**6.77**	0.87	0.25	1.12	**5.65**	0.67	**4.98**	-
Rampur I	1.09-9.49	7.15-201.03	**43.21**	4.95	1.35	6.3	**36.91**	1.46	**35.45**	-
Rampur IA	0.50-2.80	19.5-214.16	**4.95**	1.11	0.11	1.22	**3.73**	0.37	**3.36**	-
Rampur IB	0.95- 3.48	123.41-208.97	**1.16**	0.66	0.02	0.68	**0.48**	0.05	**0.43**	-
			188.07	**16.17**	**5.83**	22.00	**166.07**	10.16	**155.91**	nil

l.	Average GCV Average UHV Grade	Average GCV Band : G14 (3101-3400) Average UHV Grade: G-F
m.	Gross Geological Reserve of the block"Mte"	201.86Mt (208.58 Mt-including Rampur 1A & 1B)
n.	Net Geological Reserve of the block "Mte"	188.07 Mt
o.	Minable Reserve of the block "Mte"	166.07 Mt
p.	Blocked Reserve "Mte	22.00 Mt

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q.	Corresponding extractable reserve of the block "Mte"	155.91 Mt	
r.	Percentage of Extraction	83 %	
s.	Reserve already depleted (Base date of Mining Plan)	nil	
t.	Balance Reserve (As on Base Date)	155.91 Mt	
8			
a.	Existing method of mining if the mine is under operation	Not Applicable (Mining not yet started)	
b.	Proposed method of mining with justification on suitability of method of mining	Proposed method of Mining –Opencast mining (overburden removal by shovel-dumper & coal extraction by surface miner, Front end loader and dumper) The proposed mining block represents presence of moderately flat multiple coal seams with intermediate varying parting. Moderately thick to thin seams occur at shallow to moderate depth in wide area having power grade coal reserve. So this will make the project most viable by adopting opencast mining method.	
c.	Coal production capacity proposed "Mtpa"	8 MTPA	
d.	Justification for optimisation Coal production capacity	Optimum production to satisfy the power plant demand	
e.	Calendar year from which the production will start	2019-2020	
f.	Year of Achieving rated production	2022-2023	

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g. Coal production Plan "MT"

Year		Coal Production		OB Mcum	SR (cum/t)
		UG	OC		
Cons					
P-1	2019-20		1.00	7.43	7.43
P-2	2020-21		2.50	13.21	5.28
P-3	2021-22		5.00	20.64	4.13
P-4	2022-23		8.00	28.07	3.51
P-5	2023-24		8.00	28.07	3.51
P-6	2024-25		8.00	28.07	3.51
P-7	2025-26		8.00	28.07	3.51
P-8	2026-27		8.00	28.07	3.51
P-9	2027-28		8.00	28.07	3.51
P-10	2028-29		8.00	28.07	3.51
P-11	2029-30		8.00	28.07	3.51
P-12	2030-31		8.00	28.07	3.51
P-13	2031-32		8.00	28.07	3.51
P-14	2032-33		8.00	26.42	3.30
P-15	2033-34		8.00	20.06	2.51
P-16	2034-35		8.00	17.07	2.13
P-17	2035-36		8.00	17.07	2.13
P-18	2036-37		8.00	14.98	1.87
P-19	2037-38		8.00	14.16	1.77
P-20	2038-39		8.00	14.18	1.77
P-21	2039-40		6.00	10.54	1.76
P-22	2040-41		3.50	6.21	1.77
P-23	2041-42		1.91	3.40	1.78

Coal production is scheduled to start in 2019-20, however production may also start in early 2019 as most of the activities are in advance state & statutory clearances have been obtained.

h.	**Peak/Rated Capacity**		
	- By OC	8 MTPA	
	- By UG	Nil	
	- Overall	8 MTPA	
i.	**Life of the mine :**		
	- By OC	23 Years	
	- By UG	Nil	
	- Overall	23 Years & 1 year of construction	
j.	Whether the proposed external OB dump site is coal/ lignite bearing: If so, whether coal/lignite below waste disposal area is extractable.	No. OB dumping is proposed in the area beyond incrop of the coal seams. So the area proposed for dumping is non coal bearing area as per available geological data	

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k.	Whether negative Proving for coal / lignite in the proposed site for OB dump/ infrastructure has been done.	OB dumping is proposed towards rise side of incrop of coal seams as per available geological data. Metamorphics are exposed in the area.	
l.	Whether the mining operations to be carried out through departmental equipment/ MDO/ outsourcing.	Mining Operator (MO)	
m.	Operations that are proposed to be outsourced	Mining & CHP operations & maintenance, pumping, Reclamation	
n.	Proposed configuration of HEMM for OC (Coal & OB) & Major Equipment for UG.	10-12cum hydraulic shovel/backhoe with 100T dumper in top overburden & thick parting 5-7cum hydraulic shovel/ backhoe with 60T dumper in thin to moderately thick parting 3800mm surface miner + 6-7 cum Front end loader + 60T dumper for coal	
o.	Mode of entry for underground mines (shaft, incline, adit,):	Not Applicable	
p.	Results of any investigation carried out for scientific mining, conservation of minerals and protection of environment; future proposals.	i. Geotechnical study is completed by IIT, Mumbai. ii. Washability studies on borehole core samples was carried out by CIMFR,Dhanabad iii. Leachability study is completed by CIMFR, Dhanbad	

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9	**IMPORTANT SAFETY ASPECTS –** Major Risks and uncertainties to the project viz. Proximity to river, adjacent working, geo-mining disturbances, slope stability and remedial measures suggested. It should also include proposed overall slope of the quarry and OB dump, dump height, strata control, fire and spontaneous heating, gas monitoring, disaster management, danger from inrush of water etc	1. Inundation from nala & surface run off . (An earthen embankment is planned along the bank of Garia Nalla with a height of 3m above HFL). 2. Failure of slope in the opencast mine 3. Failure of slope in the overburden dump 4. Fly Rock and vibrations due to Blasting 5. Surface fire, 6. Road Accidents 7. Danger due to storage of explosives 8. Training 9. Medical Aid 10. Natural calamities such as Storm, Earthquake etc. Bench height: 10-12m (for 10-12 cum Hyd shovel) Bench height: 8-10m (for 6-7 cum Hyd shovel) Working bench width: 22-34m Working angle: 70° with horizontal for shovel 60-65° with horizontal for surface miner Dump angle: 37° for individual 30m tier 26-28° for overall slope	

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10	**Status of Lease**	
a.	Status of Lease	Lease executed and registered for block area.
b.	Existing Lease Area "Ha"	652.885Ha executed within block area
c.	Period for which Mining Lease has been granted/is to be renewed/ is to be applied for.	30 years from the date of execution

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d.	Date of expiry of earlier Mining Lease, if any	Not Applicable
e.	Whether the lease boundary/ required boundary is same as demarcated by CMPDI/ SCCL/ NLC for delineating block/sub-block	Mine excavation boundary is within allotted block demarcated by CMPDI
f.	Lease Area (applied/ required) as per the Mining Plan under consideration (Ha)	652.885Ha within allotted block. 411.517Ha in outside block.
g.	Whether the applied lease area falls within the allotted block	Yes
i.	Area (Ha) of lease which falls outside the block/sub-block delineated by CMPDI/SCCL/NLC.	Nil. Outside block area is 411.517 Ha(non coal bearing) for infrastructure, OB dump, colony
j.	**Details of outside area:**	
	Whether forms part of any other coal block	No
	Whether it contains any coal/lignite reserves	No
	– Purpose for which it is required, e.g. roads/ OB dumps/ service buildings/ colony/ safety zone/ others (specify)	OB Dump, Infrastructure, CHP, MGR etc
k.	**Whether some part(s) of the allotted block has not been applied for mining lease.**	No. Entire area of the block has been applied for Mining lease. Lease has been granted and executed.
	- Total area in Ha of such part(s).	Nil
	- Total reserves in such part(s). (Mt)	Nil
	- Brief reasoning for leaving such part(s)	Not Applicable
11	**ENVIRONMENTAL MANANGEMENT**	

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a. Land use pattern in Ha Pre Mining , During Mining and Post Closure Land Use and Post Closure Management of the Land should be provided in the following table

Pre Mining Land Use 'Ha'			Type	Land Use (During Mining)	Land Use (End of Life)	Land Use (Post Closure)								
						Agricultural Land	Plantation	Water body	Public/ Company Use	Water Harvesting	Dismanteled area	Forest Land (Returned)	Undisturbed Land	Total
Tenancy	Agricultural	420.276	Excavation Area	550.95										
	Township	8.684	Backfilled Area		411.95		138.662					273.288		411.95
	Grazing		Excavated Void		139		39.739	27.48	71.781					139.00
	Water Bodies		Top soil Dump	8.0										
	Road		External Dump	229.7	229.7		229.7							229.7
	Community		Safety Zone/	7.85	7.85		7.85							7.85
	Inhabitated		Road Diversion											
	Village		Diversion/below river/nala/ canal	5.36	5.36			5.36						5.36
Govt. Non Forest	Agricultural		Road & Infrastructure Area	155.308	155.308		138.0		17.308					155.308
	Township		Garland Drains	6.27	6.27			6.27						6.27
	Grazing	35.86	Embankment	9.35	9.35		8.0		1.35					9.35
	Road	6.90	Green Belt	50	58		58							58
	Water Bodies	14.22	Water Reservoir near pit/ water body	8.56	8.56			8.56						8.56
	Other	305.174	UG Entry											
Forest	Reserve	2.023	Colony	16.959	16.959		14.0		2.959					16.959
	Protected		Resettlement											
	C-J-B-J	271.265	Undisturbed/ Mining Right for UG	16.095	16.095								16.095	16.095
Free Hold			Others											
Total		1064.402		1064.402	1064.402		633.951	47.67	93.398			273.288	16.095	1064.402

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b.		Surface features over the block area	The PMGSY road is running through the block and proposed for diversion. Part of Garia nala flowing through the block is proposed for diversion. No surface structure of social/ archeological importance is present over the mining area. Both Manoharpur & Ghumudasan village will be relocated.	
c.		No. of villages/Houses to be shifted	Two villages/ 418 houses (Manoharpur: 244, Ghumudasan: 174).	
d.		Population to be affected by the project	1854	
e.		Monitoring schedules for different environmental components after the commencement of mining and other related activities.	Air Quality	Two days in a month at each station (once in a fortnight).
			Water & effluent quality	Once in a month for each station (for drinking water quality), once in a fortnight (for 4 parameters) and once in a year (23 parameters) (for effluent quality)
			Ground water level monitoring	4 times in a year (i.e. April/May, August, November & January)
			Noise level	Once in a day-time and once in a night-time in fortnight from each station.
			Study of Flora and Fauna	As & when required
			Soil Quality	As & when required

12	**PROGRESSIVE & FINAL MINE CLOSURE PLAN**			
12.1	**Parameters of Mining Plan vis-a-vis Mine Closure plan (When only Mine Closure Plan is being placed for approval details of approved mining plan must be provided)**			
			Approved Mining Plan	**Revised Mining Plan & Mine Closure Plan**
a.		Lease area "Ha"		1064.402 Ha (652.885 Ha within block+411.517 Ha outside block)
b.		Project Area "Ha"		1064.402 Ha

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c.	Life of the Project in Years		23 Years& 1 year of construction	
d.	Minimum and Maximum Depth of working "m"		Minimum Depth:8m Maximum Depth :214m	
e.	Geological Block "Ha"		651 Ha	
f.	Production Target "MTPA"		8 MTPA	
g.	Seams Available "as per GR"		Number of seams -2 Lajkura (6 sections) Rampur(5 sections) Total sections -11	
h.	Seams not considered for mining with reasons		Nil	
i.	Geological Reserve "Mte"		188.07 Mt	
j.	Blocked Reserve "Mte"		22.00 Mt	
k.	Minable Reserve "Mte"		166.07 Mt	
l.	Extractable Reserves " Mte"		155.91Mt	
m.	% of recovery		83 %	
	Reserve Depleted (till base date) in Mt		Nil	
	Balance Extractable Reserve in Mt		155.91Mt	
	Avg. Grade		G	
n.	OB MM3		466.03 Mcum	
o.	SR MM3/te		2.99 cum/t	
p.	Mining Technology		10-12 cum hydraulic shovel/backhoe with 100T dumper in top overburden & thick parting 5-7 cum hydraulic shovel/ backhoe with 60T dumper in thin to moderately thick parting 3800mm surface miner + 6-7 cum Front end loader + 60T dumper for coal	

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q.	Coal Beneficiation envisaged		Beneficiation requirement not considered in this proposal, however final decision in this regard shall be taken after feeding coal to power plant and analyzing quality of ROM coal.	
r.	Handling of Rejects		Not applicable	
s.	Land use pattern " Ha"			
	Excavation Area		550.95 Ha	
	Top Soil Dump		8 Ha	
	External Dump		229.70 Ha	
	Safety Zone		7.85 Ha	
	nala diversion		5.36 Ha	
	Road &,Infrastructure area		155.308 Ha(incl 86.527 Ha for despatch system)	
	Garland drain		6.27 Ha	
	Embankment		9.35 Ha	
	Green Belt		50 Ha	
	Water body		8.56Ha	
	Colony		16.959 Ha	
	Undisturbed area		16.095 Ha	
	Total Area		1064.402 Ha	

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12.2

Statutory Obligations

1. Mining Lease

The Mining Lease was applied to the State Government & after scrutiny it has been recommended to Central Government for prior approval. Previous approval has been granted by the Ministry of Coal, Government of India on 28th July 2016. Department of Steel & Mines, Govt. Of Odisha has issued the terms & conditions of the Mining Lease which were duly accepted by the OCPL. Department of Steel &Mines, Government of Odisha has issued the Grant Order and after that the Mining Lease agreement has been executed and registered with Collector, Sundargarh District on 17th May 2017.

2. Forest Clearances

State forest department has recommended the proposal for diversion of 193.739 Ha forest land in coal mine area to Central Government. The Central Government has accorded stage-1 forest clearance with some conditions. Stage II clearance was acquired by the earlier allotee OPGC by letter no F.NO 8-63/2011-FC sated 20.08.2014 and the same has been transferred to the OCPL by the MoEF (Forest Conservation Division) on 30th November 2015. After obtaining all the required clearances, Principal Secretary, Govt. of Odisha has recommended the case to the MoEF&CC, Govt. of India for the final clearance.

3. Environment Clearance

Ministry of Environment & Forest & Climate Change (MoEF& CC), Government of India had issued Terms of Reference (ToR) and accordingly the Environment Impact Assessment/Environment Management Plan (EIA/EMP) Report was submitted to Central Government. Environment Appraisal Committee (EAC), GoI has recommended the proposal for granting Environment Clearance. Environment Clearance for the Manoharpur Block was accorded to the OPGC vide letter no J-11015/139/2008-IA.II(M), earlier allotee. Same has been transferred to OCPL on 30th December 2015.

4. Consent to Establish

Application for Consent to Establish the Coal Mine has been submitted to Odisha State Pollution Control Board and the same is accorded.

5. Water allocation & permits

Approval from Central Ground Water Authority has been obtained for drawl of 950 cum/day ground water for use in the mine and an application to draw 558 cum/day water from Hirakud Reservoir has been submitted to Department of Water Resources, Govt. of Odisha. Dept of WR, GoO allocated 5.55 cusec of water from Hirakud reservoir vide its letter no. 8695/WR dated 12-04-2016.

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6. Road Diversion

There is a public road passing through the coal block area which requires diversion. The application has been filed to the State Govt. for diversion & it's is approved by the state government. Work has been awarded to the Shri Balajee EngiconPvt. Ltd., contractor.

7. Nalla Diversion

Application has been received by State Water Resources Department for diversion of Garianalla passing through coal mine area. Nalla Diversion permission transferred and vested in favour of OCPL vide Deptt. of WR letter no. 8693/WR dated 12-04-2016. MO will take up the nalla diversion work.**Power Connectivity**

For Mine construction power at 33KV has been planned commensurately approval has been obtained from WESCO for supply of 33 KV to Manoharpur coal mine. This requires construction & erection of overhead HT line and electrical substation. The work has already been awarded and currently site mobilization is under progress. The permanent power supply for mine operation shall be at 33 KV from the switchyard of NTPC's Darlipali STPP. Approval for drawl of 15 MVA load at 33 KV for this purpose has been obtained from GRIDCO &MoP, GoI.

8. Explosive Magazine

Permission from Chief Controller of Explosives has been obtained for construction of magazine. Drawing & design of Magazine are approved & obtained in-principle clearance received from PESO towards construction of magazine for storage, handling and consumption of explosives on 20.01.2016. Land has been acquired by OCPL and its construction has already started and expected to be complete by mid of 2018, after which final permission will be obtained from PESO.

9. DGMS permission

Permission from Director General of Mines Safety (DGMS) is required for starting mining operation and deployment of heavy earth moving machines in the coal mines as per the provision of Coal Mines Regulation, 1957. Process for obtaining DGMS permission has been initiated.

10. Coal Controller's permission

For opening of a coal mine, permission from Coal Controller, Ministry of Coal, is required broadly based on the above clearances & permits. The process for obtaining the permission has been initiated as the Mining Lease has already been executed and registered.

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11. **Escrow Account:**

Escrow Account has been opened with the Union Bank of India. First instalment of Mine Closure Cost will be deposited shortly after executing the agreement with the Coal Controller, Ministry of Coal, Govt. of India.

12. **Consent to Operate the Coal Mine:**

OCPL has submitted the application to Odisha State Pollution Control Board for obtaining the Consent to Operate the Coal Mine.

13. **Consent to Establish R& R Colony**

Consent to Establish R&R Colony was obtained by the OPGC, which was later transferred in the name of OCPL.

14. **Environment Clearance for R&R Colony Phase -1**

Environment Clearance for R&R Colony Phase -1 was obtained by OPGC on 13/01/2014 which was later transferred to the OCPL on 12/09/2016.

15. **Consent to operate for R&R Colony**

After the construction of R&R colony and complying the conditions mentioned in the Consent to Establish, OCPL applied for the Consent to Operate the R&R Colony, Phase-1 at Sukhabandh. OCPL has obtained the approval for the same.

12.3

WASTE MANAGEMENT (figure in Mcum)

Production year	Cummulative OB removal & fly ash disposal (cumulative)(Mcum)			External Dump & embankment (Mcum)		Internal Dump/ Backfilling (Mcum)	
	Top Soil	OB & flyash	Total	OB	Top Soil	OB	Top Soil
P-1	0.13	7.30	**7.43**	7.39	0.04		
P-2	0.28	20.36	**20.64**	19.06	0.05	1.53	
P-3	0.43	40.85	**41.28**	26.42	0.11	14.75	
P-4	0.56	68.79	**69.35**	33.42	0.11	35.82	
P-5	0.68	96.74	**97.42**	40.42	0.11	56.89	
P-6	0.77	124.72	**125.49**	45.42	0.11	79.96	
P-7	0.86	152.70	**153.56**	50.38	0.15	103.03	
P-8	0.95	180.68	**181.63**	55.32	0.21	126.07	0.03
P-9	1.04	208.66	**209.70**	61.75	0.27	147.58	0.10
P-10	1.13	239.33	**240.46**	68.67	0.35	171.27	0.17
P-11	1.22	270.00	**271.22**	72.63	0.39	197.96	0.24
P-12	1.31	300.67	**301.98**	76.59	0.43	224.65	0.31
P-13	1.40	331.34	**332.74**	80.55	0.47	251.34	0.38
P-14	1.48	360.37	**361.85**	82.89	0.51	278.00	0.45
P-15	1.52	383.08	**384.60**	82.85	0.55	300.70	0.50
P-16	1.56	402.80	**404.36**	82.81	0.59	320.41	0.55
P-17	1.60	422.48	**424.08**	82.78	0.62	340.07	0.61
P-18	1.62	440.13	**441.75**	82.78	0.62	357.68	0.67
P-19	1.62	456.98	**458.60**	82.78	0.62	374.47	0.73
P-20	1.62	473.85	**475.47**	82.78	0.62	391.27	0.80
P-21	1.62	487.08	**488.70**	82.78	0.62	404.44	0.86
P-22	1.62	495.98	**497.60**	82.78	0.62	413.28	0.92
P-23	1.62	502.07	**503.69**	82.78	0.62	419.29	1.00

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	Parameters	Details	Observati

12.4 Biological and technical reclamation of mined out land

Stage/ Year(Production year)		Land Degraded				Technically Reclaimed Area			
		Excav	Dump (Extn + Top Soil)	Infra/ others	Total	Backfill	Dump (Extn + Top Soil)	Others	Total
Y-1(Con)	18-19			32.0	32.0				
Y-3	20-21	106.03	67.6	259.657	433.287		27.6	24.0	51.60
Y-5	22-23	210.45	115.55	259.657	585.657	83.7	95.5	48.0	227.20
Y-10	27-28	393.90	237.70	259.657	891.257	219.0	157.70	84.0	460.70
Y-15	32-33	508.24	237.70	259.657	1005.597	335.0	197.70	95.85	628.55
Y-20	37-38	535.40	237.70	259.657	1032.757	387.0	237.70	95.85	720.55
Y-24	41-42	550.95	237.70	259.657	1048.307	411.95	237.70	95.85	745.50
Post Closure									
Y-27	44-45	550.95	237.70	259.657	1048.307	457.552	237.70	259.657	954.909

Biological Reclamation (Cumulative in "Ha")

Year/Stage		Biologically Reclaimed Area					Un Disturbed	To be left for Public/company Use
		Agriculture	Plantation	Water Body/void	Forest land (Return)	Total		
Y-1(Con)	18-19						1032.402	
Y-3	20-21		25.0			25.0	631.115	
Y-5	22-23		88.5			88.5	478.745	
Y-10	27-28		272.0			272.0	173.145	
Y-15	32-33		442.0			442.0	58.805	
Y-20	37-38		616.0			616.0	31.645	
Y-24	41-42		705.50			705.50	16.095	
Post Closure								
Y-27	44-45		633.951	47.67	273.288	954.909	16.095	93.398

12.5	**Water Quality management :** (Existing water bodies available in the lease hold area; Measures to be taken for protection of the same including control of erosion,sedimentation, siltation,water treatment, diversion of water course if any; Measures for protection of Contamination of ground water from leaching etc; Quality of surface water bodies and measures proposed to meet the water quality; Report of hydrological study of the area ; Water Balance Chart etc)	Garia Nalla having seasonal presence flows through northern & south-eastern corner of the property. Part of Garia nalla flowing through the block is proposed for straightening and diversion. Details in chapter of environmental management (Chapter-X of Revised MP & MCP).

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12.6 Top Soil Management – (Including Action plan for Top Soil management)

Year/ Stage	Top Soil Removal "MM3"	Top Soil Used: Embankment	Top Soil Used: Spreading over the backfilled area	Top Soil Used: Spreading over the ob dump area	Top Soil Used: Using for Green Belt area	Total utilised ts	Temp. TS storage
P1(1st year)	0.13				0.04	0.04	0.09
P3(3rd year)	0.43	0.01		0.06	0.04	0.11	0.32
P5(5th year)	0.68	0.01		0.06	0.04	0.11	0.57
P10(10th	1.13	0.01	0.17	0.30	0.04	0.52	0.61
P15(15th	1.52	0.01	0.5	0.50	0.04	1.05	0.47
P20(20th	1.62	0.01	0.8	0.57	0.04	1.42	0.20
P23(23rd	1.62	0.01	1.0	0.57	0.04	1.62	

12.7	**Coal beneficiation and management of Coal Rejects, proposal regarding future maintenance and dismantling of structures, slurry pond and rejects**	Beneficiation requirement not considered in this proposal, however final decision in this regard shall be taken after feeding coal to power plant and analyzing quality of ROM coal.
12.8	**Infrastructure to be retained and to be dismantled and measures to be taken for their physical stability and maintenance for the retained infrastructure facilities;**	Mine will not be closed after 23 years of production, the same will be continued into dip-side block. So all the infrastructure will have to retained for future mining operation. Detailed given in Chapter -XI (para 11.18 & 11.19 of Mine closure chapter) of the revised mining plan & mine closure plan
12.9	**Decommissioning of mining equipment and their possible post mining use**	Mining equipments will continue to work in mining operations of the dip-side block. Equipments will be decommissioned only after exhaustion of reserve in dip-side block. Details will be summarized in future mining plan covering dip-side block. Detailed given in Chapter -XI (para 11.18 & 11.19 of Mine closure chapter) of the revised
12.10	**Safety measures to be implemented to prevent access to surface opening for underground working, excavation etc (fencing to be carried out by barbed wires**	Mine will not be closed & will be continued in dip-side block. All the safety measures during progressive closure will be followed as per statutory rules. Detailed given in Chapter -XI (para 11.21 of Mine closure chapter) of the revised mining plan & mine closure plan
12.11	**Economic Repercussions of closure of mine - Manpower retrenchment, compensation to be given, socio-economic repercussions and remedial measures consequent to closure**	Mine will not be closed & will be continued in dip-side block. Detailed given in Chapter -XI (para 11.22 of Mine closure chapter) of the revised mining plan & mine closure plan.
12.12	**Time scheduling for abandonment with bar chart for the life of the project plus 3 years**	Enclosed in 11.28 para of Chapter-XI (Mine closure chapter) of the revised mining plan & mine closure plan

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12.13 **Cost of Activities to be taken up for closure of the mine**

Head		Unit	Quantity	Rate Rs/Unit	Amount "Rs Cr"
	Water quality management (DRINKING)	No	36	9295	0.80
	Water quality management (SURFACE)	No	8	9551	0.18
	Water quality management (EFFULENT)	No	48	2387	0.27
Progressive Closure	**Water quality management (TOTAL)**	No			**1.26**
	Air quality management	No	96	37592	8.66
	Waste management	M Cum	219	0	0.00
	Barbed wire fencing around dump	m	16460	800	1.32
	Barbed wire fencing around the Pit	m	5749	800	0.46
	Filling of Void – Remanding of Crown Dump	MM^3			
	Top Soil Management	MM^3	1.62	50	8.10
	Technical & Biological Reclamation of Mined out of land and OB Dump	Ha	641.65	425000	27.21
	Plantation over virgin area including green belt	Ha	103.85	425000	4.41
	Manpower Cost and supervision	No	7	130416.67	2.19
	Toe wall around the dump	m	16460	8500	13.99
	Garland drain	m	5749	7250	4.17
	Garland Drain around the dump	m	16460	7250	11.93
	Any other activity				
Dismantling of Infrastructure & Disposal/Rehabilitati	Dismantling of Workshop, CHP, Store	Sqm	125000	650	8.13
	Rehabilitation of the dismantling Facilities	Sqm	LS		0.813
	Dismantling of pumps and pipes/ other facilities		LS		1.00
	Dismantling of UG equipment				
	Rearranging water pipeline to dump top park/ agriculture land		LS		0.20
	Dismantling of Power lines	m	3000	150	0.045
Safety and Security	Barbed wire fencing around dump	m	16460	800	
	Barbed wire fencing around the pit	m	5749	800	
	Concrete wall with Masonairy Pillars around the pit	m	2874.5	8100	2.33
	Security air shaft and installation of borewell pump	LS	0.00		0.00
	Securing of incline	Ls	0.00		0.00
	Concrete wall fencing around the water body	m	2874.5	7000	2.01
	Toe wall around the dump	m	16460	8500	
	Garland drain	m	16460	8300	
	Garland drain around the dump	m	16460	8300	
	Drainage channel from the main Ob dump	m			0.00
Technical & Biological Reclamation of Mined Out of Land and OB Dump	Filling of void	MM^3			0.00
	Top Soil managemengt	MM^3	1.62		0.00
	OB rehandling for backfilling	MM^3			0.00
	Terracing, blanketing with soil and vegetation of External OB dump	Ha	LS		2.00
	Peripheral road	m	6785	3100	2.10
	Gate. View points with cemented steps	No	1	240000	0.02
	Expenditure on development of Agricultural land	Ha	LS		2.00
	Landscaping and plantation	Ha	254	500000	12.49

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	Post Closure Management & Supervision	Power Cost				
		Post Mining water quality management (DRINKING0	No	24	9295	0.07
		Post Mining water quality management (EFFLUENT)	No	24	2387	0.02
		Water quality management (TOTAL)				**0.08**
		Post Mining air quality management		72	37592	0.81
		Subsidence monitoring for 5 years				
		Waste management	MM^3			
		Manpower Cost & supervision	No	7	4840000	10.16
	Others	Enterprenuership development (vocational/skill development training for sustainable income of affected people	No	618	0.01	6.18
		Golden Handshake / Retrenchment benefits to employees of OC	No	50	0.48	14.25
		Onetime financial grant to societies / institutions /organisations which is dependent upon the project	No	LS		2.43
		Provide jobs in other mines of the company (PAFs)	No	0		
		Continuation of other services like running of school etc	No	1	500000	14.40
	Total					**165.17**

12.14 Amount to be deposited in Escrow account as a security against the mine activities to be carried out for the closure of the mine

WPI as on August 09	Aug-09	129.60
WPI as on base date "Base Date for the Mining Plan / Mine Closure Plan"(base year 2011-12)		115.8 180.7638
Escalation rate of closure cost		1.39478241
Rate of compounding of Annual Closure Cost		5.00 %
	UG	OC
Base Rate of Closure Cost "Rs. Lakh. /Ha."		6.00
Closure Cost "Rs. Lakh./Ha"		8.3686944
Project Area		1064.402
Amount to be deposited into Escrow Account "Rs. in Crs."		165.1702
Net Amount to be deposited into Escrow Account "Rs. in Crs."		165.1702
Balance Life of the project "in Yrs"		24
Annual Closure Cost " Rs in Lakhs"		371.1523

13	**Responsibility of Mine owner**	Ref. para11.26 of Chapter -XI of Revised Mining plan & Mine Closure Plan.		
14	**Provision of Mine Closure**	Ref. para11.27 of Chapter-XI of Revised Mining plan & Mine Closure Plan.		
15	**ANNEXURES**			
I.	Copy of allotment order / vesting order	**Mandatory**	Enclosed at **Enclosure-1 in revised MP & MCP**	
II.	Certificate of CMPDIL that the project boundary considered for the Mining Plan is in coherence with the block boundary vested with the allottee.	**Mandatory**	Enclosed at **Enclosure-15 in revised MP & MCP**	

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III.	Approvals of Mine Closure plan from the Board of the company	**Mandatory**	Enclosed as **Annexure- 32 in revised MP & MCP**	
IV.	Copy of earlier approved of mining plan.	**Mandatory**	Enclosed as **Enclosure-2 in revised MP & MCP**	
V.	Copy of MOC's letter granting recognition to RQP for preparation of Mining Plan.	**Mandatory**	Enclosed at **Enclosure-3 in revised MP & MCP**	
VI.	Letter of authorization by the Block allottee for formation of Mining Plan & Mine Closure Plan by the RQP.	**MP & MCP**	Enclosed as **Enclosure-4 in revised MP & MCP**	
VII.	Certificate of acceptance of the RQP to formulate the Mining Plan & Mine Closure Plan on behalf of the project proponent	**MP & MCP**	Enclosed as **Enclosure-5 in revised MP & MCP**	
VIII.	A certificate by the RQP that he has been duly authorized by the mining company to prepare Mining Plan & MCP on their behalf and that he has a valid recognition from MOC under MCR, 1960 to prepare the Mining Plan and that provisions of all relevant rules and regulations made there under have been observed in the preparation of mining plan.	**MP & MCP**	Enclosed as **Enclosure-5 in revised MP & MCP**	

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IX.	The Mining Plan / Mine Closure Plan has been prepared considering the guidelines pertaining to mining plan/ mine closure plan issued by MoC, GoI & wherever specific permission will be required the applicant will approach the concerned authorities.	**MP & MCP**	Enclosed as **Annexure-33 in revised MP & MCP**	
X.	Confirmation from RQP that he has verified the block area with the relevant plans supplied by CMPDI/SCCL/NLC and area covered by the mining plan does not encroach on any other coal lignite block.	**MP**	Enclosed as **Enclosure-7 in revised MP & MCP**	
XI.	Certificate from empowered representative of / or Block allottee/ applicant that the mine will be developed as per the approval of the mining plan from Ministry of Coal and all other approvals, as required will be obtained from relevant authorities	**MP**	Enclosed as **Enclosure-6 in revised MP & MCP**	
XII.	Copy of the document to establish that the geologist report has been duly purchased from CMPDI, GSI/ MECL as the case may be.	**MP**	Enclosed as **Enclosure-8 in revised MP & MCP**	

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XIII.	Certificate of RQP that the project boundary considered for the Mining Closure Plan has been verified by RQP. It is in coherence with the block boundary of vesting order and approved mining plan and no discrepancy has been found.	**MP & MCP**	Enclosed as **Enclosure-7 in revised MP & MCP**	
XIV.	Certificate that the Mine Plan & Mine Closure Plan have been prepared in line with the approved Mining Plan and the mine parameters considered for formulation of mine closure plan is exactly the same, which has been approved in the Mining Plan.	**MP & MCP**	NA	
XV	Certificate from empowered representative of / or Block allottee/ applicant that he mine that the reclamation & rehabilitation work shall be carried out in accordance with the approved mine closure plan and any modification /amendments which may be made in the mine Closure Plan by Ministry of Coal, from time to time.	**MP & MCP**	Enclosed as **Annexure-32 in revised MP & MCP**	
XVI	Documents in support of Mining Lease, in case the lease has already been granted.	**MP & MCP**	Enclosed as **Annexure-2 in revised MP & MCP**	

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XVII	Hydrological study carried out if any.	**MP & MCP**	Enclosed as **Annexure-7 in revised MP & MCP**	
XVIII	Other document	**MP & MCP**	Enclosed as different Annexure mentioned in Revised MP & MCP	
XIX	Environment Clearance to previous allottee & Transfer to current allottee	**MP & MCP**	Enclosed as **Annexure-3 in revised MP & MCP**	
XX	Stage – I FC diversion approval from MoEF & CC to the previous allottee & Transfer to current allottee	**MP & MCP**	Enclosed as **Annexure-4 in revised MP & MCP**	
16	**LIST OF PLANS**			
I	Location plan	**MP & MCP**	Enclosed as Gen-I & II of Revised MP &MCP	
II	Reference no. of plan of block boundary issued by CMPDI/ SCCL/ NLC (A copy of the Plan also to be annexed)	**MP**	Enclosed as Annexure-27 & Enclosure-15 of Revised MP &MCP	
III	Plan in scale of not less than 1: 10000 showing approved block boundary vis-à-vis proposed/existing mining lease & Mine boundary superimposed over it in distinct colour.	**MP & MCP**	Enclosed as Gen-III of Revised MP &MCP	
IV	Geological plan showing all the boreholes drilled and proposed to be drilled showing allotted block boundary and required lease area	**MP & MCP**	Enclosed as G-I of Revised MP &MCP	
V	Graphic Litholog	**MP & MCP**	Enclosed as G-XIV of Revised MP &MCP	

VI	Surface Plan showing drainage system, Contour , at minimum 3m interval, location of BH	**MP & MCP**	Enclosed as G-II of Revised MP &MCP	
VII	Conceptual plan showing infrastructure facilities including colony, boundary of mining area, mine entries, roads including road diversion alignment etc	**MP & MCP**	Enclosed as Gen-V,VI of Revised MP &MCP	
VIII	Land use plan showing Govt, forest and Tenancy land	**MP & MCP**	Enclosed as Gen-IV of Revised MP &MCP	
IX	Floor contour plan and seam folio plan, iso-grade plan	**MP & MCP**	Enclosed as G-III to G-XII of Revised MP &MCP	
X	X-section showing coal/Lignite seams	**MP & MCP**	Enclosed as G-XV of Revised MP &MCP	
XI	Plan showing existing and proposed surface layout	**MP & MCP**	Enclosed as Gen-V of Revised MP &MCP	
XII	Post mining land use plan	**MP & MCP**	Enclosed as MIN-VIII of Revised MP &MCP	
XIII	Progressive mine closure plan/ stage plan indicating stages at 1st,3rd, 5th, 10th, and 20th interval (showing area, volume, dump height etc for OC and seam-wise layout projects and ventilation system in UG)	**MP & MCP**	Enclosed as MIN-I to MIN-VI of Revised MP &MCP	
XIV	Reclamation plan	**MP & MCP**	Enclosed as MIN-IX of Revised MP &MCP	
	OPENCAST MINES			
XV	Plan showing total coal thickness and overburden thickness and stripping ratio	**OC**	Enclosed as G-XIII of Revised MP &MCP	
XVI	Final stage quarry plan showing haul road alignment	**OC**	Enclosed as MIN-VII of Revised MP &MCP	

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	UNGRAOUND MINES			
XVII	Plan showing mode and location of entries and surface layouts	**UG**	NA	
XVIII	Layout of the panel for each system Longwall, Bord & Pillar, road header should be given)	**UG**	NA	
XIX	Layout of pillar extraction	**UG**	NA	
XX	Support system	**UG**	NA	
XXI	Haulage and transport system	**UG**	NA	

All the data regarding earlier approved Mining Plan, data related to land, R& R, block allotment & lease have been communicated by OCPL.

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5.19 EQUIPMENT SCHEDULE

Based on yearly work load and annual productivities of the excavators, excavator requirement has been assessed. Dumpers have been calculated as per year wise average lead separately for coal, partings and top overburden. Following table shows year-wise average lead distances for coal and overburden.

Table – 5.13

Average Lead Distances (km)

Particulars	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10
Overburden	2	2.25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Coal	1.75	2.0	2.25	2.5	3.0	3.0	3.0	3.0	3.0	3.0

Requirement of HEMM is given below:

Table – 5.14

Equipment Phasing

Equipment Name	Size/Spec.	Total Required	P1 (Yr1)	P2 (Yr2)	P3 (Yr3)	P4 (Yr4)	Beyond yr4
		No.	No.	No.	No.	No.	No.
Overburden							
Hydraulic Shovel/Backhoe	10-12 cum	8	2	2	2	2	
Hydraulic Shovel/Backhoe	5-7 cum	3	1		1	1	
Rear Dumper	100 T	74	17	18	17	17	5
Rear Dumper	60 T	25	7	3	7	8	
Drill	250 mm	10	3	2	2	2	1
Drill	160 mm	2		1			1
Crawler Dozer with Ripper	860 HP	4		1		1	2
Crawler Dozer	410 HP	7	2	1	2	1	1
Coal							
Surface Miner (~900HP)	3.8m wide	3	1	1	1		
Front End Loader	6-7 cum	3	1	1	1		
Wheel Dozer	450 HP	3		1	1	1	
Rear Dumper	60 T	25	4	3	8	10	
Common Equipments							
Rough Terrain Crane	75 T	1	1				
Rough Terrain Crane	20 T	1	1				
Pick-n-Carry Crane	8 T	2	1	1			

Diesel Hyd. Backhoe	1-1.5 cum	1		1			
Tipping truck	16 T	5		5			
Water Sprinkler	70 KL	2				1	1
Water Sprinkler	28 KL	4	1	1	1		1
Truck Mounted Mobile Canon/Atomizer		2		2			
Maintenance van		4		1	1	1	1
Tyre Handler		1	1				
Vibratory Compactor		2	1			1	
Motor Grader	280 HP	3	1		1	1	
Fire Tender	14 KL	2	1			1	
Fuel Bowser	9 KL	3	1	1	1		
Land Reclamation							
Crawler Dozer with wide blade	410 HP	2	1		1		
Crawler Dozer	410 HP	1				1	
Motor Grader	280 HP	1				1	
Front end loader/Scraper	2-3 cum	2		1		1	
Tipping truck	12-16 T	8		4		4	
Farm Tractor with Trailor		2			1	1	

MINING BY OUTSOURCING AGENCY/ MINE OPERATOR

Assessment of equipment as shown in table 5.14 is for departmental variant based on 330 days working and as per CMPDI productivity norms. However if the mine is totally operated by outsourcing agencies requirement of mining machinery will be different depending on working hours and utilization of available hours as practiced by outsourcing agency. Number/Requirement of HEMM as assessed for departmental variant as shown in table5.14 should not be taken for estimating cost of mining by outsourcing agency while selection of outsourcing agency. Similar type of machinery may be adopted for operational and technical efficieny but number of equipment will vary according to working hours and utilization of machine by outsourcing agency. A fresh assessment of number of machinery and it's phasing may be worked out in detail while preparing cost estimate for selection of mine operator in future. However if required, in coal & in inseam band/ parting smaller size eqyuipment may be deployed for operational efificiency.

electric RBH drills in top overburden, parting between Rampur and lajkura Bottom, parting between Lajkura Bottom and Lajkura Middle and parting between Lajkura Middle and Lajkura Top. Other partings are generally thin and may be drilled by using 160mm drills. In coal for conventional extraction, 160mm dia elect. RBH drills are envisaged.

Total requirement of drills is assessed on 2 shift operation, physical deployment and productivity of drills. The annual productivity of drills adopted is given below:

250mm drills in OB/IB	-	35,000m
160mm drills in coal	-	32,000m
160mm drills in thin OB/IB	-	28000m

The tentative blasting pattern in coal and overburden is given below:

Table-5.15

Description	Unit	Overburden		Coal
Bench height	m	8-12	Upto 8	Upto 10
Blasthole dia	mm	250	160	160
Spacing & burden	m	9.0 x 8.0	6.5 x 5	7 x 6

For best fragmentation result with minimum fly rock, trial blasts are recommended.

5.20 MINE DEWATERING

The make of water in the mine is due to strata water and rainfall. The maximum rainfall in Sundargarh area, where this mine is located is 250mm in 24hrs recorded in 1975. The pumping requirement thus calculated considering rainfall of 170mm in 24hours and the dewatering time has been estimated as 3days. The requirement of the pump is as follows.

Sump will be created at the dip-most point of quarry. Channels shall be created so that the entire water gravitates into this sump. Face pumps will be provided at different locations for strata water as well as for rain water accumulation. The catchment area shall decrease gradually

by backfilling as the water from the backfilled area will be made to gravitate into the garland drains. The pumping requirement will vary from 70M^3/min during initial five years to 120M^3/min during subsequent years.

The pumping requirement will be met by introducing suitably selected pumps from the following alternatives:

1. 38lps X 60m. head X 37KW pumps or equivalent for face pumping upto 2nd year.
2. 80lps X 150m.head X 166KW pumps or equivalent upto 5th year.
3. 120lps X 190m.head X 300KW pumps or equivalent during subsequent years.
4. 225lps X 340m.head X 1100KW pumps or equivalent during subsequent years.
5. Diesel pumps & slurry pumps as per requirement.

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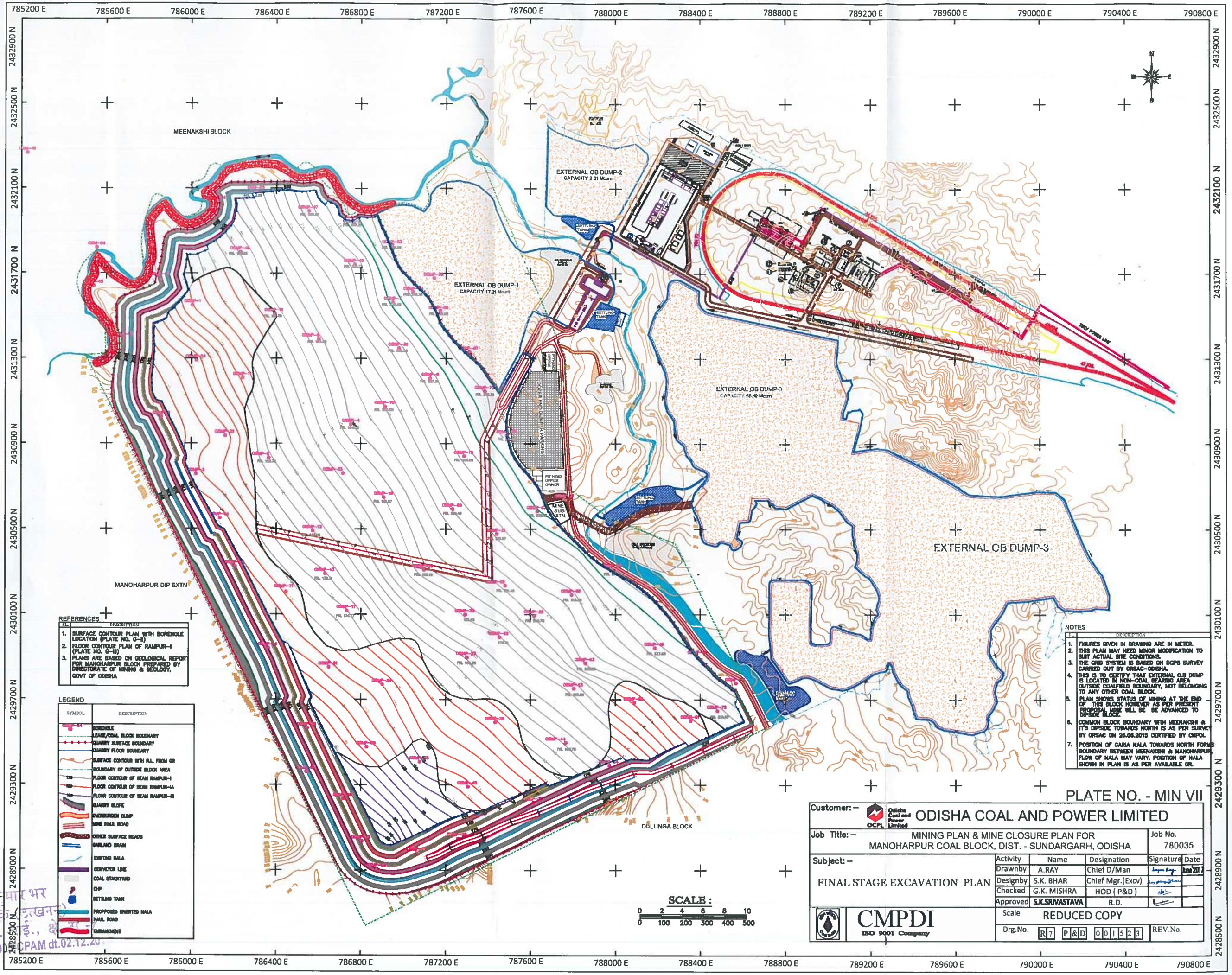
Ref. No. 34011/(22)2005-CPAM dt.02.12.2010



REFERENCES

SL	DESCRIPTION
1.	SURFACE CONTOUR PLAN WITH BOREHOLE LOCATION (PLATE NO. G–II)
2.	FLOOR CONTOUR PLAN OF RAMPUR–I (PLATE NO. G–III)
3.	PLANS ARE BASED ON GEOLOGICAL REPORT FOR MANOHARPUR BLOCK PREPARED BY DIRECTORATE OF MINING & GEOLOGY, GOVT OF ODISHA

LEGEND

SYMBOL	DESCRIPTION
	BOREHOLE
	LEASE/COAL BLOCK BOUNDARY
	QUARRY SURFACE BOUNDARY
	QUARRY FLOOR BOUNDARY
	SURFACE CONTOUR WITH R.L. FROM GR
	BOUNDARY OF OUTSIDE BLOCK AREA
170	FLOOR CONTOUR OF SEAM RAMPUR–I
160	FLOOR CONTOUR OF SEAM RAMPUR–IA
150	FLOOR CONTOUR OF SEAM RAMPUR–III
	QUARRY SLOPE
	OVERBURDEN DUMP
	MINE HAUL ROAD
	OTHER SURFACE ROADS
	GARLAND DRAIN
	EXISTING NALA
	CONVEYOR LINE
	COAL STACKYARD
	CHP
	SETTLING TANK
	PROPPOSED DIVERTED NALA
	HAUL ROAD
	EMBANKMENT

SCALE :

0 2 4 6 8 10
0 100 200 300 400 500

NOTES

SL	DESCRIPTION
1.	FIGURES GIVEN IN DRAWING ARE IN METER.
2.	THIS PLAN MAY NEED MINOR MODIFICATION TO SUIT ACTUAL SITE CONDITIONS.
3.	THE GRID SYSTEM IS BASED ON DGPS SURVEY CARRIED OUT BY ORSAC–ODISHA.
4.	THIS IS TO CERTIFY THAT EXTERNAL O.B DUMP IS LOCATED IN NON–COAL BEARING AREA OUTSIDE COALFIELD BOUNDARY, NOT BELONGING TO ANY OTHER COAL BLOCK.
5.	PLAN SHOWS STATUS OF MINING AT THE END OF THIS BLOCK HOWEVER AS PER PRESENT PROPOSAL MINE WILL BE BE ADVANCED TO DIP–SIDE BLOCK.
6.	COMMON BLOCK BOUNDARY WITH MEENAKSHI & IT'S DIPSIDE TOWARDS NORTH IS AS PER SURVEY BY ORSAC ON 26.06.2015 CERTIFIED BY CMPDI.
7.	POSITION OF GARIA NALA TOWARDS NORTH FORMS BOUNDARY BETWEEN MEENAKSHI & MANOHARPUR, FLOW OF NALA MAY VARY. POSITION OF NALA SHOWN IN PLAN IS AS PER AVAILABLE GR.

PLATE NO. - MIN VII

Customer: – Odisha Coal and Power Limited (OCPL) ODISHA COAL AND POWER LIMITED

Job Title: – MINING PLAN & MINE CLOSURE PLAN FOR MANOHARPUR COAL BLOCK, DIST. - SUNDARGARH, ODISHA

Job No. 780035

Subject: – FINAL STAGE EXCAVATION PLAN

Activity	Name	Designation	Signature	Date
Drawnby	A.RAY	Chief D/Man		June 2017
Designby	S.K. BHAR	Chief Mgr.(Excv)		
Checked	G.K. MISHRA	HOD (P&D)		
Approved	S.K.SRIVASTAVA	R.D.		

CMPDI ISO 9001 Company

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Drg.No. R7 P&D 0 0 1 5 2 3 REV.No.

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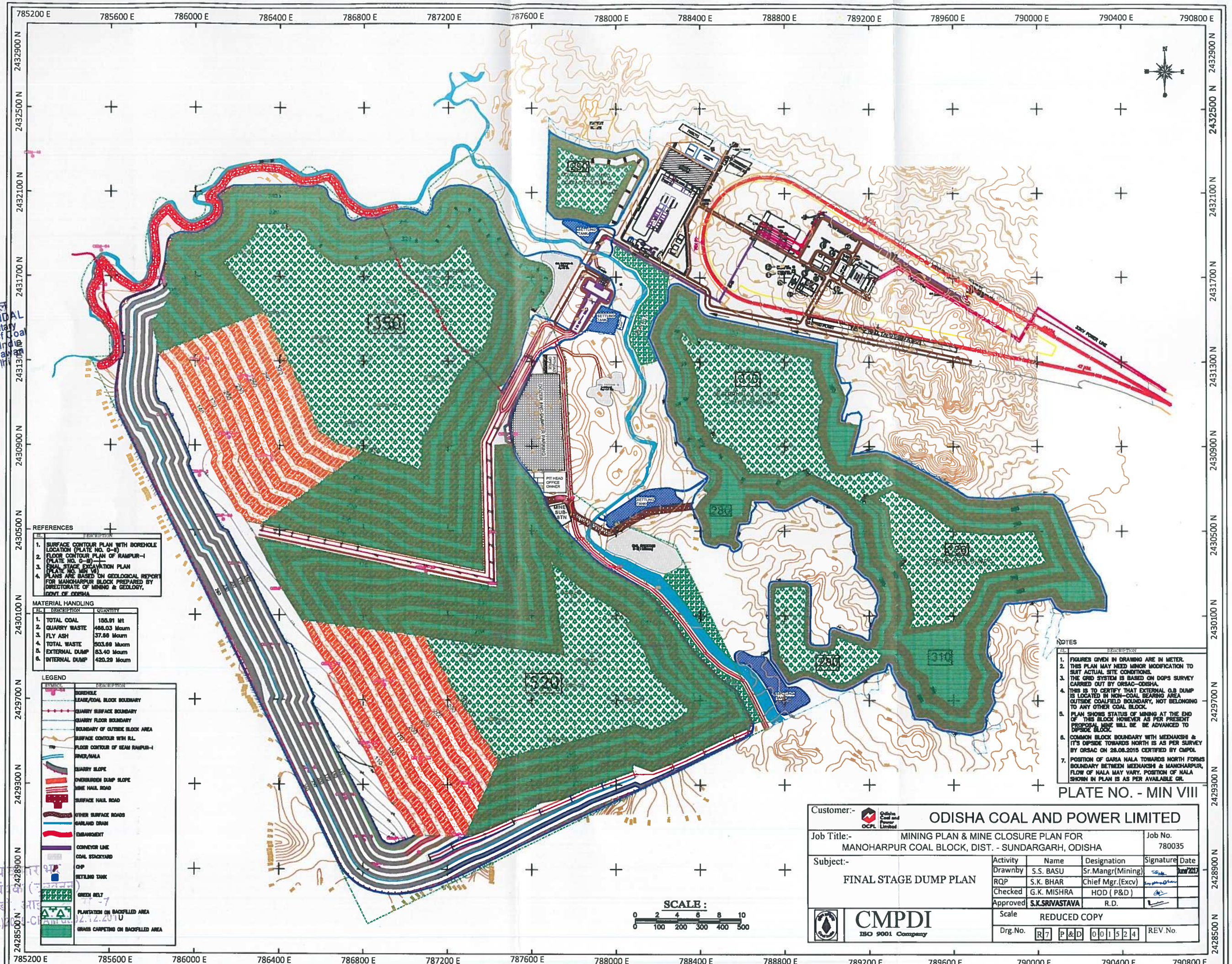
सी. एम. पी. डी. इ., क्षे. का.
Ref. No. 34011/(22)2007-CPAM dt.02.12.20



REFERENCES

SL.	DESCRIPTION
1.	SURFACE CONTOUR PLAN WITH BOREHOLE LOCATION (PLATE NO. G-II)
2.	FLOOR CONTOUR PLAN OF RAMPUR-I (PLATE NO. G-III)
3.	FINAL STAGE EXCAVATION PLAN (PLATE NO. MIN VII)
4.	PLANS ARE BASED ON GEOLOGICAL REPORT FOR MANOHARPUR BLOCK PREPARED BY DIRECTORATE OF MINING & GEOLOGY, GOVT OF ODISHA

MATERIAL HANDLING

SL.	DESCRIPTION	QUANTITY
1.	TOTAL COAL	155.91 Mt
2.	QUARRY WASTE	466.03 Mcum
3.	FLY ASH	37.66 Mcum
4.	TOTAL WASTE	503.69 Mcum
5.	EXTERNAL DUMP	83.40 Mcum
6.	INTERNAL DUMP	420.29 Mcum

LEGEND

SYMBOL	DESCRIPTION
●	BOREHOLE
- - -	LEASE/COAL BLOCK BOUNDARY
-+-+-	QUARRY SURFACE BOUNDARY
—	QUARRY FLOOR BOUNDARY
-·-·-	BOUNDARY OF OUTSIDE BLOCK AREA
~	SURFACE CONTOUR WITH R.L.
~	FLOOR CONTOUR OF SEAM RAMPUR-I
~	RIVER/NALA
▨	QUARRY SLOPE
🟧	OVERBURDEN DUMP SLOPE
═	MINE HAUL ROAD
🟥	SURFACE HAUL ROAD
▬	OTHER SURFACE ROADS
—	GARLAND DRAIN
▬	EMBANKMENT
▬	CONVEYOR LINE
▨	COAL STACKYARD
●	CHP
🟦	SETTLING TANK
🟩	GREEN BELT
△	PLANTATION ON BACKFILLED AREA
🟩	GRASS CARPETING ON BACKFILLED AREA

NOTES

SL.	DESCRIPTION
1.	FIGURES GIVEN IN DRAWING ARE IN METER.
2.	THIS PLAN MAY NEED MINOR MODIFICATION TO SUIT ACTUAL SITE CONDITIONS.
3.	THE GRID SYSTEM IS BASED ON DGPS SURVEY CARRIED OUT BY ORSAC-ODISHA.
4.	THIS IS TO CERTIFY THAT EXTERNAL O.B DUMP IS LOCATED IN NON-COAL BEARING AREA OUTSIDE COALFIELD BOUNDARY, NOT BELONGING TO ANY OTHER COAL BLOCK.
5.	PLAN SHOWS STATUS OF MINING AT THE END OF THIS BLOCK HOWEVER AS PER PRESENT PROPOSAL MINE WILL BE BE ADVANCED TO DIPSIDE BLOCK.
6.	COMMON BLOCK BOUNDARY WITH MEENAKSHI & IT'S DIPSIDE TOWARDS NORTH IS AS PER SURVEY BY ORSAC ON 26.06.2015 CERTIFIED BY CMPDI.
7.	POSITION OF GARIA NALA TOWARDS NORTH FORMS BOUNDARY BETWEEN MEENAKSHI & MANOHARPUR, FLOW OF NALA MAY VARY. POSITION OF NALA SHOWN IN PLAN IS AS PER AVAILABLE GR.

PLATE NO. - MIN VIII

Customer:- OCPL Odisha Coal and Power Limited **ODISHA COAL AND POWER LIMITED**

Job Title:- MINING PLAN & MINE CLOSURE PLAN FOR MANOHARPUR COAL BLOCK, DIST. - SUNDARGARH, ODISHA

Job No. 780035

Subject:- FINAL STAGE DUMP PLAN

Activity	Name	Designation	Signature	Date
Drawnby	S.S. BASU	Sr.Mangr(Mining)	SSB	June'2017
RQP	S.K. BHAR	Chief Mgr.(Excv)		
Checked	G.K. MISHRA	HOD (P&D)		
Approved	S.K.SRIVASTAVA	R.D.		

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भारत सरकार / Govt. of India
शास्त्री भवन / Shastri Bhawan
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संजय [illegible] भर
मुख्य प्रबंधक ([illegible])
सी. एम. पी. डी. आई
Ref. No. 34011/(22)20[illegible]-CPAM dt. 02.12.201[illegible]

Chapter – VI

MANPOWER, SAFETY & SUPERVISION

6.1 INTRODUCTION

With a target production of about 8 MTPA, the property represents a significant production stream.

To support the levels of operations envisioned, it is critical to ensure that the mine is staffed with extremely competent people at all levels from management to operators and support staff. The knowledge of a competent workforce is directly reflected in higher productivity, safe working environments, well implemented EMPS and ultimately lower costs of operating the mine as a whole.

Therefore, the recruitment, organization, training and apprenticeship programme are key to the successful operation of the mine in order to ensure a highly efficient workforce that is easily self sustaining through normal workforce changes and turnovers.

6.2 PERSONNEL AND SKILL REQUIREMENTS

All mining operations are typical in their progress cycles, which can be classified into the following phases:

- Startup Mode
- Operational Mode
- Closure Mode

Peak workforce requirements are usually encountered in the overlap of the startup and operational mode transition. Similarly, a phased reduction of the workforce is seen as the mine goes from the operational to closure phase, and the workforce is moved to other operations or personnel are provided retirement packages as the mine ceases operations.

The skill levels of people, the overall composition and organizational structure vary during these phases. In the initial startup phase, much of the construction, equipment erection and commissioning work are effected by contractors and vendors. However, this phase requires a core group of highly skilled professional engineers, project managers, a core group of supervisors and skilled labor.

Furthermore, the equipment erection phase is the perfect time to establish and train a group of skilled maintenance crew for the various pieces of equipment and infrastructure support personnel. For example, welders needing training on shovel assembly and mechanics and electricians needing to known the working of shovels, excavators, conveyors, etc., can be brought together into a core group, and hands-on training can be conducted at this stage. This represents an ideal training ground to familiarize the mechanical, electrical and support staff on the intricacies of the equipment and its operations (including coal handling plant and crushing plant).

As the operation transitions into production ramp up (usually over period of three to five years), the group is brought together and matures into streamlining the production activities. Equipment operators can be trained during the construction and startup phase in simulators and vendor-based equipment training at the equipment vendor site. Once erection and commissioning of equipment and facilities are completed, additional training is conducted on site with the actual equipment. Onsite vendor support should be maintained for the first year to smoothen out any issues with the equipment and its operations.

This ramp up period also allows the development of the key operational centres and its personnel such as:

- Mine operations
- Plant operations
- Infrastructure Management
- Fixed plant management

- Safety
- Human resources

The need for a key group of experienced personnel at the higher levels of operations management and supervision is key to ensure that the mine comes in-line smoothly and that operations can proceed satisfactorily. These key people should be mine managers, electrical engineers and supervisors, mechanical engineers and supervisors, maintenance managers and supervisors. This core group should be enough experienced and to be recruited with due care so that they can bring their experience to adopt quickly on getting the pre-operational and operational mining activities to speed simultaneously helping to recruit, train and organize the operational structure.

This ramp up period of four years also represents an ideal apprenticeship period where new recruits can be trained on various functional activities from surveying, data entry, electrician helper, mechanics helper, engine repairman, etc. The apprenticeship programme should be such that all entrants are screened initially and during the apprenticeship period, so that only the most suitable personnel are matched up with their job functions. Failure to implement this, will lead to poor productivity and unsafe working environments.

Once process and protocols have been established at this stage for the recruitment and training of new hires (promotion and cross-training of existing personnel), all these processes should be clearly documented, and then documentation becomes part of the training programme. The establishment of a work system that is well defined, detailed and described (documented) for all aspects of the operations is a critical part of the personnel development.

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6.3 MANPOWER BUILDUP

The development of the Manoharpur Mine will take place during the first three to four years of operation. During year-1 to year-2, the mine will not reach at its rated production, and the larger size equipments will not be employed. Accordingly, the manpower builds up as production increases, and the full equipment fleet is commissioned. As mentioned in clause no.5.16 (Chapter-V), the mine will be developed and operated by a prospective Mine Operator (MO), it is envisaged that the required manpower shall be engaged by the MO for the development and day to day operation of the mine, coal handling plant including other allied activities. Table 6.01 below, shows this buildup of manpower broken down by compensation grade.

Departmental manpower has been assessed by OCPL for the mining operation which is summarized below:

Table: 6.01

Manoharpur Manpower (Departmental) for MO Mode

	Exe.	Non-Ex.	Total
Co. Office	18	3	**21**
Site	73	36	**109**
TOTAL	**91**	**39**	**130**

The company has prepared a statutory and non-statutory requirement of manpower taking into consideration lead time for training and external hiring. The Board of Directors have approved a manpower budget of 130 positions for Corporate and Site office in the first phase. To achieve the milestones and carrying out different jobs a dedicated team of 32 officials have been deputed to OCPL from OPGC. Apart from the deputed employees, a few employees have been taken in direct contract & outsourcing pay roll as per the approval of the Board for supporting the work of the Company.

Company will also have 15 persons for the initial 3 years of CHP construction & operation for the supervision (2 years construction & 1 year operation on contractual basis). After initial 1st year of operation of CHP, MO will operate & maintain the CHP.

Coal extraction, loading, transport, overburden drilling & blasting, excavation and transportation and other auxiliary activities in the mine will be done by outsourcing agencies. Assessment of same will widely vary as per contract and mine operator. However a tentative assessment of operation manpower for the above activities have been done by OCPL and are summarized below:

Table: 6.02
MDO Manpower

OBR Operations		200
coal operations		75
common operations		225
TOTAL		**500**

Security & Canteen Services will be outsourced.

N.B: These figures are indicative only and may vary as per actual requirement.

PERSONNEL ORGANISATION

As described earlier, the organization structure is key to ensure a productive and safe workplace. The organizational structure can be broadly described into the following component categories:

- **Mine operations**
  - Operations
  - Engineering
  - Environmental
- **Plant operations**
  - Planning / engineering
  - Admin/ warehouse
  - Field supervision
  - Workshop
  - Data analysis

- **Infrastructure Management**
  - Assets
  - Security
  - Electrical/ communication
  - Canteen
  - Fire protection
- **Fixed Plant management**
  - Coal and ash handling
  - Electrical
  - Maintenance
  - Engineering
- **Safety**
  - Manpower required as per CMR.
  - Fire fighting
  - Emergency Organisation.
- **Human Resources**
  - Recruitment
  - Training
  - Administration
  - Community relations
  - Industrial relations
- **Financial**

The general organizational charts described above are shown in Table 6.01.

6.3.1 PERSONNEL LEVELS

Personnel levels and cost vary depending on the task required and the associated manpower.

6.3.2 MANPOWER ALLOCATION

Manpower allocation was subdivided into the following categories:

- Mine operations
- Mine maintenance
- Coal handling and processing
- Ash handling and processing
- Supervision, administration and management

6.4 TRAINING PLAN

As described earlier, a knowledgeable, experienced, well-trained workforce is critical to a productive and safe workplace environment. The benefits of this are indirectly translated into efficient and low cost operations, which are not often considered as an outcome of good training processes. This is further emphasized due to advancing technologies in mining together with the need for regulatory compliances.

A significant portion of the management and upper level operational, maintenance and supervisory workforce may be drawn from outside the local areas due to the need for highly experienced personnel in these roles to provide a good starting point for the operations. However, the remainder of the workforce should be drawn from the local populace of the adjoining villages and surrounding areas. This helps to establish good relations and good corporate social responsibility within the communities. This also allows the community to benefit from the better employment opportunities as the local workforce transition into the mining operations from a mostly agrarian livelihood. Training requirement is to some extent governed by the mines vocational training Rules (1966) and supporting DGMS circulars referring to the same. In particular, the rules address the need for proper vocational and group training centers (VTC/ GTC).

The proficiency and qualifications for the training managers and assistant training personnel are fairly well defined by the regulations. The trainers should be proficient in a variety of areas with an emphasis on mining, electrical and mechanical engineering.

Apprenticeship programmes are also key to ensure a continual pipeline of well trained staff that can be used to develop a well-trained pool of personnel from which new recruits can be easily drawn.

Skilled maintenance and support staff can also be integrated into the training process to prepare and deliver training on specific operational aspects of the job.

Training in the workflow process, development of training material, definition of processes and responsibilities are key to successful implementation of any training programme.

Training facilities should be well established, properly staffed and equipped with the latest training and instructional media viz: computer-aided simulations, interactive training and testing tools.

Several tools are available from vendors such as complete on-line libraries, detailed mechanical drawing of assemblies, electrical layout and winning details, part numbers, troubleshooting with drill-down exploring details of spare parts of equipment. These form an ideal on-line training ground and materials for mechanics and electricians to quickly learn all aspects of the equipments they work on, while also utilizing the tools effectively and more productively to address maintenance issues.

As personnel get more experienced, they should be encouraged to cross-train across specialties (operator- welder) to allow the development of versatile workforce.

Leaders in their respective groups should be recognized, and where appropriate, encourage to apply for advanced degrees or management training. Exceptional performers should also be encouraged to participate in national or international skill-enhancement programmes. These works as extremely good incentives and motivational tools for better performance and retaining the best performers within the organisation.

6.5 INDUSTRIAL TRAINING CENTRE

The Odisha Coal & Power Limited (OCPL) is running a Industrial Training Institute at Hemgir, Tahasil & Block headquarter nearer to Manoharpur Coal mine Project since, 2014. The ITI is functioning at a temporary facility provided by district administration after required renovation and modification. Presently the ITI is functioning with one trade i.e., Electrical Trade and approved seat capacity is 21. The first batch of students have already passed out while the second & third batch students are pursuing the course.

The State Government has sanctioned the Government Land measuring an area of Ac. 4.0 in favour of OPGC at village Kamlaga (Hemgir) for establishment of ITI. While land alienation process was in progress, as per the Government Directives, OCPL had started the ITI in a temporary facility at Hemgir and obtain permission from SCTE & VT, Odisha.

The ITI will play a pivotal role in the skill development and capacity building of the eligible youth from the project displaced and affected families of Manoharpur Coal Mine in particular and the youth of Hemgir areas in general. In the admission process adequate priority has been given to the land oustees / project affected candidates Coal Mine area and youth of Hemgir areas.

6.6 SAFETY

- OCPL shall strictly adhere to all safety Rules, guidelines and procedures as applicable for safe operation of the mine laid in The Mines Act,1952 and Rules, Regulations made there under, as directed by DGMS and other statutory body from time to time in writing or otherwise.

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- All activities (General/Technical) shall be done in consistent with Standard Operating Procedures (SOP) framed after a structured Hazard Identification and Risk Analysis (HIRA).
- All employed including visitors and guest workers shall be provided with necessary safety gadgets (PPE) as per applicability.
- A first-aid centre is planned at pit head under direct supervision of qualified medical officers with all provisions for regular health checkup and tracking the Occupational Health Hazards.
- In order to ensure the health of the equipments, schedule of maintenance including regular health check-up as guided by manufacturer and as per the best practices of the belonging industry shall be strictly adhered to.

The following risks have been identified during mining:

1. Inundation.
2. Failure of slope in the opencast mine
3. Failure of slope in the overburden dump
4. Fly Rock and vibrations due to Blasting
5. Surface fire
6. Road Accidents
7. Danger due to storage of explosives
8. Training
9. Medical Aid
10. Natural calamities such as Storm, Earthquake etc.

SAFETY MEASURES TO PREVENT DAMAGE

1. INUNDATION

Provisions of coal Mine Regulations shall be followed. There are three sources of water in the mine:

i) Surface run off from the surrounding area and nalla flowing over the property.

ii) Direct Precipitation.

iii) Seepage from Strata.

i) **Surface run off**

Major threat of Inundation is from Garia nala, which flows along the northern and south eastern part of the block.

The HFL of Garia nalla is 270m and estimated discharge capacity is approximately 118 cumecs. The diverted channel is planned to accommodate the flow for one day highest rainfall i.e. 170mm in 24 hours. An earthen embankment is planned along the blank of Garia Nalla with a height of 3m above HFL. HFL of the nala may be examined before starting of mining operations and embankment may be planned and built according to safety requirement. A dedicated safety team should monitor the flow of the nala.

ii) **Direct Precipitation**

Rain Water

a) Garland drains along the periphery of excavated area of the mine shall be provided to stop rainwater from surface entering into the mine. Garland drains shall be kept clean without any obstruction and shall be inspected regularly during the monsoon.

b) All Rainwater in the catchment area of the opencast mine shall be channelized to gravitate into the main sump constructed in the dip most part of the mine. Adequate pumping arrangement shall be kept to pump out water from the sump to the surface.

iii) **Seepage from Strata**

There is no danger of inundation due to make of water in the mine while mining coal. The water will gravitate into the sump and will be pumped out.

2. FAILURE OF SLOPE IN OPENCAST MINE

Benches will be aligned along general strike. Working parameters shall be maintained as per DGMS guidelines and permissions. The exposed ends of the coal

seams and OB shall be left with a safe slope to avoid slope failure and collapse of benches. Similarly, at the end of mining operation, safe terminal pit slope is provided to avoid pit failure. Detailed site specific tests for slope stability shall be carried out and site specific parameters determined. Present provision is a broad guideline.

All the working benches shall be under the direct supervision of overman /mining sirdar and all necessary precautions shall be taken to make the workings safe. Any rehandling to expose coal should be done with all safety measures and norms. Width and height of working coal benches will depend on machinery /HEMM deployed by the outsourcing agency and safety should be properly ensured by the competent authority as per provisions of existing safety norms by DGMS or other agencies.

Considering the gradient of coal seam about 5°-6° in this project area, it is proposed to excavate top OB, thick parting between Rampur and Lajkura seams and thick coal seam sections by horizontal slices. All other partings and coal sections are proposed to be worked by inclined slices. Based on the above consideration, the following pit design parameters have been adopted in the PR.

11/6.5Cum Hydraulic Shovel

Bench height (max.)	10-12m (for 10-12 cum Hyd shovel)
Bench height (min.)	8-10m (for 6-7 cum Hyd shovel)
Working bench width	22-34m
Working angle	:70° with horizontal for shovel working benches. :60° with horizontal for surface miner bench.

The mining of coal and overburden shall be carried out following this and other stipulations, by Director General of Mines Safety.

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3. FAILURE OF SLOPE IN THE OVERBURDEN DUMPS (INTERNAL & EXTERNAL)

It is estimated that about 83.40 Mcum of overburden is to be dumped outside the quarry. Therefore, the non-coal bearing area on immediate rise side of the block is considered for external overburden dumping.

Both internal & external dumps will be formed in 30m tiers with an overall slope of about 28°, angle of individual dump tier will be around 37^0 depending on angle of repose of material and there should be horizontal berm of width 30m in between the individual 30 m dump tiers. Height of each dump may even be kept at a lesser height where the dump is near any road or locality. Berm between each dump tier should be properly graded and drains should be provided at toe with proper gradient. Fencing may be done near bottommost tier to stop unauthorized entry near the dump, adequate safety distance on surface from dump toe should be maintained to avoid any accident due to slope failure.

For better stability of internal dumps it is suggested to rip the mine floor in strips before backfilling. It is suggested to level the dumps and grade them outward properly to obviate water accumulation.

HAZARD AND RISK ASSESSMENT OF OB DUMPS

Hazard of OB dump failure is mainly governed by following factors :

1. Height of benches.
2. Slope of benches.
3. Nature of material.
4. Slope of foundation rock.
5. Nature of foundation rock.
6. Drainage of foundation.
7. Depth of ground water table.

The following precautions will be taken to reduce the risk of dump failure.

1. OB benches will be made of <30m ht in each tier.
2. The angle of repose of OB benches will be around 37°.
3. Soil should be scraped separately, so that it is not mixed in OB rock.
4. The slope of ground is kept mild so that it will not have any adverse effect.
5. The soil from the foundation ground should be scrapped before starting of OB dumping.
6. The natural angle of repose shall be maintained.
7. A suitable fence shall be erected at the toe of every OB dump to prevent unauthorized person from approaching the OB dump.
8. The backfilled area shall be kept benched and the distance of active mine workings (faces) from the toe of the bottom most backfilled face (bench) shall not be less than 100m.
9. Garland drain to be made around OB dump area to avoid water flow during monsoon below the OB dump.
10. Ground water table is generally 3-5m below ground level hence may have no adverse impact.
11. Leveling, grading and drainage arrangement for top of OB dumps will be done.
12. Technical & Biological reclamation will be done.
13. Sufficient clearance as per DGMS regulations or any other statutory law should be maintained between toe of the dump and nearby road/village/infrastructure to address any accident or slope failure.

4 FLY ROCK AND VIBRATIONS DUE TO BLASTING

a) **Overburden**

A blasting pattern with clear specification of drill holes & charge per delay shall be devised keeping in view the physico-mechanical properties of host rock.

Due regard shall also be given to blast-induced ground vibration, noise & distance of nearby dwellers. The theoretical calculation shall be consolidated after a good deal of field trials. The proved pattern shall be systematically followed for all blasts. Site Mixed Emulsion explosives with milli-second delay detonators shall be used for blasting.

Safety zone of 300m for blasting has to be observed. Before blasting, warning sound shall be given so that people can move to safe places. Blasting shall be done in day time Explosive will be transported in properly designed vans.

b) **Coal**

Major percentage of coal shall be stripped by surface Miner & loaded by pay loaders. Around 15-20% of in-situ coal are being planned to be extracted by conventional drilling & blasting technology. Drilling pattern & charge calculation shall be done with due consideration of all blast-induced hazards.

5. **SURFACE FIRE**

a) **Fire in Coal Stock**

Thirty days coal stock shall be accommodated in the coal stock yard provided for this purpose. This does not pose any fire problem in the stock. However, adequate arrangements for fire-fighting shall be made by providing fire hydrants charged with water at 8Kgf/cm^2 pressure and tapping at every 50m interval along the periphery of this tock yard.

b) **Other Fires**

Adequate Fire-fighting arrangements by providing portable Fire Extinguishers shall be made at all strategic points in workshop and substation. Water Sprinklers/Tankers shall be put in service immediately after receiving information of fire. Quick jointing hose pipes fitted with nozzles shall be kept at the fire stations.

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6. ROAD ACCIDENTS

Sufficient provision for illumination of roads including haul roads will be provided. Gradient of the roads shall be kept mild and road crossings shall be suitably designed and illuminated so as to provide clear visibility to the operators. Berms shall be maintained along all haul roads and working benches. As far as possible, separate roads shall be provided for load and empty dumpers. Attempt shall be made to minimize the ground staff.

7. DANGER DUE TO STORAGE OF EXPLOSIVES

Preferably Site Mixed Emulsion explosives shall be used for blasting in coal and overburden. These explosives shall be transported in specially designed trucks from the nearby plant of explosive suppliers.

Explosive Magazine shall be suitably sited following all rules and regulations of Indian Explosive Act, Mines Act, and Coal Mines Regulations and other directives of Government issued from time to time.

8. FLYASH DUMPING

Fly ash generated from the power plant for coal produced from this mine is proposed to be brought back to mine for dumping in the internal void. For initial nine years, ash will be stacked near the power plant. Ash will be brought to mine void from 10th year onwards. During this project life, provision has been made for accommodating 37.66 Mcum fly ash from linked power plant. Practice of flyash dumping in working mine is rare in our country and adequate safety measures should be ensured while dumping flyash in the temporary dumping space/ quarry preferably in dry mode. A detailed study and scheme should be formulated to safely transport and dump fly ash in the quarry and the same should be approved by statutory authority while implementation. Alternate arrangement of flyash dumping may be examined if disposal of same in running quarry becomes difficult or is not permitted by statutory authority.

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9. TRAINING

The Supervisory personnel directly responsible for handling emergencies under the Disaster Management Plan (DMP) will be specially trained to discharge their duties during emergency. Mock drills for checking the risk management preparedness will be carried out regularly.

10. MEDICAL AID

For guarding against occupational and community health hazards, the following measures will be taken:

- Steps to control respirable dust, improve workplace environment & reduce noise nuisance.
- Periodic medical examination (PME) of workers.
- Provision of first-Aid facilities and quick evacuation facilities.

11. NATURAL CALAMITY LIKE STORM, EARTHQUAKE ETC.

These have not occurred, so far in this area. However, to meet the emergency the following facilities shall be used.

i) First Aid station provided at the mine site.
ii) Public Address System
iii) Transport Facilities – by providing jeeps, buses, ambulance, etc.
iv) Telephone facilities
v) Diesel Generator Sets
vi) Medical facilities available in OCPL/ State Government Hospitals.

CONCLUSION

With adoption of above preventive measures, the operation of this opencast mine will be safe as well as environment friendly.

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CHAPTER - VII

COAL HANDLING, WASHING & MODE OF DISPATCH

7.1 INTRODUCTION

Manoharpur Opencast Mine is being planned for a nominal rated production capacity of 8.0Mt of ROM coal per annum. The proposed Coal Handling Plant is to handle the entire coal production of this Project and is located near quarry mouth.

The coal produced from this mine will be of Non-Coking (power) grade. Major part of coal will be extracted by surface miner. The remaining part will be extracted by conventional shovel-dumper combination.

7.1.1 PROVISION FOR WARFWALL

During initial period of mine operation, if the commissioning of CHP is not completed or used if there comes any problem in CHP loading system, it is proposed to stack the mined coal transported by dumpers/trucks in a Warf wall area suitably located beside MGR track. The coal shall be loaded to MGR wagons by pay loaders for onward transportation to the power plant. Tentative location and capacity of Warf wall has been indicated in Mining Plan.

The coal handling plant will have facilities for receiving ROM coal from rear discharge dumpers at the quarry mouth of Manoharpur mine, crushing of coal in two stages with twin shaft sizer from (-)1200mm to (-)100mm size, storage in over-ground bunker and conveying up to loading hopper for onward transportation to power plant through wagon. Coal handling plant has also been provided with suitable repair, communication and other auxiliary facilities to meet the day to day requirement in the plant operation.

7.2 DESIGN PARAMETERS

The following Parameters have been considered while designing & planning of different units of coal handling plant:

Design Parameters

(a)	Coal production of mine in MTPA (nominal)	8.00
(b)	Number of working days/year	330
(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 CHPs	Rear Discharge Dumper 60te.
(f)	Feed size of ROM coal (in mm) - about 15%	(-) 1200
(g)	Surface Miner cut coal- about 85%	(-)100
(h)	Product size (in mm)	(-) 100
(i)	HGI	50-70

7.2.1 CHP WORKING SCHEDULE

Coal handling plant will be working in three shifts per day and seven days in a week basis with all its units like receiving of ROM coal, crushing, storage in bunker. Conveying of both type coal (crushed and ROM coal of (-)100mm size by surface miner) have been proposed to be transported through belt conveyors to nearby MGR for loading to railway wagons by pre-weigh hopper fitted with RLS.

7.2.2 SYSTEM CAPACITY

Crushing and conveying capacity of CHP has been selected to match with the production capacity of the mine.

One set of sizer, apron feeder and receiving hopper for crushing and conveying of coal have been envisaged. The nominal capacity of crushing of coal has been proposed as 1000tph. Two nos. receiving hopper with apron feeder have been envisaged to receive ROM coal crushed through surface miner. All the receiving hoppers shall be of 300cum capacity. ROM coal received directly by dumpers in receiving hopper will be fed to main conveyor.

ROM as well as crushed coal shall be conveyed and stored to over-ground bunker through tripper conveyors.

The reclamation and conveying of crushed coal from bunker to nearby MGR has been proposed through reclaim conveyors.

7.2.3 SALIENT FEATURES

The following factors have also been considered while finalising the location and system of proposed CHP:

- Mine boundary
- Mine entry
- Loading and despatch of Crushed coal.
- Topography
- Availability of free land / space
- Receiving & crushing arrangements (for two types of coal i.e. crushed by crusher and ROM from sizer)
- Forest & non forest land
- Power supply & 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, control, illumination, interlocking, signalling and communication facilities.

7.2.4 SYSTEM DESCRIPTION

The proposed CHP shall have the following functional units as shown in the key plan of CHP.

- Receiving Pit and Crushing complex at surface near quarry mouth for two types of coal
- Storage of crushed coal in over-ground bunker
- Reclamation and Conveying system
- Dust Extraction System
- Dust Suppression System
- Noise Control System
- Fire Protection System
- Plant cleaning System
- Plant Preventive maintenance
- Weighment

7.3 PLANT DESCRIPTION

7.3.1 RECEIVING PIT AND CRUSHING COMPLEX

One receiving complex at surface near quarry mouth has been proposed for receiving of different sizes of coal from rear discharge dumpers. This receiving complex at surface has been provided with two receiving hoppers DH1 & DH2 for receiving ROM coal of size (-) 100mm directly from dumpers. Coal of (-)1200mm size mined by shovels shall be received in a separate hopper DH3 from rear discharge dumper for crushing by sizer.

Receiving pit hoppers have been provided to accommodate payload of two/three dumpers. ROM coal of (-)1200mm size will be fed through apron feeder onto twin shaft sizer (Primary) for crushing of coal to specified size of (-)300mm. Crushed coal will be collected by conveyor BC1C of 1600mm size, having a nominal capacity of 1000tph installed underneath the primary sizer and will be discharged to secondary sizer. Crushed coal of (-) 100mm size from secondary sizer will be collected either by conveyor BC2A or BC2B of same capacity.

ROM coal of (-)100mm size mined by surface miner will be received separately in two receiving hoppers at the same receiving complex. This coal will be conveyed directly to over-ground bunker through series of conveyors. The system layout of the proposed CHP has also been shown in key plan.

7.3.2 STORAGE AND RECLAMATION

Crushed coal from conveyors BC3A & BC3B will be collected by tripper conveyors TC1A & TC1B of 1600mm size through other two set of conveyors BC4A & BC4B and BC5A & BC5B. Coal from conveyors TC1A & TC1B will be spread over an over-ground bunker of 30,000te capacity with the help of trippers. The bunker shall be constructed of pre-cast concrete slabs sloping at 55 deg. to the horizontal with two slits type opening for plough feeders. Below the slits opening reclaim conveyors BC6A & BC6B are provided to collect coal through the plough feeders. Coal from reclaim conveyors BC6A & BC6B will be received by conveyors BC7A & BC7B and conveyed up to 4000tph loading hopper at loading point through series of conveyors BC8A & BC8B and BC9A & BC9B.

Following facilities have been envisaged for loading coal into railway wagon for onward transmission to customer:

Loading conveyors BC9A & BC9B will discharge coal into the loading hoppers. Nominal capacity and width of each pair of conveyors BC7A & BC7B, BC8A & BC8B and BC9A & BC9B will be 4000tph & 1800mm respectively. Two number of surge hoppers having capacity of 500te each have been provided at the end of the loading conveyor to facilitate storage and loading of coal into railway wagons. The coal will be loaded into the railway wagon through Rapid Loading System (RLS) of about 5500tph capacity. An automatic sampling system has been provided within the RLS for quality control.

7.3.4 LOAD OUT SYSTEM

Crushed and sized coal will be fed to power plant at a distance around 50km through MGR. Construction, Operation and maintenance of MGR is within the scope of power plant.

7.3.5 DUST CONTROL SYSTEM

Dust extraction and dust suppression system have been envisaged for dust control in and around CHPs premises, entire conveying and loading system.

7.3.6 DUST EXTRACTION SYSTEM

The objective of the dust extraction system is to extract coal dust from various dust generating points, clean the dust laden air by trapping coal particles and finally discharge clean air into the atmosphere so that dust concentration in the CHP premises, even under the critical / worst operating condition remains minimum.

Wet type dust extraction system has been envisaged. This will include net-work of suction hoods and ducting connected to a wet wall cyclone for separating dust from the air stream. Air outlet of cyclone collectors will be connected so as to discharge clean air to atmosphere. Dust collected from the cyclone collector shall be suitably disposed off. The wet type extractor is preferred because of its high efficiency and elimination of risks of secondary dusting problem and coal dust explosion.

7.3.7 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.

7.3.8 NOISE CONTROL

Noise pollution causes fatigue to operating personals. Provision has been 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 will have wear resistant rubber or ultra high molecular weight plastic/synthetic liners of various thicknesses as per design requirement and their suitability.

7.3.9 FIRE PROTECTION SYSTEM

Necessary fire fighting system has also envisaged for the plant, which includes fire hydrants at strategic locations at equal spacing of 25 to 35m with suitable water supply pipe lines. Portable type fire extinguishers to deal with electrical/oil/ordinary fires shall be provided at all strategic locations in the plant.

7.3.10 PLANT CLEANING SYSTEM

To facilitate cleaning at strategic locations ample number of high pressure water servicing points have been envisaged. Locations of service points will be such that any working area in the plant or equipment working place can be reached through a 15/20m long hose. 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 wherever required. Plant effluent will be discharged through open drain/ pipe.

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7.3.11 PLANT PREVENTIVE MAINTENANCE

Sufficient working space around the equipment/machinery has been envisaged for effective maintenance of all the equipment. 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.

7.3.12 WEIGHMENT & OTHER FACILITIES

In the proposed CHP each circuit of conveyor BC3A & BC3B have been provided with suitable capacity of belt weigher for weighment of coal handled through CHP. One no of belt weigher has also been provided in loading conveyors BC9A & BC9B. It will measure instantaneous rate of coal flow as well as cumulative for shift or day wise. Two nos. of weigh bridges have also been provided for weighment of trucks, as and when required basis. Finally coal will be despatched by RLS.

Safety switches like pull chord switch, belt sway switch and zero speed switch shall be provided at suitable intervals along the length of conveyors for stopping of conveyors and trailing of belts in case of emergency.

There will be control rooms to control all equipment between receiving hoppers to despatch of coal up to RLS. The control shall be in accordance with pre-determined sequence for starting and stopping of equipment/ conveyors. But provision for local control of any equipment/conveyor has also been provided for emergency purpose.

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7.4 ELECTRICALS

The electrical system shall comprise:

- Power reception and distribution system as per system requirement.
- Centralized sequence control–cum–interlocking, automation, signalling, fire detection and instrumentation system
- Illumination of plant and adjacent area
- Centralized welding circuit
- Earthing

7.5 DRAWINGS

A tentative key plan and coal flow diagram of the proposed coal handling Plant has been given in Annexure-31.

7.6 RAILWAY SIDING

It is proposed that coal from Manoharpur OCP will be fed to the power plant of OPGC through MGR. Additional provision of railway siding along with RLS has not been considered for this Project.