PROJECT SUMMARY OF JAYANT EXPANSION OCP
(NORMATIVE - 20 Mtpa and PEAK – 25 Mtpa)

1.0 INTRODUCTION

The original PR for Singrauli-I (Jayant) for a rated capacity of 3.05 Mtpa of coal was sanctioned by the Govt. in 1962. As per Feasibility Study of Singrauli Coalfield prepared by Soviet Experts in collaboration with CMPDI in 1974, Jayant Opencast Project was identified as a premier block for a rated capacity of 10 Mtpa of coal.

DPR for Jayant Opencast Project was prepared by State Planning Institute (GIPROSHAKHT), Russia in association with CMPDI in 1981 for 10 Mt of coal with 29.70 Mm3 of OB per annum (peak) and at an average stripping ratio of 2.60 m3/t. The DPR was sanctioned by the Govt. on 20.06.1983 for a capital investment of Rs.313.61 crores. RCE for Jayant Opencast Project (10 Mtpa), with a capital investment of Rs.375.04 crores, was prepared in December 1988 and sanctioned by the Govt. on 30.11.1989.

The advance action for 5Mtpa incremental CHP was approved by NCL for a capital of Rs.129.48 Crores. ESC of CIL Board recommended the advance action proposal to CIL Board on 22.02.2012 in its 76th meeting held in New Delhi. The CIL Board approved the advance action proposal for a capital of Rs.129.48 Crores in its 279th meeting held on 12/13-03-2012 at New Delhi.

1.1 ENVIRONMENTAL CLEARANCE STATUS

Environmental Clearance for 15.50Mtpa capacity from the approved boundary of 10 Mtpa project for Jayant OCP was cleared by MOEF vide letter no.J-11015/382/2008-IA.II(M) dated 10.12.2008 *and its corrigendum issued vide No. J-11015/382/2008-IA.II(M) dated 15th April 2009*

1.2 PRESENT STATUS OF THE PROJECT

1.2.1 The actual coal production and OB removal is given in table below:

PRODUCTION PROGRAMME (PR/ACTUAL)

Years	As per PR/RPR		Actual as reported by project	
	Coal (Mt)	OBR(Mm^3)	Coal (Mt)	OBR(Mm^3)
1975-76	-	0.02	-	0.02
1976-77	-	1.51	-	1.51
1977-78	0.15	2.04	0.15	2.04
1978-79	0.75	1.72	0.75	1.72
1979-80	1.1	2.75	1.10	2.75
1980-81	1.57	3.79	1.57	3.79
1981-82	1.18	5.17	1.17	5.12
1982-83	2.25	11.00	1.90	7.46
1983-84	3.00	13.00	3.00	11.83
1984-85	4.00	14.80	3.24	12.74
1985-86	5.00	15.30	3.62	13.06
1986-87	6.60	20.90	4.44	15.77
1987-88	8.20	25.30	5.34	18.50
1988-89	10.00	29.70	6.75	24.84
1989-90	10.00	29.70	8.66	31.60
1990-91	10.00	29.70	9.32	30.50
1991-92	10.00	29.70	9.20	30.14
1992-93	10.00	29.70	7.85	28.49
1993-94	10.00	29.60	8.01	28.51
1994-95	10.00	29.40	5.73	22.78
1995-96	10.00	27.80	7.54	19.50
1996-97	10.00	27.20	9.40	25.56
1997-98	10.00	27.00	9.42	27.27
1998-99	10.00	26.90	8.59	26.00
1999-00	10.00	26.30	9.15	28.18
2000-01	10.00	25.40	9.30	27.90
2001-02	10.00	24.90	9.12	27.60
2002-03	10.00	24.90	9.01	25.00

PRODUCTION PROGRAMME (PR/ACTUAL)

Years	As per PR/RPR		Actual as reported by project	
	Coal (Mt)	OBR(Mm^3)	Coal (Mt)	OBR(Mm^3)
2003-04	10.00	24.90	9.66	27.54
2004-05	10.00	24.90	10.00	23.18
2005-06	10.00	24.90	9.90	21.69
2006-07	10.00+2.0*	24.90+6.0*	10.57	26.56 (23.03+3.53*)
2007-08	10.00+2.0*	24.90+6.0*	12.79	32.97 (23.09+9.88*)
2008-09	10.00+2.0*	24.90+6.0*	13.02	25.83 (21.72+4.11*)
2009-10	10.00+3.25#	24.90+7.66#	13.35	27.12 (20.67+6.45#)
2010-11	10.00+3.50#	24.90+10.00#	15.50	34.13 (20.71+13.42#)
2011-12	10.00+5.00#	24.90+10.00#	14.11	26.42 (17.48+8.94#)
2012-13	10.00+5.00#	24.90+10.00#	12.70	27.25 (18.14+9.11#)
2013-14	10.00+5.00#	24.90+15.00#	11.74	28.46(14.98+13.48#)
2014-15	10.00+5.00#	24.90+15.00#	11.85	26.25(14.84+11.41#)
2015-16	10.00+5.00#	24.90+15.00#	14.40	54.20(14.82+39.38#)
Total	**336.55 (303.80+32.75)**	**919.66 (834.00+85.66)**	**298.52**	**827.58 (747.25+80.33#)**

***Under Emergency Coal Production Plan of CIL.**
 # Under Scheme for outsourcing of OBR.

1.3 EPR FOR JAYANT OCP (20 Mtpa)

To meet the growing demand of coal, it is now proposed to increase the production capacity of Jayant OCP. To augment the production and for an optimum life of the project, it is necessary to encompass the additional coal reserves on the dip side from the Mehrauli East and West Geological Block.

Accordingly the EPR for Jayant OCP (20Mtpa) has been prepared and submitted in the month of May 2014 for an incremental capacity of 10 Mtpa (from 10 Mtpa to 20Mtpa) for the following two options:

Option – I, Total Departmental

Option – II, Partial OB Outsourcing (Dragline Departmental)

In both the options, total coal production is to be done departmentally. Hence the Option –I has been considered for EC purpose.

The EPR has been approved in the 202nd NCL Board board meeting held on 1st March 2016 **(Refer Annexure No.-V).** The updated EPR with the base date of January, 2016 has been taken for preparation of Form-I document.

2.0 MARKETABILITY & LINKAGE

The project is mainly linked to Singrauli Super Thermal Power Station (2000 MW) through their own MGR system. The present demand of SSTPS is 11.00 Mtpa. There is also arrangement of the Public Railway to despatch coal to other consumers if required, from Shaktinagar Railway Station. Table below shows the gap between production availability and demand.

Sl. No.	Details	PROJ. XII Plan	PROJ. XIII Plan (1 BT Plan)		
		2016-17 (Target)	**2017-18**	**2018-19**	**2019-20**
1	Production	82.00	90.00	99.00	110.00
2	Total Demand	103.82	109.25	115.30	116.50
3	Surplus/ Deficit	-21.82	-19.25	-16.30	-6.50

Expansion Project Report for Jayant OCP for incremental coal production of 10Mtpa has been proposed, which will meet the requirement partially. We are already dispatching coal through e-auction to small consumers at present, therefore, provision of dispatch of coal by road upto 10 % of the EC capacity for meeting the demands of the small consumers of varied industries (Bricks, Foundries, Ceramics and other small industries). There is a government guideline for e-auction of 10% of the production vide MOC, GOI, OM No. 23011/4/2007-CPD dtd. 18th Octber 2007 {clause No. 10(V)}.

3.0 PROJECT SITE INFORMATION

3.1 LOCATION

Jayant Opencast Project is situated in Singrauli district of Madhya Pradesh and forms a part of Singrauli Coalfield of Northern Coalfields Limited (NCL).

The project is located in the south-central part of the Moher Sub-basin of Singrauli Coalfield and is bounded by Dudhichua and Nigahi Projects on the east and west respectively **(Plate No.-1).**

3.2 COMMUNICATION, PHYSIOGRAPHY, DRAINAGE AND CLIMATE

Jayant Project site is well connected by both road and rail. Nearest Railway Station Shaktinagar is about 5 km towards east and Singrauli Station is 12 km from the project office.

Jayant Project area exhibits hilly rugged and undulating topography with general elevation variation from 375 to 424 m above MSL. Bijul Nalla, a tributary of Sone River traverses, the north-eastern part of the block.

A numbers of seasonal nallas, flowing from north to south and south to north drain through this area and meet the master drain, the Rihand Dam (Govind Ballabh Pant Sagar) which is located south of this area and Sone river located North of this area. BijulNalla, Motwani Nalla, Balia Nalla, Amjhar Nalla and TippaJharia Nalla drain this area.

The climate of this area is tropical with severe summer. The temperature in summer rises as high as 48^{o}C in May and June. In winter, temperature comes down to 4^{o}C and varies up to 21^{o}C.The rainy season is generally from July to September with average rainfall around 1218 mm.

4.0 GEOLOGY

GEOLOGICAL STRUCTURE

The amount of dip is generally about 2^o to 3^o.

DESCRIPTION OF COAL SEAM

Turra Seam

Turra seam represents the most potential and bottom-most workable coal horizon. The seam occurs at a depth range (roof) of 106 to 249 m. The stratigraphic thickness, i.e. including all dirt bands varies from 13.90 to 23.61 m whereas effective thickness, i.e. excluding dirt bands of 1 m and above in thickness, ranges from 11.90 to 21.65m.

Purewa Bottom Seam

The Purewa Bottom seam overlies Turra Seam after a parting of 46.61 to 66.40 m. The seam occurs at a depth range (roof) of 39 to 227 m. The stratigraphic and effective thickness of the seam varies from 8.69 to 18.54 m and from 3.40 to 15.17 m, respectively.

The seam is highly interbanded in nature. The maximum cumulative number and thickness of dirt bands less than 1 m in thickness is 9 and 2.11 m respectively

Purewa Top seam

Purewa Top seam represents the top most workable coal horizon in the area. The seam incrops in the central part and occurs at a depth range (roof) of 16.40 to 204.90 m. The stratigraphic, as well as, effective thicknesses of the full seam vary between 4 m and 13.07 m.

This seam is interbanded in nature The full seam contains 0 to 5 combustible and 0 to 6 non-combustible dirt bands of less than 1 m thickness with maximum cumulative thickness of 1.38 m and 1.79 m, respectively.

5.0 MINE BOUNDARY, RESERVE AND MINE LIFE

MINE BOUNDARIES

(i) **Southern Boundary** (Rise Side)-Southern boundary of existing Jayant Opencast Mine (10 Mtpa) forms the southern boundary of Jayant Expn. OCP;

(ii) **Northern Boundary** (Dip side) – The northern boundary of the expansion project has been fixed considering the total mineable coal reserves of about 20 years and with minimum disturbance of Singrauli township and a proper dragline cut for facilitating drainage up to fault F-8.

(iii) **Eastern Boundary**- The existing floor boundary has been extended in the dip side and shares common boundary on the floor of Purewa Bottom seam with Dudhichua OCP.

(iv) **Western Boundary** – The western boundary for the sanctioned 10 MtpaJayant OCP was fixed after leaving about 100m surface barrier with Nigahi OCP. The same width of the surface barrier (100m) with Nigahi OCP has been maintained for fixation of the western boundary of Jayant Expansion Project.

Mineable Reserves

Considering the balance coal reserves in existing Jayant mine (10.00 Mtpa) and up to the planned quarry boundary in Mehrauli East & West Block, the estimated Geological Reserve is 367.59Mt. The balance mineable coal reserves is 314.601Mt (as on 31.03.2016). The balance life of the Jayant Expansion Project has been estimated as 18/16 years from 31.03.2016 at normative/peak production.

5.1 MINEABLE RESERVES (MR), OBR & AVERAGE STRIPPING RATIO

The total MR is 339.86 Mt and total OBR is 1017.52 Mm3 with average stripping ratio of 2.99m3/t. The section-wise MR,OBR& Av.SR are given in table below:

Section-wise, MR, OBR & Av. SR

Particulars	West Section	East Section	Total
Mineable Coal Reserves (Mt)			
Purewa Top Seam	31.55	28.42	**59.97**
Purewa Bottom Seam	61.00	43.93	**104.93**
Turra Seam	100.94	74.02	**174.96**
Total	**193.49**	**146.37**	**339.86**
Volume of OBR (Mm3)			
Top OB	259.59	117.03	**376.62**
Parting between Purewa Top and Purewa Bottom Seams.	84.13	93.88	**178.01**
Parting between Purewa Bottom and Turra Seam.	270.05	192.84	**462.89**
Total	**613.77**	**403.75**	**1017.52**
Average Stripping Ratio (m3/t)	**3.17**	**2.76**	**2.99**

6.0 METHOD OF MINING

6.1 Geo-mining Characteristics

The geological and mining characteristics of the mining block are given in table below:

GEOLOGICAL AND MINING CHARACTERISTICS

S.No.	Particulars	Unit	Value	
1	Thickness of Coal Seam (Full seam thickness zone)			
	Seam		Stratigraphic Th.	Effective Th.
	a) Turra seam	m	13.90-23.61 (19.17)	11.90-21.65 (17.18)
	b) Purewa Bottom Seam	m	8.69-18.54 (12.59)	3.40-15.17 (11.19)
	c) Purewa Top Seam	m	4.00-13.07 (7.87)	4.00-13.07 (6.81)
2	Thickness of OB and Partings			
	a) OB above Purewa Top	m	16.40-204.90	
	b) Parting between Purewa Bottom & Purewa Top Seams	m	2.80-33.04	
	c) Parting between Turra& Purewa Bottom	m	46.61-66.40	

S.No.	Particulars	Unit	Value
3	Seam Gradient	Deg.	2-4
4	Volume weight of Coal		
	a) Turra Seam	t/cum	1.52-1.54
	b) Purewa Bottom Seam	t/cum	1.56-1.58
	c) Purewa Top Seam	t/cum	1.60-1.64
5	Volume Weight of OB	t/cum	2.20
6	Volume Weight of dirt bands	t/cum	2.00
7	Excavation Category		
	a) Coal	Cat-III - 90% Cat-IV –10%	
	b) Overburden	Cat-III - 90% Cat-IV –10%	
8	Total mineable reserves of EPR for Jayant OCP (20Mtpa) as on 31.03.2014	Mt	339.86
9	Total OB of EPR for Jayant OCP (20Mtpa) as on 31.03.2014.	Mm3	1017.52
10	Average Stripping Ratio	M3/t	2.99

6.2 QUARRY PARAMETERS

Sl. No.	Particulars	Unit	Western	Eastern	Total
1	Maximum strike length of quarry along Turra seam floor	Km	2.20	2.35	4.55
2	Maximum strike length of quarry along surface	Km	2.50	2.60	5.10
3	Dip-rise width of the quarry on Turra Seam floor from existing face	Km	2.25	1.45	2.25
4	Dip-rise width of the quarry on surface from existing face	Km	2.55	1.65	2.55
5	Maximum depth of the quarry from surface	m	225	190	225
6	Quarry Surface Area (Expansion) from existing face	Sq. Km	-	-	10.41
7	Total quarry Surface Area (Existing & Expansion)	Sq. Km	-	-	18.40

6.3 MINING SYSTEM

Considering the mining and geological conditions such as:

a) Flat gradient of 2^{o}-4^{o} of the coal seam;
b) Mining of multiple seams viz. Turra (19m), Purewa Bottom(12m) and Purewa Top (7m);
c) Parting of 55m to 60m between Turra and Purewa Bottom Seam and
d) Large scope of work including 20 Mt of ROM coal and peak 61.97 Mm3 of OB per annum;

Jayant OCP has been working for last 40 years with combined system of mining viz. Dragline and shovel-dumper system. The existing system has been proposed to be continued with up-gradation of equipment size for achieving higher production level.

Surface Miners have been introduced in NCL mines including Jayant OCP as a Pilot Project. After the success of the Pilot Project, application of Surface Miner may be considered in future for its implementation.

6.4 OB Dump Benches:

Bench height of OB dumps formed by Shovel-Dumper system will be 30m and slope of individual dump benches will be 37^{o} (equal to angle of natural repose of OB material). Width of berm between two adjacent benches will be 40m. Overall slope of dump works out to 28^{o}.

7.0 MINING & DUMPING STRATEGY

7.1 CONSTRAINTS ON MINE DEVELOPMENT

The following surface constraints have to be overcome for Jayant OCP Expansion (20Mtpa):

i) Part diversion of Jayant-Singrauli road passing through western side of Quarry Area;
ii) Rehabilitation of about 4000Private Houses/families from the northern dip side of mining area.
iii) Shifting of Madhauli Sub-Station. It is under process of Shifting.

7.2 Mine Development Strategy

Jayant OCP (10Mtpa) is existing working mine. The EPR for Jayant OCP (20Mtpa) has been proposed to be worked by extending the existing workings in the dip side of Mehrauli East & West Block. The Jayant OCP expansion (20Mtpa) is envisaged to be worked in two sections viz. Eastern and Western Sections with the application of 2 Nos. of Draglines in each Section.

Coal from Turra seam will be extracted by 10m^3 Elect. Rope shovel and transported through main Central Entry to receiving pit of proposed semi-mobile crusher as well as receiving pit of existing main CHP. Purewa Bottom & Purewa Top will be extracted by 10m^3 Elect. Rope shovel and 10-12m^3 Diesel Hyd. Shovel.

The flank roads are proposed to be used for OB transportation to internal dumps and for coal transportation from Purewa Bottom and Purewa Top seams to receiving pits of proposed semi-mobile crusher.

7.2 Summarised Calendar Programme of Excavation :

Sl. No.	Year	Coal in Mtpa	OB
1	2016-17	15.00	55.53
2	2017-18	16.00	58.97
3	2018-19	18.00	56.03
4	2019-20	20.00	61.47
5	2020-21	22.00	66.30
6	2021-22	25.00	75.18
7	2022-23	25.00	75.18
8	2023-24	25.00	75.18
9	2024-25	25.00	75.23
10	2025-26	25.00	75.43
11	2026-27	25.00	75.45

12	2027-28	25.00	75.45
13	2028-29	20.00	52.56
14	2029-30	14.00	32.55
15	2030-31	9.00	19.64
16	2031-32	5.01	9.33

8.0 COAL QUALITY

ROM Coal Quality

The average product mix grade of all the three seams is Grade–E. The grade based on GCV for Turra seam and Purewa Bottom Seam varies mainly from G8 to G14 and that for Purewa Top seam from G9 to G14. The average product mix grade of all the three seams is G10.

9.0 COAL HANDLING AND DESPATCH ARRANGEMENTS

9.1 INTRODUCTION

Existing CHP of 10 Mtpa has already been constructed and is in operation. Existing CHP broadly has the facilities of three number of receiving and crushing complex, two number of bunkers for storage and reclamation, two silos with rapid loading system, one public railway loading system and associated conveyor system.

The EC sanction capacity of The Project is 15.50 Mtpa. Since, the coal production has reached to 15.00 Mtpa. Hence, an advance action for CHP for incremental capacity of 5.00 Mtpa has already been approved by NCL Board in March-2012. The incremental 5 Mtpa CHP shall have the facilities for one semi mobile crusher of 1440 THP capacity comprising of receiving hopper-apron feeder and twin shaft sizer, located in the main haul road inside the quarry (central section) of Turra seam, to crush (-) 1500 mm to (-) 200 mm size and associated conveyor system to transport and feed crushed coal into the PR Bunker of existing CHP. A provision of one no. of secondary sizer has been envisaged in the 5 Mtpa incremental CHP for crushing (-)100 mm size coal from

(-) 200mm size coal. Coal from the existing bunker will be reclaimed and loaded into the wagon through existing silo/PR loading system. The tendering for construction of 5 Mtpa incremental CHP as advance action is under Process.

Total handling capacity of the CHP including existing and proposed will be 25.00 Mtpa (10.00 mtpa existing + 5.00 Mtpa as advance process+ 10.00 mtpa additional proposed) which will cater the target coal of 20.00 Mtpaupto peak load of 25.00 Mtpa.

9.2 **Railway Siding**

The existing PR lines are taking off from Shaktinagar Railway Station. The proposed interconnection between existing lines and MGR rail lines shall be made at suitable location so that full length of PR rake empty receiving line and after loads line is available by extending the existing MGR loop line of NTPC.

Necessary provision for proposed interconnection and accommodation of full empty receiving and after load line has been made in EPR of Jayant OCP (20 Mtpa).

10.0 **WORKSHOP & STORES**

Existing Workshop (10 Mtpa)

At present Jayant Opencast Project has a full-fledged Field workshop, Base workshop, Dozer workshop and Project store having facilities to cater the repair and maintenance needs of HEMM, mining, electrical & mechanical equipment etc. deployed in Jayant OCP (10 Mtpa).

Proposed Workshop (Incremental 10Mtpa):

For expansion of the Project from 10 Mtpa to 20Mtpacoal production, EPR has envisaged 52 Nos. 100TDumper and 88 Nos. 190T Dumper. Existing 85T dumper and 120T dumper has been envisaged for replacement in equivalent numbers of 190 T dumpers.

11.0 POWER SUPPLY, ILLUMINATION AND COMMUNICATION

Jayant Project is getting power at 33KV by double circuit transmission lines from 2x40MVA, 132/33KV Madhauli substation of NCL, including township. There are three sub-stations as stated below:-

2x10MVA, 33/6.6KV OB West Substation
2x10MVA, 33/6.6KV OB East Substation
2x10MVA, 33/6.6KV Coal Substation

The OB East and West Substations supply power to HEMM like draglines, shovels, drills, etc. The coal substation supplies power to HEMM deployed in coal section, pumping, CHP, workshop, etc.

For supplying power to colony, there is one 5MVA, 33/6.6KV transformer in the coal substation. The colony substation supplies power to colony, CGM office, shopping complex etc.

. Considering the prevailing practice in NCL for OB outsourcing all the equipment used are diesel driven. Therefore no additional electrical power is required for HEMM deployed for OB outsourcing and the analysis has been worked out accordingly.

A coal substation will be constructed with a capacity of 1X10 MVA to cope up with the additional load of CHP. This CHP will get power from coal substations.

12.0 CIVIL CONSTRUCTION

Jayant OCP is a running project and most of the civil infrastructure construction works have been completed. Civil works involve mainly for residential buildings, non-residential/service structures, surface reorganization, roads and culverts, water supply and sewerage system for smooth operation of the OCP for expansion of production from existing capacity of 10 Mtpa to 20 Mtpa.

Provision of Service/Welfare Buildings

Existing facilities of service buildings shall remain in use for the proposed EPR. However, Additional provision for expansion of GM office along with boundary

wall has been made in the Office complex. Additional Provision of welfare buildings such as shopping center, Gymnasium, Cycle shed, Garage, with suitable boundary wall has been made in colony area . Provision for a new executive hostel has been made. Provision for extension of VTC has also been made.

RESIDENTIAL BUILDINGS

The requirement of residential quarters has been assessed as per total manpower of the mine. However, there are already 2161 standard quarters available in the project township. The mine has been smoothly operating with existing manpower of 2249 (as on 30th Nov.-2016) in different grades. The proposed manpower will be 3050.

However additional 22 nos. of D type and 10 nos. of C type quarters have been proposed for officer's accommodation as there is scarcity of proper housing at the nearby area.

12.1 WATER SUPPLY AND SEWAGE DISPOSAL ARRANGEMENT

The permanent water supply arrangement for Jayant Opencast Project is covered in Phase-I of IWSS for Singrauli Coalfield. Drinking .and non-drinking water requirement is to be fulfilled from existing supply of IWSS source.

The normal requirement of water for domestic, industrial and firefighting purposes for Jayant OCP for 20 Mtpa production capacity has been calculated as:

a)	Potable water demand	0.75 MGD	3428 m^3/d
b)	Industrial water demand	2.80 MGD	8226 m^3/d
	Total	3.55 MGD	11654 m^3/d
c)	Firefighting water demand	0.40 MGD	1828 m^3/d

12.2 SURFACE REORGANISATION AND REHABILITATION

Surface reorganization and rehabilitation work has been covered under the head of Capital Outlay in Mines. Head of Capital outlay includes mainly the job of development of land for the township and workshop area and community development, rehabilitation and compensation, green belt development, retaining wall/Garland drain, Compensatory Afforestation etc. Most of the

development works have already been completed in the township and industrial areas.

Major provision has been made for rehabilitation work. However, some provision of funds for the development of land, afforestation, earthwork for workshop area etc. have been made.

13.0 ENVIRONMENTAL MANAGEMENT

It has been estimated that around 4000 families shall be rehabilitated. For the compensation purpose, Rs.200crores has been provided in the Expansion Project report. These families will be shifted/rehabilitated as per R&R policy of CIL/Govt. PAPs are to be given plots in rehabilitation complex and shifting grant per family.

Total manpower for implementation of Environmental Control measures in Jayant OCP (Expansion) has been estimated as 55 Nos.

Sl. No.	Designation	Cat/Scale	Total Strength
1	Sr. Manager (Env)	E6	1
2	Asstt. Manager (Env)	E3	1
3	Technician/ Supervisor	S8	1
4	Environment Asstt.	S8	1
5	Dozer/ Shovel/ Grader/Water sprinkler operator	Gr.-B	43
6	Tipping Truck Driver/ Road Sweeping Machine Operator	S5	8
Total Man Power for Environmental Management			**55**

The total capital requirement for environmental control measures for Jayant OCP(Expansion) 20 Mtpa includes cost for technical reclamation, rehabilitation, pollution abatement, effluent treatment, compensatory afforestation, green belt development, community development and others including furniture and fittings, open lungs and vehicles.

14.0 LAND REQUIREMENT

The total land requirement for EPR of Jayant OCP (20Mtpa) has been broadly assessed as 3177Hafor expansion from existing 10 Mtpa to 20Mtpa.The break-up of land use is given below in Table below:

Sl. No.	Particulars	Area (Ha)
1	Total Quarry Area	1840
2	External Dump	118.65
3	Colony (Residential area)	261.90
4	Green Belt in colony	19.30
5	Infrastructure (Office, drains etc.)	64.00
6	ETP, CHP, Mineral Storage	18.00
7	Road, Railway	96.75
8	Green Belt on Waste/Vacant land	74.00
9	Safety Zone/Undisturbed area	120.00
10	Modwani Dam	59.20
11	Others (waste land, vacant land etc.)	505.20
	Total	**3177**

Out of the total requirement of 3177 Ha, the break-up for the type of the land is given below in table below:

Type of Land	Requirement	Acquired as on 31.3.14	Balance to be acquired
Forest Land	1180 Ha	1180 Ha	-
Non-forest Land	1997 Ha	1629 Ha	368 Ha
Total	**3177 Ha**	**2809 Ha**	**368 Ha**

15.0 MINE CLOSURE PLAN

The Mine Closure Plan has been prepared as per the Guidelines approved by the Ministry of coal, Govt. of India and notified vide communication No. 55011-01-2009-CPAM on dated 27th August, 2009, 8th September,2009, 11th January, 2012, 25th April, 2012 and &7th January, 2013.

As per the notification all coal mine owners shall adopt a Mine Closure Plan for each of their mines comprising progressive Closure Plan and final Closure Plan duly approved by the Competent Authority.

In compliance of the notification this Mine Closure Plan for Jayant Opencast coal Mining Project has been prepared.

Mine closure encompasses rehabilitation process as an ongoing programme designed to restore physical and biological quality of environment disturbed by the mining to a level acceptable to all concerned. It must also aim to create a self-sustained ecosystem. Mine closure operation is a continuous series of activities starting from day one of the initiation of mining project.

Mine closure planning has to be carried out at the starting of the mine and needs periodic reviewing and revision during its life cycle to cope with the geo-technical constraints, safety risks and economic risks, social and environmental challenges. Some other objectives of Mine Closure Planning are as follows:

a. To allow a productive and sustainable after-use of the site which is acceptable to the mine owner, adjacent mine owners (since all the mines are owned by the same company therefore it is done in an integrated manner), the regulatory authority, the local community and the other stake-holders.

b. To protect public health and safety.

c. To alleviate or eliminate environmental damage and thereby encourage environmental sustainability.

d. To minimize adverse socio-economic impacts.

Mine closure planning covers the progressive mining and post-mining phase of the project. Several attribute of progressive mine closure planning have to be implemented and introduced during the period of mine operation.

Progressive mine closure process is undertaken concurrently with mine development/ production activities.

15.1 **Rehabilitation of mined out land**

The reclamation of mined out land will be a concurrent with mining operations. The post mining land use at the end of mine life will be as follows:

No	Type of land	Area (Ha)	Post Mining Land Use
1	Reclaimed backfilled area (Green land)	1589.00	Green Land
2	Void with Batter	251.00	Water body

3	External Dump(Green Land)	118.65	Green Land
4	Infrastructure	64.00	Public use
5	Safety zone	120.00	Undisturbed Area
6	Residential	261.90	Public use
7	Green Belt and others	772.45	Green Land
	Total	**3177.00**	

At post mining stage area of forest / green cover will increase from 1180.00 Ha to 2480.10Ha.

There will be significant increase in green/forest cover at post-mining stage due to proposed reclamation activities and actual site restoration with improved green cover is targeted in the final mine closure plan.

15.2 Financial Aspects

The mine closure cost has been estimated as Rs.**26824.54** lakhs. Other than Mine closure activities this cost also include all post environmental monitoring cost for 3 years, supervision charges for 3 years, power cost, protective and rehabilitation measures including their maintenance and monitoring, miscellaneous charges etc.

This cost has been estimated based on the guide line provided by Ministry of Coal i.e**.** Rs.8.21296 (December-2015) lakhs per Hectare of the mine lease hold area of 3177.00ha. However, this is subject to modification based on wholesale price index as notified by Govt. of India from time to time.

The above fund will be generated annually over the remaining life of the mine i.e. 18 years from 2016-17.The annual closure cost is computed considering the total lease hold area at the above mentioned rate and dividing the same by the mine life.

An amount equal to the annual cost is to be deposited each year throughout the mine life compounded @5% annually.

Table1: Progressive and Final Mine Closure Cost Distribution of Jayant Expansion OC Mine

Sl. No	Activity	Closure Cost (Rs. lacs)	Remarks
A	**Dismantling of Structure**		To be included in final mine closure plan
	Service Buildings	53.65	
	Residential Buildings	716.22	
	Industrial structures like CHP, Workshop, field	80.47	
	sub-station etc.		
B	**Permanent Fencing of mine void and other dangerous area**		To be included in final mine closure plan
	Random rubble masonry of height 1.2m including leveling up in cement concrete 1:6:12 in mud mortar	402.37	
C	**Grading of highwall slopes**		To be included in final mine closure plan
	Leveling and grading of highwall slopes	474.79	
D	**OB Dump Reclamation**		71% for progressive and 17.66% for final mine closure.
	Handling/Dozing of OB into mine void	23782.64	
	Bio-reclamation including soil spreading, plantation and maintenance	107.30	Equal weigh-tage throughout the life of the mine.
E	**Landscaping**		
	Landscaping of the cleared land for improving its aesthetic	80.47	To be included in final mine closure plan.
F	**Plantation**		
	Plantation over area obtained after dismantling	134.12	To be included in final mine closure plan.
	Plantation around the fencing	53.65	
	Plantation over the cleared off external OB dump	5.36	

G	**Monitoring/testing of parameters for three**		For three years after mine closure.
	years		
	Air quality	59.01	
	Water quality	53.65	
H	**Entrepreneurship Development**		Equal weightage throughout the life of the mine.
	(Vocational/skill development training for sustainable income of affected people	69.74	
I	**Miscellaneous and other mitigative measures**	536.49	
J	**Manpower cost for supervision**	214.60	
	TOTAL	**26824.54**	

Table2: Progressive Mine closure activities and cost to be incurred

Sl. No.	Activities	Expenditure to be incurred from 2016-2020	Expenditure to be incurred from 2021-2025	Expenditure to be incurred from 2026-2029*
D	**OB dump reclamation**			
	Handling/Dozing of OB into mine void	6030.59800	6030.59800	4824.47840
	Bio-reclamation including soil spreading, plantation and maintenance	28.23684	28.23684	22.58947
H	**Entrepreneurship Development**			
	Vocational/skill development for sustainable income of affected people	18.35263	18.35263	14.68211
I	**Miscellaneous and other mitigative measures**	141.18158	141.18158	112.94526
J	**Manpower cost for supervision**	56.47368	56.47368	45.17895
	Total	**6274.84274**	**6274.84274**	**5019.87419**

15.3 Financial Assurance

For financial assurance, Northern Coal Field Ltd shall open an Escrow Account with any Scheduled Bank, with the Coal Controller Organization (on behalf of the Central Government) as exclusive beneficiary. The above annual closure cost compounded @ 5% annually will be deposited annually for 18 years. The

owner of the company may select the Scheduled Bank where the Escrow Account is to be opened and inform the same to Coal Controller, Kolkata. The amount being deposited will be reviewed with such periodicity as deemed fit by the Coal Controller.

Mining is to be carried out in a phased manner initiating afforestation/reclamation work in the mine out area of the first phase while commencing the mining in the second phase i.e. continuation of mining activities from one phase to other indicating the sequence of operations depending on the geo-mining conditions of the mine. Up to 80% of the total deposited amount including interest accrued in the Escrow account may be released after every five years in line with the periodic examination of the Closure Plan as per Clause 3.1 of the Annexure of the guidelines.

The amount released should be equal to expenditure incurred on the Progressive Mine Closure in past five years or 80% whichever is less. The balance amount at the end of the Final Mine Closure shall be released to mine owner/leaseholder on compliance of all provisions of Closure Plan duly signed by the lessee to the effect that said closure of mine complied all statutory rules, regulations, orders made by the Central or State Government, statutory organizations, court etc. and duly certified by the Coal Controller.

An agreement, outlining detailed terms and conditions of operating the Escrow Account, shall be executed amongst the mining company, the Coal Controller and the concerned bank in order to give effect this.

16.0 MANPOWER, PRODUCTIVITY AND TRAINING

The break-up of peak manpower is given below:

Sl. No.	Particulars	**No. of Persons**
1	OB	723
2	Coal	767
3	Common	1505
4	Land Reclamation	55
	Total	3050

17.0 **CAPITAL INVESTMENT**

The Board of Directors, Northern Coalfields Limited , in its 193rd meeting held on dtd. 25th Feb'2015 approved the proposal and agreed for obtaining approval of CIL Board , for the additional capital investment of Rs. 1226.38 Crores for EPR of Jayant OCP with a rated capacity of 20 Mtpa (peak 25 Mtpa) for option –II (partial OB outsourcing).

Further, Board of Directors , Northern Coalfields Limited , in its 202nd meeting held on dtd. 1st March, 2016 agreed to recommend the UCE (updated cost estimate) for approval of CIL Board with an additional investment of Rs. 1326.55 Crores for option –II (partial OB outsourcing). (Excerpts of both the Board meetings is uploaded separately).

The capital investment has been proposed from the internal resources of the Company.

Table No.-I

जयंत परियोजना के लिए अर्जित भूमि का विवरण

LAND DETAILS (Plot No/Khasra No/Survey No) OF JAYANT OCP EXPANSION of 25 MTPA

क्रम॰ स॰	ग्राम का नाम	प्लाट न॰	रकबा (हेक॰में)
		S.O.NO.5136 DTD : 15.11.75	
1.	मूडवानी	1(P),5(P),6,7(P),8(P),9(P),10(P),11,12(P),13,14,15,16(P),25(P),26(P), 32(P),33,34,59	510
2.	सरसवाह राजा टोला	1(P),2(P),3(P),4(P),5(P)	
3.	निगही	109(P),111(P),113(P),114(P),153(P),154(P),155(P),172(P)	
4.	मेढौली	537(P),538(P),539(P),541(P),569(P),570(P),571,572,573,574,575(P), 581(P),582(P),583(P),584(P),586,587,588,589,590,591,592(P),593(P), 594(P),595(P)	
		S.O.NO.4413 DTD : 04.11.76बीएलओसीके-1	
5.	मूडवानी	2(P),3(P),4,12(P),15(P),16(P),17से 24, 25(P),26(P), 27 से 31, 32(P),35,36(P),37(P),38(P),39,58	751
6.	सरसवाह राजा टोला	4(P),5(P),6(P),7(P), 8से 43,43/1,43/2,43/3, 44 से 51, 54(P), 55(P),56,57,58, 59(P),60(P),60 से 66, 67(P),68(P),69(P),70(P),71से79,80(P),81(P),82 से 99,100(P),104(P),105(P),106,107(P),108(P),109(P),163 से173,174(P),175 से181,182(P),183(P),184 से187	
7.	सरसवाह लाल टोला	1(P),3(P), 4 से 6,17/2(P),17/3(P),41(P),82(P),83(P),211,212	
8.	गर्दा	2,4/1,4/2,4/3,5 से62, 63(P),64(P),65,66(P),66/1(P), 67(P),6/69,72 से 95	
9.	जैतपुर	1,2,3(P),4,5,6,7,8(P),10(P),11(P),43(P),47(P),881,882(P), 883(P),884(P)	
		BLOCK -II	
10.	निगाही	92(P),94(P),95(P),111(P),112(P),114(P),115(P),95/167(P), 25/168(P)	
		S.O.NO.2616DTD : 21.08.1978	
11.	सरसवाह राजा टोला	52,53,54(P),55(P),67(P),68(P),69(P),70(P),80(P),82(P), 174(P),182(P),183	73
12.	सरसवाह लाल टोला	17/1,17/3(P),17/2(P),18 से40, 41(P),42 से 53,54(P),55,56(P),57(P),58(P), 60(P),61(P),62,63(P),64(P),75(P), 76(P),77,78,79(P),80(P),81(P),82(P),88(P),90(P),210,213	
13.	चंदुली	1(P),2(P),3(P),4(P),1273,1274,1275,1276	

Table No.-I

LAND DETAILS OF JAYANTOCP EXPANSION

- 2 -

		S.O.NO.3456DTD : 15.11.1978	
14.	सरसवाह राजा टोला	1(P),2(P),3(P),4(P),6(P),7(P)	143
15.	सरसवाह लाल टोला	1(P),2(P),3(P)	
		LA Act - S.O.NO.11-3-78 SA-1 DTD : 18.01.82	1000
		S.O.NO.2183DTD : 27.10.98	
16.	मेढौली	132(P,)133(P),134(P),147(P),148(P),149(P),152(P),154(P) 155/1(P),155/4(P),156(P),157,157/2,157/3,158(P),159(P), 161(P),166(P),167(P),171(P),172,173(P),174 से 205,206(P),207 से 211, 213(P),215(P),218(P),219(P),220(P),221,222(P),223(P),234(P),2 35(P),236(P),236/2,237,238,239(P), 240(P),241(P),242(P),243,244,245,246,247(P),255(P),258(P),259 (P), 260 से 276,277(P),302(P),304/598(P),304/630(P),305,306,306/633(P),3 07,308,309(P),311(P),313(P),314,315,316(P),620/315(P),408(P), 409(P),409/1,410(P),411(P),416/2(P),416/3(P),417(P),418(P),42 9(P),430(P),431,432(P),433 से 455,455/604(P),446(P),447(P),469(P),470(P),471,472(P),473,474 (P),475,476,477,478(P),479,480,481,481/624,482(P),486(P),486/ 625,487(P),488(P),606,617(P),154/609,154/609GA,154/609GH, 159/610(P),164/613,171/596,188/611,197/612,508/597,208/616/ 2(P),208/616(P),435/632,483(P)	243
		S.O.NO.3065DTD : 20.10.2011	
17.		63(P),65(P),66 से 75, 75/608, 76 से 79, 80(P),81(P). 82(P),83(P),84 से 88, 89(P),90(P),91,92,93(P),94, 95(P),96(P),98(P),99,100(P),101(P),102(P),122(P), 123(P),155(P),156(P),158(P),159(P),159/610(P), 160,161(P),162,163,164(P),165,166,,167(P),168, 169,170,171(P),173(P),206(P),309(P),310,311(P), 312,313(P),620/315(P),316(P),317 से 342,343(P), 344(P),345(P),361(P),362,362/599,363,363/600, 364 से 369,370(P),372(P),372/622(P),373,373/621, 374,375 से 388,389(P),389/623,390 से 396, 396/601,397,397/602,398,399,400(P),401,402(P), 409(P),410(P),412(P),413,414,414/603(P),415, 416(P),417(P),418(P),419 से 423,423/628,424, 424 से 629, 425 से 428, 429(P),430(P),432(P),474	457.00
		Total :	3177.00