MINING PLAN
(ALONG WITH MINE CLOSURE PLAN)
FOR
JHINGURDAH OPENCAST PROJECT
(5 Mtpa)

NORTHERN COALFIELDS LIMITED

September – 2018

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REGIONAL INSTITUTE – VI
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MINING PLAN
FOR
JHINGURDAH OPENCAST PROJECT
(5 Mtpa)

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NORTHERN COALFIELDS LIMITED

SEPTEMBER - 2018
## MINING PLAN FOR JHINGURDAH OPENCAST PROJECT

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<td>5(B)</td>
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<td>Land Use Plan</td>
<td>6</td>
</tr>
<tr>
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<td>7</td>
</tr>
</tbody>
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MINING PLAN
OF
JHINGURDAH OPENCAST PROJECT

1.0 INTRODUCTION

1.1 A preliminary Project Report for Jhingurdah OCP in Singrauli Coalfield was prepared by NCDC in November, 1963 and sanctioned by the Govt. vide letter no. C2-5(27)/63 dated 02.03.65. As per the above report it was envisaged to produce 1.80 Mt coal per annum at an average stripping ratio of 0.92 m³/t and an estimated capital expenditure of ₹6.078 crores. The Project was to meet the demand of coal for Renusagar Power Division of Hindalco and Obra Thermal Power Station of UPSEB.

1.2 Feasibility Study of Singrauli Coalfield and Project Report for Jhingurdah Expansion

The feasibility study of Singrauli Coalfield was prepared by CMPDI in collaboration with Russian Expert in August 74. It was recommended that the capacity of Jhingurdah project should be expanded to 3.0 Mt per annum. Accordingly, an Expansion Project Report for Jhingurdah OCP with a rated capacity of 3.0 Mt ROM coal per annum at an average stripping ratio of 1.15 m³/t was prepared by CMPDI in January, 1975. This was sanctioned by the Govt. in January, 1977 for estimated capital of ₹24.87 crores.

1.3 RCE for Jhingurdah Opencast Project

The project became cost over-run in the year 1981-82. Revised cost estimates for a capital of ₹63.12 crores was sanctioned by the Govt. on 27.07.88.

1.4 Scheme for Augmentation of OB Removal

Jhingurdah Opencast Mine had reached to a critical stage when it was difficult to maintain the target production of the mine due to huge backlog in OB removal.
The Augmentation Scheme for liquidation of OB backlog and for creating a bench configuration for arresting decline in coal production was prepared by CMPDI in 1992 for a capital investment of ₹48.16 crores and sanctioned by CIL Board on 17th November '92 for a capital investment of ₹42.98 crores.

Further, a Scheme under head "maintenance of coal production" was prepared on the basis of departmental study for 8.24 Mt additional coal and OB removal of 28.28 MBCM. The said scheme was approved by NCL Board in its 203rd meeting held on 6th April 2016 vide no. NCL/CP/JRD/359 dated 6th June 2016.

A "Scheme for Re-handling of Loose OB for maintenance of Coal Production & Safety of OB dump at Jhingurda Project" was prepared by the project for removal 10.17 Mcum OB removal with anticipated availability of 1.11 MT coal considering additional 0.55 Mcum in seam band. NCL board accorded in principal approval in 561st meeting of the FDs of NCL held on 15.05.2018.

1.5  
STATUS OF THE PROJECT

The Jhingurdah OCP was started in 1964-65 and has produced 137.33 Mt of coal and removed 182.30 Mm3 of overburden till 31.03.2018. The year-wise actual production performance of the project is shown in Table 1.1 below:

Table 1.1

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Year</th>
<th>Actual reported by the Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coal (Mt)</td>
</tr>
<tr>
<td>1</td>
<td>Upto 2003-04</td>
<td>98.91</td>
</tr>
<tr>
<td>2</td>
<td>2004-05</td>
<td>4.08</td>
</tr>
<tr>
<td>3</td>
<td>2005-06</td>
<td>4.32</td>
</tr>
<tr>
<td>4</td>
<td>2006-07</td>
<td>4.50</td>
</tr>
<tr>
<td>5</td>
<td>2007-08</td>
<td>4.52</td>
</tr>
<tr>
<td>6</td>
<td>2008-09</td>
<td>3.86</td>
</tr>
<tr>
<td>7</td>
<td>2009-10</td>
<td>2.38</td>
</tr>
<tr>
<td>8</td>
<td>2010-11</td>
<td>1.40</td>
</tr>
</tbody>
</table>

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Mining Plan for Jhingurdah OCP
### 1.6 EC/EMP STATUS


### 1.7 MINING PLAN FOR OBTAINING ENVIRONMENTAL CLEARANCE AS PER THE EIA NOTIFICATION, 2006


However, as per Ministry of Environment, Forest and Climate Change, Government of India, letter No.L-11011/69/2014-IA.II(M) dated 06.04.2018, mining projects which were granted environmental clearance under the EIA Notification, 1994, and but not obtained environmental clearance for expansion/modernization/amendment under the EIA Notification, 2006 are required to obtain environmental clearance under the EIA Notification, 2006.

Hence, this Mining Plan is solely prepared for regularization of EC of the Jhingurda OCP.

### 2.0 PROJECT SITE INFORMATION

#### 2.1 LOCATION

Jhingurda Opencast Project is located in the Jhingurda Block, in the North-Eastern part of Singrauli coalfields in Singrauli district of MP.
The block lies between latitudes 24° 10' 29" to 24° 12' 31" North and longitudes 82° 42' 00'' to 82° 44' 30" East.

2.2 COMMUNICATION

The nearest Railway Station Singrauli on Singrauli-Chopan of East-Central Railway is located at a distance of 8 Kms from the project. The project is connected with the all weather metalled road to Shaktinagar and Renukut. The project is also approachable from the Company's headquarters at Singrauli by a fair weather road. The nearest air-strip is at Myorepur (UP), located at a distance of about 80 Kms from Singrauli.

2.3 PHYSIOGRAPHY & DRAINAGE

Jhingurda Block has a high hill in the background with steep southern slopes covered with trees. The hilltop is about 500 m above MSL where as the cultivated area in fore-ground has an elevation ranging between 360m to 385m above MSL.

The hill area is cut by Jhingurdah nallah and it's large number of feeders, which flow from east to west and join the Chatka nallah in the west. During the dry season, there is hardly any flow of water in this nallah but during the monsoon the discharge is very heavy.

2.4 CLIMATE

The climate of the area is tropical. There is a well-defined winter from November to February. Summer from April to June and rainy season from July to September. The lowest temperature recorded during winter (December to January) is generally 4°C and the maximum during the same period is 21°C. In summer (May/June), the maximum temperature as recorded goes up to 48°C and the minimum 21°C. The average annual rainfall is generally 1000 mm out of which about 95% is during June to September only.
2.5 MARKETABILITY

The Jhingurdah Opencast Mine has initially linked to M/S Hindalco for Renusagar Power division and Obra thermal power station of UPSEB. Presently, it serves as Basket Linkage to meet the overall demand of NCL.

3.0 GEOLOGY

3.1 Status of Exploration

Jhingurdah area was first prospected by Geological Survey of India in 1958. Only eight boreholes were then drilled by them in this block. Drilling was again undertaken from time to time and by NCDC & CMPDI and Geological Report is available.

3.2 Geological Succession

The geological sequence established in Jhingurdah Block by detailed investigation by GSI, NCDC & CMPDI is as follows:

<table>
<thead>
<tr>
<th>Formations</th>
<th>Lithology</th>
<th>Thickness (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent to Sub-Recent</td>
<td>Soil and Sub Soil</td>
<td>10 to 25</td>
</tr>
<tr>
<td></td>
<td>Unconformity</td>
<td></td>
</tr>
<tr>
<td>Raniganj</td>
<td>Sandstone and Shale</td>
<td>Up to 152.30</td>
</tr>
<tr>
<td></td>
<td>Jhingurdah Top Seam (including Bands and parting)</td>
<td>105.80-159.70</td>
</tr>
<tr>
<td></td>
<td>Sandstone and Shale</td>
<td>25.00 to 58.00</td>
</tr>
<tr>
<td></td>
<td>Jhingurdah Bottom Seam (including Bands and parting)</td>
<td>6.40 -19.02</td>
</tr>
<tr>
<td></td>
<td>Sandstone and Shale with thin Coal Stringes</td>
<td>About 60</td>
</tr>
<tr>
<td>Barren Measures</td>
<td>From Coarse grained to clayey sandstone</td>
<td>+125</td>
</tr>
</tbody>
</table>

The Barakars underlying Barren measures have not been encountered in any Bore holes. The Raniganj and Barren measures outcrop in the Block.
3.3 STRUCTURE/FAULT

In the Jhingurdah Block, the coal measures occur in the form of a sub-basin and the incrops of the coal seams exhibit crescent shape. The northern half of the sub-basin in faulted against the metamorphics exposed in the north. The dips are centripetal and varies from 9° to 11°. From east to west, the strike swings from NE-SW to E-W to NW-SE.

A total of 19 faults have been deciphered within the 2.0 Sq. Km. quarriable area. In general, there are two sets of fault, one set trending ENE–WSW to NE-SW and the other set trending WNW-ESE to E-W. The northern boundary fault trends in an east-west direction. Parallel to this a few sympathetic faults have also developed.

3.4 DESCRIPTION OF COAL SEAMS & GEOLOGICAL RESERVES

Two coal seams occur in the block viz. Jhingurda Top Seam (131-138 m) and Jhingurda Bottom Seam (10 to 15 m). These seams are separated by massive sandstone parting varying in thickness from 31 to 58.3 m. The detailed description of the two seams is given below:–

Jhingurda Bottom Seam

The thickness of this seam varies from 9.38 m to 19.62 m. The seam is highly inter-banded in nature with Carb. Shale, grey shale, sandy shale and shaly coal of varying thickness. On an average, the dirt bands within the coal seam constitute 50% of the seam thickness out of which dirt bands of ash content over 60% are around 28% of the seam thickness. The coal from the entire thickness of Jhingurda Bottom Seam, including dirt bands but excluding partings of one meter and above, would normally analyze 6 to 7% moisture and 43 to 47% ash.

This seam has not considered in the Project Reports of Jhingurda OCP. Jhingurda bottom seam reserves will be exploited after exhaustion of reserves of Jhingurda Top Seam.
Jhingurdah Top Seam

The Jhingurdah Top Seam overlies the Jhingurdah Bottom Seam after a parting of 31 to 58 meters. The full thickness of the seam varies from 131.56 m in borehole SN 55 to 139.27 m in borehole NCSJ-73.

This seam is highly inter-banded and contains a number of bands of carb. Shale, grey shale, sandy shale, thin fire clay etc varying in thickness from 0.05 to 5-6m individually. These bands do not exhibit any systematic behavior in their horizon, lithology and thickness.

The overall Coal from the entire seam on inclusion of all the shaly coal and also other evident dirt bands of less than one meter thickness but excluding those of one meter and above in thickness would analyze 7.5-8.5% moisture and 30-37% ash.

Geological Reserve: Balance net geological reserve of Jhingurdah Top Seam as on 01.04.2018 is estimated to 8.56 Mt.

4.0 GEO-MINING PARAMETERS

4.1 GEO-MINING CHARACTERISTICS

The maximum strike length of the mine on the floor as per PR is about 2800m and maximum width of the quarry along the floor as per PR is 1030m. The gradient of the seam varies from 9°-11°. Present working depth of Jhingurdah OCP is around 323m.

At present, only Jhingurdah Top seam is being mined. Jhingurdah Bottom seam has not been considered in the PR. Table below shows the mining and geological characteristics of Jhingurdah Top seam:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thickness of coal seam (full seam thickness zone)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Jhingurdah Top Seam</td>
<td>m</td>
<td>131.00-138.00</td>
</tr>
<tr>
<td></td>
<td>b) Jhingurdah Bottom Seam</td>
<td>m</td>
<td>9.38-19.62</td>
</tr>
<tr>
<td>2</td>
<td>Thickness of parting between Jhingurdah Top &amp; Bottom seams</td>
<td>m</td>
<td>31.00-58.00</td>
</tr>
<tr>
<td>3</td>
<td>Seam Gradient</td>
<td>Deg.</td>
<td>11-15</td>
</tr>
</tbody>
</table>
### Quality of Coal of balance reserves

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Parameters</th>
<th>GCV</th>
<th>G-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Quality of Coal of balance reserves</td>
<td>GCV</td>
<td>G-10</td>
</tr>
<tr>
<td>5</td>
<td>Category of OB rocks</td>
<td>Cat.</td>
<td>Cat-III – 50%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cat-IV – 50%</td>
</tr>
</tbody>
</table>

#### Quarry parameters

| a)     | Maximum strike length of the mine on the floor as per PR | m   | 2800          |
| b)     | Maximum width of the quarry along the floor as per PR   | m   | 1030          |

### Coal Reserve and Overburden Estimate

The Coal reserve and Overburden of Jhingurdah OCP as on 01.04.2018 are given below:

<table>
<thead>
<tr>
<th>Sl No.</th>
<th>Parameters</th>
<th>Net Geological Reserve (Mt)</th>
<th>Mineable Reserve (Mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Balance Coal Reserves as on 01.08.2018 as per assessment based on updated plan and sections.</td>
<td>6.37</td>
<td>5.73</td>
</tr>
<tr>
<td>2</td>
<td>Coal production from April’18 to July’18</td>
<td>0.96</td>
<td>0.86</td>
</tr>
<tr>
<td>3</td>
<td>Additional Coal Reserves as per approved scheme by NCL Board dated 25.05.2018</td>
<td>1.23</td>
<td>1.11</td>
</tr>
<tr>
<td>4</td>
<td>Balance Coal Reserves as on 01.04.18 (1+2+3)</td>
<td>8.56</td>
<td>7.70</td>
</tr>
</tbody>
</table>

### OVERBURDEN

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Parameters</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overburden excluding band as on 01.04.2018</td>
<td>Mm³</td>
<td>18.21</td>
</tr>
<tr>
<td>2</td>
<td>Re-handling of loose OB (BCum) as per approved scheme dated 25.05.2018</td>
<td>Mm³</td>
<td>10.17</td>
</tr>
<tr>
<td>3</td>
<td>Total OB (Solid+RH) excluding band as on 01.04.2018</td>
<td>Mm³</td>
<td>28.38</td>
</tr>
<tr>
<td>4</td>
<td>Volume of in seam band as on 01.08.2018 as per assessment based on updated plan and sections.</td>
<td>Mm³</td>
<td>6.29</td>
</tr>
<tr>
<td>5</td>
<td>Removal of in seam band from April’18 to July’18</td>
<td>Mm³</td>
<td>0.32</td>
</tr>
<tr>
<td>6</td>
<td>Volume of in seam band as on 01.04.2018</td>
<td>Mm³</td>
<td>6.61</td>
</tr>
<tr>
<td>7</td>
<td>Volume of in seam band as per approved scheme as on 01.04.2018</td>
<td>Mm³</td>
<td>0.55</td>
</tr>
<tr>
<td>8</td>
<td>Volume of in seam band (8+9)</td>
<td>Mm³</td>
<td>7.16</td>
</tr>
<tr>
<td>9</td>
<td>Total OB (including in seam band)</td>
<td>Mm³</td>
<td>25.37</td>
</tr>
<tr>
<td>10</td>
<td>Average SR (including in seam band)</td>
<td>m³/t</td>
<td>1.32</td>
</tr>
<tr>
<td>11</td>
<td>Average SR (excluding in seam band)</td>
<td>m³/t</td>
<td>1.236</td>
</tr>
</tbody>
</table>
4.3 **PRODUCTION TARGET AND MINE LIFE**

Considering the balance mineable reserve as on 01.04.2018, the Mining plan for Jhingurdah OCP has been prepared. The life of the mine would be up to 2021-22.

5.0 **MINING TECHNOLOGY**

5.1 **SCHEME OF OPERATION**

Workings of the mine are concentrated in eastern and north eastern sides of the mine. Jhingurdah Top seam is being worked by open cast method deploying shovel-dumper combination in horizontal slicing.

Coal production & band removal is being done departmentally and OB removal is being done by outsourcing agency. 10 m³ Electric Rope shovel and 5.5 m³ diesel hydraulic shovel in conjunction with 100T/85T rear dumper are used in departmental coal winning and removal of band. 3.1 m³ diesel hydraulic backhoe in conjunction with 19.1 m³ Trucks are deployed for OB removal by outsourcing agency. The bench height for OB benches are 12 m and for coal benches 8-10 m.

5.2 **DUMPING STRATEGY**

There are eight external OB Dumps. Dump Nos. 2, 3, 4 & 5 are technically and biologically reclaimed whereas dump No.1, 6, 7 & 8 are active. A detail map showing overburden dumps is shown in Plate No.3.

5.3 **EXISTING HEMM**

The list of existing HEMM on roll at the Project as on 01.04.18 is given below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Equipment</th>
<th>Size</th>
<th>Existing as on 01.04.18</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P&amp;H Elec. Rope shovel,</td>
<td>10m³</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hyd. Shovel</td>
<td>5.5m³</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.8 m³</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Rear Dumper</td>
<td>85 T</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Rear Dumper</td>
<td>100 T</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Dozer</td>
<td>410 HP</td>
<td>6</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Equipment</td>
<td>Size</td>
<td>Existing as on 01.04.18</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------------</td>
<td>------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>4</td>
<td>Drill</td>
<td>160 mm</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Drill</td>
<td>250 mm</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>FE Loader</td>
<td>5.7 m³</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Water Sprinkler</td>
<td>70 KL</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Water Sprinkler</td>
<td>28 KL</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Water Sprinkler</td>
<td>85 T (Converted)</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Grader</td>
<td>280 HP</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Tyre handler</td>
<td>196 HP</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Crane (Hydraulic)</td>
<td>3/6/18/20 T</td>
<td>4</td>
</tr>
</tbody>
</table>

5.4 CALENDAR PROGRAMME OF EXCAVATION

Out of total mineable coal reserve within the sanctioned quarry boundary of Jhingurdah OCP, 137.33 Mt coal has been extracted and 182.30 Mm³ OB has been removed up to 31.03.2018.

Thus, the balance mineable coal reserve as on 01.04.2018 is 7.70 Mt and corresponding total OB is 25.37 Mm³ with average stripping ratio of 3.29 m³/t.

The calendar programme of excavation has been prepared based on the above balance coal reserves and volume of OB as on 01.04.2018 and is given in the table below:

### Calendar Programme of Excavation

<table>
<thead>
<tr>
<th>Year</th>
<th>Coal Production (Mt)</th>
<th>OB Removal (Mm³)</th>
<th>In Seam Band (Mm³)</th>
<th>Total OB Including in Seam Band (Mm³)</th>
<th>Rehandling (BCuM) (Mm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-19</td>
<td>3.00</td>
<td>7.32</td>
<td>2.79</td>
<td>10.14</td>
<td>1.17</td>
</tr>
<tr>
<td>2019-20</td>
<td>2.00</td>
<td>7.30</td>
<td>1.86</td>
<td>9.16</td>
<td>5.00</td>
</tr>
<tr>
<td>2020-21</td>
<td>2.00</td>
<td>3.59</td>
<td>1.86</td>
<td>5.42</td>
<td>4.00</td>
</tr>
<tr>
<td>2021-22</td>
<td>0.70</td>
<td>-</td>
<td>0.65</td>
<td>0.65</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>7.70</td>
<td>18.21</td>
<td>7.16</td>
<td>25.37</td>
<td>10.17</td>
</tr>
</tbody>
</table>
5.5 DRILLING & BLASTING

Drilling and Blasting operations for loosening of OB rocks and Coal are necessary before excavation. Both coal and OB require drilling and blasting prior to excavation. RBH Drills of 160 mm dia are used for coal bench and RBH Electrical drills of 250 mm dia are used for OB removal (departmental) worked by shovel-dumper system.

5.6 EXPLOSIVE CONSUMPTION

The following specific consumption of explosives has been adopted for estimating the annual requirement of explosives:

- OB from shovel benches - 2.05 m³/kg
- Coal seam - 9.28 t/Kg
- OB from HOE benches - 2.01 m³/kg

The provisions of the Coal Mines Regulation 1957, other relevant rules and regulations and circulars shall be observed during the course of mining operation.

5.7 COAL QUALITY

The average grade of ROM coal is G-10.

6.0 INFRASTRUCTURE

6.1 PUMPING & DRAINAGE

The planning of de-watering of the mine has been done in such a way that as far as possible the working faces and haul roads remain dry.

The layout of the quarry provides suitable gradient along the quarry floor and the benches to facilitate self-drainage of water to the lowest level of the quarry.

Adequate no. of pumps and pipes have been provided. The details of the pumps are given below:
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Discharge (m³/hr)</th>
<th>Head (m)</th>
<th>Operating Voltage (V)</th>
<th>Motor Rating (KW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>540</td>
<td>250</td>
<td>6600</td>
<td>595</td>
</tr>
<tr>
<td>2</td>
<td>540</td>
<td>250</td>
<td>6600</td>
<td>595</td>
</tr>
<tr>
<td>3</td>
<td>540</td>
<td>250</td>
<td>6600</td>
<td>595</td>
</tr>
<tr>
<td>4</td>
<td>540</td>
<td>250</td>
<td>6600</td>
<td>595</td>
</tr>
<tr>
<td>5</td>
<td>275</td>
<td>216</td>
<td>3300</td>
<td>190</td>
</tr>
<tr>
<td>6</td>
<td>275</td>
<td>216</td>
<td>3300</td>
<td>190</td>
</tr>
<tr>
<td>7</td>
<td>220</td>
<td>60</td>
<td>440</td>
<td>110</td>
</tr>
</tbody>
</table>

6.2 COAL HANDLING PLANT

6.2.1 INTRODUCTION

A full-fledged coal handling plant for Jhingurda Opencast Project has been constructed.

The coal handling plant have the facilities for receiving ROM coal from coal yard via grizzly, crushing the coal to a specific size, storage & reclamation, rope haulage loading system and belt transport between the intermediate points. The ROM coal has to be crushed down to a size of (-) 200 mm.

6.2.2 System Capacity

The handling capacity of the CHP is in commensurate with the production capacity of the mine.

Based on 330 working days per year and 5 hours per shift, and in order to meet the fluctuations of coal output from the mine due to irregularities of transport system and seasonal fluctuations, the system capacity of the CHP has been fixed at 800 TPH.

6.2.3 Salient features of CHP

- One Reciprocating Feeder of capacity 800 TPH feeds ROM Coal to Horizontal Crusher
Horizontal Roll Crusher crushes the Coal to (-)200 mm Size and subsequently, feeds the crushed Coal to Conveyor
- From a network of 6 Conveyor Belts, Crushed Coal reaches Ground Bunker having capacity 5000 Tons
- In the Ground Bunker, Eighteen Reciprocating Feeders of Capacity 350 TPH each, feeds the Coal to Conveyor
- From a network of 14 Conveyor Belts, crushed coal eventually reaches wagons.
- One No. Rope Haulage System installed at Siding
- Necessary electrical and interlocking facilities.

6.2.4 System Description
The coal handling plant for Jhingurda OCP consists of 1 number of horizontal roll crusher to crush ROM coal to -200 mm size, 1 number of ground bunker of 5000T capacity with associated belt conveyor and accessories. It has peak handling capacity of about 3.5 Mtpa.

6.2.5 Railway Siding
The existing public railway siding at Jhingurdah OCP has a capacity of full rake of Box-N, Box-C type which is in operation. The existing railway siding has following facilities:

i. Empty receiving line : 929 M
ii. Engine escape line : 929 M
iii. Load line : 968 M

Empty line receives empty rake with the help of rail engine. Then rail engine goes back through engine escape line. Then with the help of wagon hauler, the empty rake is placed to load line. After placement, the empty wagons are loaded with the help of wagon hauler.

6.3 POWER SUPPLY ARRANGEMENT
Jhingurdah Project receives power at 33 KV from 132/33 KV Morwa substation of MPSEB.
There is a 33/11KV main substation in the project of installed capacity 1x3.15 MVA & 2x 5 MVA. Out of these three, 3.15 MVA transformer is for colony supply.

From the main substation, power is transmitted at 11 KV to the following substations:

**West Substation**
It has installed capacity of 2x3.15 MVA, 11/6.6 KV.

**CHP Substation**
It has installed capacity of 2x2.5 MVA, 11/3.3 KV.

### 6.4 WORKSHOP

#### 6.4.1 INTRODUCTION

To meet the maintenance and repair of HEMM, mechanical, electrical and other mining equipment, LMVs etc. the existing Jhingurdah OCP has following facilities:

- **Excavation Workshop**
  - i) Base workshop
  - ii) Site/Field workshop
- **E&M workshop**
- **Regional store and magazine**

#### 6.4.2 Scope of Work

a) Excavation Workshop

i) Preventive Maintenance
   - Daily maintenance including washing of equipment
   - Scheduled maintenance including lubrication
   - Inspection

ii) Incidental minor repair/replacement of components and assemblies of HEMM
iii) Routine inspection and scheduling for repair needs at central workshop
iv) Incidental minor repairs of assemblies and sub-assemblies of mining and mechanical equipment i.e. shovels, drills etc.

b) E&M workshop:
- Daily washing and inspection of the E&M equipment
- Routine/scheduled maintenance of all E&M equipment
- Incidental minor repair/replacement of sub-assemblies and components of CHP equipment and accessories, water pumps and pumping installations and other E&M equipment.

6.4.3 Existing Facilities

a) Base workshop
The Base workshop has following sections:
- Dumper repair section
- Dozer repair section
- Light vehicle repair shed
- Field equipment repair shed
- Tyre shop
- Machine shop

Besides, there is facility of parking, canteen, site stores etc. Behind this workshop, there is a regional store.

Major repairs like engine & transmission etc. are being done at Central workshop, Jayant.

b) Site workshop
The site workshop is equipped with the following facilities:
- Minor repairs
- Fuel filling
- Air checking
- Washing
- Lubrication etc.
c) **E&M workshop**

The E&M workshop is equipped with the facilities to repair and maintain pumps, motors, LMVs etc.

The existing facilities are sufficient to maintain the coal production at Jhingurda and hence, no further modification/addition is proposed.

### 6.5 CIVIL CONSTRUCTION

#### 6.5.1 Residential Buildings

The existing numbers of residential quarters in the Jhingurdah Project are 1140. The status of total constructed residential buildings is given below:

<table>
<thead>
<tr>
<th>Type of Quarter</th>
<th>Nos. (Existing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>'D' Type Quarter</td>
<td>5</td>
</tr>
<tr>
<td>'C' Type Quarter</td>
<td>56</td>
</tr>
<tr>
<td>'A+B' Type Quarter</td>
<td>321</td>
</tr>
<tr>
<td>'HB' Type Quarter</td>
<td>708</td>
</tr>
<tr>
<td>'T1' Type Quarter</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1140</strong></td>
</tr>
</tbody>
</table>

The overall quarter satisfaction in the Jhingurda Project is 100%. The provision of residential buildings for employees as per manpower is given below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Category</th>
<th>Provision of Houses (%)</th>
<th>Manpower (Nos. as on 01.04.2018)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Officers</td>
<td>100%</td>
<td>66</td>
</tr>
<tr>
<td>2</td>
<td>Monthly Rated Staff</td>
<td>100%</td>
<td>129</td>
</tr>
<tr>
<td>3</td>
<td>Daily Rated Workers</td>
<td>100%</td>
<td>328</td>
</tr>
<tr>
<td>4</td>
<td>Overall Total</td>
<td>100%</td>
<td>523</td>
</tr>
</tbody>
</table>

The manpower of other projects is also residing in the quarters of Jhingurdah colony.
6.5.2 Service Buildings

Provision of Service/Welfare Buildings

The service buildings viz. Project office, Mine office, Township office, Time & Security office, Worker’s Training Centre, and Cycle shed/Car Shed in the office complex have been constructed.

Statutory buildings like First Aid Centre, Rest shelter, Toilets, Training centre, canteen etc. in the mine area have been constructed.

Welfare building/community building such as Dispensary, Workers Institute, Bus shed, Cycle shed, Rest house, Officer’s clubs, Toilet room, in the township have been constructed.

6.5.3 Mine Development

6.5.3.1 Community Development

Under the community development programme, the project arranges periodical health camps in the nearby villages. Two RO plants have been installed in the nearby villages for potable water. Hand pumps have also been installed in the nearby villages. Skill development training programs like bag making, beauty parlor, fashion/dress designing, floriculture/flower decoration, computer training, English speaking course etc. are being conducted on regular basis to promote self employment.

6.5.3.2 Open Lungs

The park for recreation of inhabitants in the colony has been made.

6.5.3.3 Development of land for residential & other purpose

The existing quarters of the township are sufficient to cater the needs of the employees and adequate roads are already available in the township.

6.5.3.4 Arboriculture

For arresting dust and protection of the environment against pollution, plantation and green belt development are being carried out around the
industrial and colony areas. Around 17.60 plantations have been carried out up to 2017-18.

6.5.3.5 Village Rehabilitation & Compensation against R&R
A total of 63 families and 516 persons have been affected by the past mining activities and they have been rehabilitated in Chandrapur Rehabilitation Complex near Jhingurdah.

6.5.3.6 Garland drains in the mining area
Garland drains have been constructed in the mining area. The length of the existing garland drains is approximately 2.5 Kms.

6.5.3.7 ROADS AND CULVERTS
The requirement of roads & culverts has been assessed as per norms and plan

Colony Roads and Culverts
No additional provision of colony road has been made as the existing quarters of the township are sufficient to cater the needs of the employees and adequate roads are already available in the township.

Service Roads and Culverts
Service road includes Haul road, Heavy duty road to workshop and Approach road to project.

A permanent 7.5 m wide and 3.0 Km long bituminous approach road from the township/office complex to project has been in place since long. The approach road also connects the haul road.

A 20-30 m wide WBM Heavy duty road has been made within the mines and from workshop to mines.

In short, all the haul roads are WBM and all the approach roads are bituminous.
For smooth movement of dumpers, concrete pavement has been constructed in the workshop. Sufficient parking space with pavement has also been given.

6.5.4 Water Supply & Sewerage Disposal Arrangement

The existing system for drinking water supply, industrial water supply and sewage disposal system has to be continued as suitable provision for water supply for industrial purpose and sewerage system has been made.

6.5.4.1 Water Supply

The water is supplied from Integrated Water Supply Scheme (IWSS), Khadia, to Jhingurda Pump House which has a storage capacity of around 3.27 Lakh Gallons. From Jhingurda pump house, water is pumped to Overhead Tanks and from there water is supplied to the Colony and Mines Area for non Industrial use. Mine Water is used for industrial purpose. Sufficient provision has already been made to supply water to the existing township & mines and the same will be continued in the future as well.

6.5.4.2 Industrial/ Non-drinking Water Supply

The demand of industrial water has been assessed as per norms for the requirements of technological needs of different works in the mine.

The need for water has been assessed mainly for the activities at the workshop, CHP and Mine. Provision for fulfilling requirement of water for industrial use for these activities has been made accordingly. Mine water is used for industrial purpose. Suitable arrangement for industrial water recycling and reuse has been made for conservation of water.

6.5.5 Sewage Disposal

Colony Sewerage

One centralized Sewerage Treatment Plant (STP) of capacity 1.5 MLD has already been constructed for treatment of domestic sewage
generated within the township. It consists of sewage pumping stations, aeration tank, settling tank, sludge drying beds etc. with all necessary mechanical, electrical & other instruments.

The sewage from individual houses is collected through branch/trunk sewers and fed to the STP where it is treated before final disposal. As the facilities at the existing STP are sufficient to cater to the needs of maintenance of coal production from Jhingurda Top Seam OCP, no balance provision is required to be made.

**Industrial Effluent**

One centralized Effluent Treatment Plant (ETP) of capacity 300 cum/hr. has already been in place for treatment of effluent arising out of the mining activities.

The industrial waste water from workshop, CHP and other establishments is guided through oil and grease traps. The effluent coming out of the industrial premises is channelized to close circuit waste water treatment plant and recirculation plant where after passing through sedimentation tanks and filters, it would be recycled for industrial use.

Zero water discharge is maintained and the treated effluent is completely utilized for dust suppression, fire-fighting, horticulture and plantation activities.

**Industrial Fire Fighting Demand**

Water is being stored in the reservoir for firefighting purpose. Provision of reservoir, pumps and pipeline has been made for industrial firefighting.

**Water Supply for Fire Fighting**

Industrial Water is collected at the two different points in the mine area. One reservoir shall be used for quarry fire fighting and other one is used for workshop/CHP. Suitable pipeline network has been made as per the site condition.
7.0 MANPOWER & PRODUCTIVITY

7.1 MANPOWER

Manpower requirement is assessed on the basis of 330 days of annual working. The sanctioned manpower (Non Executives) for FY 2018-19 is 652, whereas the total existing manpower as on 01.04.2018 is 523.

7.2 PRODUCTIVITY

OMS of Jhingurdah Opencast Mine for the last Financial Year 2017-18 is 7.62/1.

8.0 LAND ACQUISITION & REHABILITATION

The total land required for mining and infrastructure etc. of Jhingurda Opencast Project is 1200 Ha which has already been acquired before 1980. The head-wise break-up of the land is given below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Type</th>
<th>Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mine Excavation</td>
<td>235</td>
</tr>
<tr>
<td>2</td>
<td>External OB Dumps</td>
<td>258</td>
</tr>
<tr>
<td>3</td>
<td>Infrastructure</td>
<td>216</td>
</tr>
<tr>
<td>4</td>
<td>Residential Colony</td>
<td>120</td>
</tr>
<tr>
<td>5</td>
<td>Green belt</td>
<td>355</td>
</tr>
<tr>
<td>6</td>
<td>Unaffected Forestland</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1200</strong></td>
</tr>
</tbody>
</table>

The type-wise land requirement viz. Forest land, Government land, Agricultural land is given below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Type</th>
<th>Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tenancy Land</td>
<td>206</td>
</tr>
<tr>
<td>2</td>
<td>Forest Land</td>
<td>748</td>
</tr>
<tr>
<td>3</td>
<td>Government Land</td>
<td>246</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1200</strong></td>
</tr>
</tbody>
</table>
RESETTLEMENT/REHABILITATION

A total of 63 families and 516 persons have been affected by past mining activities and they have been rehabilitated in Chandrapur Rehabilitation complex near Jhingurdah.

9.0 SAFETY & CONSERVATION

9.1 Safety

While carrying out different mining operation in the opencast mine, the safety rules in force as per rules and regulations made under mine Act 1952 should be strictly followed and the desired safety measures adhered to various DGMS circulars issued from time to time regarding safety. In order to ensure safety to the personnel and equipment of the mine, the Jhingurda OCP envisages following measures:

- To prevent industrial accidents;
- To ensure stability of benches, batters and OB dumps;
- To ensure safety of equipment;
- To control fire;
- To control dust and emission of noxious gases, inundation and
- To control pollution

During planning and design of the mine working and infrastructural facilities, provisions of safety rules in force and various DGMS circulars issued from time to time are kept in mind and are strictly adhered to.

9.2 CONSERVATION OF COAL

Measures have been taken to minimize coal losses during mining operations. The number of bands more than a meter in thickness are not consistent and it varies from 2 m to some times as high as 10 or 11 m. These bands are removed separately as overburden/reject.
10.0 ENVIRONMENTAL MANAGEMENT

Jhingurdah mine is operating since 1965. The mine has already implemented various pollution control measures for containing air, water and noise pollution arising out of mining operation. An approximate amount of Rs126.49 Lakhs has been spent in the year 2017-18 for environmental protection. The corresponding figure for the year 2016-17 was Rs 87.75 Lakhs.

10.1 EXISTING POLLUTION CONTROL MEASURES

10.1.1 Air Pollution Control Measures

It can be seen from the environmental data, that main air pollutant in mining operation is dust. Keeping this in view, following control measures are being adopted:

✓ The coal surface is watered during loading and transportation.
✓ Three nos. of water tankers (converted) having 42 KL capacity each and one no. of water tanker (converted) having 28 KL capacity and one no. of water tanker (Mist Spray Type) having capacity 70 KL are deployed for dust suppression on haul roads, service roads and coal stock piles.
✓ Wet drilling is practiced
✓ Transportation of Coal from CHP to siding occurs through a network of closed conveyor belts.
✓ Fixed water sprinklers are provided at loading/unloading/transfer points in the CHP to check fugitive emissions from crushing operations, conveying system, transfer points etc.
✓ All service roads/permanent roads have been surfaced with asphalt.
✓ Cleaning and sweeping of coal transport road is done daily.
✓ Vegetation/Plantation has been carried out over the surface of dumps.
✓ Green belts around colony, quarries, OB dumps and industrial area has been provided and approx. 17.60 Lakhs saplings have been planted up to 2017-18.
10.1.2 Air Pollution Control at Source

Haul Road

Haul roads are major source for fugitive dust generation in coal projects. Following mitigation measures are taken for haul roads within the mine area;

✓ Regular Water sprinkling.
✓ Long life WBM haul roads
✓ Proper Maintenance of HEMM
✓ Prevention of overloading

Drilling

Wet drilling is practiced to minimize any generation of dust during drilling process.

Blasting

Blasting releases a lot of dust if they are not planned well. Energy released by blasting is lost in powdering effect. This is avoided by proper design of blast geometry and charge weight.

Plantation

Extensive tree plantation has been carried out in open areas available within and around the mine premises and also on overburden dumps. About 17.60 plantations have been carried out up to 2017-18.

10.1.3 Water Pollution Control Measures

The existing water pollution control scheme incorporating various control measures is given below:

Provision of Mine sump and Mine drainage

The water from the mine flows into the mine sump which acts as primary sedimentation. The settled water is being pumped out to ETP, which is properly treated prior to its utilization in dust suppression, fire fighting, horticulture, dumper-dozer washing etc.
Industrial Effluent

One Effluent Treatment Plant (ETP) of capacity 300 cum/hr has been in place for treating the industrial effluent from mine sump, workshop, CHP and other establishments.

The Industrial waste water is guided through oil and grease trap to a close circuit effluent treatment plant where after passing through sedimentation tank and clarifier, it is utilized for industrial use. Zero water discharge is maintained and the treated effluent is completely utilized for dust suppression, fire-fighting, horticulture and plantation activities.

Domestic Effluent

One centralized Sewerage Treatment Plant (STP) of capacity 1.5 MLD has already been constructed for treatment of domestic sewage generated within the township. It consists of sewage pumping stations, aeration tank, settling tank, sludge drying beds etc. with all necessary mechanical, electrical & other instruments. The sewage from individual houses is collected through branch/trunk sewers and fed to the STP where it is treated. As the facilities at the existing STP are sufficient to cater to the needs of maintenance of coal production from Jhingurda Top Seam OCP, no balance provision is required to be made.

10.1.4 Noise Pollution Control Measures

Following control measures are being adopted to keep noise levels to minimum:

i) Provision of noise-proof cabins for operators of drills, dumpers, shovels etc.
ii) Routine maintenance of HEMM
iii) Provision of ear-muffs and ear-plugs as and when required.
iv) Blasting operation is carried out in between 2.00 pm to 3.00 pm
v) Thick green belt has been developed around the colony. This acts as a barrier to the noise
10.1.5 **Ground Vibration Control Measures**

The following control measures are being adopted to control ground vibration:

a) Design of optimum blast hole geometry considering bench height, dia of hole, type of explosive, nature of rock, level of fragmentation required etc.;

b) Divide total charge/blast in several parts so as to keep minimum explosive/delay.

c) Use of relays;

d) Reduce the depth of the holes (larger the depth, the ground vibration is felt over larger area);

e) Plaster shooting is avoided to reduce air shock wave.

10.1.6 **Pollution Control Measures at Coal Handling Plant**

**Coal Crushing**

The coal crushing unit is enclosed and appropriate dust suppression and collection arrangements have been installed. Following control measures are being adopted for the existing mining operation:

**Transfer Points**

Crushed coal is transported by a system of closed conveyor belts. Fixed type water sprinklers are installed at transfer points.

**Ground Bunker**

Ground Bunker is provided with both dust extraction and dust suppression system. Besides, fixed type water sprinklers are also installed at Ground Bunker.

10.1.7 **Pollution Control Measures at Railway Siding**

i) Water sprinkling arrangement during loading of coal;

ii) Regular water spraying around Railway siding near loading and transfer point

iii) Thick plantation along the railway siding.
10.2 Proposed Pollution Control Measures

The existing pollution control measures will be continued in the future.

11.0 CAPITAL PROVISION

As there is no enhancement of the Coal production, thus, no additional capital is envisaged in the Mining Plan.
MINE CLOSURE PLAN

1.0.0 INTRODUCTION

1.0.1 Name of Mine owner

Shri G. Pandey, Director Technical (Operations)

1.0.2 Location and Extent of Project/Lease Area

Jhingurdah Open cast Project is located in the Jhingurdah Block, in the North-Eastern part of Singrauli coalfields in Singrauli district of MP. The total land requirement for Jhingurdah Open cast Project (Project area/Lease area) has been estimated as 1200 Ha.

Details about the location of the project are given in 2.1 of Mining Plan. The location map of Jhingurdah OCP is given in Plate No.1.

1.0.3 Type of Project/Lease Area

The lease area consists of Forest and Non Forest Land:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Total Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Forest</td>
<td>748</td>
</tr>
<tr>
<td>2</td>
<td>Government Land</td>
<td>246</td>
</tr>
<tr>
<td>3</td>
<td>Tenancy/Agriculture Land</td>
<td>206</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1200</strong></td>
</tr>
</tbody>
</table>

1.0.4 Present Land use pattern

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>Total required Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quarry area</td>
<td>235</td>
</tr>
<tr>
<td>2</td>
<td>External Dump area</td>
<td>258</td>
</tr>
<tr>
<td>3</td>
<td>Infrastructure</td>
<td>216</td>
</tr>
<tr>
<td>4</td>
<td>Residential Colony</td>
<td>120</td>
</tr>
<tr>
<td>5</td>
<td>Green Belt</td>
<td>355</td>
</tr>
<tr>
<td>6</td>
<td>Undisturbed Area</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1200</strong></td>
</tr>
</tbody>
</table>

Page 28

Mining Plan for Jhingurdah OCP
1.0.5 **Method of Mining**

Details of mining technology and scheme of operation is given in 5.0 of Mining Plan.

1.0.6 **Coal Processing Operation**

There is no proposal for coal beneficiation for this mine. Detailed description of Coal Handling Plant and railway siding is given in 6.2 of Mining Plan.

1.1.0 **Reasons for closure**

1.1.1 **Exhaustion of Minerals**

Depending on prevailing geo-mining & techno-economic conditions, it has been decided to mine coal up to exhaustion of reserve in the proposed block.

As per the calendar programme of excavation (section 5.4 of the Mining Plan) the mineable coal reserve of the Jhingurdah top seam would be exhausted by the year 2021-22.

As per the mining plan (section 3.4) the underlying seam i.e. Jhingurdah Bottom seam will be exploited later and after its exhaustion the mine will be closed.

1.1.2 **Lack of Demand**

The Jhingurdah mine is not to be closed due to lack of demand, but due to exhaustion of minerals.

1.1.3 **Un-economic operations**

Jhingurdah mine is not to be closed due to un-economic operations, but due to exhaustion of minerals.
1.1.4 **Natural calamity**

The Jhingurdah mine is not to be closed due to natural calamity, but due to exhaustion of minerals.

1.1.5 **Direction/court cases**

Jhingurdah mine is not being closed due to direction/court cases, but due to exhaustion of minerals.


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 Jhingurdah Opencast 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.

1.2.0 Statutory obligations

1.2.1 Special conditions imposed while execution of lease deed

Special condition imposed while execution of lease deed is being complied.

1.2.2 Approval of Mining Plan

The Mining Plan shall be approved by NCL Board.

1.2.3 Directives/conditions imposed by MoC/MoEF/SPCB/CPCB

The directives/conditions imposed by the MoC/MoEF&CC/SPCB/CPCB & any other statutory agency shall be complied by the project.

The existing Environment clearance conditions (EC for 5 Mtpa under EIA notification 1994) are enclosed as Annexure-1.
The conditions imposed under Air (Prevention and Control of pollution) Act, 1981 and Water (Prevention and Control of pollution) Act, 1974 while granting the consent by MPPCB are enclosed as Annexure-2.

There is a need to define the liabilities, responsibilities and authorities of the mine management, other regulatory bodies, central and state governments after mine closure. Although no comprehensive legislation exists on mine closure, the following legislations are relevant to mine closure aspects of Coal Mines:

- Coal Mines Regulations (Amendment)-2017: Regulations 6, 66,107,108 120, 128,137 , 249 ,etc. of Coal Mines Regulations (Amendment)-2017 and its related DGMS Circulars.
- Water (Prevention and Control of Pollution Act), 1974.
- Air (Prevention and Control of Pollution), Act 1981.

In addition documents like EI/A/EMP submitted to MOEF and the commitments made therein also have legal status.
1.3.0 CLOSURE PLAN PREPARATION

1.3.1 Decision of mine closure

Considering the balance mineable reserve as on 01.04.2018, the Mining Plan for Jhingurdah OCP has been prepared for a mine life of 4 yrs up to 2021-22. The coal reserve in the Jhingurdah bottom seam will remain to be exploited after 2021-22. The present closure plan is a conceptual closure plan. Final decision of closure will be taken by the competent authority in appropriate time. The Final Stage Quarry Plan of Jhingurdah OCP is given in Plate No.3.

2.0 MINE DESCRIPTION

2.1 Geology

2.1.1 Topography

Jhingurdah Block has a high hill in the back ground with steep southern slopes covered with trees. The hilltop is about 500 m above MSL whereas the cultivated area in fore-ground has an elevation ranging between 360 m to 385 m above MSL.

More details about the physiography and drainage of the area are given in section 2.3 of Mining Plan.

2.1.2 Rock types

Detailed description of geology of the block area is given in 3.0 of Mining Plan.

2.1.3 Toxic Elements Study

Toxic elements study of coal samples from coal seams of NCL mines has been tested by IIT BHU & CIMFR Dhanbad. Result shows elemental parameters are within permissible limits.

2.1.4 Geological Structures

Details of the geological features of the area is given in 3.0 of Mining Plan.
2.1.5 **FAULT**

Description of the faults existing in the Jhingurdah Block is given in section 3.3 of Mining Plan.

2.2.0 **RESERVE**

The balance mineable reserve for Jhingurdah Project is 7.70 Mt as on 01.04.2018.

2.2.1 **Study about category of coal**

The average grade of ROM coal is G-10.

2.2.2 **Balance quantity of Coal reserve at time of mine closure**

According to the mining plan the Jhingurdah bottom seam will remain to be exploited after the ceasing of mine life of Jhingurdah Top Seam (2021-22).

2.3.0 **MINING METHOD**

Details of Mining Technology and Scheme of operations is given in 5.0 of Mining Plan.

3.0.0 **CLOSURE PLAN**

3.1.0 **MINED OUT LAND**

3.1.1 **Proposal/Measures implemented for reclamation**

The closure plan envisages concurrent land reclamation of mined out land. The reclamation is to be done in three phases:

**Phase-I  Physical / Technical Reclamation**

Due to steep gradient of coal seams and presence of Jhingurdah Bottom seam most of the over burden has been dumped outside the quarry area as external dumps. Same practice will be followed in the future.

The technical reclamation of the dumps is carried out by forming individual benches of 30 m and grading of slopes such that the overall slope of the dump comes to be 28°.
Phase-II Biological Reclamation

Biological reclamation is the Phase-II of reclamation process. The physical, chemical and biological characteristic of the top surface of mine spoil is totally different than the original soil, which can be seen from the analysis results of natural forest soil and OB material.

The reclamation at the waste dump sites should be ecologically sustainable. The local species may be encouraged and species should be so chosen that the slope, bottom of dumps and top of the dumps are able to sustain these species.

Re-vegetation covers in terms of grass & trees of appropriate species are raised over the physically reclaimed land. It is to be ensured that in the final land use plan, major portion of land acquired for the project shall be reclaimed as forestland. Mined out area shall be suitably reclaimed for vegetation. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion and surface runoff. In critical area, use of geo textiles shall be undertaken for stabilization of the dump. Both progressive technological & biological reclamation shall be carried out as per Environmental Management plan.

Phase-III Hydro Reclamation

At the end of mine life a void of 205 Ha will be left in the excavated zone. (As per EMP of Jhingurdah Project). This void will be converted into a water body. The water body will recharge the ground water of the regime. This water reservoir may be developed for pisci-culture.

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:
3.1.3 Actual site restoration for post mining land use
There will be significant increase in forest cover post-mining due to proposed reclamation activities and actual site restoration with improved green cover will be targeted in the final mine closure plan.

The proposed Final Dump Plan is enclosed as Plate-3 and reclaimed Dump Plan at post mining stage is enclosed as Plate-7.

3.1.4 Method of restoration/reclamation/Rehabilitation
Method of restoration/reclamation/rehabilitation has been described in the section 3.1.1.

3.1.5 Afforestation in first phase mined out area while commencing the mining in second phase
Mining is to be carried out in a phased manner initiating afforestation work in the mined 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.

3.1.6 Progressive mine closure plan shall be prepared for a period of five years from the beginning of the mining operation
The same has been complied.

3.1.7 These plans would be examined periodically in every five years period and be subjected to third party monitoring by the agencies approved by the Central Government
These plans would be examined periodically in every five years period and be subjected to third party monitoring by the agencies approved by the Central Government like the Central Mine Planning and Design Institute (CMPDIL), National Environmental Engineering Research Institute (NEERI), Indian School of Mines (ISM) etc. for the purpose.

3.2.0 WATER QUALITY MANAGEMENT

3.2.1 Details of existing Surface and Ground Water bodies in MLA

The hill area of the project is cut by Jhingurdah Nalla and it’s large number of feeders, which flow from east to west and join the Chatka Nallah in the west. During the dry season, there is hardly any flow of water in this nallah but during the monsoon the discharge is very heavy. There are two distinct ground water storage in and around Jhingurdah project:

a) Primary porosity system in sedimentary formation

b) Secondary porosity system in the northern and the north-western part of the Jhingurdah Block consisting of Metamorphic gneisses and schists.

3.2.2 Steps for Water Quality protection

Following water quality protection measures are taken:

a) Control of erosion: The possible sources of surface water erosion are the OB dumps. In order to prevent erosion from the OB surfaces massive plantation is being done on it. Up to 2017-18, 772753 plants have been planted on OB dumps.

The slopes of OB dumps are restricted to overall slope of 28°. Such a mild slope not only caters the stability requirement of dumps but also decelerates the surface runoff thereby minimizing the erosion. The haul roads are properly paved and wherever possible black top roads are provided to minimize erosion.
b) **Sedimentation:** Sedimentation tanks and Siltation ponds have already been constructed. The requirement of more number of such siltation ponds should be assessed and constructed accordingly.

c) **Diversion of water courses:** There was no need of diversion of any water course for the project.

d) **Water Treatment:**

The effluent discharged from the mine, workshop & CHP are treated in an ETP.

The domestic sewage is treated in a STP.

e) **Control of siltation:** To arrest the silt brought by surface runoff Catch drains have been constructed around the OB dumps which have their outlet in a siltation pond made to collect these surface runoffs and mine water.

- At the toe of the dump, a retaining wall has been provided.
- A series of open drains have been provided on dump body to arrest surface run-off and prevent siltation.

f) **Hydrogeology Study in the area:**

The detailed hydrogeological study of Singrauli Coalfield was carried out at the instance of World Bank. The hydrogeological investigation comprised of well inventory of approximately 116 dugwells, drilling and construction and monitoring of 34 nos. of piezometers and pumping test at 5 different well field sites.

The major hydrogeological units identified in the area are as follows:

<table>
<thead>
<tr>
<th>Hydrogeological Unit</th>
<th>Formation</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Table aquifer</td>
<td>Sandstone and shale underlying soil and sub-soil</td>
<td>10 m to 152.3 m</td>
</tr>
<tr>
<td>Aquiclude</td>
<td>Coal seam-Jhingurdah Top</td>
<td>105.8 m to 159.7 m</td>
</tr>
<tr>
<td>Deeper aquifer-A</td>
<td>Sandstone and shale</td>
<td>25 m to 58 m</td>
</tr>
<tr>
<td>Aquiclude</td>
<td>Coal Seam-Jhingurdah Bottom</td>
<td>6.4 m to 19.02 m</td>
</tr>
<tr>
<td>Deeper aquifer-B</td>
<td>Sandstone and shale within coal stringes</td>
<td>About-60 m</td>
</tr>
<tr>
<td>Deeper aquifer-C</td>
<td>From coarse grained to clayey sandstone</td>
<td>More than 125 m</td>
</tr>
</tbody>
</table>
g) Water Balance chart

<table>
<thead>
<tr>
<th></th>
<th>Water Balance chart</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A Net Annual Ground water Recharge</td>
<td>31.85 Mm³</td>
<td></td>
</tr>
<tr>
<td>B Net Annual Ground water Draft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Irrigation Use</td>
<td>0.023 Mm³</td>
<td></td>
</tr>
<tr>
<td>ii) Community Use</td>
<td>2.83 Mm³</td>
<td></td>
</tr>
<tr>
<td>iii) Net Mine Discharge</td>
<td>10.86 Mm³</td>
<td></td>
</tr>
<tr>
<td>Net Annual Ground water Draft</td>
<td>13.71 Mm³</td>
<td></td>
</tr>
<tr>
<td>Balance Annual Ground water Recharge (A-B)</td>
<td>18.14 Mm³</td>
<td></td>
</tr>
</tbody>
</table>

To assess the impact of opencast mining on local water regime, a regular seasonal monitoring of ground water level and quality is being carried out by establishing a network of 59 no's existing dug wells in the study area and 2 nos. piezometers in core zone of the project.

Analysis of ground water samples from monitoring wells around Jhingurdah Project indicates that the water quality is generally suitable for domestic use. The pH ranges from 7.0 to 8.0 standard units, concentration of dissolved solid, sulphate, iron, manganese, nitrate, fluoride and other heavy metals are found within the drinking standard (IS-10500). In the study area ground water level variation is as follows:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Season</th>
<th>Water level (bgl) in m (Study area-10 Km radius)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-monsoon</td>
<td>4.89 – 9.04</td>
</tr>
<tr>
<td>2</td>
<td>Post-monsoon</td>
<td>3.04 to 5.93</td>
</tr>
</tbody>
</table>

h) Treatment of Acid Mine Drainage:

There is no such problem of Acid mine drainage at this mine.

3.3.0 AIR QUALITY MANAGEMENT PLAN

3.3.1 Existing Air Quality Status:

With progressive mine operation & closure, the Ambient air quality of Jhingurdah OCP is being monitored regularly on fortnightly basis for all seasons by measuring the concentration of SPM, RPM, SO₂, NOₓ.
The existing ambient air quality of Jhingurdah OCP is being monitored at four locations/stations in core zone and four locations in buffer zone, which are as follows:

### Core Zone:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Location</th>
<th>Location code</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>East section sub-station</td>
<td>JHA1</td>
<td>Industrial</td>
</tr>
<tr>
<td>2</td>
<td>West section sub-station</td>
<td>JHA2</td>
<td>Industrial</td>
</tr>
<tr>
<td>3</td>
<td>Regional Store Office</td>
<td>JHA3</td>
<td>Residential</td>
</tr>
<tr>
<td>4</td>
<td>E&amp;M Office of Colony</td>
<td>JHA4</td>
<td>Residential</td>
</tr>
</tbody>
</table>

### Buffer Zone:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Location</th>
<th>Location code</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chandrapur Rehabilitation Site</td>
<td>JHA5</td>
<td>Residential</td>
</tr>
<tr>
<td>2</td>
<td>CETI Singrauli</td>
<td>HWA1</td>
<td>Residential</td>
</tr>
<tr>
<td>3</td>
<td>Vikash Kunj Singrauli</td>
<td>HQA2</td>
<td>Residential</td>
</tr>
<tr>
<td>4</td>
<td>Audi Village</td>
<td>KKA6</td>
<td>Residential</td>
</tr>
</tbody>
</table>

With existing control measures, the ambient air quality of the core & buffer zone is found to be well within the permissible limit and therefore no further additional control measures are required.

### 3.3.2 Measures to control Air pollution:

Following mitigation measures are in vogue:

- Approach roads to mine and service roads are provided with black topping to reduce dust generation.
- Water sprinklers are provided for dust control on haul roads.
- Green belts provided along roads & plantation in vacant land in industrial & township areas for dust control.
- In coal Handling Plant (CHP), dust control system and automatic sprinklers are provided at coal receiving pits. Fixed sprinklers are provided for coal bunkers, transfer points and loading points.
For Jhingurdah OCP, monitoring of Ambient Air Quality and above Air Quality Control measures will continue for progressive mine operation & closure. After closure, Ambient Air Quality will be monitored for a period of 3 years, if required further control measures will be taken.

3.4.0 WASTE MANAGEMENT

3.4.1 Details of type, quality and quantity of OB, Coal rejects, location plan longitude, latitude

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

The quantity of OB has already been discussed in the earlier sections of mining plan.

3.4.2 Year-wise progress of OB removal in terms of height of OB dump and No. of benches etc.

Proposed calendar programme of coal production & waste (OB) management is given in Mining Plan.

3.4.3 Their disposal practice

Due to steep gradient of coal seams and underlying coal seam (Jhingurdah Bottom) the OB generated is dumped externally and same will be practiced in future.

3.4.4 Stabilization of waste-Physical, biological year wise progress to be achieved

Details have already been given in 3.1.1.

3.4.5 Measure for prevention of siltation, erosion and dust generation, and their dispersal in the air, environment, leaching in the surface and ground water

These details have already been discussed in the earlier sections.

3.4.6 Details of reclamation and afforestation with mining activity

Details have already been given in 3.1.1.
3.4.7 Waste material re-handled or back filled in the final voids for safety
Due to steep gradient of coal seams and underlying coal seam (Jhingurdah Bottom) the OB generated is dumped externally and same will be practiced in future.

3.4.8 Efforts for minimum land requirement and degradation of land due to external OB

While designing the OB dumps of the project, technical parameters such as width, height, slope of dump etc. have been taken into consideration for safe OB dumping, so that there is minimum impact on environment and land degradation.

3.4.9 Proposal to recharge and stabilize the water table in the surrounding areas

Details have already been discussed in the earlier sections.

3.5.0 TOP SOIL MANAGEMENT

Top soil replacement is effective way of enhancing the physical and nutrient status of OB material. The top soil, if any, shall be temporarily stored at earmarked site(s) only and it should not be kept unutilized for long.

The topsoil shall be used for land reclamation and plantation. A proper top soil replacement can assure the following improvements in OB quality:

a) Increased water holding capacity
b) Improved nutrient supplying capability
c) Improved buffering capacity
d) Increased plant root depth

3.5.1 Details of top soil available and its utilization

At Jhingurdah OCP, it is found that there is hardly any top soil present in the lease hold area and the total terrain is hilly. Wherever top soil will be found, it shall be stacked separately at earmarked site.
3.5.2 Quantity and details of preserving it
Whenever top soil will be found it will be preserved as follows:

a) Top soil removed will be stock-piled only when it is impractical to promptly redistribute on required area.
b) Stock piled top soil shall be selectively placed on pre designed area
c) A vegetative cover will be generated immediately on the stock pile to prevent erosion.

3.6 MANAGEMENT OF COAL REJECTS FROM WASHERY

There is no proposal for Coal Washery for this mine.

3.7.0 INFRASTRUCTURE

3.7.1 Details of existing infrastructural facilities
Several infrastructures have been provided that includes:

i. Workshop facilities
ii. Office complex
iii. Townships
iv. Coal Handling Plants
v. Railway siding for transportation of coal
vi. Power Network including sub-stations
vii. Industrial and municipal effluent treatment plants
viii. Community facilities

3.7.2 Decommissioning proposed and their dismantling and disposal proposal
At the end of mining operations, it is proposed to decommission the Industrial infrastructures. However, before such decommissioning other infrastructures like office complex, residential complex, roads, pipelines and transmission line and community facilities, the possibility of re-use of these infrastructures for the neighboring mines shall be explored.

Salvaged materials/equipment would be used for creating infrastructures facilities for coal mines that are likely to be developed in the coalfield in future. The unusable materials will be disposed off.
After decommissioning of industrial infrastructure facilities, the leasehold area will be leveled.

The community facilities developed during the mine life like educational facilities, health facilities etc. would be continued even after the mine closure. The final closure plan will envisage interaction of mining company with the State or local bodies for running these facilities.

3.8 DISPOSAL OF MINING MACHINERY

The machineries that can be used would be diverted to new/existing projects. Other machineries that have exhausted its life will be disposed off by auctioning and removed from the site.

3.9 SAFETY & SECURITY

While carrying out all kinds of mining and allied activities in the mine, the safety rules in force as per Rules & Regulations made under Mines Act, 1952 is being observed and required safety measures are taken. There will be various elements of safety & security at the time of mine closure, which will be dealt under above Rules & Regulations. The Safety & Security hazard include the followings.

Safety hazards including management of fire:

In the Final mine closure plan, action for control of likely fire areas of the mines will be discussed. Action will also be suggested to cover all the safety aspects.

Management of Pit Slopes and Waste Dumps:

The final quarry slopes has been so designed and then subsequently developed that after the closure of the mine, there is no likelihood of any slope failure. The final slope of the quarry has been designed with above consideration. However, strict compliance with the proposed final slope of quarry would be made as given in Quarry & Surface Layout Plan and subsequent slope stability studies.
Waste OB Dumps:

The external waste dump shall be developed as per the proposed design so that slope failures do not create any safety hazard to the local community. The external dump will be formed in number of decks, each deck will have 30 m (maximum) height & slope of 37° (maximum) to avoid dump slope failure, overall dump slope shall be maintained within 28°.

Waste dumps shall be provided with garland drains and vegetation cover on surface of these dumps.

Fencing around mined out area:

To prevent illegal mining and considering safety of human & fauna, mined out area shall be properly fenced and all the entries to the mine shall be effectively sealed.

Management of final voids:

In due course of time, dip side of void (205 Ha) will be filled with rain & ground water. This water reservoir may be developed for pisci-culture.

At the time of final closure of mine, fencing with RCC post and barbed wire will be erected around the water body.

3.10.0 ECONOMIC REPERCUSSIONS OF CLOSURE OF MINE
3.10.1 a) Number of local residents employed

The project has given employment to 58 Nos. of local residents.

b) Status of continuation of family occupation

There is less likelihood of their continuation of their family occupation as the land acquired will be used for plantation on closure.

c) Scope of joining the occupation back

Near the end of the mine life, manpower will start getting reduced. The reduction of manpower could be done as per the following options:


i. Natural retirement

ii. Retraining and redeployment of younger groups in other mine.

iii. Transfer of experienced middle aged groups to other projects.

3.10.2   a) Compensation given

A total of 63 families and 516 persons have been affected by the past mining activities and they have been rehabilitated in Chandrapur Rehabilitation Complex near Jhingurdah.

b) Compensation to Employees:

Since employees are to be redeployed on closure of mine, they will continue to enjoy the regular pay and other benefits. As such there is no need for additional compensation.

3.10.3   a) Satellite Occupations connected to the mining industry:

Number of satellite occupations like transport, explosive industry, electrician, automobile mechanic, local shops, dairy etc. is connected with the mining industry.

b) Number of persons engaged therein

No such study has been carried out to determine the number of persons engaged in satellite occupations.

c) Continuance of such business after mine closure

Once the mine closes, some of these activities would be affected. But this effect would not be severe, as there are other mines and townships close to this mine.

3.10.4   a) Rehabilitated status of MLA

Persons affected by mining activities have been rehabilitated in Chandrapur Rehabilitation complex near Jhingurdah.

Rehabilitation complex is so planned that it constitutes part of the existing village environment, so that while enjoying all the civic facilities provided in the rehabilitation complex developed by NCL, the families continue to be in a rural matrix. The complex is on the road connecting to Jhingurdah OCP and Waidhan and villagers have accessibility to public transport system.
b) Other Remnant activities

The remaining rehabilitation activities will be carried out at the time of final mine closure.

3.10.5 Expectation of society on closure of mine:

The mine extends several community development facilities to the population living in this vicinity. On closure of the mine this will cease.

The project affected persons (PAPs) are provided many civic facilities on the line of the management of community facilities dealt above. The final closure plan will envisage interaction of mining company with the State or local bodies for running these facilities.

4.0 Time scheduling for Abandonment

Mine closure in terms of progressive dumping, technical & biological reclamation is concurrent with the mining process. The Reclaimed Final Stage Dump Plan is given in Plate No. 7.

Detailed mine closure plan shall be prepared & submitted before actual closure. However, tentative closure activities at the time of mine closure are scheduled below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Activities</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
<th>5th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mine Pit &amp; Management Dump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pit water body Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Plantation and its after care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Disposal of Mining Machinery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Infrastructure Dismantling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Environmental Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Fencing</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
5.0 Abandonment Cost

Mine lease hold area of Jhingurdah OCP = 1200 Ha
WPI for August 2009 = 129.6
WPI for July' 2018 = 116.7
Linking Factor WPI (Base 2004-05) for 2011-12 = 1.561
Hence WPI for July' 2018 (Base year 2004-05) = 186.8

Mine closure cost/ Ha according to WPI of 2009 = Rs.6 lakhs
Mine closure cost/ Ha according to WPI of July' 2018 = Rs.8.64815 lakhs
Mine closure cost according to July, 2018 rate = Rs.8.64815 /Ha × 1200 Ha
= Rs.10377.78 lakhs ................................ (i)

Amount deposited up to March'18 in Escrow account = Rs.9973.16 lakhs........................................... (ii)

Balance mine closure cost = (i) - (ii) = Rs.404.62000

Amount to be deposited in first year i.e. 2018-19= Balance mine closure cost/life of mine from 2018-19=Rs.404.62/4=Rs.101.15500 lakhs

The amount deposited in the following years with 5% increment (as given in mine closure guidelines) is given in the following table:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Year</th>
<th>Amount to be deposited (Rs. Lakhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2018-19</td>
<td>101.15500</td>
</tr>
<tr>
<td>2</td>
<td>2019-20</td>
<td>106.21275</td>
</tr>
<tr>
<td>3</td>
<td>2020-21</td>
<td>111.52339</td>
</tr>
<tr>
<td>4</td>
<td>2021-22</td>
<td>117.09956</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>435.99070</td>
</tr>
</tbody>
</table>

5.1 The estimated cost of various mine closure activities are given below:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Mine Closure Cost (% weightage)</th>
<th>Closure Cost (₹ Lakhs)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dismantling of Structure</td>
<td></td>
<td></td>
<td>To be included in final mine closure plan</td>
</tr>
<tr>
<td>Service Buildings</td>
<td>0.2</td>
<td>0.07199</td>
<td></td>
</tr>
<tr>
<td>Residential Buildings</td>
<td>2.67</td>
<td>11.64095</td>
<td></td>
</tr>
<tr>
<td>Industrial structures like CHP, Workshop, field sub-station etc.</td>
<td>0.3</td>
<td>1.30797</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Permanent Fencing of mine void and other dangerous area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Random rubble masonry of height 1.2m including leveling up in cement concrete 1:6:12 in mud mortar</td>
<td>1.5</td>
<td>6.53966</td>
</tr>
<tr>
<td>C</td>
<td>Grading of high wall slopes</td>
<td>To be included in final mine closure plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Leveling and grading of high wall slopes</td>
<td>1.77</td>
<td>7.71703</td>
</tr>
<tr>
<td>D</td>
<td>OB Dump Reclamation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Handling/Dozing of OB dump and backfilling.</td>
<td>88.66</td>
<td>386.54938</td>
</tr>
<tr>
<td></td>
<td>Technical and Bio-reclamation including plantation and post care</td>
<td>0.4</td>
<td>1.74396</td>
</tr>
<tr>
<td>E</td>
<td>Landscaping</td>
<td>Equal weightage throughout the life of the mine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Landscaping of the open space in leasehold area for improving its aesthetics and eco value.</td>
<td>0.3</td>
<td>1.30797</td>
</tr>
<tr>
<td>F</td>
<td>Plantation</td>
<td>To be included in final mine closure plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plantation over cleared area obtained after dismantling</td>
<td>0.5</td>
<td>2.17985</td>
</tr>
<tr>
<td></td>
<td>Plantation around the quarry area and in safety zone.</td>
<td>0.2</td>
<td>0.87198</td>
</tr>
<tr>
<td></td>
<td>Plantation over the external OB dump</td>
<td>0.02</td>
<td>0.0872</td>
</tr>
<tr>
<td>G</td>
<td>Post Closure Environment Monitoring/testing of parameters for three years</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Air quality</td>
<td>0.22</td>
<td>0.95918</td>
</tr>
<tr>
<td></td>
<td>Water quality</td>
<td>0.2</td>
<td>0.87198</td>
</tr>
<tr>
<td>H</td>
<td>Entrepreneurship Development (Vocational/skill development training for sustainable income of affected people)</td>
<td>0.26</td>
<td>1.13358</td>
</tr>
<tr>
<td>I</td>
<td>Miscellaneous and other mitigative measures</td>
<td>2.0</td>
<td>8.71981</td>
</tr>
<tr>
<td>J</td>
<td>Manpower cost for supervision</td>
<td>0.8</td>
<td>3.48792</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>100.00</td>
<td>435.9907</td>
</tr>
</tbody>
</table>

The mine closure cost has been estimated as Rs.435.9907 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.
6.0 Financial Assurance

For financial assurance, Northern Coal Field Ltd has opened an Escrow Account with Union Bank of India, Morwa, Singrauli, 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 4 years. Proposed schedule of Year wise deposition of closure cost is given in Section 5.0.

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.
7.0 **Responsibilities of Mine Closure**

For the purpose of monitoring of mine closure activities, the unit as well as area and HQ levels of the production company should set standard system and form a mine closure cell. The team of monitoring at different level should consist of member each from Mining, Environment, E & M, Finance, Civil and Survey cadre etc.

Mine Closure Organization has to be created in all subsidiaries and all areas of the subsidiaries. This organization is to be headed by a nodal officer preferably GM (Environment)/ HOD (Mine Closure Org.) of the subsidiary at the Head Quarters. Below this Officer will be the Area Nodal Officer, preferably HOD (Env.) of the Area. The organization of the HQ and area will consist of executives from Finance, Civil, E&M, Mining and Survey. Organization chart is given below:

**Mine Closure Organization at HQ Level**

```
GM (Env) / HOD (Mine closure Org)
```

```
Finance  Civil  E&M  Survey  Mining
```

**Mine Closure Organization at Area Level:**

```
GM (Env) / HOD (Mine closure Org) of HQ
```

```
Area Nodal Officer (Env)
```

```
Finance  Civil  E&M  Survey  Mining
```

Team should keep the accounting of technical and financial impacts of different mine closure activities stated in Mine Closure Plan.
The company should also prepare accounting methodology by introducing separate code for each activity. All the expenditure should be booked under the said prefixed code as also suggested by Finance Division.

This will help CMPDIL or any other agency under Mine Closure Guidelines to monitor mine closure activities of any mine of Production Company. Company should have sufficient documentary evidences for reimbursement from the Escrow account (duly signed by the above MCP committee) after each progressive stage as well as after final stage of mine closure. Apart from above documentary evidences monitoring should also include the following:

(i) Satellite imagery of plantation.

(ii) Audio – Visual documentation of different mine closure activities.

As per final MCP, provision of additional fund to be added/assessed and included in final MCP. For abandoned and closed mines if there is no provision of escrow account the subsidiary has to provide fund as required.

8.0 Provision for Mine closure

The mine owner shall be required to obtain a mine closure certificate from Coal Controller to the effect that the protective, reclamation and rehabilitation works in accordance with the approved mine closure plan/final mine closure plan have been carried out by the mine owner for surrendering the reclaimed land to the State government concerned.

The balance amount at the end of the final Mine Closure shall be released to mine owner on compliance of all provisions of Closure Plan duly signed by the mine owner to the effect that said closure of mine complied with all statutory rules, regulations, orders made by the Central or State government, statutory organizations, court etc. and duly certified by the coal Controller. This should also indicate the estimated extractable coal reserves and coal actually mine out.
If the coal Controller has reasonable grounds for believing that the protective, reclamation and rehabilitation measures as envisaged in the approved mine closure plan in respect of which financial assurance was given has not been or will not be carried out in accordance with mine closure plan, either fully or partially, coal controller shall give the mine owner a written notice of his intention to issue the orders for forfeiting the sum assured at least thirty days prior to the date of the order to be issued after giving an opportunity to be heard.
To,
The Chief General Manager
Jhingarda Project
NCL.

Sub: Expansion of Jhingarda opencast Coal Project (5.0 MTY to 5.0 MTY) of M/s Northern Coalfields Ltd. Located in Village Jhingarda, Tehsil Morwa, District Sidhi, Madhya Prades-environmental clearance reg.

Dear Sir,

Please find herewith Environment Clearance letter from MoEF for Jhingarda Project for Maximum Coal Production Capacity of 5.0 MTY involving total lease area of 1200 ha.

Kindly instruct the Concerned persons to comply specific condition and general Condition as stated in an enclosed letter Dated 11.05.2005 by Ministry of Environment and Forests.

The specific condition and general condition are to be strictly followed and assistance required from NCL, HQ and CMPDI, RI-VI are to be sought on urgent basis.

Encl: Environment Clearance letter from MoEF
Containing 6 pages.

Yours faithfully

(D.Senapata)
GM (Env.ISO&WBP)

Copy to:
1. Director (T/P&P), NCL. For kind information.
To:
Director (Tech) (Project & Planning),
Jhingurda Project,
Northern Coalfields Ltd.,
P.O. Singrauli,
Singrauli Collery,
District Sidhi-486889,
Madhya Pradesh

Subject: Expansion of Jhingurda opencast coal project (3.0 MTP to 5.0 MTP) of M/s Northern Coalfields Ltd. located in Village Jhingurda, Tendu Morade,
District Sidhi, Madhya Pradesh-environmental clearance reg.

Sir,


The Ministry of Environment & Forests has considered the environmental clearance application. It has been noted that the total lease area the project is 1200.0 ha out of which 226.0 ha is agricultural (tenancy) land, 416.0 ha is forest area and 416.0 ha is Government wasteland. Area proposed for mining is 235.0 ha, 214.0 ha is kept for OB dumping, 214.0 ha for infrastructure, 399.0 ha green belt, 120.0 ha for township and 16.0 ha is unaffected forest land. No National Park/Wildlife Sanctuary/Biosphere reserve is located within core & buffer zone of the mine lease area. Budhniha 9F and Mehrauli PF are in the buffer zone. Rehabilitation has already been carried out, no further displacement of population is involved. The annual targeted production capacity of the mine is 5.0 million tonnes. Working will be open cast by mechanised method using shovel dumper combination involving deep hole blasting. Ultimate working depth will be 250 m bgl. Total water requirement is 5159 m³/d, out of which 3999 m³/d will be met from mine water (sump) and 1250 m³/d for domestic use from LWSS of NCL. A total of 85.06 mm³ of DB has already been generated and 63.01 mm³ will be generated from future operations. Back-filling is not proposed at present. As there is coal existing in the lower seam, back-filling will be done after extraction of coal from lower seam. NCC from the State Pollution Control Board obtained on 02.12.2002. Public hearing held on 12.06.2002. Project report has been approved on 11.04.2005 for annual targeted capacity of 5.0 million tonnes. Capital cost of the project is Rs. 213.50 crores.

2. The Ministry of Environment and Forests hereby accords environmental clearance to the above mentioned coal mining project of M/s Northern Coalfields Ltd. for 5.0 MTP production by opencast method involving total lease area of 1200.0 ha under the provisions of the Environment Impact Assessment Notification, 1994 as amended on 04.05.1994 and 10.04.1997 subject to strict compliance of the terms and conditions mentioned below.

Dated the 11th May 2005

[Signature]

C.G.A.
(T&D)
A. Specific conditions:

(i) The environmental clearance is subject to approval of the State Landuse Department, Government of Madhya Pradesh for diversion of agricultural land for non-agricultural use.

(ii) The environmental clearance is subject to grant of forestry clearance.

(iii) Top soil should be stockpiled with proper slope at earmarked site(s) only with adequate measures and should be used for reclamtion and rehabilitation of mined out areas.

(iv) OB dumps should be stockpiled at earmarked dump site(s) only and should not be kept active for long period. Proper terracing of OB dump should be carried out so that the overall slope will come down to 28 degree. The excavated area should be backfilled after extraction of coal from the lower seam. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests on yearly basis.

(v) Catch drains and sediment ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The ditches should be regularly desilted and maintained properly.

Garland drains of appropriate size should be constructed to collect surface run-off from the OB and waste dump site(s) and taken to settling pond before discharge.

(vi) Dimension of the retaining wall at the toe of dumps and OB benches within the mine to check run-off and siltation should be based on the rain fall data.

(vii) Green belt should be raised in an area of 709.6 ha by planting the native species around the ML area, OB dump sites, CHP, colony etc in consultation with the local DPO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

(viii) The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.

(ix) Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year— pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and Regional Director, Central Ground Water Board.
(v) Emissive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spray ing arrangements on heap roads, wagon loading, dumps, loading & unloading points should be provided and properly maintained.

(vi) Adequate measures should be taken for control of noise levels within prescribed standards. Workers engaged in blasting and dicing operations, operations of refiners, etc., should be provided with ear plugs/muffs.

(vii) Industrial wastewater (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under (GSR 422(E) dated 19th May 1993) and 31st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of effluents from workshop.

(viii) Acid mine water, if any has to be treated and disposed of after conforming to the standard prescribed by the competent authority.

(ix) Persons working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

Occupational Health Surveillance programme of the workers should be undertaken periodically to observe any contractions due to exposure to coal dust and take corrective measures, if needed.

(x) Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

(xi) A separate environmental management cell with suitable qualified personnel should be set up under the control of a senior executive, who will report directly to the Head of the organization.

(xii) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purposes. Year-wise expenditure should be reported to the Regional Office, Bhopal of the NOF and to the Ministry.

(xiii) The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities should extend full cooperation to the officer(s) of the Regional office by furnishing requisite data/information/monitoring reports.

(xiv) A copy of the clearance letter will be marked to the concerned Panchayat Pradhan NGO, if any, from whom any suggestions/representation has been received while processing the proposal.

(xv) The Project authorities should inform to the Regional office located at Bhopal regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
(x) The project authorities should meet the water requirement of nearby village(s) if the village wells go dry due to dewetting of the mine.

(xi) Permission from the competent authority should be obtained for withdrawal of water from Godavari Balay Pant Sagar for domestic use.

(xii) Coal handling plant should be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.

(xiii) Consent to operate should be obtained from SPCB for the enhanced production.

(xiv) Vehicular emissions should be kept under control and regularly monitored.

(xv) Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to MOEF and its regional office.

(xvi) The project proponent should take all precautionary measures during mining operation for conservation and protection of endangered fauna such as bear, leopard, python and peacock spotted in the study area in consultation with the concerned forest officers. Action plan for conservation of endangered fauna should be prepared and submitted to the Ministry and its Regional Office within 3 months.

(xvii) A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

B. General Conditions

(i) No change in mining technology and scope of works should be made without prior approval of the Ministry of Environment and Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral coal and waste should be made.

(iii) At least four ambient air quality monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO₂, NOₓ, and CO monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Data on ambient air quality (RPM, SPM, SO₂, NOₓ, and CO) should be regularly submitted to the Ministry including its Regional Office at Ghaziabad and to the State Pollution Control Board/General Pollution Control Board once in six months.

(iv) Drills should either be wet operated or with dust extractors.
(xvi) State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collectors/Tehsildar’s Office for 30 days.

(xvii) The Project proponents should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the Project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at the website of the Ministry of Environment and Forests at http://envfor.nic.in.

3. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

5. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

(Chairman)

Additional Director

Copy to:

1. Secretary, Ministry of Coal, Government of India, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment, Government of Madhya Pradesh, Bhopal.
3. Secretary, Department of Forests, Government of Madhya Pradesh, Bhopal.
5. Chairman, Central Pollution Control Board, CIO-Dwm-Office Complex, East Adhin Nagri, New Delhi-110 012.
7. Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Bungalow, K.G. Marg, New Delhi-110001.
8. District Collector Sidhi District, Madhya Pradesh.
5. Shri H.K. Shukla, Chief General Manager, Coal India Limited, 403/8, Surya Kiran, 14 Kasturba Gandhi Marg, New Delhi-110 001.


13. Record File.
Consent Order

To,
The Occupier,
MA. Jhingurda Project-Northern Coalfield Ltd,
Post-Jhingurda,
Teh & Dist: Singrauli, (M.P.)


Ref: Your online Renewal Application Receipt No. 321894 Dt. 20/07/2017.

With reference to your above application for renewal of consent, has been considered under the aforesaid Acts and existing rules therein. The M.P. Pollution Control Board has agreed to grant consent under Air and Water Act & Authorisation under Hazardous Waste Rules as referred to above, up to 31/07/2018 subject to the fulfillment of the terms & conditions, enclosed with this letter and mentioned here in after:

a. Mining lease area: 1200 0.6 Hect.
b. Product & Production Capacity:

<table>
<thead>
<tr>
<th>Product</th>
<th>CCA Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining of Coal</td>
<td>5.0 Million Ton Per year</td>
</tr>
</tbody>
</table>

Notes: For any change in above industry, shall obtain fresh consent from the board.

The validity of the consent is up to 31/07/2018 and has to be renewed before expiry of consent validity. Online application through XGN with annual license fees in this regard shall be submitted to this office 6 months before expiry of the consent/Authorization. Board reserves the right to amend/cancel / revoke the above condition in part or whole as and when required.

Enclosures:
* Conditions under Water Act
* Conditions under Air Act
* Conditions under Hazardous Rules
* General conditions

CHD-636, NULL, INDORE - 482010, MADHYA PRADESH
Member Secretary
E-Signed On 24/10/2017 12:25:35.066
(Organic Authentication on AADHAR from UIDAI Server)
TPAV # F0455R22K4


Print Id: 10/08/2017

E-Signed (Physical Signature NOT required)
CONDITIONS PERTAINING TO WATER (PREVENTION & CONTROL OF POLLUTION) ACT 1974 -:
1. The daily quantity of trade effluent at out fall of the unit shall not exceed 1275.000 KLD/day, and the daily quantity of
sewage at out fall of the unit shall not exceed 1200.000 KLD/day.
2. Trade Effluent Treatment:
The applicant shall provide comprehensive effluent treatment system and maintain the same properly to achieve following standards:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>5.5 - 9.0</td>
</tr>
<tr>
<td>Suspended Solids</td>
<td>Not to exceed 100 mg/l</td>
</tr>
<tr>
<td>BOD 5 Days 27°C</td>
<td>Not to exceed 24 mg/l</td>
</tr>
<tr>
<td>COD</td>
<td>Not to exceed 250 mg/l</td>
</tr>
<tr>
<td>Oil and grease</td>
<td>Not to exceed 10 mg/l</td>
</tr>
<tr>
<td>TDS</td>
<td>Not to exceed 250 mg/l</td>
</tr>
<tr>
<td>Chlorides</td>
<td>Not to exceed 1000 mg/l</td>
</tr>
</tbody>
</table>

For other parameters general standards of discharge as notified under UP Act 1986 shall be applicable.

3. Sewage Treatment - The applicant shall provide comprehensive sewage treatment system and maintain the same properly to achieve following standards:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>5.5 - 9.0</td>
</tr>
<tr>
<td>Suspended Solids</td>
<td>Not to exceed 34 mg/l</td>
</tr>
<tr>
<td>BOD 5 Days 27°C</td>
<td>Not to exceed 16 mg/l</td>
</tr>
<tr>
<td>COD</td>
<td>Not to exceed 50 mg/l</td>
</tr>
<tr>
<td>NH3-N</td>
<td>Not to exceed 5 mg/l</td>
</tr>
<tr>
<td>N-Total</td>
<td>Not to exceed 50 mg/l</td>
</tr>
<tr>
<td>Feecal Coliform</td>
<td>&lt; 250 (MPN/100 ml)</td>
</tr>
<tr>
<td>NO3-P</td>
<td>Not to exceed 2 mg/l</td>
</tr>
</tbody>
</table>

4. The effluent shall be treated up to prescribed Standards and reuse in the process, for cooling and for green belt
devolution/gardening within premises. Hence zero discharge condition shall be practiced. In no case treated effluent shall
be discharged outside of industry/unit premises.

5. Any change in production capacity, process, raw material used etc. and for any enhancement of the above prior
permission of the Board shall be obtained. All authorized discharges shall be consistent with terms and conditions of this
consent. Facility expansion, production increases or process modifications which result new or increased discharges of
pollutants must be reported by submission of a fresh application for prior permission of the Board.

6. The specific effluent limitations and pollution control systems applicable to the discharge permitted herein are set forth as
above conditions.

7. Compilation of Monitoring:
   i. Samples and measurements taken to meet the monitoring requirements specified above shall be representative of the
      volume and nature of monitored discharge.
   ii. Following promulgation of guidelines establishing test procedures for the analysis of pollutants, all sampling and
       analytical methods used to meet the monitoring requirements specified above shall conform to such guidelines unless
       otherwise specified.
   iii. The applicant shall take samples and measurements to meet the monthly requirements specified above and report online
       through XCON in the same to the Board.

8. Recording of Monitoring:

Consent No: AWH-47447, Validity: 31/07/2018, Hard Validity: 30/11/2022, Outward No:55735,24/10/2017, TPAY # FO43SR22K4
Consent Order

1. The applicant shall make and maintain online records of all information resulting from monitoring activities by this Consent.
2. The applicant shall record for each measurement of samples taken pursuant to the requirements of this Consent as follows:
   (i) The date, exact place and time of sampling
   (ii) The dates on which analysis were performed
   (iii) Who performed the analysis?
   (iv) The analytical techniques or methods used and
   (v) The result of all required analysis.
3. If the applicant monitors any Pollutant more frequently as is by this Consent he shall include the results of such sampling in the calculation and reporting of values required in the discharge monitoring reports which may be prescribed by the Board. Such increased frequency shall be indicated on the Discharge Monitoring Report Form.
4. The applicant shall retain for a minimum of 3 years all records of monitoring activities including all records of Calibration and maintenance of instrumentation and original strip chart regarding continuous monitoring instrumentation.
5. The period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the applicant or when requested by Central or State Board or the court.

9. Reporting of Monitoring Results:
   Monitoring results required by this Consent shall be summarized and reported by submitting a Discharge Monitoring report on line to the Board.

10. Limitation of discharge of oil Hazardous Substance in harmful quantities:
    The applicant shall not discharge oil or other hazardous substances in quantities defined as harmful in relevant regulations into natural water course. Nothing in this Consent shall be deemed to preclude the institution of any legal actions or relieve the applicant from any responsibilities, liabilities, or penalties to which the applicant is or may be subject to clauses.

11. Limitation of visible floating solids and foam:
    During the period beginning date of issuance the applicant shall not discharge floating solids or visible foam.

12. Disposal of Collected Solids:
    All hazardous wastes/digests shall be disposed of as per the Authorization issued under Hazardous & other waste (M&IM) Rules 2016. And other Solids Sludges, dirt, silt or other pollutant separated from or resulting from treatment shall be disposed of in such a manner as to prevent any pollutant from such materials from entering any such water. Any live fish, Shell fish or other animal collected or trapped as a result of intake water screening, or treatment may be returned to their habitat.

13. Provision for Electric Power Failure:
    The applicant shall ensure to the consent issuing authority that the applicant has installed or provided for an alternative electric power source sufficient to operate all facilities utilized by the applicant to maintain compliance with the terms and conditions of this Consent.

14. Prohibition of By pass system:
    The diversion or by-pass of any discharge from facilities utilized by the applicant to maintain compliance with the terms and conditions of this Consent is prohibited except:
    (a) Where unavoidable to prevent loss of life or severe property damage or
    (b) Where excessive storm drainage or run off would damage any facilities necessary for compliance with the terms and conditions of this Consent. The applicant shall immediately notify the consent issuing authorities in writing of each such diversion or by-pass in accordance with the procedure specified above for reporting non-compliance.

15. Industry/Institutional mine management shall submit the information online through XGN in reference to compliance of consent conditions.

Additional Conditions for Water Pollution Control:

1. The mine management shall maintain zero discharge conditions. The Mine shall optimize the water abstraction from the surface water source, if any, by utilizing the mine discharge for spraying on haul roads, mine area and loading - unloading area after proper treatment. The treated mine discharge shall also be utilized for sanitary purposes by providing separate supply lines, dust suppression and for plantation in order to ensure zero discharge status.

2. Rain water harvesting shall be undertaken to recharge ground water source and status of implementation shall be submitted to the Board. Hydro-geological study of the area shall be reviewed annually. In case any adverse effect on ground water quality and quantity is observed, mining shall be stopped and resumed only after applying the necessary measures.
mitigating steps to restore the same.

**CONDITIONS PERTAINING TO AIR (PREVENTION & CONTROL OF POLLUTION) ACT 1981**

1. The applicant shall provide comprehensive air pollution control system consisting of control equipments with reference to generation of emission and same shall be operated & maintained continuously so as to achieve the level of pollutants in the following standards:

<table>
<thead>
<tr>
<th>Name of section</th>
<th>Capacity</th>
<th>Stock bed source</th>
<th>Fuel</th>
<th>Control equipment to be installed</th>
<th>PM$<em>{10}$/PM$</em>{2.5}$ (µg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Handling</td>
<td>Fugitive Emissions</td>
<td>NA</td>
<td>NA</td>
<td>Dust Suppressor, Green Belt, Water Sprinkler, Wind Breaking Wall</td>
<td>100 / 60</td>
</tr>
<tr>
<td>Transportation etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Ambient air quality at the boundary of the industry/unit premises shall be monitored and reported to the Board regularly on quarterly basis. The Ambient air quality norms are prescribed in MoEF gazette notification no. GSR/R2(E), dated: 16/11/09. Some of the parameters are as follows:
   a. Particulate Matter (less than 10 micron) - 100 µg/m$^3$ (PM$_{10}$ µg/m$^3$ 24 hrs. basis)
   b. Particulate Matter (less than 2.5 micron) - 60 µg/m$^3$ (PM$_{2.5}$ µg/m$^3$ 24 hrs. basis)
   c. Sulphur Dioxide [SO$_2$] (24 hrs. Basis) - 80 µg/m$^3$
   d. Nitrogen Oxides [NO$_x$] (24 hrs. Basis) - 80 µg/m$^3$
   e. Carbon Monoxide [CO] (8 hrs. Basis) - 200 µg/m$^3$

3. The industry shall take adequate measures for control of noise level generated from industrial activities within the premises less than 75 dB(A) during day time and 70 dB(A) during night time.

4. All other fugitive emission sources such as leakages, seepages, spillages etc. shall be ensured to be plugged or sealed or made airtight to avoid the public nuisance.

5. All the internal roads shall be made pucca to control the fugitive emissions of particulate matter generated due to transportation and internal movements. Good housekeeping practices shall be adopted to avoid leakages, seepages, spillages etc.

**Additional Conditions for Air Pollution Control:**

1. Mine management shall strictly comply with the directions of the Hon'ble NGT (CZ) in the matter 127/2017 (Ajay Dubey vs. Coal India & Others) and shall report accordingly to Board with regard to ambient air quality (AAQ).

2. Mine management shall install CAAQMS stations at suitable locations to monitor ambient air quality in the leased area and its vicinity and shall provide its suitable unhindered connectivity with Environment Surveillance Centre of the MPPCB and transmit the data with in 3 months time.

3. Coal handling plant and coal loading and unloading in railway wagons should be provided with adequate number of high efficiency dust extraction / suppression system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated. Dust control measures shall be adopted at coal transfer point of the high wall mining machine as per the need.

4. Mine management shall provide continuous water sprinkler systems at suitable locations on the road side and also provide proper pollution control arrangements in control the fugitive emission generated due to transportation of Coal from CHP to siding.

5. Major approach roads and haul roads shall be metal topped.

6. Drills shall be wet operated to reduce the fugitive emission.

7. Mining area to the Ambient A should be surrounded by green belt having thick canopy of the tree cover.

8. Sufficient number of water tanker for water sprinkling shall be provided for the control of fugitive emission from haul.
CONSENT ORDER

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parish, Bhopal - 16 MP
Tele: 0755-2466191, Fax:0755-2463742

CONDITIONS PERTAINING TO THE HAZARDOUS AND OTHER WASTES (MANAGEMENT AND TRANSBORDER MOVEMENT) RULES, 2016.

FORM-2
[See rule 6 (2)]

FORM FOR GRANT OR RENEWAL OF AUTHORISATION BY STATE POLLUTION CONTROL BOARD TO THE OCCUPIERS, RECYCLERS, REPROCESSORS, REUSERS, USER AND OPERATORS OF DISPOSAL FACILITIES

1. The operator of facility, i.e. Occupier of M/s. Jhingarva Project-Northern Coalfield Ltd is hereby granted the authorization to operate a facility for collection, reception, treatment, storage, transport and disposal of Hazardous waste to be generated and disposed to the time mentioned in table below on the premises situated at NCL project, Post-Jhingarva, Dist Shajnagar, (M.P.)

2. The authorization granted to operate a facility for generation, collection, reception, storage and transport of hazardous waste

<table>
<thead>
<tr>
<th>Category of Hazardous Waste as per the Schedules I, II and III of these rules</th>
<th>Authorised mode of disposal or recycling or reutilisation or co-processing, etc.</th>
<th>Quantity (ton/amount)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used or Spent Oil</td>
<td>(5.1) To be sold to authorized recycler authorized by SPCB.</td>
<td>114,000-M.T</td>
</tr>
<tr>
<td>Wastes or residues containing oil</td>
<td>(5.2) M.P. Waste Management Project, Pithampar, Dist. Dhar (M.P.)</td>
<td>12,000-M.T</td>
</tr>
</tbody>
</table>

3. The waste specified under hazardous waste stream as mentioned above shall be stored as per MoEF and CPCB guidelines issued time to time and disposed off as indicated in above table at Sl. No. 3 as Hazardous and other Waste (Management & Transboundary movement) Rules, 2016.

4. The authorization shall be in force for a period of five years from 01/12/2017 to 30/11/2022.

5. The industry shall take all the steps wherever required, for reduction of the waste generated or for recycling or reuse.

6. The industry shall display the information on hazardous waste generated on notice board of size 6" x 4" (in Hindi & English) outside the unit main gate along with quantity and nature of hazardous chemicals being handled in the plant, including wastewaters, air emission and hazardous wastes.

7. The authorisation is subject to the terms & conditions as given below and to such conditions as may be specified in the rules for the time being in force under the Environment (Protection) Act, 1986. Violation of any of the conditions shall be liable for legal action as per provisions under Environment (Protection) Act, 1986.

Terms and Condition Of Authorisation

1. The authorisation shall comply with the provision of Environment (Protection) Act, 1986 and the rules made thereunder.

2. The authorisation or its renewal shall be produced during inspection on the request of the inspecting officer authorized by the State Pollution Control Board.

3. The authorized person shall not rent, lend, sale, transfer or otherwise transport the hazardous wastes without obtaining prior permission of the State Pollution Control Board.

4. If the industry comes in such a category where insurance under Public Liability Insurance Act, is necessary, the industry shall comply with provision and submit a copy of the policy to the Board.

5. Any unauthorized change in production capacity, process, raw materials, personnel, equipments etc. as mentioned in the application by the person authorized shall constitute a breach of this authorisation.

6. The unit should maintain the records of hazardous wastes as per the Form-3 of rule 9 (1) and should submit and upload online the annual return in Form No.4 as per the rule 9 (2) for the preceding year to this office on or before 31st June every year. If the units fails to submit it or upload it online on time or before the due date, the authorization will be treated as cancelled with immediate effect.

Print Date: 19/08/2017  
Signed (Physical Signature NOT required)  
Page: 5/9
Consent Order

7. Details of auction/sale of non-farmer hazardous waste should be submitted online in form no. 13 in this office annually.

8. An on-site storage for waste for a maximum period of one year or a maximum quantity of 10 MT, whichever is less, should be provided and it shall be ensured that there is no leakage or seepage or spillage from surrounding walls or bottom. The site should be covered and properly protected to prevent the entry of rainwater in storage area.

9. It is the duty of authorized person to take prior permission of the M.P. Pollution Control Board to close down the facility.

10. The information regarding quantity of hazardous wastes generated and its analysis report should be sent to the Board online quarterly.

11. Hazardous Waste Storage Site & Danger sign board shall be provided with all safety devices at the storage site.

12. The authorized person should inform the name and address of the contact person responsible for hazardous waste management.

13. In case of importing Hazardous Waste, occupier shall apply to the M.P. Pollution Control Board, 180 days in advance in Form-6, for permission to import of the waste as per Rule 13 (i) of Hazardous and Other Waste (Management and Transboundary Movement) Rules 2016 as amended up to date.

14. In the event of any accident due to handling of hazardous wastes, the authorized person must inform immediately to the Regional Office & Head office of the board on Fax/telephone/email at mppch@rediffmail.com about the incident and detail report should be sent in Form No.5 as per rule 10 of Hazardous and Other Waste (Management and Transboundary Movement) Rules 2016 as amended up to date.

**Additional Conditions for Management of Hazardous Wastes:**

(i) The occupier or operator of the Treatment, Storage and Disposal Facility or recycler shall ensure that the hazardous waste are packaged and labeled, based on the composition in a manner suitable for safe handling, storage and transport as per the guidelines issued by the Central Pollution Control Board vide - October 2004 & conditions issued from time to time.

(ii) The labeling and packaging shall be easily visible and be able to withstand physical conditions and climate factors.

(iii) The transport of the hazardous waste shall be in accordance with the provision of these rules and the rules made by the Central Govt. under the Motor Vehicle Act 1988 and other guidelines issued from time to time in this regard.

(iv) In case of transportation of hazardous wastes through a State other than the State of origin or destination, the occupier shall intimate the concerned State Pollution Control Board before he hands over the hazardous wastes to the transporter.

(v) The occupier shall provide the transporter with six copies of the manifest as per the colour codes as per rule 21(1).

(vi) The occupier shall forward copy 1 (white) to the State Pollution Control Board and in case the hazardous wastes is likely to be transported through any transit State, the occupier shall prepare an additional copy each for intimation to each State and forward the same to the concerned SPCB before he hands over the hazardous wastes to the transporter.

(vii) No transporter shall accept hazardous wastes from an occupier for transport unless copies 3 to 6 of the manifest accompany it.

(viii) The transporter shall submit copies 3 to 6 of the manifest duly signed with date to the operator of the facility along with the waste consignment.
Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parishad, Bhopal - 16 MP
Tel: 0755-2466191, Fax: 0755-2463742

GENERAL CONDITIONS FOR THE IMPROVEMENT OF ENVIRONMENT:

MANAGEMENT & DISPOSAL OF FLY ASH

1. THE MINE MANAGEMENT SHALL ENSURE ALL THE COMPLIANCES REGARDING DISPOSAL AND UTILIZATION OF FLY ASH AS STIPULATED IN M&EF&CC NOTIFICATIONS NO. S.O. 763(E) DATED 14/9/99 AND ITS AMENDMENTS VIDE NOTIFICATION NO. S.O. 979(E) DATED 27/8/03, S.O. 2804(E) DATED 03/03/09 AND S.O. 254(E) DATED 25/1/16. SOME OF THE RELEVANT STIPULATIONS ARE AS BELOW:

A. No person or agency shall within radius of 50 kilometers (by road) from coal or lignite based thermal power plants, undertake or approve stowing of mines without using 25% of fly ash on weight to weight basis, of the total stowing materials used and this shall be done under the guidance of DGMS.

B. No agency, person or organisation shall within a radius of hundreds kilometers of a coal or lignite based thermal power plant undertake or approve or allow reclamation and compaction of low lying areas with soil; only fly ash shall be used for compaction and reclamation and they shall also ensure that such reclamation and compaction is done in accordance with specifications and guidelines laid down.

C. No person or agency shall within radius of 50 kilometers (by road) from coal or lignite based thermal power plants, undertake or approve without using 25% of fly ash on volume to volume basis of the total materials used for external dumps of over burden and same percentage in upper benches of back filling of opencast mines under the guidance of DGMS.

2. The non hazardous solid waste arising in the industry/unit/unit premises sweeping, etc. be disposed off scientifically so as not to cause any nuisance/pollution. The applicant shall take necessary permission from civic authorities for disposal to dumping site if required.

Non Hazardous Solid wastes:-

<table>
<thead>
<tr>
<th>Type of waste</th>
<th>Quantity</th>
<th>Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrap/ Plastic/ Packing Material, Card Board, Candy Bags Etc</td>
<td>—</td>
<td>Sale To Authorized Party/ As Per CPCB, MoEF&amp;CC Guidelines / Others</td>
</tr>
</tbody>
</table>

3. The applicant should allow the staff of Madhya Pradesh Pollution Control Board and/or their authorized representatives, upon the representation of credentials:

a. To inspect raw material stock, manufacturing processes, reactors, premises etc to perform the functions of the Board.

b. To enter upon the applicant’s premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this Consent.

c. To have access at reasonable times to any records required to be kept under the terms and conditions of this Consent.

d. To inspect at reasonable times any monitoring equipment or monitoring method required in this Consent or, to sample at reasonable times any discharge or pollutants.

4. This consent/authorisation is transferable, in case of change of ownership/management and addresses of new Owner/partner/Director/proprietor should immediately apply for the same.

5. The issuance of this Consent does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorise any invasion of personal rights, nor any infringement of Central, State or local laws or regulations.

6. This consent is granted in respect of Water pollution control Act 1974 or Air Pollution Control Act, 1981 or Authorization under the provisions of Hazardous and other Waste (Management & Transboundary Movement) Rules 2016 only and does not relate to any other Department/Agencies. License required from other Department/Agencies have to be obtained by the unit separately and have to comply separately as per there Act / Rules.


Print ID: 10086207777

e-Signed (Physical Signature NOT required)
Consent Order

7. Balance consent/authorisation fee, if any shall be recoverable by the Board even at a later date.

8. The applicant shall submit such information, forms and fees as required by the board not later than 180 day prior to the date of expiration of this consent/authorisation.

9. Knowingly making any false statement for obtaining consent or compliance of consent conditions shall result in the imposition of criminal penalties as provided under the section 42(g) of the Water Act or section 58(g) of the Air Act.

10. After notice and opportunity for the hearing, this consent may be modified, suspended or revoked by the Board in whole or in part during its term for cause including, but not limited to, the following:
   (a) Violation of any terms and conditions of this Consent.
   (b) Obtaining this Consent by misrepresentation of failure to disclose fully all relevant facts.
   (c) A change in any condition that requires temporary or permanent reduction or elimination of the authorized discharge.

11. On violation of any of the above-mentioned conditions the consent granted will automatically be taken as canceled and necessary action will be initiated against the industry.

12. The Mine shall improve their existing pollution control facilities and maintain the same properly so that the treated effluent could be maintained within the prescribed standards.
13. No effluent shall be discharged outside the Mine premises in any circumstances, hence Zero discharge condition shall be maintained.
14. Adequate & effective precautionary measures shall be taken before and during operation, maintenance and cleaning of pollution control system to avoid any accidental hazard.
15. Extensive tree plantation shall be carried out in open areas available within and around the mine premises and also overburden dumps in consultation with expert agency. Good house keeping practice shall be adopted.
16. The Mine shall have to do the work of biological reclamation as per direction of Indian Bureau of mines, GOI and ministry of Environmental & Forest Govt. of India on the internal and external dumps and yearly reclamation data shall be submitted to the Board.
17. Mine shall have to take effective steps to check the soil erosion from over burden/waste material dumping area, causing siltation problem into near by nallah/ river/ pond during the rainy season. Mine shall have to inform about the progress regularly to the Board.
18. The Mine shall improve their existing pollution control facilities and maintain the same properly so that the emission could be maintained within the prescribed standards.
19. Adequate & effective precautionary measures shall be taken before and during operation, maintenance and cleaning of pollution control system to avoid any accidental hazard.
20. Extensive tree plantation shall be carried out in open areas available within and around the mine premises and also on over burden dumps in consultation with expert agency. Good house keeping practice shall be adopted.
21. Controlled blasting should be practiced with the use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders should be implemented.
22. Vehicular emissions should be kept under control and regularly monitored for compliance of emission norms. Vehicles used for transporting the mineral should be covered with tarpaulin and optimally loaded.
23. Mine management shall submit environmental statement for the previous year ending 31st March on or before 30th September every year to the Board.
24. Mine management shall comply with the OM issued by GOI/MoEF & CC dated 26.08.2015 and report the compliance to this office.

Consent/Authorisation as required under the Water (Prevention & Control of Pollution) Act,1974. The Air (Prevention & Control of Pollution) Act,1981 and the Authorization under Hazardous & Other Waste (Management & Transboundary Movement) Rule, 2016 is granted to your industry subject to fulfillment of all the conditions mentioned above. For renewal purpose you shall have to make an application to this Board through XCN at least Six months before the date of expiry of this consent/authorisation. The applicants without valid consent (for operation) of the Board shall not bring in to use any outlet for the discharge of effluent and gaseous emission.

For and on behalf of
M.P. Pollution Control Board

(Member Secretary)

Consent No:AWI-47447, Validity:31/07/2018, Hazard Validity:20/11/2022, Outward No. 55535, 24/10/2017, TPAV # FO455R22K4
Print Date: 09/08/2017
Signed (Physical Signature NOT required)
REGISTERED OFFICE
Gondwana Place, Kanke Road
Ranchi – 834 031
(Jharkhand)

REGIONAL INSTITUTES

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

Regional Institute - II
Koyla Bhavan, Koyla Nagar
Dhanbad - 826 005
(Jharkhand)

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

Regional Institute - III
Gondwana Place, Kanke Road
Ranchi - 834 031
(Jharkhand)

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

Regional Institute - IV
Jaripatka, Kasturba Nagar
Nagpur - 440 014
(Maharashtra)

क्षेत्रीय संस्थान-V
सीपत रोड बिलासपुर -
(छत्तीसगढ़)

Regional Institute - V
Seepat Road
Bilaspur - 495 001
(Chattisgarh)

क्षेत्रीय संस्थान-VI
पोस्ट : जयंत कोल्लियरी जिला : सिंगराउली पिन नं. - 486 890
(मध्य प्रदेश)

Regional Institute - VI
P.O.: Jayant Colliery
Distt.: Singrauli
PIN - 486 890
Madhya Pradesh

क्षेत्रीय संस्थान-VII
गृह निर्माण भवन सचिवलाय मार्ग पिन नं. - 486 890
(ओडिशा)

Regional Institute - VII
Grih Nirman Bhawan
Sachivalaya Marg
Bhubaneswar - 751 001
(Orissa)

Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited)
A Mini Ratna Company

Gondwana Place, Kanke Road, Ranchi - 830 031, India
Phone : (91-0651) 2230002, 2230483
Fax : (91-0651) 2231447
Website : www.cmpdi.co.in