CHASNALLA COLLIERY
CHASNALLA

CAPACITY UPGRADEATION OF
CHASNALLA COKING COAL WASHERY TO 4 MTPA

PRE-FEASIBILITY REPORT

STEEL AUTHORITY OF INDIA LTD.
CENTRE FOR ENGINEERING AND TECHNOLOGY
RANCHI

APRIL 2014 CET/03/RN/3696/PRE-FR/CC/01/R=0
### CONTENTS - CHAPTERS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
<th>Page no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Summary</td>
<td>1.1 - 1.3</td>
</tr>
<tr>
<td>2.</td>
<td>Background</td>
<td>2.1 - 2.7</td>
</tr>
<tr>
<td>3.</td>
<td>Analysis and Selection of Alternative</td>
<td>3.1 - 3.4</td>
</tr>
<tr>
<td>4.</td>
<td>Project Description</td>
<td>4.1 - 4.13</td>
</tr>
<tr>
<td>5.</td>
<td>Project Implementation &amp; cost estimate</td>
<td>5.1</td>
</tr>
<tr>
<td>6.</td>
<td>Capital Cost Estimate</td>
<td>6.1</td>
</tr>
<tr>
<td>7.</td>
<td>Recommendation</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>ANNEXURES</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DRAWINGS</td>
<td></td>
</tr>
</tbody>
</table>

---

Task Force Leader (TFL) | HOD (Lead Section)  
------------------------|---------------------
K.P. Jayakumar (C, C&C) | R.K. Burman, DGM & I/c (C, C&C)
## CONTENTS - ANNEXURES

<table>
<thead>
<tr>
<th>Annexure No.</th>
<th>Description</th>
<th>No. of pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.17.1-1</td>
<td>MOM dated 20.2.14.</td>
<td>3</td>
</tr>
<tr>
<td>4.1-1</td>
<td>MOU SAIL &amp; CCL</td>
<td>3</td>
</tr>
<tr>
<td>4.10-1</td>
<td>Water Balance of new 1.2 Mtpa coking coal washery</td>
<td>1</td>
</tr>
<tr>
<td>4.2.1-1</td>
<td>Topography of Chasnalla</td>
<td>1 sheet</td>
</tr>
</tbody>
</table>
## CONTENTS - DRAWINGS

<table>
<thead>
<tr>
<th>Sl. no.</th>
<th>Drawing no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>CET RN 3696 CC1 00 004,R=0</td>
<td>Process flow diagram of Upgraded Chasnalla Coal Washery</td>
</tr>
<tr>
<td>2.</td>
<td>CET RN 3696 CC1 00 005,R=0</td>
<td>Process flow of Proposed new 1.2 Mtpa Coking coal washery</td>
</tr>
<tr>
<td>3.</td>
<td>CET RN 3696 CC2 00 002, R=0</td>
<td>General Layout of Upgraded existing Chasnalla Coal Washery</td>
</tr>
<tr>
<td>4.</td>
<td>CET RN 3696 CC2 00 003,R=0</td>
<td>General Layout of Proposed 1.2 Mtpa Coking Coal Washery</td>
</tr>
</tbody>
</table>
1. **SUMMARY**

1.1. Steel Authority of India Ltd (SAIL), a public sector undertaking is one of the major steel producers in the country. SAIL is having five major integrated steel plants and other small units across the country.

1.2. SAIL requires coking coal for steel making. The annual requirement of coking coal is around 14 Mtpa.

1.3. Capacity expansion of SAIL is in progress and the annual requirement of coking coal is to increase from the present 14MT to more than 20 MT by the end of this year.

1.4. SAIL is having a pit head coal washery of 2.04 Mtpa capacity in Chasnalla. However, due to deterioration in ash percentage and change in size fraction of coal, the rated capacity could not be achieved and the washery has operated at a maximum coal throughput of 1.326 Mtpa in the near past.

1.5. SAIL has proposed to upgrade the capacity of existing coal washery to 2.8 Mtpa and to setup a new 1.2 MTPA Coking Coal Washery at Chasnalla, in the district of Dhanbad, Jharkhand, India.

1.6. The plant is to be designed to maximize yield of clean coal having 15% to 18% ash content for use in converting to furnace coke. The secondary by-product middling will have ash content of 34% to 39% to be used in power generation units.

1.7. The production schedule for the proposed washery will be as given below:

<table>
<thead>
<tr>
<th>Production Schedule (As per Peak Rated Capacity)</th>
<th>ROM Coal (‘000 Tons per Year)</th>
<th>Clean Coal (‘000 Tons per Year)</th>
<th>Middling (‘000 Tons per Year)</th>
<th>Rejects (Tons ‘000 per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgraded washery</td>
<td>2800</td>
<td>1000</td>
<td>1268</td>
<td>532</td>
</tr>
<tr>
<td>1.2 Mtpa new washery</td>
<td>1200</td>
<td>350</td>
<td>420</td>
<td>430</td>
</tr>
<tr>
<td>Total</td>
<td>4000</td>
<td>1350</td>
<td>1688</td>
<td>962</td>
</tr>
</tbody>
</table>
1.8. Procedure for environmental clearance from MOEF and the consent to establish from Jharkhand State Pollution Control Board, for Upgrading the product capacity of existing coal washery at Chasnalla to 2.8 Mtpa ROM Coal and for setting up of the new 1.2 Mtpa coking coal washery is to be initiated after the submission of this document.

1.9. The coal washery circuits considered for the two washeries are as indicated below:

**Upgraded washery**
- Primary Heavy Media Bath – Secondary Heavy Media Bath – Batac Jig – Spiral/Teeter Bed Separator-Froth Flotation-Tailing Dewatering by Filter Press.

**1.2 Mtpa New Washery**
- Primary Heavy media cyclone – Secondary Heavy media cyclone – TBS/Spiral – Froth Flotation- Tailing Dewatering by Filter Press.

1.10. To get the environmental clearance, the request letter should be accompanied with a pre-feasibility report. Accordingly, this Pre- Feasibility Report for “Upgradation of Existing coal washery & Setting up of new 1.2 Mtpa Coking Coal Washery” has been prepared.

1.11. The project has been envisaged for 4.0 Mtpa raw coal throughput. Adequate measures for mitigating air, water, noise pollution; impact on socio-economic condition of the surrounding area and conservation of water have been considered.

The project is envisaged to be implemented within a period of 24 months from the date of Stage-II approval.
1.12. Fresh manpower requirement envisaged for the proposed 1.2 MTPA coking coal washery is around 135.

1.13. The indicative total capital cost estimate for the up-gradation of existing washery to 2.8 Mtpa and setting up of 1.2 Mtpa coking coal washery is estimated at Rs. 300 crore.

1.14. The co-operation extended by Chasnalla officials in preparation of this pre-feasibility report is gratefully acknowledged.
2. BACKGROUND

2.1. Steel Authority of India Ltd (SAIL), one of the major steel producers in the country requires coking coal for steel making. The annual requirement of coking coal has been 14 Mtpa. At present 75% of the requirement i.e., 10.5 Mtpa is met by import and 3.0 Mtpa is sourced from Coal India Ltd. Remaining coal requirement is met from own mines after washing in own washery at Chasnalla.

2.2. Capacity expansion of Steel Authority of India Ltd (SAIL) is in progress. The expected crude steel production by the end of this year is 21.4. Mtpa. Annual requirement of coking coal is to increase from the present 14MT to more than 20 MT by the end of this year to meet coke requirement of blast furnaces.

2.3. Indian coal is of drift origin and has high ash content. It is very difficult to wash these coals due to their high NGM content compared to other coal sources in abroad. These high ashes containing coal cannot be directly fed to Blast furnaces. In order to minimize the ash level, it is necessary to beneficiate coal.

2.4. Chasnalla coal washery unit was installed by M/s Coppee & Co Ltd in 1969 for supply of washed coal to IISCO, Burnpur. Installed capacity of the coal washery was 2 MTPA of raw coal. Washery was to be fed raw coal from its own Chasnalla colliery and Jitpur Colliery.

2.5. Originally, the washery was designed for good coal with ash content of 20 - 22 percent. Accordingly, the washery circuit was installed with 2 nos of Heavy Media bath (HMB) and 2 nos. of Heavy Media Cyclone (HMC).

2.6. Subsequently, in 1990 the washing system was modified as the size fraction after primary crusher changed from the design basis due to changes in mining process. The percentage of 75 to 20mm became 34%, 20 to 0.5mm to 50% and (-)0.5mm to 16% and the quality of ROM coal got deteriorated due to depletion of coal reserve on upper seam and it became difficult to wash for higher content of ash and NGM in raw coal.
2.7. Modification in the system was done by adding 1 No. of Batac Jig and Froth flotation facilities in a new building adjacent to the old HMB building. With installation of these facilities, operation of HMC circuit was discarded.

2.8. In 1998 Spiral unit was installed at the downstream of froth flotation system for handling tailing containing coal of size fraction 0.5 to 0.2 mm. Spiral unit was installed as the percentages of coal in tailings from froth flotation became high and the performance of the floatation unit was not satisfactory.

2.9. Spiral unit is in operation. However, froth flotation circuit could not be operated and finally stopped due to poor techno-economics. As a result, at present the complete feed of (-)0.5mm size fraction is routed through scavenging plant. The total feed of (-)0.5mm size fraction is directly fed to classifying hydro cyclone were 0.5 to 0.15 m size fraction is separated out and fed to spiral. (-)0.15mm size fraction deslimed through hydro-cyclones is diverted into fines thickener. The underflow of the thickener is dewatered and directly mixed with cleans.

2.10. In 2010, secondary hammer crusher (1w +1s) was added to the existing coal handling circuit to crush the coal below 20 mm so as to ensure production by maximum utilisation of the jig unit.

2.11. Originally envisaged rated capacity of the plant was 2 mtpa. Subsequently in 1990 the process was modified to facilitate fines treatment as well as to maintain the rated capacity. The process modification incorporated Batac Jig and flotation plants. Even after these modifications the peak production could not increase beyond 1.17 Mtpa due to consistent deterioration in the feed quality and washability characteristics and over dependence on lower seam coals of BCCL.

2.12. With this changed scenario, sink generation has increased substantially and the existing sink handling capacity of Heavy media bath is not sufficient to handle the same. With the incorporation of spiral plant after suspending flotation circuit operation, there has been significant improvement in terms of yield. However, the practice of diverting tailings into ponds is still continuing on
which need to be addressed by incorporating a suitable dewatering equipment so that ponds can be done away with and the clarified filtrate can be reused as process water.

2.12.1. **Source of supply of coal to the washery:**

<table>
<thead>
<tr>
<th>Coal</th>
<th>Ash %</th>
</tr>
</thead>
<tbody>
<tr>
<td>West quarry</td>
<td>29.8</td>
</tr>
<tr>
<td>East quarry</td>
<td>25.4</td>
</tr>
<tr>
<td>Tasara</td>
<td>37.3</td>
</tr>
<tr>
<td>Jogta Mines</td>
<td>37.1</td>
</tr>
<tr>
<td>Jitpur Mines</td>
<td>24.7</td>
</tr>
<tr>
<td>Bastacola Mines</td>
<td>41.8</td>
</tr>
<tr>
<td>Kuiya Mines</td>
<td>43.1</td>
</tr>
<tr>
<td>Kujama Mines</td>
<td>30.8</td>
</tr>
</tbody>
</table>

2.12.2. Raw coal supply and washed coal production parameters achieved during last three years from the washery are as follows:

**Production:**

<table>
<thead>
<tr>
<th>Coal</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own Source</td>
<td>736941</td>
<td>900037</td>
<td>842816</td>
<td>435377</td>
<td>558462</td>
</tr>
<tr>
<td>Tasra</td>
<td>13747</td>
<td>40098</td>
<td>102144</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other source</td>
<td>325411</td>
<td>207726</td>
<td>265926</td>
<td>198175</td>
<td>321694</td>
</tr>
<tr>
<td>Total receipt</td>
<td></td>
<td>1122489</td>
<td>673650</td>
<td>982300</td>
<td></td>
</tr>
<tr>
<td>Total ROM fed</td>
<td>1008594</td>
<td>1002555</td>
<td>1001600</td>
<td>634200</td>
<td>862900</td>
</tr>
<tr>
<td>Clean Coal</td>
<td>576552</td>
<td>526679</td>
<td>528864</td>
<td>337748</td>
<td>447813</td>
</tr>
<tr>
<td>Clean Slurry</td>
<td>105711</td>
<td>112428</td>
<td>119446</td>
<td>73866</td>
<td>90791</td>
</tr>
<tr>
<td>Middlings</td>
<td>128405</td>
<td>179826</td>
<td>246640</td>
<td>175882</td>
<td>248174</td>
</tr>
<tr>
<td>Rejects</td>
<td>197926</td>
<td>183622</td>
<td>106650</td>
<td>46704</td>
<td>75822</td>
</tr>
</tbody>
</table>

**Quality: Ash & Yield**

<table>
<thead>
<tr>
<th>Coal</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
<th>2011-12</th>
<th>2012-13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ash Yld</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total ROM</td>
<td>31.30</td>
<td>30.8</td>
<td>29.8</td>
<td>31.7</td>
<td>33.6</td>
</tr>
<tr>
<td>Fed</td>
<td>18.4</td>
<td>57.20</td>
<td>18.4</td>
<td>52.5</td>
<td>18.5</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Clean Coal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Slurry</td>
<td>34.90</td>
<td>10.50</td>
<td>35.1</td>
<td>11.2</td>
<td>33.8</td>
</tr>
<tr>
<td>Middlings</td>
<td>37.30</td>
<td>12.70</td>
<td>35.3</td>
<td>17.9</td>
<td>39.5</td>
</tr>
<tr>
<td>Rejects</td>
<td>68.90</td>
<td>19.60</td>
<td>65.5</td>
<td>18.3</td>
<td>58.0</td>
</tr>
</tbody>
</table>

2.12.3. Major customers for the clean coal, middlings & tailings, rejects.

Washed coal would be supplied to the following steel plants of the project proponent –

(i) Bokaro Steel Ltd., (ii) IISCO Steel Plant (iii) Durgapur Steel Plant, (iv) Bhilai steel Plant and (v) Rourkela steel Plant.

Middlings will be fed to thermal power plants of SAIL.

Rejects would be supplied to Fluidized Bed Power Plant for generation of electricity and cement units.

2.12.4. Brief description on nature of project

Steel Authority of India is at present importing nearly 75% of the total coking coal requirement of 14 Mtpa for consumption in its Blast furnaces in the five integrated steel plants. Expansion projects are under progress and by the end of the year, the total coking coal requirement in SAIL will be above 20 Mtpa. Under these conditions SAIL is planning for Up-gradation of existing chasnalla coal washer from its present capacity of 1.327 Mtpa to 2.8 Mtpa. In addition to the upgradation, SAIL is planning to install a new 1.2 Mtpa Coking coal washer in chasnalla. After completion of the projects SAIL will have a total washing capability of 4.0 Mtpa coking coal in Chasnalla.

2.12.5. Process description of presently operated existing plant

Coal handling plant mainly consists of ROM4 Conveyor, 500t surge bunker grizzly with hopper for feeding BCCL coals, conveyors 5p, 6p, 7P, RM8 for feeding coal to the two (-) 75mm screening and crushing house (with 2 nos.
single roll crushers), Conveyor RC1 & RC2 for feeding coal from old screening and crushing house to 4 nos of silos (500t capacity each), Conveyors 10p, 11p, 13p & 14p for feeding coal from new screening and crushing house to 6 no of silos (650 t capacity each).

ROM (250mm approx.) coal is received from different sources. Coal are crushed in single rolled crusher to (-)75 mm size and stored in RCC silos. There are two streams of conveyors for crushing and storing of coal in RCC silos. The total coal storage capacity of silos is 6000 t.

Each silos is provided with vibratory feeder for feeding coal to conveyor circuit 16p, 17p, RC7 and RC8 for feeding coal to Heavy Media Bath building of the washery where (-)20mm size fractions are separated by dry screen installed in HM bath Building.

Additional facility for crushing (-)75mm size coal to (-)20mm size fraction was installed at Chasnalla coal washery in the year 2010. The unit consists of conveyors RC-8A, RC-8A/1, RC-8A/2, RC-8B for feeding coal from the main circuit conveyor RC-7 to the secondary crusher building. The crusher building consists of two nos of screens, two nos. of secondary crushers (impact crushers) and conveyor US-1, US-2 and RC-8C for feeding finally crushed (-)20mm size fraction back to conveyor no. RC-8.

In the heavy media bath building (-)75 to (+)20 mm size fraction (around 40%) is fed to Heavy media bath for obtaining two products i.e clean with 18.5 % ash and middling. The (-)20 mm size fraction (around 50%) is conveyed by a conveyor to New washery building where, the ROM coal is again screened to take out (-)0.5 mm size fraction before feeding to Batac Jig. The combined middling ash at present is between 40-48%. Balance 10% of coal is processed in fine coal section. In fine coal section, the slime is fed to a thickener and the under flow is fed to fine coal scavenger plant where a classifying cyclone, the under flow of cyclone i.e., particle size of 0.5 to 0.2 mm fraction are recovered in spiral and Fine coal less than 0.2 mm is processed in another thickener.

2.13. **Need for the project and its importance:**
Capacity expansion of SAIL is in progress. To meet the crude steel production, annual coking coal requirement is to increase. In order to push up the production of steel in the country and to gainfully utilize natural resources, the government is encouraging the development of coking coal washery. The factors in favour of coal washery are:

a) It reduces dependency on imported coking coal.

b) Better utilisation of indigenous coking coal for steel making.

c) Reduction in environmental impact, by reduction of carbon print, sulphur content etc.

2.14. **Demand supply gap**

The expected crude steel production by the end of this year is 21.4 Mtpa. Annual requirement of coking coal is to increase from the present 14MT to more than 20 MT by the end of this year to meet coke requirement of blast furnaces. As per Ministry of Steel and SAIL future plan, the percentage of indigenous coal component in the blend is to increase from 25% to 30%. To meet a part of the indigenous coal requirement, existing chasnalla coal washery production is to be upgraded and a new coking coal washery needs to be installed.

2.15. **Import Vs indigenous production**

In view of the limited availability of coking coal in the global market and the fact that its supply is controlled by a few large companies, it will be extremely important to increase the domestic production of coking coal and upgrade its quality to meet the requirements of steel making.

In order to reduce the impact of imports, the production capacity of existing coal washery and a new coking coal washery is proposed.

2.16. **Employment generation (Direct & Indirect) due to project**

By upgradation of existing coal washery and installation of new coal washery, the employment opportunities will be generated both in a direct and indirect manner as mentioned below:
a) The project will create employment opportunities both for skilled and semi-skilled persons in the area.

b) Business opportunity in Secondary & Tertiary Sectors will increase.

c) The CSR initiatives being carried out in the area by SAIL will be further boosted by the proponent leading to better quality of life for people living in the area.

2.17. ASSIGNMENT FROM CHASNALLA WASHERY

2.17.1. In order to meet the coking coal requirement of SAIL Ltd, an assignment was received from Chasnalla unit for preparation of Pre-Feasibility Report for “Upgradation of Chasnalla Coal Washery to 2.8 Mtpa ROM coal and Installation of 1.2 Mtpa Coking Coal Washery”. The MOM in this regard between Chasnalla & CET is placed at Annexure-2.17.1-1.

2.17.2. Accordingly, the Pre-Feasibility Report (R=0) for “Capacity Upgradation of Chasnalla Coal Washery to 4.0 Mtpa” has been prepared.
3. ANALYSIS AND SELECTION OF ALTERNATIVE

3.1. Basic purpose of a coal washery plant is to separate out mineral matter to the extent possible from the feed coal so that desired percentage of mineral content is removed i.e. ash in clean coal is achieved with an optimum cost of production and yield of clean coal.

3.2. Ash percentage, ash distribution and its density variations in different size fractions in feed coal are the main input data which decide the washing circuit of a coal washery. Depending upon coal analysis test, Heavy media bath, Jig, Heavy media cyclone, TBS, Spiral and Froth flotation techniques etc. are used in different combinations.

3.3. Indian coals are difficult to wash in general as it content high ash with a uniform distribution throughout the entire coal mass. Further, percentage of near gravity material (NGM) is also high compared to imported coal. Indian coal is required to be crushed even upto 13 mm for liberation of ash so that the optimum yield and desired ash percentage in clean coal can be achieved.

3.4. Latest trend of coal washery which is being followed in India and in abroad is based on Heavy media cyclone and froth flotation with pressure filter etc. These equipment are selected in different combination and capacity depending upon coal analysis.

3.5. Alternatives for upgradation of existing Chasnalla coal washery-

3.5.1. Selection of site for the project-

The Chasnalla Coal Washery was commissioned in 1969 and is operating in the present location. The existing plant with equipments will be retained and the plant capacity will be up-graded through two stages. In the initial stage no new addition is envisaged. However, in the second stage, the adjoining area of the washery will be utilised for installation of one additional module.

3.5.2. Selection of appropriate technology:
There are several technologies available for beneficiation/washing of coal. Criteria for selection of appropriate technology are

- Characteristics of raw coal
- Required quality of product coal
- Maximum yield of product coal
- Reliability of technology

3.5.2.1. The following coal washery circuits is considered for proposed up-gradation of existing coking coal washery at Chasnalla:

**Primary Heavy Media Bath – Secondary Heavy Media Bath - Batac Jig – Spiral/Teeter Bed Separator-Froth Flotation-Tailing Dewatering by Filter Press.**

In the existing washery circuit will be retained with certain modifications in the receiving and fine coal circuit. The coal receiving circuit will be provided with new rock breaker having grabber cum crusher arrangement in the truck unloading facilities and under-ground hoppers etc., the ROM coal will be crushed to (-) 75mm size fraction completely. The feed coal will be screened and the (-)75 to (+) 20mm size fraction will be fed to Heavy Media Bath. The (-)20 to (+) 0.5mm size fraction will be fed to Batac Jig Circuit. The (-)0.5mm size fraction will be classified by classifying cyclones. The (+) 0.25mm size fraction will be fed to Spiral/Teeter Bed Separator and the (-)0.25mm size fraction along with the rejects from the spiral will be fed to Froth Flotation circuit. The tailings from Froth Flotation will be dewatered with filter press.

3.6. **Alternatives for installation of 1.2 Mtpa Coking Coal Washery—**

3.6.1. **Selection of site for the project—**

Various alternatives were considered for

- Selection of site for the project
- Selection of appropriate Technology for Coal Washing.

3.6.2. Following alternate sites were identified:
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Site No.</th>
<th>Name of Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S-I</td>
<td>New location adjoining to East Query area.</td>
</tr>
<tr>
<td>2</td>
<td>S-II</td>
<td>Existing washery location</td>
</tr>
</tbody>
</table>

3.6.3. The factors considered to choose the final site are listed below:

- Minimize Resettlement & Rehabilitation issues arising out of acquisition of private land or houses.
- Avoid a site close to residential area or other eco-sensitive area, particularly if they are on downwind direction of the project site area.
- Avoid forest land & Agriculture land.
- Project site should be preferably as close to an existing railway siding as possible to minimize road transportation of raw coal or product coal. This is an important issue as approval for and construction of a dedicated new railway siding requiring acquisition of land may take a long time which in turn would entail transportation of coal in the interim period by road. This will then add to air pollution and also add to existing road traffic in the area.

3.6.4. Based on the overall assessment of the two sites, Site S-II, New location adjoining to East Query area is selected for the installation of the coking coal washery based on the following advantages:

- Project site-II is close to Tasra railway siding and mining area of Chasnalla mines requiring minimum road transport of raw coal and no road transport of product from the washery is required.
- Project Site-II is free from any underground facilities as this is a pit head washery in Chasnalla Coal mining area. Whereas in Site-I, underground mining area may be encountered.
- No forest and Agricultural land is considered, as the proposed land belongs to the proponent and is part of the mining area allocated to the proponent under the mining planning.
Resettlement & Rehabilitation issues arising out of acquisition of private land or houses is comparatively very less.

3.6.5. **Selection of appropriate technology for Coal Washing:**

3.6.6. There are several technologies available for beneficiation/washing of coal. Criteria for selection of appropriate technology are:

- Characteristics of raw coal
- Required quality of product coal
- Maximum yield of product coal
- Reliability of technology

3.6.7. The coal washery circuits will consist of the following equipments:

**Primary Heavy media cyclone – Secondary Heavy media cyclone – TBS/Spiral – Froth Flotation-Tailing Dewatering**

In this process, the ROM coal will be crushed to (-) 13mm size fraction completely. The feed coal from the crusher will be processed in two heavy media cyclones in series where different media densities are maintained. Clean coal will be produced from the first cyclone. Middling and reject will be produced from the second cyclone. Fine fraction less than 1.0 mm will be deslimed from the feed coal before feed to the Heavy Media Cyclones and then classified into two size fractions. 1.0 to 0.25mm size fraction is treated in Teter Bed Separator or spirals and (-)0.25mm size fraction will be treated in forth flotation circuit.
4. PROJECT DESCRIPTION

4.1. Coal Linkage & Coal Analysis

Annual raw coal requirement to meet the production from the Upgraded existing washery and the proposed 1.2 Mtpa new coking coal washery is around 4.0 Mtpa. Desired quantum of ROM coal will be transported by road from the adjoining mines of Chasnalla and from the BCCL linkages in the surrounding area. It is envisaged that around 2.8 Mtpa (i.e., 8000 tpd approx.) will be sourced from own collieries i.e., Chasnalla Jitpur and Tasra, and the balance amount of around 1.2 Mtpa (around 3500tpd approx.) will be sourced from CIL through Fuel Supply Agreement with CIL. Fuel Supply Agreement presently signed with CIL are enclosed in Annexure No.4.1-1 for reference, further extension of FSA will be done on a periodic basis as per the prevailing system.

4.2. System Flow

4.2.1. Upgraded Existing Washery

Existing Coal handling plant consists of ROM4 Conveyor, 500t surge bunker will be revamped and the grizzly with hopper for feeding BCCL coals will be provided with hydraulic rock breaker cum grabber arrangements, conveyors 5p, 6p, 7P, RM8 for feeding coal to the two (-) 75mm screening and crushing house (with 2 nos. single roll crushers), Conveyor RC1 & RC2 for feeding coal from old screening and crushing house to 4 nos of silos (500t capacity each), Conveyors 10p, 11p, 13p & 14p for feeding coal from new screening and crushing house to 6 no of silos (650 t capacity each) will be retained as per the existing system.

ROM (250mm approx.) coal is received from different sources. Coal are crushed in single rolled crusher to (-)75 mm size and stored in RCC silos. There are two streams of conveyors for crushing and storing of coal in RCC silos. The total coal storage capacity of silos is 6000 t.
Each silos is provided with vibratory feeder for feeding coal to conveyor circuit 16p, 17p, RC7 and RC8 for feeding coal to Heavy Media Bath building of the washery where (-)20mm size fractions are separated by dry screen installed in HM bath Building.

Additional facility for crushing (-) 75mm size coal to (-)20mm size fraction was installed at Chasnalla coal washery in the year 2010. The unit consists of conveyors RC-8A, RC-8A/1, RC-8A/2, RC-8B for feeding coal from the main circuit conveyor RC-7 to the secondary crusher building. The crusher building consists of two nos of screens, two nos. of secondary crushers (impact crushers) and conveyor US-1, US-2 and RC-8C for feeding finally crushed (-)20mm size fraction back to conveyor no. RC-8.

In the heavy media bath building (-)75 to (+)20 mm size fraction (around 40%) is fed to Heavy media bath for obtaining two products i.e clean with 18.5 % ash and middling containing 34.5% ash. (-)20 mm size fraction (around 50%) is conveyed by a conveyor to New washery building where, the ROM coal is again screened to take out (-)0.5 mm size fraction before feeding to Batac Jig. In fine coal section, the slime is fed to a thickener and the under flow is fed to the classifying cyclones were (+)0.25mm size will be fed to coal scavenger plant were particle size of 0.5 to 0.2 mm fraction are recovered in Teeter Bed Seperator/spiral and Fine coal less than 0.2 mm along with the tailings from the scavenger plant is processed in FF Plant. Tailings from FF plant will be fed to tailing dewatering system. Process flow diagram of the upgraded coal washery is shown in Drg No. CET RN 3696 CC1 00 004, R=0.

4.2.2. **New 1.2 Mtpa Coking Coal Washery**

The raw coal of 250 mm nominal top size (1200 mm occasionally) will be available from the adjoining mines of SAIL/CIL. The raw coal will be brought to the site through trucks. The coal received will be weighed on weigh bridges and will be received in ROM stock pile. The received coal will be subsequently fed through conveyors to the coal crushing section.
The proposed coal washery will be designed for 250 tph capacity. In the crushing section, the crushing of coal to (-) 75mm size by primary crushers will be carried out. From the primary crusher the coal will be conveyed to four number of open storage bays. Storage bay will be provided with stacking cum reclaiming arrangement. The total storage capacity of the bay will be approx. 5600 ton.

Coal will be reclaimed from the storage bay and fed to secondary crusher for crushing coal to (-) 13mm size for feeding to the main washery. In the washery (-) 13 to 1 mm size fraction feed rate of which will be around 175 tph will be processed in two stage heavy media cyclone. The main product from the primary HM cyclone will be clean coal and from secondary HM cyclone middling will be produced.

(-)1 mm size fraction will be around 85 tph . It will be classified to (+)0.25 mm size fraction which will be fed to Teeter Bed separator / reflux classifier or Spirals and (-) 0.25 mm size fraction will be fed to the Froth floatation circuit. From Teeter Bed Separator/reflux classifier/spirals main product i.e., clean coal will be produced and reject will be added to middling.

The Froth floatation circuit will produce clean coal and the tailing generated in the process will be received in thickener and over flow of the thickener will be recycled back to the system and the underflow of the thickener will be fed to tailing dewatering system consisting of filter press. Total clarified water will be recycled back to the system.

Clean, Middling & Rejects from the washery will be stocked on the ground stock piles earmarked for clean, middling and rejects respectively. A common belt conveying circuit will be installed from the stock pile to the Tasra siding for direct loading to wagons through gravity feed hoppers for dispatch of clean & middlings . Rejects will be dispatched by trucks.

Process flow diagram of the coal washery is shown in Drg No. CET RN 3696 CC1 00 005, R=0.
4.3. Layout of the upgraded washery building is shown in **Drg.No. CET RN 3696 CC2 00 002, R=0.**

Layout of the new 1.2 Mtpa Coking Coal washery building is shown in **Drg.No. CET RN 3696 CC2 00 003, R=0**

Scanned TOPO- Sheet indicating the topography of Chasnalla area in total is shown in **Annexure No. 4.2.1-1.**

4.4. **Operating Parameters**

4.4.1. **Feed Characteristics Of Raw Coal**

ROM coal quality envisaged for the design of Upgraded existing & new washery will be as given below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Existing Washery Values</th>
<th>New Washery Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nominal top size of ROM coal</td>
<td>250 mm (1200mm occasional)</td>
<td>250 mm (1200mm occasional)</td>
</tr>
<tr>
<td>2</td>
<td>Raw coal ash</td>
<td>25 to 35%</td>
<td>30 to 50%</td>
</tr>
<tr>
<td>3</td>
<td>ROM coal moisture</td>
<td>3 to 5% (During Monsoon moisture of ROM may vary upto 10%)</td>
<td>3 to 5% (During Monsoon moisture of ROM may vary upto 10%)</td>
</tr>
<tr>
<td>4</td>
<td>Bulk density of raw coal (t/cu.m)</td>
<td>0.8 to 0.9</td>
<td>0.8 to 0.9</td>
</tr>
<tr>
<td>5</td>
<td>Specific gravity of coal</td>
<td>1.4-1.6</td>
<td>1.5-1.6</td>
</tr>
<tr>
<td>6</td>
<td>Angle of repose</td>
<td>35to 40 degree</td>
<td>35to 40 degree</td>
</tr>
<tr>
<td>7</td>
<td>HGI of raw coal</td>
<td>40 to 60</td>
<td>40 to 60</td>
</tr>
<tr>
<td>8</td>
<td>Size of coal to be fed to the main process plant</td>
<td>(-)75mm</td>
<td>(-)13mm</td>
</tr>
</tbody>
</table>

**Products**

4.4.2.1. Upgraded Chasnalla washery will have the same products as of the existing washery. However, the production volume will only improve and the percentage of fine coal in the final product will increase. The clean coal will have 18% ash with moisture content of 10% and the middling 39% ash.

Envisaged performance parameters (tentative) for the Upgraded Existing Chasnalla washery are as follows:

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Item Description</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The new washery will be designed to produce two products namely clean coal and middling. The clean coal will have 15-18% ash with moisture content of 10% and the middling 34-39% ash.

The rejects thus produced will be stockpiled separately for subsequent loading and dispatch.

Main coal processing plant circuits and equipments’ capacities will be designed for best coal as well as for worst quality of coal.

Envisaged performance parameters (tentative) for the proposed washery are as follows:

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Item Description</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Throughput Capacity</td>
<td>T/h</td>
<td>550</td>
</tr>
<tr>
<td>2.1</td>
<td>Clean Coal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1.1</td>
<td>Composite ash of clean coal</td>
<td>%</td>
<td>18</td>
</tr>
<tr>
<td>2.1.2</td>
<td>Surface moisture of the composite clean coal</td>
<td>%</td>
<td>10 max</td>
</tr>
<tr>
<td>2.2</td>
<td>Middling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2.1</td>
<td>Ash in Middling</td>
<td>%</td>
<td>39</td>
</tr>
<tr>
<td>2.2.2</td>
<td>Surface Moisture of Middling</td>
<td>%</td>
<td>10 max</td>
</tr>
<tr>
<td>3.0</td>
<td>Rejects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Surface moisture of Rejects</td>
<td>%</td>
<td>10 max</td>
</tr>
</tbody>
</table>

4.5. Plant Capacity
It is proposed to Upgrade the capacity of existing Chasnalla coal washery to a rated capacity of 2.8 Mtpa from its existing 1.326 Mtpa in two stages, in the first stage the existing washery circuit will be revamped and bottle necks associated with the material handling area and improvement in fine coal circuit and tailing recovery circuit performance will be enhanced by addition of additional fine coal processing circuits consisting of teeter bed separator/reflux classifier/spirals and froth flotation etc, and in the tailing circuit ultra fine recovery is envisaged. By these activities, the capacity of the plant will be increased to 1.9 Mtpa.

In the second stage, additional module will be added to increase the availability of coarse coal circuit i.e., by adding additional heavy media circuit in the already existing set up. After the addition of these facilities, rated capacity of 2.8 Mtpa will be achieved. The plant will be designed to maximize yield of Clean Coal having 18% ash content for use in converting to furnace coke. The secondary by-product middling will have ash content of 39% to be used in power generation.

The 1.2 Mtpa coking coal plant will be installed with complete new facilities. The production schedule for the Up-graded Chasnalla washery will be as given below:

<table>
<thead>
<tr>
<th>Production Schedule (As per Peak Rated Capacity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROM Coal ('000 Tons per Year)</td>
</tr>
<tr>
<td>Upgrade</td>
</tr>
<tr>
<td>existing</td>
</tr>
<tr>
<td>washery</td>
</tr>
<tr>
<td>1.2</td>
</tr>
<tr>
<td>Mtpa</td>
</tr>
<tr>
<td>new</td>
</tr>
<tr>
<td>washery</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Tailing generated from the proposed washery will be treated in a tailing dewatering system and will be mixed with middling or reject.
4.6. **Interlinked Activities**

Following interlinked activities which have been envisaged for enabling and connecting utility & power to the washery site are indicated below:

i. Site preparation and land levelling for the new washery.

ii. HT Power supply system from the existing substation or driving power from the DVC source.

iii. Purchase of private land as required in the adjoining area for the proposed new washery.

iv. Raw water piping network from existing industrial water reservoir of mine water to washery site for new washery.

4.7. **UTILITY & SERVICES**

4.7.1. The following utilities and services will be provided from the existing facilities:

- Industrial water/Emergency Water
- Drinking water

4.7.2. Make–up water system

Existing Chasnalla washery is having its own two industrial ponds, as its source of water supply. These ponds draw water from Under-ground pit of Chasnalla Colliery. The dimensions of each pond is 60m X 32m X 3m and the total capacity is around 11,520 cu.m. Make-up water will be supplied from these ponds to the Up-graded washery and the proposed new 1.2 Mtpa coking coal washery.

From the industrial water ponds water will be pumped to fresh water tank in the new location. This common tank will include storage water for fire hydrants also.

4.7.3. Fire fighting water system

The hydrants system will basically consists of a network of mostly surface laid pipe fed to different hydrant points installed at strategic locations throughout
the plant. In addition to this hydrant network will cover all along the conveyor galleries, electrical junction houses & other fire prone areas in the plant. Manual type water spray system will also be provided on the coal conveyor galleries.

In the system, make up water for the fire fighting will be provided to raw water ground concrete tank having a separate compartment. Water for fire fighting will be pumped from the fire fighting compartment to all the hydrants provided on the distribution network in the yard throughout the plant.

**Portable/mobile fire extinguishers**

Portable/mobile fire extinguishers will be provided in different areas of the plant area in adequate quantities as per the requirement. All portable/mobile type fire extinguishers will conform to relevant Indian Standards.

**Diesel Engine**

A diesel engine operated pump, meeting the TAC requirement will be provided. This pump will be operated in case of power failure.

4.7.4. **Pollution Control**

The project activities will have impact on environmental attributes:

- Ambient Air Quality
- Ambient Noise Level
- Surface Water Quality
- Land
- Bio-environment including Flora & Fauna
- Socio-economic profile.

The proposed washery as well as upgraded existing washery will be designed such that estimated value of each parameter will be below the value prescribed by MoEF vide schedule VII of Env (Protection) Rules 86.

a) Major measures for mitigating air pollution are:

- Installation of water sprinkling system at the ground coal stock for raw coal.
• Raw coal crushers completely enclosed.
• In coal handling plant, water sprinkling system on all transfer points.
• Belt conveyors handling coal enclosed from side and top.
• Regular water sprinkling on paved area.
• Green Belt along periphery of the plant area.
• Tippers carrying raw coal and product coal to be covered.
• Green belt along both sides of road.
• Motorized Dust extraction equipment.

b) Major measures for mitigating water pollution are:

• Municipal Effluent generated in service buildings i.e. rest shelter, canteen, office etc. would be treated in septic tank - cess pool.
• Industrial Effluent generated in washeray plant will be treated in tailing dewatering system and the treated effluent will be recycled for reuse in plant. Thus there will be zero discharge from the plant premises.

c) Major measures for mitigating noise pollution are:

• Noise generating stationary sources i.e. crusher, coal handling plant, etc to be enclosed.
• Coal washing equipments are to be housed inside the building. Thus noise generated by these equipments will not spread.
• Vibrating equipments to be provided with vibration control pads to reduce vibration and noise.
• Green belt around plant area—will help in mitigating noise.

d) Impact on Socio-economic Profile and measures

The land required for location of plant and development of project infrastructure is almost owned by the proponent and a small part only needs to acquired from local families leading to R&R issues.

Benefits for affected families under R&R policy will be as mentioned here-

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Affected Families</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Families owning house and</td>
<td>To be allotted to the extent of actual</td>
</tr>
<tr>
<td>Category</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>whose house is acquired or lost</td>
<td>land acquired by it is not more than 10 decimal in rural area and 5 decimal in urban area for each nuclear family. A Pakka house comprising of two bed room, one drawing room, kitchen and a toilet with a total carpet area of 100 sq.m, or in urban area house can be provide in multi storied building.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Families who are having less than 10 decimal in rural area and 5 decimal land in urban area and same is acquired.</td>
<td>To be allotted a minimum 150 sq.m of land for residential purpose. A Pakka house with a total carpet area equal to the extent of allotted land or minimum 55 sq.m, whichever is more but limited to 100 sq.m, to be provided on allotted land.</td>
</tr>
<tr>
<td>3</td>
<td>Families who do not wish to accept house in re-settlement area or wish to settle elsewhere on their own.</td>
<td>One time financial assistance of Rs. 3.0 lakhs to be given to such families.</td>
</tr>
<tr>
<td>4</td>
<td>Affected BPL families without homestead land, who are residing in affected area for a period of not less than 15 years in non-scheduled area and not more than 30 years in</td>
<td>Such families will be entitled for a house of 55 sq.m carpet area in rural or a house of same area in multi storied building complex in urban area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>5</td>
<td>BPL families who opts not to accept house in proposed resettlement area.</td>
<td>One time financial assistance of Rs. 2.0 lakhs for construction of their house to be given to such families.</td>
</tr>
<tr>
<td>6</td>
<td>Provision for shifting of cattle &amp; making shed.</td>
<td>One time financial assistance of Rs. 35 thousand.</td>
</tr>
<tr>
<td>7</td>
<td>Shifting of family, building materials, belongings and cattles</td>
<td>One time financial assistance of Rs. 15 thousand.</td>
</tr>
<tr>
<td>8</td>
<td>Traders and has pakka shop or Gumti for business purpose.</td>
<td>One time financial assistance of Rs. 50 thousand for construction of shop or working shed.</td>
</tr>
</tbody>
</table>

The project construction and operation will have positive impact on account of following

- Creation of employment opportunities
- Creation of income generation opportunities in terms of small contractual works, opportunities in service sector, improvement in physical & social infrastructure on account of CSR activities, etc.

4.8. **OTHER DEVELOPMENT WORK**

Following work for development of plant site are included in the scope:

a) Site preparation including levelling and dressing

b) Dismantling of existing facilities if any, as required for implementation of the project.

4.9. **CONSUMPTION PARAMETERS**

Power Consumption in KWH/Tonne of raw coal handled and processed.
Normal operation = less than 15 KWH/ t of raw coal.

The total power requirement for the new coal washery will be as indicated:

Connected Load - 7642 kW (approx.)
Average Load - 5480 kW (approx.)

Make-up Water consumption in KL/Tonne of raw coal feed:

For Normal operation it is less than 0.5KL/ t including sprinkling and maintenance of green belt. Design of water supply system will be considered for up to 1.0 KL/t minimum.

The industrial water consumption for the washery is indicated in Annexure No. 4.10-1.

Magnetite consumption of (grades Superfine and Maxifine) magnetite in Kg/T of raw coal feed:

Normal operation = less than 1.2 kg/ t of raw coal plant feed (at capacity of 250 tph). System design will be capable of supplying up to 2.0Kg/t.

Flotation Reagent Consumption in Kg/T of raw coal plant feed:
Normal operation = less than 0.04kg of collector/tonne of feed to froth floatation plant
Normal operation = less than 0.15 kg of frother/tonne of feed to froth floatation plant

Flocculent Consumption in Kg/T of raw coal plant feed:
Normal operation = less than 0.04 kg of anionic/tonne of raw coal plant
Normal operation = less than 0.02 kg of cationic/tonne of raw coal plant

4.10. MANPOWER

The upgraded existing washery and the new washery will be operated in three shifts (16 working hours a day) and the total operating days in a year will be 300.
The total requirement of managerial staff, skilled and unskilled workers for the new washery based on the equipment and facilities proposed for the project will be around 135.

For the up-graded existing coal washery, the existing man power will be used and no new additional manpower is envisaged.
5. PROJECT IMPLEMENTATION

5.1. Initial 3 months for installation of new 1.2 Mtpa coking coal washery will be for land levelling and other enabling work.

5.2. The project is envisaged to be implemented within a period of 24 months from the contract signing or LOI whichever is earlier. The placement of order for all the packages will be placed simultaneously.
6. **Capital Cost Estimate**

6.1. The indicative capital cost estimate of the project “Up-gradation of existing coal washery and Installation of 1.2 Mtpa Coking Coal Washery” at Chasnalla is estimated at Rs. 300 Crore. It also includes cost of imported equipments and parts of the washery like Heavy media cyclone, Dewatering equipments and parts of Froth floatation unit.
7. **Recommendation**

7.1. Upgradation of existing coal washery and installation of new coal washery will reduce the dependency on imported coking coal by better utilisation of indigenous coking coal for steel making in SAIL. Adequate measures have been envisaged for meeting the environmental pollution control norms.

Installation of this project will create employment opportunities both for skilled and semi skilled persons in the area and increase business opportunities in secondary and tertiary sectors.

The land required for location of the new plant is almost owned by SAIL, and only a small part is to be acquired from local families. R&R issues associated with project shall be properly taken care during project implementation.

This project is technically feasible and recommended for implementation.
Proposed Process Flow for New 1.2 MTPA Coke Plant at Chasala, Indiabiz II Ltd.
Minutes of Meeting held on 20th and 21st February, 2014 between officials of Chasnalla Coal Washery and CET regarding the “Upgradation of existing coal washery” and “Installation of a new 1.2 Mtpa coking coal washery” in new location at Chasnalla

Members Present:
S/Shri:

<table>
<thead>
<tr>
<th>Chasnalla Coal Washery</th>
<th>CET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sh. N.S.Prasad, DGM &amp; I/c (Chasnalla washery)</td>
<td>Sh. R.K.Burman, DGM &amp; I/c (C.C&amp;C)</td>
</tr>
<tr>
<td>Sh. G.R. Shrivastava, DGM (Estate)</td>
<td>Sh. S.K.Singh, Sr.Mgr. (Mech.)</td>
</tr>
<tr>
<td>Md. Adnan, AGM (M-CPP)</td>
<td>Sh. K.P Jayakumar, Mgr (C.C&amp;C)</td>
</tr>
<tr>
<td>Sh. S.K.Kureel, AGM(CPP)</td>
<td></td>
</tr>
</tbody>
</table>

With respect to the assignment for “Upgradation of existing coal washery” and “Installation of a new 1.2 Mtpa Coking Coal Washery” at Chasnalla, concerned engineers from CET and Chasnalla jointly visited the site on 20th and 21st February 2014. During the visit concerned engineers from McNally Sayaji (Bangaluru) , JP Hudraulics Ltd. (Kolkata) , McNally Bharat Ltd. (Kolkata) also took part in the site study. During the visit following points emerged:

1. Chasnalla officials communicated that the existing washery capacity will be upgraded to 2.8 Mtpa and a new washery will be installed in a new location with a capacity of 1.2 Mtpa. Upper seam coals will be processed in the existing washery, whereas the new washery shall be designed considering difficult to wash coal.

2. Chasnalla is planning to move a proposal for obtaining EC clearance for a capacity of 4 Mtpa coal washery projects in total. Accordingly following reports are to be prepared by CET:
   a) Pre-feasibility report for 1.2 Mtpa new coal washery by 15.03.2014.
   b) Pre-feasibility report for up-gradation of existing coal washery to 2.8 Mtpa by 15.03.2014.
   c) Feasibility report for up-gradation of existing coal washery to 2.8 Mtpa by 15.5.2014.

3. Existing washery process consist of coal handling plant (CHP), Heavy Media Bath (HMB), Batac Jig and fine coal handling circuit consisting of Froth flotation (FF) plant, Spiral circuit, thickeners and tailing ponds. Capacity of crushing circuit upto silo is 700 tph (2 streams of 350 tph each) and from silo onwards the capacity of the process plant is 550 tph. The plant was originally designed for handling 6800t per day. All units are in operation except for the FF plant. FF plant operation was suspended since 1998, after the successful commissioning of fine coal scavenger plant in 1998 for the following reasons:
   a) Yield from the FF plant was 30% which was much below from the envisaged figures of 60% effecting the techno-economics.
   b) Vacuum filter operation was not effective and frequent failures did occur.
   c) With incorporation of Scavenger plant, the yield from the fine coal circuit could be ensured to the envisaged figures in a cost effective manner.

4. Chasnalla officials indicated that the maximum achieved production with existing set up was 1.326 Mtpa in the year 1992. The annual production figures of the existing plant for last 3 years will be provided by Chasnalla by 1.3.2014. Now in order to achieve the capacity of the washery to 2.8 Mtpa, following jobs are involved-
   a) Installation of a new hydraulic rock breaker/grab crane.
Truck unloading is hampered due to large size lumps of coal & shale. M/s JP Hydraulics Ltd visited the site and after assessing the problem suggested for installation of a coal breaker/grab crane arrangement to solve the problem. They indicated that similar system has been supplied by them at CSEC, Budge Budge, Kolkata.

b) Heavy Media Bath Circuit-
Chasnalla officials communicated that the HMB circuit is maintenance prone and therefore associated with longer maintenance periods. A stand-by facility may be studied, so that the capacity upgradation can be met.

c) Fine Coal Circuit-
Existing fine coal circuit is to be revived considering the following facilities:
- Conversion of existing slurry thickener, fine coal thickener and the flotation tailing thickener to high rate thickeners. M/s McNally Sayaji indicated that the conversion of existing thickeners to HRT is possible, and they shall be giving a scheme.
- Revival/new FF plant with new dewatering circuit consisting of filter press/pressure filter. M/s McNally Sayaji has taken the details of the existing FF plant and will revert back later, regarding the revival of FF Plant.
- Feed of tailings from the existing spiral circuit to the FF Plant.

d) Revamping of facilities in the existing plant-
List of facilities to be revamped will be sent by Chasnalla by 1.3.2014.

e) Revamping/revival of electrics of existing plant-
SLD of the existing plant both HT and LT facilities and the additional power availability for 2.8 and 1.2 Mtpa upgradation may be provided by Chasnalla by 1.3.2014.

f) Chasnalla officials communicated that a total of 8000t ROM coal per day is available from BCCL and own source. Annual plan and copy of Fuel Supply Agreement (FSA) with BCCL and other suppliers shall be provided by Chasnalla for the proposed 4.0 Mtpa expansion of the existing washery, which shall be part of the Pre-Fr. Details in this regard shall be forwarded by Chasnalla by one week.

g) Operating audit report by CIMFR was handed over to CET during the visit.

h) Layout for 1.2 Mtpa washery.
This plant will be located in the space available in front of work shop and the total area shall be around 150X300m (approx.). Plant layout along with major facilities will be forwarded by CET to estate department for clearance. The layout shall be part of PFR and the FR.

i) FR will be made considering short term and long term measures. In short term, the rated capacity of the plant shall be upgraded to 1.9 Mtpa (approx.) and in the long term the rated capacity shall be upgraded to 2.8 Mtpa.

CET (R.K. Burred)
21.2.14

CHASNALLA
21.2.14

Page 2 of 2
MOU BETWEEN SAIL AND BCCL FOR SUPPLY OF LINKED WASHERY RAW COAL

(October, 2011 - March, 2013)

In response to SAIL’s proposal to lift linked Washery Raw coal from different collieries of BCCL for beneficiating at Chasnala Washery, DSP Washeries, TATA Steel Washeries, BCCL had agreed to supply through Rail/Road, the required quantity for the year April, 2011 to March, 2012 on certain terms and conditions as stated in earlier MOU dated 16.03.2011.

Due to accumulation of Coking coal stock in the Collieries of BCCL and as BCCL Washeries can not receive the total quantity of linked Washery Grade coal, BCCL agreed to offer linked Washery grade Coking coal of STL-1 to W-III Grade by Rail/Road from all sources of BCCL as per availability, apart from the sources mentioned in the MOU dated 16.03.2011. SAIL agreed to take this coal by Rail/road for beneficiation at Chasnala, DSP, TATAs and other Washeries.

All terms and conditions will be same as agreed in the MOU dated 16.03.11 between SAIL and BCCL.

This MOU will be valid for a period of eighteen (18) months from October, 2011 to March, 2013.

FOR SAIL

(V Sharma)
GM, CCSO,

(RK Suri)
DGM[Coal]

(M Malpani)
AGM(F), CCSO

(AK Singh)
AGM[Coal]

FOR BCCL

(VK Jha)
G.M.(S&M)

CHASNALLA
COKING COAL WASHERY
Record notes of discussions between SAIL and BCCL on 4th Mar’13 at Dhanbad, regarding supply of raw coking coal to SAIL.

In addition to the quantity of raw coking coal being taken by SAIL presently from different sources of BCCL for washing at Chasnalla, BCCL indicated that following quantity of raw coking coal may be available for Chasnalla/SAIL:

<table>
<thead>
<tr>
<th>S No</th>
<th>Quantity (T)</th>
<th>Availability (T/month)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

BCCL requested SAIL to take maximum quantity of raw coking coal.

Chasnalla/SAIL examined the issue with respect to washing capacity at the washing plant, raw coal production at captive collieries of SAIL, and raw coal storage capacity at Chasnalla. SAIL is also exploring the possibility of getting raw coking coal washed at other washeries. Accordingly, Chasnalla/SAIL has agreed to take about 50,000 T per month of raw coking coal during the year 2015-16 from different sources for washing at Chasnalla washeries, subject to quality of coal being in conformity with the declared grade(s). Further quantity of raw coking coal, which may be required by SAIL for washing at other washeries, shall be communicated by SAIL later on.

For Bharat Coking Coal Limited

For Steel Authority of India Limited

1. [Signature]
   GM, CIT

2. [Signature]
   [Name]

3. [Signature]
   [Name]

Chasnalla

For Coking Coal Washery

Date: 04.03.2015
In response to the SAIL's proposal to let linked washery raw coal from different sources for bulking (drying) at Chasnalla and Tata Steel washeries, BCCL has agreed to supply through rail/may on the following terms and conditions:

1. BCCL agreed to offer linked washery grade coal other than Direct Feed Steel grade coal based on the availability from different stock such as Kusunda-CCP (Hemul) Patch), Juge, Bhownag, Eno, Lodna-Varanee, Muddah etc from April'11 to March'12. SAIL agreed to operate road dispatch by SAIL-Chasnalla and Tata Steel.
2. Price: SAIL will pay Rs 500/- as ADD ON PRICE over and above the notified price prevailing as per CIL/BCCL's notification based on the declared grade of coal for ECCI, statutory levies plus other charges, if any applicable as per ECCI notification.
3. Weight: Actual net weight as recorded at the loading point shall be the basis of billing/payment.
4. Payment: SAIL will make payment to the equivalent value of the weekly dispatched quantity.
5. Intercity Part: It was mutually agreed that in case the volume of the coal supply is more than Rs 20 Crs, then BCCL and SAIL will enter into an Integrity Pact.
6. All the Coal bills pertaining to Road despatches to SAIL Chasnalla will be submitted to CCSO Office for payment.
COALING COAL WASHERY

ANNEXURE-4.10-1
CET/03/RN/3696/PR-E-PR/CC/01/R=0

CHASWALLA

WATER BALANCE FOR THE PROPOSED 1.2 MTPA COAL WASHERY