CHAPTER- XI

COAL HANDLING PLANT

11.1 INTRODUCTION

The existing main CHP has been designed for 4.50 Mtpa coal dispatch. ROM coal has crushed down by one number 1500 TPH Gyratory crusher from (-) 1500 mm size to a size of (-) 200 mm and discharges coal either to a conveyor for transporting coal to loading bunker or to deshaling plant. Crushed ROM coal/ deshaled coal is stored in loading bunker and dispatched by rail wagons through a 300 te overhead hopper through pre-weigh hopper and rapid loading system. The system has 1 no. 15000 te primary ground bunker and 1 no. 15000 te secondary ground bunker at loading end.

An Expansion Project Report for Bina Extension OCP (6.0 Mtpa) was prepared in Dec., 1999 and approved by G.O.I. The approved EPR envisaged the addl. provision of 2 nos. 1000 TPH semi mobile crusher, 1 no. Ground bunker of 15000 te capacity, 2 nos. reclaim cum loading conveyor to reclaim coal from bunker and discharge into a 300 te overhead loading hopper and dispatch by rail wagons through rapid loading system to cope up the addl. 1.5 Mtpa coal. But the approved CHP of 1.5 Mtpa has not yet been commissioned and addl. coal production of 1.5 Mtpa is presently transported by road.

Now, it has been envisaged to have a full-fledged coal handling plant and coal Deshaling Plant to cater 10 Mtpa coal production. For this, a separate comprehensive CHP has been proposed for additional 5.50 Mtpa coal dispatch which also includes the approved CHP provision of 1.5 Mtpa. A provision of one no. addl. 5.5 Mtpa coal Deshaling Plant has been provided separately.

The proposed coal handling plant shall have the facilities for receiving ROM coal from rear discharge dumpers, crushing the coal to a specific size of (-) 200mm, storage & reclamation, rapid loading system with silo and belt transport between the intermediately points. The ROM coal has to be crushed down from (-) 1500 mm size to a size of (-) 200 mm by gyratory crushers and discharges into a primary ground bunker, received coal from primary ground bunker through plough feeders and discharges coal either to a conveyor for transporting coal to secondary ground bunker or to coal deshaling plant. ROM crushed coal/deshaled coal is stored in the secondary ground bunker and dispatched by rail wagons through a silo consisting of pre-weigh hopper and rapid loading system. A link conveyor has also been envisaged for interlinking the new CHP with old CHP.

11.2 Design Parameters of Proposed CHP

11.2.1 Basic data

• Production capacity in million tonnes	:	10 (Incremental 5.5 Mtpa for CHP)
• Number of working days per annum	:	330
• Number of working shifts per day	:	3
• Duration of each shift (Hours)	:	5
• Type of Dumpers	:	100 T Rear dumper
• Feed size of ROM coal in mm	:	(-) 1500 mm
• Product size in mm	:	(-) 200 mm

11.2.2 CHP Working Schedule

a) Crushing and storage (From receiving pit up to Bunker)	:	3 shifts/day
b) Reclamation and loading	:	3 shifts/day and 7 days a week

11.2.3 System Capacity

The handling capacity of the CHP has been decided to match with the coal production of 5.5 Mtpa. 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 2 x 1800 TPH.

11.2.4 Salient Features of CHP

- Two number of receiving pit of 170 te capacity hopper each.
- Two number of gyratory crusher of 1500 TPH to crush ROM coal from (-) 1500 mm to (-) 200 mm size.
- One number of pedestal mounted rock breaker with each receiving pit to deal with oversize lump size of (+) 1500 mm.
- One number of Apron feeder in each receiving pit to feed crushed coal from gyratory crusher to conveyors.
- One number of self-flowing storage overhead primary ground bunkers of 22000 te capacity and one number of secondary ground bunkers of 22000 te capacity at loading end.
- Eight number of Plough feeders each of 1800 TPH capacity for reclamation of coal from the bunkers.
- 2x1800 TPH conveyors for Silo loading.
- One number of Rapid load out systems comprising of 3000 te silo and two number of pre weigh hoppers with flood loading chutes.
- Associated belt conveyors.
- Link conveyors between proposed 5.5 Mtpa CHP to existing 4.5 Mtpa CHP.
- Miscellaneous facilities like dust control system; fire fighting, ventilation system, plant cleaning system, infrastructure for preventive maintenance etc.
- Necessary electrical, interlocking, signaling and communication facilities.

11.2.5 System Description

The coal handling plant of 10 Mtpa capacity for Bina-kakri amalgamation OCP consists of 2 nos. of receiving pit, 2 nos. of Gyratory crushers (1500 TPH) to crush ROM coal from (-)1500 mm to (-) 200 mm size, two number of ground bunkers each of 22,000 te capacity and one number Silo of 3000 te capacity with associated belt conveyors and accessories, link conveyor to transport coal between proposed 5.5 Mtpa CHP to Existing 4.5 Mtpa CHP.

11.2.6 Plant Description

11.2.6.1 Receiving Pit and crusher complex

The Run-off mine coal from the opencast mine project shall be received into the both receiving pits by means of rear discharge dumpers of 100T.Both receiving pits are provided with 170 te capacity hopper and gyratory crusher of 1500 TPH for crushing of ROM coal from (-) 1500 mm down to (-) 200 mm size.

Two number pedestal mounted hydraulically operated rock breaker has been provided to rake and break oversize lumps. The crushed coal from the crusher shall be collected by apron feeders to transport the same through a set of conveyors to a primary ground bunker of 22000 te capacity. Coal received from primary ground bunker through plough feeders and discharges coal either to a conveyor for transporting coal to coal deshaling plant or, to secondary ground bunker, if necessary by a two way chutes. Deshaled coal or, ROM coal is stored in the secondary ground bunker of 22000 te capacity for dispatch.

11.2.6.2 Storage bunker and Reclamation System

Two number storage bunker of 22,000 te capacity each one primary and other secondary has been proposed for Bina-Kakri amalgamation CHP. The bunkers shall be constructed of pre-cast concrete slabs with sides sloping at 55^0 to the horizontal. The bottom of bunker will have longitudinal slits with a long tunnel. Below the slit, plough feeders with reclaim conveyors shall be provided. The capacity of the reclaim conveyors and plough feeders shall be 1800 TPH each.

Two sets of reclaim conveyors below the secondary bunker will discharge coal directly to silo loading conveyors which subsequently discharges coal into silo of 3000 te capacity.

11.2.6.3 Wagon Loading System

The Silo loading conveyors discharge coal in a 3000 te silo. Below the silo two numbers pre-weigh hoppers are provided with flood loading facility. The load out system shall be complete with power pack, level sensors and microprocessor based controls for the operation of the gates and chutes in a preset sequence for uniform and correct loading of wagons. The pre-weigh hopper filling capacity shall be selected in accordance with the type of railway wagons arriving under the loading station. The weighing capacity of pre-weigh hopper shall be 72 te.

The system shall permit loading of each wagon with pre-weighed quantity of coal, thereby eliminating the necessity of any wagon weighing equipment. The whole system shall be designed to operate either in fully automatic or in semiautomatic mode. In case of automatic mode closing and opening of different gates is done automatically during the entire loading operation until the rakes of wagon gets loaded. In semiautomatic mode, opening and closing of chute is done by the operator for each wagon and all other operations viz., recording/displaying of weights, closing of chutes and filling of pre-weigh hopper is done automatically. The system is complete with all necessary facility needed for successful operation of the system.

The sampling unit consisting of automatic primary sampler, jaw crusher/hammer mill including sample collecting device shall be located adjacent to wagon loading silo. The sample collected shall be sent to laboratory for analysis.

11.2.6.4 Dust Extraction System

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

11.2.6.5 Dust Suppression System

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

11.2.6.6 Noise Control

It is well-accepted fact that noise pollution causes fatigue to operating personnel. Provision will be made to keep down the noise level to the extent it is feasible as per relevant IS/International standards. All machine mounting will have in their foundation anti-vibration pads/sheets for reducing the vibration and thereby noise. All transfer chutes and hoppers shall have wear resistant rubber or ultra high molecular weight plastic liners of various thicknesses as per design requirement and their suitability.

11.2.6.7 Fire Fighting and Fire detection System

Necessary fire fighting system along with fire detection & annunciation system have been envisaged for the plant. This includes fire hydrant tees at strategic locations at equal spacing of 30 meters with suitable water supply pipelines. The fire detection & annunciation unit shall be located at strategic location of the plant. In addition, portable fire extinguishers to deal with electrical/oil/ordinary fires shall be provided at all strategic locations in the plant.

11.2.6.8 Plant cleaning System

To facilitate cleaning at strategic locations ample number of high pressure water servicing points have been envisaged. These service points will be so located that with a 15/20 M long hose, any working area in the plant or equipment-working place can be reached. These service points will be provided with quick connecting hose couplings for easy fixing and dismantling of hoses.

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

11.2.6.9 Plant Maintenance System

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

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

11.2.6.10 Weighment

For the purpose of weighment, belt weighers have been envisaged. In addition, for recording of weight of coal dispatched to the consumers, pre-weigh system of weighment has also been envisaged with the wagon loading system.

11.2.6.11 Electrical

The electrical system shall comprise of:

- Power reception and distribution system.
- Centralised sequence control-cum-interlocking, automation, signaling and instrumentation system.
- Illumination of plant and adjacent area.
- Centralised welding circuit.
- Earthing.

11.2.6.12 Capital requirement of CHP

The Estimated addl. capital requirement for 5.5 Mtpa incremental CHP is Rs. 304.35 Crores and detail has been given in **Appendix-A.3.5**. For incremental 1.5 Mtpa CHP an addl. amount of Rs 59.18 crores has already been approved in EPR for Bina extension OCP (6 Mtpa)..

11.3 Railway Siding

11.3.1 General Information Existing Railway siding

The existing railway siding at Bina OCP has capacity of full rack as per Railway norms for 4.5 Mtpa coal despatch. At present there is one loading point in operation.

The characteristics of the existing railway siding is as under:

- Siding gauge : 1.6764M
- Fixed point : Take off from chainage 28.215 Km from Karaila Road railway stn.
- Total track length of the siding has full capacity for empties and load.
- Gradient as per Railway Norms.
- Two empty receiving lines and two after load lines to hold a full rake of boxes. Out of these two lines, one is being used by existing Bina CHP and other line is proposed to be used by Krishnashila CHP under construction.
- One engine escape line.

11.3.2 Existing sequence of operation for 4.5 Mtpa

- Empty rake is brought by Indian Railway engines and are placed at empty receiving line.
- Engine is detached and another loaded rake is drawn out with the same engine (at front) by load drawal line.
- Loading is being done through existing CHP and rail engine is hauling the rake.

11.3.3 Proposed Railway Siding facility for additional 5.5 Mtpa

Following additional railway siding facility for Bina-Kakri Amalgamation (Ph-II CHP) has been proposed:

- One empty receiving line of full length (750m).
- One after load line of full length (750m).
- One engine escape line
- Loading line with arrangement of mechanical loading and in-motion weighment of wagons
- One take-off point from KBJ line

11.3.4 Sequence of operation of proposed CHP

The empty rake will be brought by Indian Railways from its own marshalling yard and placed on empty receiving line .The engine will be detached and will be move on through engine escape line and will be coupled to the empty rake for loading into wagons in-motion through silo of CHP. The loading will be done in one hour for the full rake and move back to railways marshalling yard at Krishnashila Railway station.

11.3.5 Capital

The total length of proposed siding including link portion would be about 3 Km. The total estimated capital requirement of railway siding in the PR is given in **Appendix-A.5.**