CHAPTER – XI

COAL HANDLING AND DESPATCH ARRANGEMENT

11.1 INTRODUCTION :-

The target production of Kusmunda OCP will be 50Mty.The PR for Kusmunda OCP Expansion (6-10Mty) has been approved in 2006 and 10-15Mty has been approved in 2008.A coal handling plant with siding and conveyor system is existing handling with approximately 8-10Mty.In 10-15Mty report it was proposed to deploy surface miners, so no crushing arrangement for additional 5Mty has been proposed. Now, it is proposed to produce 50Mty by surface miners with FEL & dumper combination along with in-pit conveyor system. Therefore, the proposed coal handling arrangement has been thought of for target production of 50 Mty considering the provisions already given in approved PR of 6-10 Mty and 10-15 Mty. The coal of around 10Mty.from the project will be transported to proposed Kusmunda washery (around 2km from the pit top) by conveyors. CSEB will carry 10 Mty coal by changing the existing belt conveyors and coal bunkers for their west bank thermal station .After meeting the requirement of the Kusmunda washery and CSEB west bank thermal station, the balance coal around 37.5 Mty will be dispatched to distant consumers by rail through silo(s).

11.2 EXISTING ARRANGEMENT

11.2.1 PARAMETERS: The existing coal handling and surface transport arrangements are catering the needs of crushing, transportation, storage, dispatch, weighment of coal produced from Kusmunda OCP & Laxman OCP. ROM coal after crushing to (-) 200 mm size is being dispatched to CSEB by belt conveyors and to distant consumers through public rail system. The arrangement consists of the following:-

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i)	Crushing section-	a) 2 nos. double stage four roll crushers (average capacity 800 tph) b) 10 nos. of feeder breakers (average capacity 400tph).
ii)	Transport section-	a) Belt conveyors, 1200 mm wide of various specifications.
iii)	Storage section-	a) Surge Bunker - 1500 t cap. (Self flowing) b) Main Bunker 20,000 t cap. (Self flowing)
iv)	Dispatch section-	a) By two nos. of CSEB belt conveyors to CSEB's power house. b) Three nos. of wagon loading points working on 2 lines for dispatch to distant consumers through public rail system. c) Warf wall loading platform for loading coal with the help of front end loaders. d) By trucks in case of requirement.
v)	Weighment section-	a) 2 nos. of 100 t capacity rail weigh bridges (electronic) for weighing rail wagons. b) 3 nos. of Belt weighers for weighing coal dispatched through CSEB's belt conveyors. c) 4 nos. of Road weigh Bridges for weighment of trucks.
vi)	Sampling section	on line Automatic Sampling unit for rail dispatches. (Not in operation).
vii)	Wagon marshalling	Wagon haulers for moving the wagons while they are being loaded at the loading points.

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11.2.2 COAL FLOW (REF. FIG 11.1)

i) Two numbers of Feeder Breakers WF2 and WF4 are installed on surface near quarry 1 for receiving coal from trucks/dumpers. These feeder breakers crush coal to (-) 200 mm size and deliver to conveyor J2 which in turn discharges on conveyor J1. At present, the feeder breakers and conveyor J2 are not in operation.

ii) A crusher house cum receiving pit housing a double stage four roll crusher has been constructed near quarry no. 1. It crushes coal to (-)200 mm size and conveyor J0 receives coal from below the crusher and delivers on to conveyor J1' or J1. Conveyor J1 and J1' are installed parallel to each other up to coal handling plant.

iii) A Feeder Breaker along with a belt conveyor has been installed near Quarry-I for crushing coal to (-)200 mm size and then deliver on to J1 or J1' as per requirement.

iv) Conveyor J1' discharges on belt conveyor G3 which in turn discharges on belt conveyor C5 installed over the main bunker.

v) Conveyor J1 is discharging coal on conveyor J1 itself or on conveyor G4 with the help of a fixed tripper and a two way chute. Conveyor G4 elevates coal and discharges on conveyor C6 installed over the main bunker. Conveyor J1 at discharge end delivers coal on conveyor C2. This conveyor C2 also receives coal from Feeder Breaker WF1 and elevates to discharge in a 1500 t capacity surge bunker or on conveyor C4.

vi) A second receiving pit cum crusher house having a double stage crusher has been constructed near quarry no. 3.The crusher crushes coal to (-) 200 mm size to discharge on conveyor K0 which in turn discharges on conveyor K1 for transporting on surface to discharge on conveyor C1. Conveyor C1 elevates coal and discharges in a 1500 t capacity bunker.

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vii) The conveyors C5 and C6 installed over the main bunker spreads coal in the main bunker with the help of reversible traveling trippers. Conveyor C4 is carrying coal from top of the surge bunker to discharge at a single point in the main bunker.

viii) Two Feeder Breakers IR5, WF5 along with belt conveyor IR5 have been installed near main bunker for discharging coal at a single point in the main bunker after crushing.

ix) One Feeder Breaker IR6 along with belt conveyor IR6 has been installed near main bunker for discharging coal at a single point in the main bunker after crushing.

x) From below the main bunker coal is reclaimed with help of vibratory feeders installed in three rows (13 in each row) and load onto three parallel belt Conveyors (IA and IB of CSEB, C7 of SECL). Conveyors IA, IB along with other conveyors in series transports coal from main Bunker up to CSEB'S power plant. Conveyor C7 discharges on conveyor C8 for transporting coal upto conveyor C9, which in turn loads coal on conveyor NO or in rail wagons at loading point Lp2 with the help of a two way chute.

xi) From below the surge bunker coal is reclaimed with the help of vibratory feeders and loaded on belt conveyor N2 which in turn loads on Belt conveyor N1 for transporting upto transfer point 1 where it discharges on belt conveyor No. or on it self with the help of a fixed tripper associated with a two way chute. Conveyor N1 discharges on belt conveyor N0' at its discharge end. Conveyors N0 and N0' are discharging coal into wagons at loading point I and II respectively. A Feeder Breaker IR-9 is discharging coal on conveyor N1 after crushing. This section will be in operation when rail wagons are available for loading. Loading point LP1and loading point 1 is on line 1, whereas loading point LP2 and loading point 2 are on line 2.

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xii) A third wagon loading station has been established before LP1 and LP2 for filling the part rake on line 1 or 3 as per requirement. A Feeder Breaker IR7 has been installed for loading coal on conveyor IR7 which elevates and discharge coal in the wagons on line I or line 3 as per requirement through a two way chute fitted with a flap gate. A truck receiving hopper is also provided to receive crushed coal and then discharge on Belt conveyor IR7. A second feeder breaker has also been provided at this place to feed crushed coal to IR7 conveyor.

xiii) The wagons are moved while they are being loaded below the loading points with the help of wagon haulers. A wharf wall has been constructed along the empty portion of line I for loading of coal by means of front-end/pay loaders. Crushed coal from surge bunker and other places is being transported by tipping trucks and spread along the siding for loading the same in the wagons by means of pay loaders. The transportation and loading operations are being carried out by hiring the equipment. Due to this the loading of wagons through CHP is being carried out on line 3 only.

11.3 PROPOSED ARRANGEMENT AS PER APPROVED PR 6-10Mty (2006)

11.3.1GENERAL:

Kusmunda OCP CHP was initially planned/designed to dispatch 6.0 Mty of coal after crushing to (-) 200 mm size. It was planned to dispatch about 4.20Mty to MPEB (now CSEB) by belt conveyors and remaining 1.80 Mty to distant consumers by public rail system The existing arrangement for dispatch of coal to CSEB can not handle the additional requirement of 3.0 Mty so a new CHP will be required which will be located near the 20,000t capacity main bunker. The existing crushing arrangement is suitable for crushing coal to (-) 200mm size. For dispatch of (-) 100mm size fraction secondary crushers are required to be introduced in the system.

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The crushing units are located at different locations and providing of secondary crushers at each place will be cost prohibitive and requires the existing crushing units to be shifted to new locations. Further the trucks have to travel to different locations causing environmental pollution. So in this report it is proposed to establish two crushing stations one near the 20,000t capacity bunker and the other near new CHP. The Crushers and some of the Feeder Breakers have out lived their life and are due for replacement so these need not be replaced. The Feeder Breakers having balance life may be shifted to other projects for gain full utilization. The details of coal handling arrangement are described as below:

Mode of dispatch	
- CSEB	7.2Mty by belt conveyors
- Power houses, misc.	2.8 Mty By public rail
Bunkerage (Self flowing)	
- Main Bunker	20000t
-Over head Bunker	10000t
-Surge Bunker	1500t
Weighment:	
-Dispatch by Belt conveyors	by belt weighers
-Public rail system	Rail weigh bridge
-By road	Road weigh bridge

At each crushing station two nos. of crushing units will be established out of which one ill be working and the other standby. The crushing unit consists of:

i) Truck receiving hopper
ii) Primary sizer.
iii) Apron feeder/Chain conveyor
iv) Secondary sizer
v) Link conveyor between primary and secondary sizer
vi) Bridge conveyor between secondary sizer and out by conveyor
vii) Electromagnetic separator
viii) Other associated equipment.

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11.3.2 MODIFICATIONS PROPOSED IN EXISTING COAL HANDLING PLANT

i) The existing belt conveyor s G3 and G4 of 1200 mm wide will be replaced by 1400 mm wide belt conveyors and will be renamed as conveyor C3 and C4. These conveyors will receive coal from the link belt conveyors of crushing units.

ii) The existing C5 and C6 (1200 mm wide) belt conveyors will also be replaced by 1400 mm wide belt conveyors and receive coal from Conveyor C3 and C4. These conveyors C5, C6 will spread coal in the main bunker (existing) of 20,000 t capacity with the help of reversible traveling tripper.

iii) The existing method of reclamation of coal from below the main bunker and loading of the same on three numbers of belt conveyors will remain same however the existing electromagnetic feeders will be replaced by vibratory feeders with unbalanced motors.

iv) The existing lining of the bunker will be repaired for better flow ability.

v) The existing method for weighment of coal dispatched to CSEB will remain the same.

vi) Conveyor C7 will load coal on Conveyor C8 for transporting and discharging on Conveyor. C9 for wagon loading.

vii) The existing system of dispatch through public Rail will continue.

viii) The existing circuit of con C1, C2, Surge bunker Conveyor N1, N2, N0, N0' will continue to stay. All other installations of the existing system will be discontinued.

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11.3.3 PROPOSED COAL HANDLING PLANT FOR DESPATCH OF COAL TO CSEB.

i) The Belt conveyors S1 or S2 will receive coal from the link belt conveyors of crushing units with the help of a two way chute. These conveyors will elevate coal and discharge the same on belt conveyors S3 or S4. The belt conveyors are of 1400 mm wide and 1000 tph capacity.

ii) The belt conveyors S3, S4 will be provided with reversible traveling trippers for spreading coal in the 10000 t capacity over head bunker.

iii) The bunker will have ten compartments each of 1000t capacity out of the ten compartments one compartment will be used for dispatch of coal by trucks. Two rows of pockets have been provided below the bunker to which mechanical vibratory feeders will be fitted for reclaiming the coal and load onto the Belt conveyors S5, S6and S7 as the case may be.

iv) The Belt conveyors S5 and S6 will discharge coal on conveyors S7 or on CSEB's conveyors with the help of a two way chute fitted with a hydraulically/ electrically operated flap gate. Belt conveyor S7 will act as a bridge conveyor between the bunkers.

v) Belt conveyor S8 will elevate and discharge coal in a 400t capacity over head steel bunker having four hoppers. The trucks will be loaded below the hoppers for dispatching to wharf wall loading yard or to local customers in case of requirement.

vi) Belt weighers will be provided on belt conveyors S5, S6, S7, and S8 to measure the dispatched.

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11.3.4 WHARF WALL LOADING

The existing system of loading of coal into wagons on line 1 by hiring pay loaders will continue. Coal brought by tipping trucks will be spread along the siding.

11.4 PROPOSED ARRANGEMENT AS PER APPROVED PR 10-15Mty (2008)

11.4.1 In this expansion report it is contemplated to increase the capacity of the project from 10Mty to 15 Mty. As per the linkage envisaged in the present report 8.6Mty (2.5Mty by rail and 6.1Mty by belt conveyors) coal is to be despatched to CSEB and 6.4Mty coal to other consumers by rail. CSEB will carry 6.1 Mty coal by the existing belt conveyors for their west bank thermal station and 2.5Mty by rail for their east bank thermal station. The existing coal handling plant along with a wharf wall siding is meeting the existing despatch needs of the mine.

11.4.2 It is proposed to construct a silo with rapid loading arrangement to load a full rake of 58'N' Box wagons to dispatch about 5.0 Mty coal to distant consumers. This provision is in addition to the provisions made in the 6 – 10 Mty report.

It is also proposed to continue the existing wharf wall siding and construct a new wharf wall at the existing siding to take care of the dispatch needs in case CSEB fails to lift the coal and to meet the dispatch requirements during construction of the CHP and silo.

11.4.3 Proposed additional provision in the CHP as per expansion report (10-15Mty)

Additional coal handling plant as envisaged in the expansion PR of 10 - 15Mty will handle about 5Mty of coal and consists of the following :-

i) Truck receiving stations -2 nos.
ii) Belt conveyors (B1 to B4), 1400 mm wide
iii) Belt conveyors (B5 to B8), 1600 mm wide

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iv) Vibratory feeders below overhead bunker of 10,000t capacity
v) Overhead bunker of 10,000 t capacity
vi) One Silo, 4000t capacity with rapid loading arrangement for volumetric loading system
vii) Rail weigh bridges.
viii) Automatic sampler for on line sampling at the transfer point of belt conveyors B5 & B6 to Silo loading conveyor B7 & B8.
Ix) Diesel engine, creep controlled
x) Dust suppression arrangement
xi) Fire fighting arrangement
xii) Associated chutes, lifting tackles, tools etc.
xiii) Power distribution arrangement, illumination, control system
xiv) Associated civil and structural works

11.4.4 COAL FLOW OF THE CHP PROPOSED IN THE 10 - 15 MTY REPORT

In this expansion report it is proposed to deploy surface miners for production of coal. Since the surface miner can produce (-) 100 mm size coal there will not be any requirement of separate crushing arrangement. The cutter drum of the surface miner cuts the coal and leave on the surface. Pay loaders will load the coal in to trucks for transporting the same to surface and discharge the coal in to the hoppers provided in the truck receiving stations. Vibratory feeders will be provided below the hoppers to reclaim coal and load on to belt conveyors B9/B10. These conveyors will in turn discharge coal on to belt conveyors B1/B2, with the help of a two way chute with flap gate fitted at the discharge pulleys of conveyors B9/B10. The belt conveyors B1/B2 will elevate coal and discharge the same on the reversible shuttle conveyors B3/B4 (1400 mm wide and 1000 tph capacity) for spreading coal in the 10,000t capacity RCC overhead bunker. The 10,000 t capacity overhead RCC bunker will have ten compartments each of 1000 t. capacity. Two rows of pockets have been provided below the bunker to which mechanical vibratory feeders will be fitted for reclaiming the coal from the RCC bunker and load onto the belt conveyors

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B5 and B6 (1600 mm wide and 2000tph capacity) as the case may be. The belt conveyors B5 and B6 will discharge coal on belt conveyors B7 and B8 (1600 mm wide and 2000tph capacity) The belt conveyors B7 and B8 will in turn discharge coal into the silo of 4000t capacity. The silo will be constructed between the existing rail line 3 and the main public railway line. The belt conveyors B7 & B8 will cross the siding lines 1, 2 & 3 over head to reach the silo and discharge coal in to it. A swing chute with flow control gate will be provided below the silo for choke loading of coal in to the wagons while they are being moved by a creep controlled diesel engine. Automatic sampling system has been envisaged at the transfer point of belt conveyors B5 & B6 to B7 & B8 for automatic sampling for coal.

11.5 PROPOSED ARRANGEMENT AS PER PR FOR EXPANSION (15-50Mty)

11.5.1 DESIGN PARAMETERS:-

The design parameters considered for planning of the coal handling plant are as given below.

11.5.1.1 BASIC DATA

I.	Annual target out put from mine	50.00 Mty
ii.	Life of the mine	24 years
iii.	Quality of coal	Non coking, Grade- F
iv.	Mode of transport from coal faces to CHP	By in pit conveyors
v.	Dispatch requirements	
	- Kusmunda washery	by belt conveyor
	- CSEB west bank thermal station	by belt conveyor
	- CSEB east bank thermal station	by rail
	- To distant consumers	by rail through silo/rapid loading.
vi.	Customers	Washery, Power houses & misc.

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11.5.1.2 CHP and in pit conveying working schedule

The working schedule considered for planning of coal handling plant is as given below:

I.	Mine operation	330 days/annually 3 shifts/day
ii.	CHP operation	330 days annually 3 shifts/day

11.5.2 SYSTEM DESCRIPION

The total coal handling arrangement proposed for 50 Mty considering provisions already given in approved PR of 6-10 Mty and 10-15 Mty has been divided into four section , namely CHP , INPIT central , INPIT west and INPIT East depending on the phasing of coal production and related seams. The total coal handling arrangement has been planned based on data supplied by Kusmunda area / SECL and space available considering existing CHP structures

11.5.2.1.1 INPIT CONVEYING SYSTEM (INPIT Central, INPIT West and INPIT East) (Surface miner)

i) Coal will be mined by surface miner; as such no crushing arrangement is required.

ii) Coal mined by surface miner will be transported inpit by trucks/dumpers through haul roads to coal receiving station, where belt conveyors will be fed.

iii) Coal mined by surface miners will be transported by trucks/dumpers to the reclaim feeder installed on ground in the quarry. These reclaim feeders will load coal into the inpit central conveyors with the help of short belt conveyor.

iv) Coal from seams LKT & LKB/C will be taken out from the central of the property (INPIT Central) and coal from E&F and UK will be taken out through haul road of eastern &western side (INPIT west .& INPIT east). However, INPIT east will be operated after 10 years.

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11.5.2.1.2 INPIT CONVEYING SYSTEM – SALIENT POINTS

i) Around 40 Mty productions will come from INPIT central and 10 to 15 Mty from INPIT West.

ii) Installation of conveyors of INPIT Central will start from 7th year onwards and those of INPIT West from 10th year as per calendar programmed for proposed 50Mty.

iii) In initial period of INPIT Central conveyors will be laid at 1 in 5 gradients from surface after getting the proper required space. Afterwards conveyors will be shifted to the permanent position as the case may be.

iv) In final stage of INPIT Central there will be 28 no of conveyors P1 to P28. These conveyors will be of 2000 mm wide & 3500 tph. In final stage of INPIT West there will be 8 no of conveyors 1P to 8P .These will be of 2000 mm wide & 3500 tph

v) In INPIT Central, four sets of 2000 mm wide, 3500tph have been provided in the main stream out of which two will be working and two will be stand bye.2 sets of belt conveyor of 2000 mm wide and 3500tph will be used near coal faces both the side of INPIT Central main stream of belt conveyor for feeding coal from reclaim feeder. In INPIT West, two sets of 2000 mm wide, 3500tph have been provided in the main stream out of which one will be working and one will be stand bye. Similarly in INPIT East main stream of belt conveyor for feeding coal reclaim feeder.

vi) Conveyors of INPIT central &INPIT west will be connected with the main CHP. However, INPIT east can feed coal to washery directly, if required.

11.5.2.1.3 INPIT CONVEYING SYSTEM (INPIT-East) (surface miner)

Coal will be won by surface miner in -100mm size will be carried to east side of INPIT by trucks/dumpers and will discharge coal over two sets of 4X400t hoppers at the road way. Below the hoppers conveyors no EC7/EC8 carried the coal up to conveyor no EC1/EC2. Afterwards coal will be fed in similar way to washery..

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11.5.2.2 COAL HANDLING PLANT (CHP) (Plate No. XXIII to XXVII)

i) CHP provided in this report is for target production of 50 Mty. About 40Mty production will be received from INPIT Central and 10Mty from INPIT western. Out of 50 Mty production 10Mty will go to proposed Kusmunda washery through CHP. Remaining 40 Mty, 10 Mty will be taken by CSEB west bank power plant and difference 37.50 Mty will be dispatched through silos of CHP.

ii) Salient features of CHP

Overhead bunker :

No (1&2) - 2 nos 40,000te RCC O.H. Bunker with plough feeder arrangement each for storing ROM coal

No (3) - 12,000 te RCC O.H. Bunker with vibro-feeder arraangement for ROM coal to feed washery/washeries.

No (4&5) - 30,000 te RCC O.H. Bunker with plough-feeder arrangement (2no) for washed coal

No (3) - 20,000 te RCC O.H. Bunker with plough feeder arrangement for supply of raw coal/ washed coal to CSEB

Silo with pre-weigh hopper (4000t) for rail dispatch - 4 Nos.

Truck unloading steel hoppers - 2 sets of 4x100te for receiving coal from the east and 2 sets of 6X40te for receiving coal from central side. Surge bunker 1500 te capacity to receive coal (ROM) from Bunker no. 2 to feed to the CSEB washery.

iii) CHP

Coal carried by inpit conveyor P1/P2 and P3/P4 (upto P25/P26 & P27/28 from Inpit central and from INPIT west conveyor 1P/2P (upto 7P/8P) will be discharged to the CHP. INPIT central conveyor P1/P2 will be discharged to Tripper conveyor C1/C2 of overhead Bunker No.1 and conveyor P3/P4 will be discharged to Tripper Conveyor C5/C6 of overhead bunker No. 2.

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INPIT west conveyor 1P will be discharge on the either of C1/C2 Tripper conveyors of overhead bunker No.1. Conveyor 2P will be discharged to Tripper conveyor of overhead bunker No. 2 either on conveyor C5/C6.

The Tripper conveyor C1/C2 and C5/C6 will spread the coal into the bunkers Nos. 1 & 2 respectively.

The reclaim conveyor C3/C4 (Below bunker No. 1) and conveyor C7/C8 (Below conveyor no. 2) will transfer the coal on to silo loading conveyor C9/C10 and C13/C14. The silo loading conveyor C9/C10 will discharge the coal either into 4th silo or to the bridge belt conveyor C11/C12 to the 3rd silo. Similarly conveyor C13/C14 silo discharge conveyor discharges the coal to silo 2 & 1 by similar way through bridge belt conveyor C15/C16.

Reclaim conveyor C3/C4 (Below bunker no.1) will discharge coal either on C9/C10 or C13/C14 (silo loading conveyor) or C17/C18. Tripper conveyor C17/C18 over bunker no.3 will also receive coal from reclaim conveyor C3/C4 Tripper conveyor C17/C18 will spread the coal into the bunker no.3 for washery. Similarly conv. C7/C8 (Below bunker no.2) will discharge coal either on conv. C9/10 or C13/14 or C17/C18 (for supply coal to washery.

Coal from washery feed into tipper conveyor C19/C20 and C23/C24 over 2 nos (30,000T capacity bunker) for spreading coal. Below 2 nos bunkers reclaim conveyor C21/C22 and C25/C26 carry the coal and feeded to belt conveyor in such a way it will discharge into C27/C28 and C29/C30 respectively. Conveyor C27/C28 and C29/C30 which will deliver coal either on silo loading conveyor C9/C10 and C13/C14.

Reject coal from washery will be feeded to reject belt conveyor through tripper conveyor over reject coal O.H.RCC bunker (20,000 T capacities) with plough feeder arrangement. Below the bunker reject conveyors will receive coal and feed it to wagon loading conveyor. Coal from wagon loading conveyor will transfer reject coal either to bunker no1 or bunker 2 (500 Capacity each) by short belt conveyor for rail dispatch.

Coal from OH RCC Bunker No. 2 (40,000Te cap.) will feed by reclaim conveyor C7/C8 either on Silo loading conveyors or extended up to Tripper conveyor of

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C17/C18. At this point a transfer chute will be constructed such way that the coal will be fallen from 27m height to 19m height. Below the transfer chute a surge hopper of 1500te cap will be constructed. Below the surge bunker 4 nos. of vibro feeder will be operated and feed the coal onto ground Belt conveyor C33/C34 of 16000 mm wide and 2000 TPH. Belt conveyors C33/C34 will also be fed by 1600 mm belt conveyors C35/C36 from a truck unloading station comprising 2 sets of 4x100 te steel hoppers in the east side. The belt conveyors C33/C34 carry the raw coal and feed it either to the tripper conveyors C37/C38 to CSEB bunker (20000 te cap.) or to the belt conveyors to the washery side.

Truck receiving arrangement with 2 rows of 6 x 100 t. steel hoppers has been provided. Coal carried by trucks whenever required, will be discharged into hoppers. Conveyor C31/C32 will reclaim coal from hoppers and discharge coal onto conveyor P1/P2/P3/P4 (IN-PIT Central) at the ground level. There after coal from the above central IN-PIT conveyors feed to tripper conveyors C1/C2 orC5/C6 of O.H RCC bunker (40,000Te Cap.)No 1&2. Belt conveyor P1/P2 and P3/P4 of inpit central will be constructed first. The length of P1/P2 will be 85m each and P3/P4 will be 159m length each. Over the ground to connect with the tripper conveyor C5/C6 and C1/C2 of 40,000T capacity O.H. bunker 1&2. Remaining length of conveyor P1/P2 and P3/P4 381 m length each will be merged with the final stage of construction of inpit central.

Another 2 nos. of 4 x 100 T steel hoppers has been provided for coal carried by trucks whenever required will be discharged into hoppers. Conveyor C35/C36 will reclaim from hoppers and discharge coal onto conveyor C33/C34 and will feed to tripper conveyor C37/C38 of OH RCC Bunker (20,000 te) with plough feeder arrangement or go to washery.

Belt conveyors C35/C36 which will carry coal from the truck receiving hoppers of the east side and the portion (200 m) of conveyors C33/C34 from the transfer house of conveyors C35/C36 to the transfer house for the washery/20,000 te bunker will be installed initially along with transfer houses of raw coal conveyors and washed coal conveyors. The 20.000 te O.H. RCC bunker along with the

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tripper conveyor and plough feeder arrangements will be constructed by CSEB, however the total cost of its construction, procurement, installation and commissioning etc. will be reimbursed to CSEB by SECL. The remaining 572 m length of conveyors C33/C34 will be constructed afterwards and added with the initial portion of conveyors C33/C34.

v) Overhead RCC Bunker

The overhead bunkers 1&2 are of RCC construction of 40,000te capacities each. It consists of 2 slits of opening. In each slit 2 nos. plough feeder arrangement will be provided in which 1 no. will be in operation and other will be kept as standby. RCC overhead bunker no-3 of 12000 t cap. Under each hopper there will be three rows of openings. Bunker no-3(12,000te) there are opening rack and pinion chute gate / rod gate along with mechanical vibratory feeders of 400tph capacity will be provided for discharging coal at a regulated rate on belt conveyors. RCC overhead bunker no. (4 &5) of capacity 30000t capacity each. It consists of 2 slits of opening in each of the bunker. In each slit 2 nos. plough feeder arrangement will be there, in which 1 no. will be working and other will be kept as standby.

The slanting surfaces inside the Bunker will be lined by means of stainless steel liners and extended up to a height of 3m in the vertical portion. The vertical portion will be lined with epoxy based Ferro site lining of 25 mm thick for easy flow of coal. An ultrasonic type level switch will be provided on the carriage of the tripper conveyor to monitor the high level of coal in the bunker. In case high level is reached in the bunker, it gives signals so that carriage can move to the next place for discharging coal in the bunker. Similarly low level switch will be provided at each bunker opening to stop the vibratory feeder provided at the bunker opening in case a pre-determined low level is reached. Two numbers of partition walls will be provided in the bunker which will be help-full during maintenance and repair. Inspection trolleys with cage will be provided above the bunker for inspection of outer and inner surfaces of the bunker.

Two numbers of belt conveyors each of 2000 mm wide, 4200tph (nominal) will be provided below the bunker (1,2,4&5) openings to receive coal from the plough

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feeder arrangement provided. These belt conveyors will elevate coal and discharge on either of the silo loading conveyors 2000 mm wide with the help of a two way chute fitted with flap gate. Two numbers Bridge conveyors will be provided to discharge coal in silo no-3&4 and silo no-2&1. A two way chute with flap gate will be provided at the discharge end of silo loading conveyor to facilitate transfer of coal either in silos or on bridge conveyor.

As most of the conveyors are long conveyors and may cause some spillage at the time of stopping, proper braking arrangement will be provided after calculating the coasting time.

vi) Silo and Rapid Loading System

Each of four nos silo will be of 4000 t. capacity and of RCC construction. The slanting surface will be lined with stainless steel liners and will be extended upto 3 m in vertical section. The vertical portion will be lined with epoxy based Ferro site lining of 25 mm thick for easy flow of coal. The silo will be designed and constructed on mass flow concept to reduce the possibility of rat holing /arching taking place during the evacuation /loading process. For this proper slopes will be provided in the slanting faces of the silos. Provision for installation of air blasters/ air cannons will be provided at suitable locations to keep the coal agitated to avoid rat holing and arching inside the silo so that continuous coal flow is assured. Ultrasonic type high level limit switches will be provided in each silo to stop the vibratory feeders below the bunker if a pre-determined high level is reached in the silo. Low level limit switches will be provided to close the silo discharge gates if a predetermined low level is reached i.e. approx. 600 t. capacity in the silo. Temperature monitoring devices will be provided at various levels in the silo to monitor temperature of coal inside the silo and give audio, visual alarms in the control room for necessary action. These will operate through battery in case of power failure. Inspection trolley with cage will be provided above the silo for inspection of outer and inner surfaces of the silo.

Below each silo four numbers of hydraulically operated emergency gates will be provided. These will be used in emergency cases during the

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maintenance of the equipment below the silo. Four numbers of hydraulically operated silo discharge gates will be provided below the emergency gates. The discharge through the silo discharge gates will be into a steel hopper of min. 60t live capacity and mounted on four numbers of load cells to weigh the coal before it is discharged. Under each pre-weigh hopper a swing chute gate with a flow control valve will be provided by which the wagons will be choke loaded. The wagons will be moved by means of a creep controlled diesel engine while they are being loaded. Track logic system will be provided on the rail lines to identify the engine and rail wagons and send signal to the central processing unit for operating the swing chute. During the period when there is no wagon loading the pre weigh hopper will be filled in. LED based aviation light will be provided over one of the two silos. Lightning arrestors will be provided on both the silos.

vii) Weighment

Coal dispatches through silos will be weighed in the pre weigh hopper located below the silo before loading into the wagons. Coal received by trucks through road will be weighed on 4 nos 100 t capacity pit less, electronic weigh bridges. The control room near the weigh bridge will be of modular construction and will be located very near to the weigh bridge and on the right side of the road so that weigh bridge personnel are at shake hand distance & for better communication with the driver. All such control room should be air conditioned.

viii) Sampling System

Automatic sampling system consisting of primary sampler (swing hammer type), belt feeders, secondary sampler, crusher (Hammer mill type), tertiary sampler, bag collector, bucket elevator will be provided near silo. The primary samplers will collect coal from the silo loading conveyor before discharging into silo. The sample size and number of samples per hour will be in accordance with relevant Indian/ International Standards.

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ix) Dust suppression arrangement

Dust suppression arrangement to suppress dust at all transfer points, truck receiving stations, over the RCC bunkers, over the silos, below truck loading hoppers etc. The dust suppression arrangement will be by spraying water in atomized /mist form (fog type) to have better dust suppression and minimum water consumption. Necessary full cone nozzles, pipes, pumps will be provided.

x) Fire fighting arrangement

Fire fighting arrangement as per statutory requirements will be provided. Fire detection and alarm system will be provided. Fire extinguishers, sand buckets will be provided in control room, substation/MCC rooms, compressor room, pump house, drive houses etc. to put-off fires.

11.6 RAILWAY SIDING AND DESPATCH

11.6.1 INTRODUCTION

The nearest railway station from where rakes will be supplied to this project is Gevra road Railway station. The Gevra road railway station is serving the needs of Kusmunda OCP, Gevra OCP and Dipka OCP. In order to meet the demand of rail dispatches from these projects doubling of rail line between Korba and Gevra road railway station was completed by Indian Railways. Doubling of rail line between Gevra road Railway station and Gevra OCP (Junadih) is also completed. A single line between Gevra OCP and Dipka OCP has already been commissioned. ST-CLI coal washries are loading coal at Dipka OCP in the rake of wagons by means of pay loaders at ST-CLI wharf wall siding. ST-CLI is contemplating to load coal in the rake of wagons under a silo (to be constructed by them) by means of rapid loading system.

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11.6.2 LINKAGES:-

As per approved PR of Kusmunda 10-15 mty. The tentative linkage of the Kusmunda OCP, Gevra OCP and Dipka OCP on long term basis (as worked out by SECL) is as given below

i) Kusmunda OCP (15Mty)

- Belt conveyor system to CSEB West bank power plant	- 6.1Mty
- By rail to CSEB, east bank power plant	-2.5Mty
- To distant consumers by rail (MPEB, NTPC- Ramagundam, Cement plants & sponge iron plants etc)	-6.4 Mty
Total =	-15.0Mty

ii) Gevra OCP (35Mty)

- Super thermal power station NTPC, Korba by conveyor	-12.75Mty
- Balco, Korba by conveyor	- 4.15Mty
- Local washaries by rail	-11.60Mty
- Distant power stations by rail to RSEB etc.	-6.50Mty

iii) Dipka OCP (25Mty)

- Super Thermal power station, NTPC Seepath by rail	-15.0Mty
- ST-CLI coal washery by rail	-6.25Mty
- Local washery by rail/road (MSEB, Bhilai TPS)	-3.40Mty
- HECBIPL Washery	-0.35Mty
Total	-25.00Mty

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The total dispatches through rail from these mines was estimated approximately 32.00 Mty as per approved PR of Kusmunda Expansion 10-15 Mty. In order to dispatch the amount of coal through rail wagons the rail line between Gevra road Railway and Korba Railway station has already been doubled by Indian railways.

Now after expansion of Kusmunda OC from 15 Mty to 50 Mty the proposed dispatches from Kusmunda OC will be as under:

Belt conveyor system to CSEB West bank power plant	- 6.10 Mty
By rail to CSEB, east bank power plant	- 2.50 Mty
Proposed Kusmunda washery	- 10.00 Mty
Other consumers by rail	- 31.40 Mty
Total	- 50.00 Mty
Increment of rail dispatch from Kusmunda OCP	- 33.90 Mty

Therefore, the total dispatches through rail from the said three mines will be around 65.90 Mty (32+33.90).

11.6.3 Existing arrangement at Kusmunda OCP

Railway siding at Kusmunda OCP is in operation. The existing siding at Kusmunda OCP consists of 3 numbers of lines (2 loading lines, one engine escape line). Line 1 and line 3 are used for loading of coal and line 2 is used for engine escape. Each line consists of empty rake berthing place, loaded berthing place, and wagon loading zone suitable for 58 box-N wagons. Part of the line 1 is being used for loading of the 58 box-N wagons rake by means of hired pay loaders and line 3 is used for loading of wagons through CHP.

11.6.4 Requirements in the expansion report (15 to 50Mty)

In order to meet the enhanced requirements of dispatch through public rail system four no silo of 4000t capacity including one no already approved in 10-

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15 Mty PR will be established to load the coal through rapid loading system. Two sets of railway sidings consisting of one load line ,one empty line both suitable for 58 box N wagons, one engine escape line loading stations, crossovers, electrification, signaling etc. will be constructed for the above mentioned rapid loading system. Due to the above, modification /addition of existing railway siding will be required. In approved PR of 10-15 mty it was proposed to establish another wharf wall loading station to meet the emergency requirements. After commissioning of said rapid loading system wharf wall loading station may not be required. Capital requirement for establishing two sets of railway sidings will be provided.

11.6.5 WEIGHMENT

Weighment of coal will be done by pre-weigh hopper installed below the silo.

11.6.6 MAINTENANCE AND ILLUMINATION

A maintenance shed has been provided near the siding for maintenance of diesel locomotive engine. It is proposed to outsource the maintenance of diesel engine. So no provision of equipment has been made for maintenance, however an E.O.T. crane has been provided in the shed. Proper illumination arrangement will be provided near the siding and loco shed for easy operation at site.

11.6.7 A new railway line connecting from Dipka/Gevra/Kusmunda up to Gatora near Bilaspur consisting of rail lines, culverts, bridges, electrification, signaling, block station etc. may be constructed just side by side of existing rail line of Super Thermal power station, NTPC Seepath for smooth flow of rake in one direction just like merry go round system to dispatch the huge production from Dipka /Gevra /Kusmunda. It needs detail study.

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11.6.8 Capital Requirement:

The capital requirement along with the details is shown in the appendix A.5. The estimated cost for construction of the 50 km rail line from Dipka/Gevra/Kusmunda up to Gatora near Bilaspur comes to 400 crore and has been included in Appendix A-5. Provision of Rs.120.5 crore has been kept for construction of Railway Siding to be used with 4 nos. of silos, which will be required in the initial stage of the expansion project. Provision of Rs. 10 crore has also been made for renovation of the existing siding which will also be done in the initial stage.

11.7 MANPOWER REQUIREMENT

The details manpower required for operation and maintenance of CHP are shown in Appendix B.

11.8 CAPITAL REQUIREMENT

The capital requirement, phasing of the capital, brief specifications of the equipment for CHP has been shown at Appendix – A.3.5.

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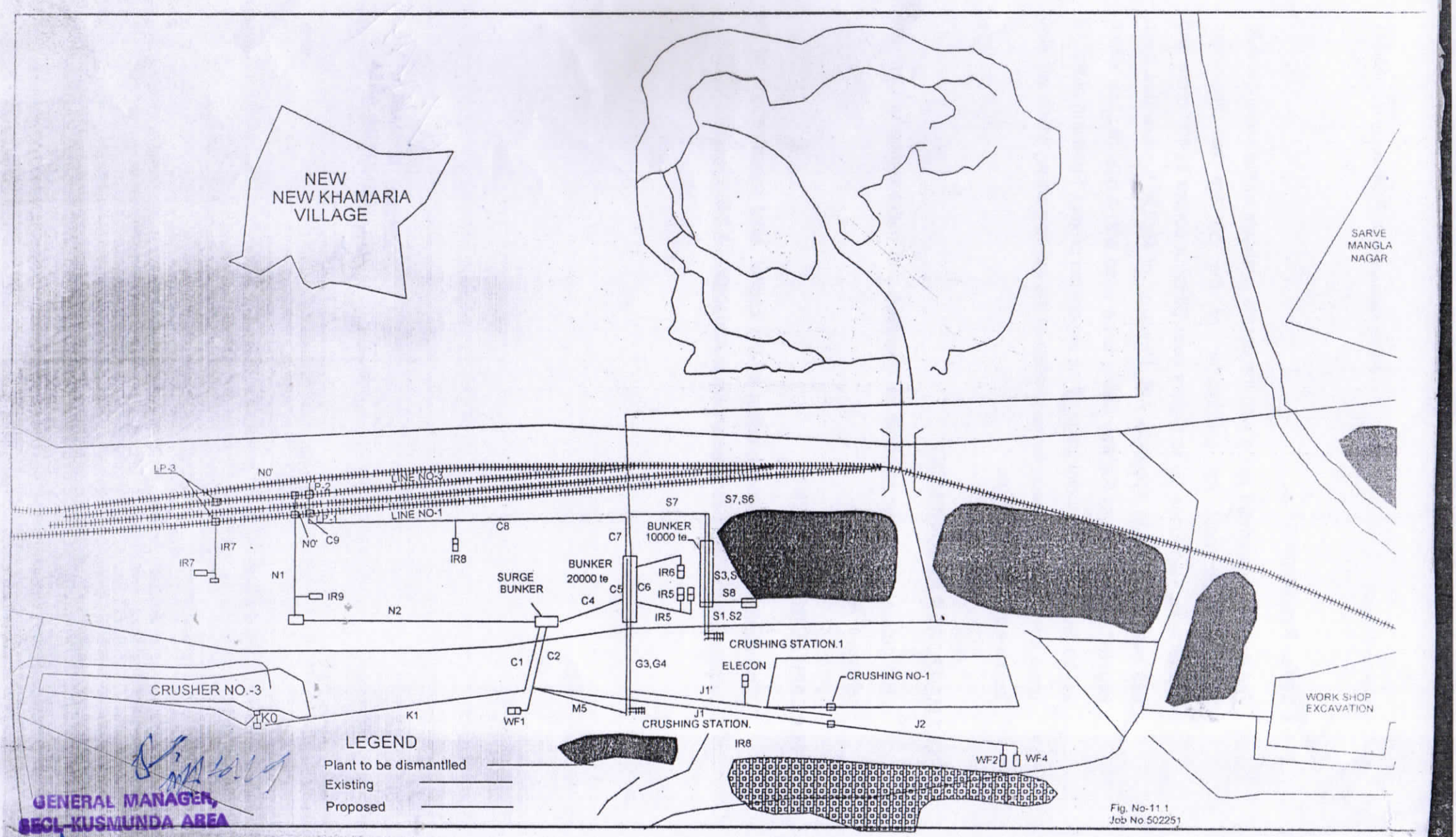
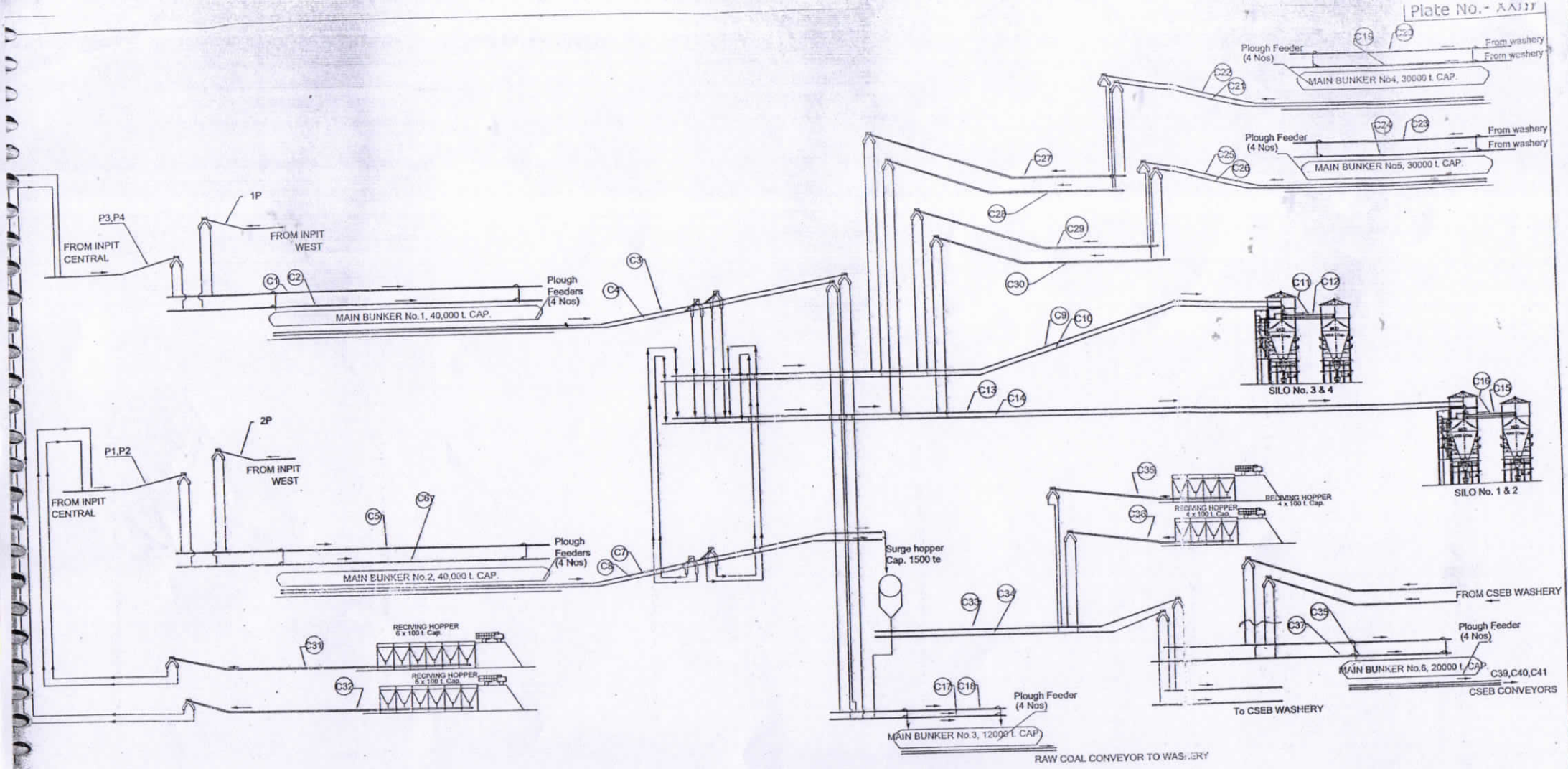

NEW
NEW KHAMARIA
VILLAGE
SARVE
MANGLA
NAGAR
LP-3
N0'
LP-2
LINE NO-3
LP-1
LINE NO-1
N0'
C9
C8
C7
IR7
IR7
IR8
N1
IR9
N2
SURGE
BUNKER
BUNKER
20000 te
C5
C6
C4
IR6
IR5
IR5
S7
S7,S6
BUNKER
10000 te
S3,S
S8
S1.S2
CRUSHING STATION.1
C1
C2
G3,G4
ELECON
CRUSHING NO-1
J1'
CRUSHER NO.-3
K0
K1
WF1
M5
J1
CRUSHING STATION.
J2
IR8
WF2
WF4
WORK SHOP
EXCAVATION
LEGEND
Plant to be dismantlled
Existing
Proposed
GENERAL MANAGER,
SECL-KUSMUNDA AREA
Fig. No-11.1
Job No 502251

Plate No.- XXIII



CONVEYOR DETAIL					CONVEYOR DETAIL				
No.	CONV	WIDTH in mm	LENGTH in m.	POWER IN Kw.	S.No.	CONV.	WIDTH in mm	LENGTH in m.	POWER IN Kw.
1	C1/C2 Tripper conv.	2000	302	2x300	12	C23/C24	2000	185	2x300
2	C3/C4	2000	551	3x300	13	C25/C26	2000	174	2x300
3	C5/C6 Tripper conv.	2000	285	2x300	14	C27/C28	2000	142	2x300
4	C7/C8	2000	551	3x300	15	C29/C30	2000	92	3x110
5	C9/C10	2000	36	3x500	16	C31/C32	2000	450	3x300
6	C11/C12	2000	25	2x110	17	(A) C33/C34	1600	300	2x300
7	C13/C14	2000	415	3x500	18	(B) C33/C34	1600	572	300
8	C15/C16	2000	29	2x110	19	C35/C36	1600	80	2x110
9	C17/C18	2000	240	2x300	20	C37/C38	1600	110	2x90
10	C19/C20	2000	172	2x300	21	C39,C40/C41	1400	CSEB CONVEYORS	
11	C21/C22	2000	185	2x300					

DETAIL OF MAIN EQPT.			
S.No.	PARTICULAR	Cap.	Qty.
1	Silos	4000 t.	4 Nos. each
2	A. Mech. vibro feeder B. Mech. vibro feeder	400 tph 1000 tph	36 Nos. 4 Nos.
3	Automatic sampler		4 Nos.
4	Passenger lift		4 Nos.
5	Diesel loco		4 Nos.
6	Rapid loading system	5500-6000 tph.	4 Nos.
7	OH. RCC. Bunker (Plough feeder)	40,000t.	2 Nos.
8	OH. RCC. Bunker (Mech. vibro feeder)	12,000t.	1 No.
9	OH. RCC. Bunker (Plough feeder)	30,000t.	2 Nos.
10	OH. RCC. Bunker (Plough feeder)	20000t.	1 No. for CSEB
11	Road weigh bridge	100 t.	6 Nos.
12	Truck receiving hopper	6 x100 t. 4 x100 t.	2 Sets 2 Sets

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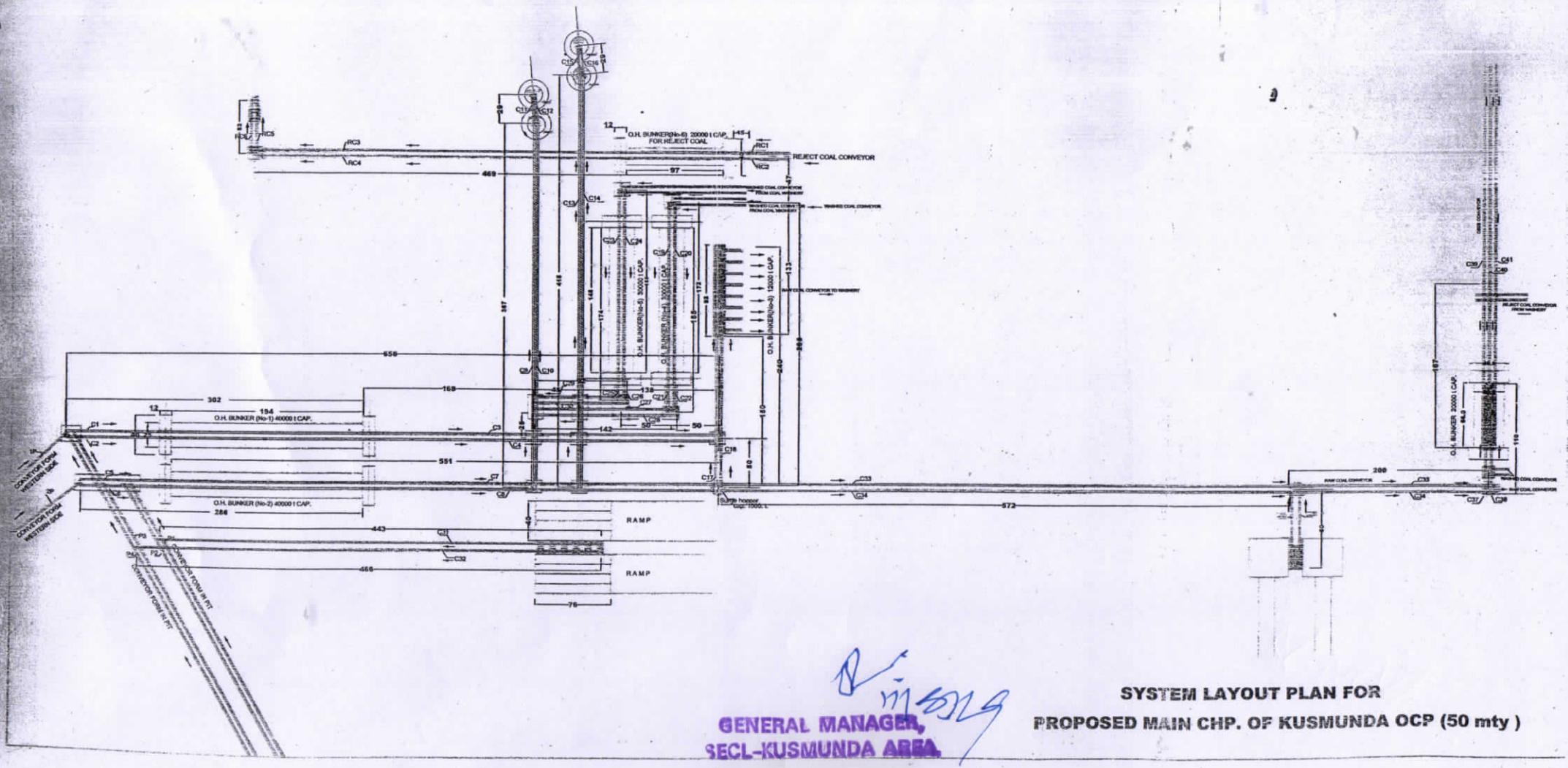
FOR KUSMUNDA OC EXP. (50 Mty)

COAL FLOW DIAGRAM

Plate No.- XXIV



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SYSTEM LAYOUT PLAN FOR
PROPOSED MAIN CHP. OF KUSMUNDA OCP (50 mty)