

## Chapter – 8

## 8.0 MINERAL PROCESSING

8.1 ROM ore from the Daitari Hill Top iron ore Deposit shall be subjected to processing. A part of the production (ROM) shall be crushed & screened by dry process for which three dry screening plant are installed in the lease area. The capacity of these plants is 325 tph (one number) and 350 tph (two numbers) respectively. Besides, one dry screening plant is also there installed in the mines. Recovery of these plants is 100% of feed quantity of ROM. The other part of production (ROM) shall be processed through OHP.

8.1.1 The following table shows the performance Dry Crushing & Screening Plant for last 4 years (2008-09, 2009-10, 2010-11, 2011-12 and 2012-13 (till 31.12.2012))

Year	Feed (ROM)			Production			Rejection		
	Qty (t)	Gr. (Fe%)	Size (mm)	Qty (t)	Gr. (Fe%)	Size (mm)	Qty (t)	Gr. (Fe%)	Size (mm)
2008-09	1470356.469			763411.188	62-65% (L)	10-40			
				177868.380	60-62% (F)	- 10			
				529076.901	62-65% (F)	- 10			
Total	1470356.469			1470356.469	L & F	>- 10			
2009-10	1652347.540			789005.469	62-65% (L)	10-40			
				438350.250	60-62% (F)	- 10			
				424991.570	62-65% (F)	- 10			
Total	1652347.540			1652347.540	L & F	>- 10			
2010-11	787799.820	Total ROM Produced from the mines is fed to the plants. Average grade of ROM is >60% Fe.	ROM <10 mm & above	504031.880	62-65% (L)	10-40	0.000		
				71316.580	60-62% (F)	- 10			
				212451.36	62-65% (F)	- 10			
Total	1652347.540			787799.82	L & F	>- 10			
2011-12	1988986.465			1033450.260	62-65% (L)	10-40			
				348843.136	60-62% (F)	- 10			
				606693.069	62-65% (F)	- 10			
Total	1988986.465			1988986.465	L & F	>- 10			
2012-13 (till 31.12.2012)	514140.000			284544.000	62-65% (L)	10-40			
				13358.000	60-62% (F)	- 10			
				216238.000	62-65% (F)	- 10			
Total	514140.000			514140.000	L & F	>- 10			
Grand Total	6413630.043			6413630.043	L & F	>- 10	0.000		

No middling concentrates tailing is there. (-) 10 mm size is termed as fines while 10 to 40 mm size is lump. All size of materials analyses >60% Fe. Recovery percentage of (-) 10 mm size is 47.39% by weight while the balance 52.61% by weight is 10 to 40 mm size. The



finished products are transported by road to Baliparbat area stack yard and Railway siding for final dispatch to buyers.

8.1.2 The following table shows the performance of OHP of 2008-09.

Year	Feed (ROM)			Production			Rejection		
	Quantity (t)	Grade (Fe%)	Size (mm)	Quantity (t)	Grade (Fe%)	Size (mm)	Quantity (t)	Grade (Fe%)	Size (mm)
2008-09	137700.000	Total ROM Produced from the mines is fed to the plants. Average grade of ROM is >60% Fe	ROM <10 mm & above	2600.000	62-65% (L)	10-40	0.000		
				62653.800	60-62% (F)	- 10	0.000		
				72446.200	62-65% (F)	- 10	0.000		
Total	137700.000			137700.000	L & F	>- 10	0.000		

After primary & secondary crushing and screening below 100 mm product is transported by a belt conveyor of 3.5 km long to a processing plant located at Baliparbat. Further crushing & screening is undertaken in the processing plant to produce CLO and fines, which are stock piled in the Baliparbat stock yard for final dispatch to buyers by road and rail.

8.1.3 Flow Sheet of Dry Crushing & Screening Plant Puzzolana 325 TPH Crusher Plant; - Annexure - 23

8.1.4 Flow Sheet of Dry Crushing & Screening Plant Multi Stage 350 TPH Crushing & Screening Plant (CCS Make) - Annexure - 24

8.1.5 Flow Sheet of Dry Crushing & Screening Plant Multi Stage 350 TPH Crushing & Screening Plant (METSO Make) - Annexure - 25

8.1.6 Flow Sheet of Dry Screening Plant 200 TPH (Sandvick Make) Annexure - 26

8.1.7 Flow Sheet of OHP (800 TPH) - Annexure - 27

8.1.8 Silent features after Modification of 2.00 TA Ore Handling Plant (OHP) on BOT Basis (Dry Circuit)

1. Location Of Primary Crusher Area

(a) The ROM being transported by the dumpers from mines fed to the hopper located at primary crusher house at 688.551 RL.

(b) The same ROM process through an apron feeder then to vibrating screen (Metso make, VG645, 800tph) & subsequently primary jaw crusher (Metso make, O140, 800tph).

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- (c) BC-1 a common conveyor instilled to carry the under size material from apron feeder, vibrating grizzly and the crushed material (-275mm) which fed to the DDS ( double deck scalper screen Metso make, Model:CVB2661-2P)
- (d) A surge bin installed at the end of DD screen carries the o/s material i.e +75mm & +40mm material delivers to a cone crusher ( Metso make 400tph) through BC-2.
- (e) BC-3 carries the u/s material from DDS which fed to BS-4 than to BC1>9,1 the existing conveyor (Extended) than to BC-1<1<0 (Existing).
- (f) The crushed material from secondary cone crusher flows to BC-1, 9,2 which fed to BC-1,10 which fed to BC-1,100 the down conveyer where VVVF motor with dynamic braking system is adopted.
- (g) BC-1,100 fed to 2.1BC (RC) which can either fed to 5000T stock pile or to BC-2.6 than to BC-2,7 (The down conveyor where VVVF motor with dynamic braking system is adopted).
- (h) The material at intermediate stock pile will be feed to BC-2,3 through a movable hopper by pay loader which can fed to BC-2,7 when necessary.

## 2. LDBC

A long distance belt conveyor having 3.8 km length & having 10 transfer stations carries the ROM after crushing at both the crushers & being transferred from 2.7 BC fed to 3.1BC, than to 3.2 BC & to 3.3 BC which is an inclined belt (where VVVF motor with dynamic braking system is adopted), as a series of whole 3.4 BC,3.5 BC 3.6 BC,3.7 BC are inter connected delivering ROM to each to other ,3.8 BC receives ore from 3.7 BC & delivers to 3.8 BC is an inclined belt partially where VVVF motor with dynamic braking system is adopted & same system is repeated at 3.9 BC and 3.10BC & finally delivers to BC-A(RC) situated at 15000 stock pile.

## 3. 15000 Intermediate Stock Pile

BC-A (RC) receiving ore from LDBC can either fed to BC-B or BC-C, BC-D which fed to 15000 stock pile or to BC-E than to BC-F through a fixed hopper. The ore collected from stock pile may fed to BC-F & G by pay loader through a movable hopper which fed to BC-4.3(existing) than to BC-4.8 (existing).

## 4. Processing Plant

- (a) The ROM from 4.8 BC fed to 4.9BC (RC) which can either fed to feeding bin A,C or B having cap 200T.
- (b) ROM flows through 3 nos apron feeder from the bins said a above which led to BC-5.1.1 (A,B & C) then to 3D screen Metso make , CVB 2060-3P (A&B line) and C (Existing ), the oversize material fed to 5.7.0.1 BC through 5.5.1 BC, the product material (-40+10 & -20+10) flows to 5.702BC through 5.52 BC & delivers to 6.2 BC then to 6.2 BC & the undersize ( Fines product) material to 6.62BC the common conv. Through a new conveyor, surge hopper made for and simultaneously it goes to fine stock through 6.8.1 BC and 6.7BC.
- (c) The oversize material flows to 50tph (2 nos ) sayaji make jaw crusher which fed to BC-1, then to BC-2 to DDS, the oversize material fed to another 50tph jaw crusher through BC-3, product



to 6.2 BC from BC-4 and the undersize material to BC17.2 through BC-5 to surge bin then to 5.6.2 BC (fines) which fed to 6.8.18BC then to 6.7 BC (fines) to fines stock yard.  
(d) BC-6.2 fed to 6.4BC (CLO) then to 6.4.3BC the reversible conveyor either to stock yard or to loading bins 400.T cap each (5 nos) through 6.0.3 BC and 6.4.0 the retractable conv.(existing) for direct transport by truck from each bin.  
This is to be noted that the entire system is functional by PLC-3 nos (Programmable Logistic Control) installed at Pri-crusher house, LDBC (TS-6) & in washing plant.

## 8.2 Proposed New Standalone Projects

A new stand alone project of 1000 TPH production capacity is proposed to be installed with mechanized wagon loading facility. It is envisaged to mine 1000 tph iron ore from Daitari Hill Top deposit and the ROM shall be maximum 1000 mm size. These products shall be crushed to an optimum size at the proposed crusher in the hilltop at a approximate lead distance of 3 km (to & fro) from the mines and will be transported to Odisha State Commercial Transport Corporation (OSCTC) area at the foothills through a suitable downhill conveyor system of approximately 4.5 km long. The above crushed ore shall be subjected to further crushing and sizing, as required, in the plant to be installed at OSCTC area and screened to produce (-) 40 mm and (+) 10 mm calibrated ore (-) 10 mm fines. These products will be stacked in the adjacent area in 2 different stock piles. The capacity of the lump ore stock pile will be 0.2 million tonnes and fines ore stock pile of around 0.3 million tonnes. The finished products will be reclaimed and subsequently transported to railway siding area at a distance of 5 km through another conveyor for mechanized loading into wagons at a new captive railway siding.

### 8.2.1 Flow Sheet of Standalone Plant - Annexure - 28

#### 8.3 Performance of the dry crushing & Screening Plant during last 5 years (Refer para 8.1.1)

Year	Total quantity Feed (t)	Recovery Qty in (t) 62-65% Fe (L)	Recovery Qty in (t) 62-65% Fe (F)	Recovery Qty in (t) 60-62% Fe (F)
2008-09 to 2012-13 (till 31.12.2012)	6413630.043	3374442.747	1989450.900	1049736.346
Recovery (%)	100.00%	52.76%	30.58%	16.66%

8.3.1 Considering the above performance the tentative recovery for the proposed scheme period of 3 years from the dry crushing & Screening Plant shall be as follows.

Year	Total Production (t)	Total quantity Feed (t)	Recovery Qty in (t) 62-65% Fe (L)	Recovery Qty in (t) 62-65% Fe (F)	Recovery Qty in (t) 60-62% Fe (F)
1	2	3 (2 x 50%)	4 (3 x 52.76%)	5 (3 x 30.58%)	6 (3 x 16.66%)
2013-14	2874675	1437338	758339	439538	239460
2014-15	2982354	1491177	786745	456002	248430
2015-16	5722601	2861301	1509622	874986	476693
Total	11579630	5789815	3054706	1770525	954583
Recovery (%)		100.00%	52.76%	30.58%	16.66%