ORISSA METALIKS PRIVATE LIMITED

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Date: 18th August, 2018

To,
The Director & Member Secretary (Industry-1)
Ministry of Environment, Forest & Climate Change,
Govt. of India,
Indira Paryavaran Bhawan,
Ali Ganj, Jor Bagh Road,
New Delhi – 110 003

Subject: Reply to A.D.S. for getting Environmental Clearance of Proposed 1.2 MTPA Integrated Steel Plant along with 225 MW Captive Power Plant at Mouza Nandarchak, Bargai & Khanjarichak, Village Gokulpur, P.O. Shyamraipur, P.S. Kharagpur (L), Dist. Paschim Medinipur in West Bengal by M/s Orissa Metaliks Pvt. Ltd.

Ref : F. No. J-11011/169/2017-IA. II (I)

Sir,

This has reference to the 34th meetings of Reconstituted Expert Appraisal Committee (Industry-1) of Ministry of Environment, Forest and Climate Change (MoEF&CC), Govt. of India dated 6th August 2018 respectively pertaining to the additional queries, raised during the said meeting for further consideration of our proposal for the appraisal to grant Environmental Clearance.

We are giving under our reply against the respective points as raised by the Honorable committee members.

Point 1: Details of Source of water, wastewater treatment process, revised water balance and water management.
Reply: Enclosed as **Annexure-I**.

Point 2: Type of iron ore and source, process of beneficiation, details of slime management.
Reply: Enclosed as **Annexure-II**.

Point 3: Management of Tar sludge generated from producer gas plant.
Reply: Enclosed as **Annexure-III**.

Point 4: Revised corporate environment policy.
Reply: Enclosed as **Annexure-IV**.

Point 5: Modification of wet quenching process to dry quenching
Reply: Enclosed as **Annexure-V**.

Point 6: Waste heat recovery from stove gases
Reply: Enclosed as **Annexure-VI**.

Point 7: Details of sinter cooler waste heat recovery
Reply: Enclosed as **Annexure-VII**.

Point 8: Disposal of sludge generated from the cold rolling mills, pickling and galvanizing process
Reply: Enclosed as **Annexure-VIII**.

Point 9: Detailed plan for completion of green belt in two years
Reply: Enclosed as **Annexure-IX**.

Point 10: Revised CER plan along with budgetary requirement and time schedule for completion of CER activities
Reply: Enclosed as **Annexure-X**.

Point 11: Chrome slag management, including option for use as green concrete
Reply: Enclosed as **Annexure-XI**.

Point 12: Details of rainwater harvesting
Reply: Enclosed as **Annexure-XII**.

Point 13: Scheme for skill development as per the programmes of Skill Development Council of India to improve the employability in the proposed project
Reply: Enclosed as **Annexure-XIII**.

Here we would like to inform that No rehabilitation and resettlement is involved for the subject project. The proposed upcoming plant and allied activities will provide direct & indirect job opportunities. The proposed long term activity will open up market and opportunities growth for self-employed and cultivators. To this extent, the impact will be beneficial. Also Gram Panchayat –Barkola has given NOC to OMPL on April 2017 to establish this project. As the private rayat are giving land after mutual negotiation and proposed project has significant benefit, the management of OMPL has proposed to give one time welfare fund in total Rs.93, 22,500 to the land looser in addition to the land cost.

We hope this will serve your purpose.

We hereby request you to take the necessary action so that an early Environmental Clearance could be issued for our proposed project.

Thanking you,

Yours faithfully,
For M/s **Omega Metaliks Private Limited**

ORISSA METALIKS PRIVATE LIMITED

Authorised Signatory

Enclosure:
- Minutes of Meeting of 34th EAC Meeting dated 6th August, 2018

Ministry of Environment, Forest and Climate Change
Impact Assessment Division
(Industry-I Sector)

SUMMARY RECORD OF THE THIRTY FOURTH (34TH) MEETING OF EXPERT APPRAISAL COMMITTEE HELD DURING 6TH TO 7TH AUGUST 2018 FOR ENVIRONMENTAL APPRAISAL OF INDUSTRY-I SECTOR PROJECTS CONSTITUTED UNDER EIA NOTIFICATION, 2006.

The thirty third meeting of the Expert Appraisal Committee (EAC) for Industry-I Sector as per the provisions of the EIA Notification, 2006 for Environmental Appraisal of Industry-I Sector Projects was held during **6th to 7th August 2018** in the Ministry of Environment, Forest and Climate Change. The list of participants is annexed.

34.1 After welcoming the Committee Members, discussion on each of the agenda items was taken up ad-seriatim.

34.2 Confirmation of the Minutes of the 33rd Expert Appraisal Committee (Industry-1) held during 9th – 11th July, 2018.

33.5 Integrated Cement Plant [Clinker 1.98 MTPA; Cement: 5.0 MTPA CPP: 20 MW; WHRB: 8 MW] and Lime Stone Mine [4.8 MTPA, 267.695 Ha and 281.339 Ha] at Malpuri Khurd Village, Dist. Durg, Chhattisgarh by **M/s JK Laxmi Cement Limited** - Amendment in Environmental Clearance for change in configuration of Clinker production of 1.5 Million TPA to 1.98 Million TPA through Up-gradation and Optimization in Phase-I under the provisions of 7(ii) of EIA Notification.

At Sl. No. 3 of table given under para 4 may be read as

For	Read as
Mine 2.4 Million TPA	Mine 4.8 Million TPA

6th August 2018

34.3. Integrated Steel Plant (1.2 MTPA) with 225 MW CPP Mouza – Nandarchak (J.L. No. 124), Bargai (J.L No. 197) & Kanjarichak (J.L. No-125) at Village – Gokulpur, P.O – Shyamraipur, P.S – Kharagpur(L), Dist. Paschim Mednipur, West Bengal by M/s Orissa Metaliks Private Limited Online proposal No. IA/WB/IND/64050/2017; MoEFCC File No. J-11011/169/2017-IA.II(I)] – Environmental Clearance.

M/s Orissa Metaliks Private Limited made online application vide proposal no. **IA/WB/IND/64050/2017** dated 19th July 2018 along with copies of EIA/EMP report seeking environmental clearance under the provisions of the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at Sl. No. 3(a) Metallurgical industries (ferrous & non-ferrous) under Category "A" EIA Notification, 2006 and the proposal is appraised at Central level.

Details submitted by the Project Proponent

2.0 The proposed **Integrated Steel Plant (1.2 MTPA) with 225 MW Captive Power Plant** of **M/s Orissa Metaliks Private Limited**, is located at Mouza- Nandarchalk (J.L. No.-124), Bargai (J.L. NO-197) & Kanjarichak (J.L. No-125), Village Gokulpur, Post Office Shyamraipur, District Paschim Mednipur, West Bengal was initially received in the Ministry on 19th April 2017 for obtaining Terms of Reference (ToR) as per EIA Notification, 2006. The project was appraised by the Expert Appraisal Committee (Industry) [EAC(I)] during its 18th meeting held on 3rd-5th May, 2017 and prescribed ToRs to the project for undertaking detailed EIA study for obtaining environmental clearance. Accordingly, the Ministry of Environment, Forest and Climate Change had prescribed ToRs to the project on 22nd May 2017& 19th April 2018 vide Ref. File No J-11011/169/2017-IA.II (I).

3.0 The project of M/s Orissa Metaliks Private Limited located in Gokulpur Village , P.O. Shyamraipur, P.S. Kharagpur (L), West Medinipur District, West Bengal State is for setting up of a new Integrated Steel Plant of 1.2 million tons per annum (million TPA) with 225 MW CPP using standard and proven down grade technology for production of Hot Metal/Pig Iron, Sinter, Sponge Iron, Billets, Ferro Alloys, Fe-Cr Briquette, Coke, Lime & Dolomite, Oxygen, H.R. Coils, Plates (Checkered or Flat)/ TMT Bar, Wire Rod & Wire/ Structural long product like-Angel, Channel & Beam , Galvanized Sheet/ Plate / Coils, Flat Sheet/ Checkered Sheet, Strip & Nail, DI Pipe, Power, Iron ore Pellet, Iron Ore Concentrate, Producer Gas. The proposed capacity for different products for new site area as below:

Sl. No.	**Name of the Unit**	**Capacity**	**Production**	**Product**
1.	Blast Furnace	2 x 550 m^3	1.0 Million T.P.A	Hot Metal / Pig Iron
2.	Sinter	1 x 175 m^2	1.0 Million T.P.A	Sinter
3.	DRI	2 x 500 TPD + 2 x 350 TPD	0.5 Million T.P.A	Sponge Iron
4.	Steel Making Facilities - Induction Furnace - Electric Arc Furnace with matching LRF and oxygen optimized furnace	- 10 x 20 T IF - 2 x 50 T EAF	1.0 Million T.P.A	Billets
5.	Ferro Alloy Plant	10 x 9 MVA	0.12 Million T.P.A	Ferro Alloys
6.	Fe-Cr Briquette Manufacturing plant	1 x 40 TPH	40 ton/hr	Fe-Cr Briquette
7.	Non-recovery type Coke Oven Plant	2 x 0.25 MTPA	0.5 Million T.P.A	Coke
8.	Lime Dolomite Plant	1 x 200 TPD	200 TPD	Lime & Dolomite
9.	Oxygen Plant	1 x 200 TPD	200 TPD	Oxygen
10.	Hot Rolling Mill	0.6 Million T.P.A	0.6 Million T.P.A	H.R. Coils, Plates (Checkered or Flat)/ TMT Bar, Wire Rod & Wire/ Structural

				long product like- Angel, Channel & Beam
11.	Cold Rolling Plant with Pickling Line & Continuous Galvanizing	0.35 Million T.P.A	0.35 Million T.P.A	Galvanized Sheet/ Plate / Coils, Flat Sheet/ Checkered Sheet, Strip & Nail
12.	Ductile Iron Pipe Unit	0.2 Million T.P.A	0.2 Million T.P.A	DI Pipe
13.	Captive Power Plant	225 MW [WHRB Based 90 MW (54 MW from DRI Plant+ 34 MW from Coke Oven Plant + 2 MW from EAF + CFBC (Coal & Dolochar Mix based) 3 x 45 MW]	225 MW [WHRB Based 90 MW (54 MW from DRI Plant+ 34 MW from Coke Oven Plant + 2 MW from EAF + CFBC (Coal & Dolochar Mix based) 3 x 45 MW]	Power
14.	Pellet Plant	2 x 1.2 MTPA	2.4 MTPA	Iron ore Pellet
15.	I/O Beneficiation Plant	2 x 1.2 MTPA	2.4 MTPA	Iron Ore Concentrate
16.	Producer Gas Plant	20 x 7,500 $N.m^3/hr$	1,50,000 Nm^3/hr	Producer Gas

4.0 The total land required for the project is 125.45 ha which is grazing land. No forestland involved. Out of the 125.45 ha of land, 96.32 ha of land is in possession by M/s Orissa Metaliks Private Limited and for rest of the land consent has been obtained from private rayat. The river Kangsabati passes at a distance of 4.5 km from the project site. Modification/diversion in the existing natural drainage pattern at any stage has not been proposed.

5.0 The topography of the area is flat and reported to lie between Latitude 22°21'39.58"N to 22°22'13.00"N & Longitude 87°17'54.24"E to 87°18'28.60"E in Survey of India toposheet No. 73 N/7 at an elevation of 33.5m AMSL. The depth of water as measured in the open wells is between 11 and 12 feet below the land surface. The water occurring in deeper zones is under pressure and is reported usually to rise by 25 to 30 feet below the land surface. The total thickness of the aquifer in the study area varies from 3.1 m to 17.1 m.

6.0 No National park/Wild life sanctuary/Biosphere reserve/tiger reserve/Elephant reserve is reported to be located in the core and buffer zone of the project. The area also does not report to form corridor for Schedule – I fauna. The authenticated list of flora and fauna provided through theChapter-3.0, Section-3.12 reporting presence of flora and fauna in the study area.

7.0 The process of project showing the basic raw material used and the various processes involved to produce the final output, waste generated in process is presented below:

Sr. No.	Raw Materials	Source of Raw Materials	Mode of Transportation	Distance from Project Site (Km)	Estimated Quantity (in TPA)
1	Iron Ore Lump	Barbil-Joda, Orissa	Rail/ Road	201	1,55,000
2	Iron Ore Fines	Barbil-Joda, Orissa	Rail/ Road	201	37,00,000
3	Non-cooking Coal	E-Auction or Imported	Rail/ Road	--	17,21,125
4	Cooking Coal	Purchased from BCCL, Dhanbad Alternate source: Imported	Rail/ Road	177	6,70,000
5	Dolomite	From Birmitrapur, Orissa / Bilaspur, CG	Rail/ Road	264/541	1,08,375
6	Limestone	From Birmitrapur, Orissa / Bilaspur, Raipur CG / Katni MP	Rail/ Road	264/541	2,42,023
7	Manganese Ore	Captive mines in Balaghat, Orissa, M.P	Rail/ Road	719	3,12,000
8	Chromium Ore	Jajpur, Orissa	Rail/ Road	202	2,64,000
8	Quartzite	From Belpahar Orissa / / Bilaspur, Raipur CG	Rail/ Road		4,38,125
9	Inoculants	Local Market	Road	<150	192
10	Magnesium	Local Market	Road	<150	340
11	Runner Coat	Local Market	Road	<150	1022
12	Slag Coagulant	Local Market	Road	<150	277
13	Zinc	Local Market	Road	<150	378
14	Bitumen Solution	WRAS* Approved Vendor	Rail/ Road	<150	841 KL/Year
15	Epoxy Paint	WRAS* Approved Vendor	Rail/ Road	<150	200 KL/year

8.0 Solid Waste Management for 1.2 MTPA I.S.P with 225 MW CPP is as follows:

Sl. No.	**Type**	**Quantity in Tons/Year**	**Utilization**
1.	Slag from MBF	6,73,000	To be used for Cement Making.
2.	DoloChar from DRI Plant	1,75,000	To be used in proposed CFBC Boilers.
3.	Slag from SMS (IF & EAF)	1,09,083	To be used for Road construction / Land filling purpose, Paver Block Making after

			recovering metal from Slag Crushing unit
4.	Slag from Ferro Alloys Plant	1,50,000	➢ Slag generated during Ferro Manganese production will be used as a raw material for Silico Manganese production. ➢ Slag generated during Silico Manganese production will be used for road construction / land filling. ➢ After maximum recovery of Chrome, Ferro chrome slag after undergoing TCPL Test will be used in green concreting.
5.	Core Sand And Slag from DIP	5429	To be used for Road construction / Land filling purpose
6.	Cement Slurry	572	To be used for Brick making and also in Captive Cement Plant
7.	Bottom Ash	5,44,916	To be used for Road construction / Land filling purpose
8.	Dust from APC Devices	2,86,220	Used in Sinter Plant and also for Brick Manufacturing Zinc Dust will be sold to PCB certified Paint manufacturer.
9.	Tar Sludge from Producer gas plant	14,400	Sold to WBPCB authorized vendor
10.	Miss Roll/ End Cuts	50,000	To be used in Proposed S.M.S Plant.
11.	Fly Ash	3,01,860	To be used for Cement Making.

9.0 The targeted production capacity of the Integrated Steel Plant is 1.2 million TPA. The ore for the plant would be procured from Rungta Mines (linkages). The ore transportation will be done through rail/road.

10.0 The daily make up water requirement for the entire project as mentioned in the EC is 26,592 KLD. The raw water will be sourced mainly from the supply system of Kharagpur Municipality & Kansabati River and partially from Bore Wells. Already project proponent has obtained recommendation / Single window clearance by West Bengal Industrial Development Corporation for use of 27912 KLD water. Apart from that permission/consent for use of 12,650 KLD water from Kharagpur Municipality (12,000 KLD) & SWID (650 KLD) is obtained by Project Proponent

11.0 The power requirement of the project is estimated as 334.8 MW, out of which 225 MW will be obtained from proposed Captive Power Plant and the remaining109.8 MW power will be obtained from WBSEDCL.

12.0 Baseline Environmental Studies were conducted during summer season i.e., from Oct, 2017 to Dec, 2017. Ambient air quality monitoring has been carried out at 8 locations and the data submitted indicated: PM_{10} (70.7µg/m^3 to 82.0µg/m^3), $PM_{2.5}$ (29.1µg/m^3 to 37.2µg/m^3), SO_2

(8.6µg/$m^3$to 18.1µg/m^3) and NOx (20.3µg/$m^3$to 29.3µg/m^3). The results of the modeling study indicate that the maximum increase of GLC for the proposed project is 12.52 µg/m^3(SW direction), 4.88 µg/m^3 (SW direction)and 3.37 µg/m^3(SW direction), with respect to the PM, SO_2 and NOx.

13.0 Ground water quality has been monitored in 8 locations in the study area and analysed. pH: 7.1 to7.5, Total Hardness: 180 to 212 mg/l, Chlorides: 75 to 99mg/l, Sulphate: 8to 16mg/l, Nitrate: 2.2 to 4.2 mg/l. Heavy metals are within the limits. Surface water samples were analysed from 10 locations – 2 **Kangsabati** river water samples and 8 pond water samples. For **Kangsabati** River water, pH: 7.3 to 7.4; DO: 6.8 to 6.9 mg/l and BOD: 4 to 6 mg/l. For 8 pond water samples, pH: 6.7 to 7.4; DO: 5.7 to 6.3 mg/l and BOD: 4 to 8 mg/l.

14.0 Noise levels are in the range of 55.7 – 68.2 dBA for daytime and 49.0 – 57.7 dBA for nighttime.

15.0 It has been reported that there are 6,38,918 people in the study area. R&R Action Plan is presented in Annexure-7-III in the EIA Report. It has been envisaged that 95 families to be rehabilitated, which will be provided compensation and preference in the employment.

16.0 It has been reported that a total of 23,10,480 TPA of waste will be generated due to the project, out of which 975432 TPA will be used in cement making, 175000 TPA Dolochar will be used in proposed CFBC Boilers, 809428 TPA slag from SMS, Ferro, DIP will be used in road construction/land filling purpose/ brick making, 286220 TPA dust from APC device will be used in Sinter Plant, 50,000 TPA end cuts miss rod from rolling mill to proposed SMS and Tar Sludge and Zn dust will be sold to WBPCB authorized vendors.

17.0 The Public hearing of the project was held on 27th July 2018 at Mahasakti Mahasangha, Salkui, P.O. Malkalpur near B.D.O. office), Kharagpur-1, Distt. Paschim Mednipur, West Bengal under the chairmanship of Mr. S.K Meena, I.A.S, Additional District Magistrate (G) & DLLRO, Paschim Medinipur for the proposed 1.2 MTPA Integrated Steel Plant along with 225 MW Captive Power Plant. The Statement of main issues raised by the public and response of the project proponent with action plan is as follows:

Sl. No.	Name	Issues raised during PH	Response by project proponent (after PH)	Time Bound Action Plan proposed WHERE IT TIME BOUND PROGRAM IN some COLUMNS	Budgetary provision
1	Sri Deepak Bagli, Village Shyamraipur	• Pollution from the proposed project has to be controlled.	M/s Orissa Metaliks Private Limited stated that after detailed engineering APC devices of adequate capacity are proposed in order to minimise the pollution.	Adequate capacity APC devices and **OCEMS** (Online Continuous Emission Monitoring System) will be installed at relevant point in parallel with implementation of the plant.	Pollution Control Cost Details • Capital Cost:Rs.105.2Crores; • Recurring Cost:Rs. 11.35 Crores/ Annum.
2	Sri SomanathShar	• Provide jobs for the locals.	OMPL in past has given priority to the	In the proposed project top most priority will	-

	am, Village Khidipur		local people for employment generation based on their academic qualification for their existing plants.	be given to the local people based on their academic qualification. (tentatively upto 2025)	
		• Health check-up facilities.	Free medical Camps, health check-up for surrounding villages are organised on regular basis. And same will be continued in upcoming years.	Funds have been earmarked under Corporate Environment Responsibilities to be utilized over a period of 7 years tentatively by 2025.	Rs 2300 Lakhs of the project cost is earmarked under CER head. Out of this Rs. 193 Lakhs is earmarked for health facility which will be utilized over a period of 7 years.
				Primary health check-up facility	Rs 44 Lacs
				Construction of charitable Dispensary	Rs 84 Lacs
				Ambulance to nearby panchayats	Rs 30 Lacs
				Providing equipment to the local hospitals	Rs 35 Lacs
		• Development of the local areas.	OMPL in past has developed and provided necessary help to the nearby school, NGO & village through CSR program and in future they will also con the same work.	Financial support to Local School for extension of building classroom, development of library facility	Rs 50 Lacs
				Solar/LED Street Lighting provision in some areas	Rs 72 Lacs
				Local Village pond up gradation	Rs 45 Lacs
				Drinking water infrastructure (Tube Well, ATM Water Machine)	Rs 162 Lacs
				Development of community hall	Rs 75 Lacs
				Sanitation Facility-Construction of Toilet, Dustbin	Rs 362 Lacs
				Promotion of sports	Rs 24 Lacs
				Skill development & Scholarship to unprivileged student	Rs 304 Lacs
				Infrastructure Facilities	Rs 155 Lacs
				Transportation facilities	Rs 32 Lacs
				Irrigation Infrastructure	Rs 45 Lacs

				Construction of road	Rs 648 Lacs
				Development of Park, Tree Plantation	Rs 133 Lacs
3	Sri Dijen Senapati, Village Baharapat	• Develop local roads	OMPL stated that road nearby existing plant is being repaired periodically in construction with Road Construction Department, Govt. of West Bengal and in future more focus will be given to develop the local roads under CER Activities.	OMPL will coordinate with Road Construction department officials for repairing of roads in the nearby area. 7 Years (tentatively 2025)	Company has allocated Rs 6.48 Cores under Corporate Environment Responsibilities (CER).
		• Control of pollution to be generated from the project.	M/s Orissa Metaliks Private Limited stated that after detailed engineering APC devices of adequate capacity are proposed in order to minimise the pollution.	Adequate capacity APC devices and OCEMS (Online Continuous Emission Monitoring System) will be installed at relevant points in parallel with implementation of the plant.	<u>Pollution Control Cost Details</u> • Capital Cost:Rs.105.2Crores; Recurring Cost:Rs. 11.35 Crores/ Annum.
4	Sri AchintyaGhosh, Village Barkola	• Provide jobs opportunities for the local people and land looser.	OMPL has given priority to the local people for employment generation based on their academic qualification for their existing plants. And same will be done for the proposed project	In the proposed project top most priority will be given to the local people based on their academic qualifications. (tentatively upto 2025)	-
		• Look into the safety aspects.	OMPL stated their concern about safety about the workers in the plant premises and outside the plant premises. OMPL has already taken some steps to prevent the accidents near plant premises.	• Deploying private security staff near plant gate to control traffic. • Providing guard rails to control harsh traffic on roads near plant area.	-
5	Sri Narayan Patro, Kharagpur	• Look into the pollution matter to be generated form the proposed project.	OMPL has confirmed that they will take all major necessary actions to control the pollution from the proposed project	Adequate capacity APC devices and OCEMS (Online Continuous Emission Monitoring System) will be installed at relevant point in parallel with implementation of the	<u>Pollution Control Cost Details</u> • Capital Cost:Rs.105.2Crores; Recurring Cost:Rs. 11.35 Crores/ Annum.

				plant. Proper green Belt will be developed in the plant premises with time bound manner. (tentatively upto 2025)	
6	Sri Bhavesh Senapati, Village Baharapat	• Provide jobs for the locals.	OMPL has given priority to the local people for employment generation based on their academic qualification for their existing plants. And same will be done for the proposed project	In the proposed project top most priority will be given to the local people based on their academic qualification. (tentatively upto 2025)	-
		• Develop drinking water facilities, health check-up facilities, education for under privilege children.	Since inception of the company in Kharagpur, OMPL has committed for development and upliftment of socio economic status of entire jangalmahal area. OMPL in past has developed and provided necessary help to the nearby school, NGO & village through CSR program and in future also will continue the same work.	Financial support under CER for next seven years will be given: ▪ Local School for extension of building class room ▪ Drinking water infrastructure (Tube Well) ▪ Village pond upgradation ▪ Primary health & sanitation facilities, Construction of charitable dispensary, providing ambulance facility to near-by panchayats and providing equipment to the local hospitals. ▪ Promotion of Sports	Company has earmarked Rs 23.00 Crores under Enterprises Social commitment for a period of seven years.
		• Development of roads.	OMPL stated that road nearby existing plant is being repaired periodically in construction with Road Construction Department, Govt. of West Bengal and in future more focus will be given to develop the local roads under CER Activities.	OMPL will coordinate with Road Construction department officials for repairing of roads in the nearby area. 7 Years (tentatively 2025)	Company has allocated Rs 6.48 Crores for road developemnt under Corporate Environment Responsibilities.

7	Sri Satadal Banerjee, Malancho Kharagpur	• Request to more efforts need to be done regarding CSR.	Since inception of the company in Kharagpur, OMPL has committed for development and upliftment of socio economic status of entire jangalmahal area. OMPL has been doing the CSR activities from long back and assure will continue it in future.	Funds have been earmarked under Corporate Environment Responsibilities to be utilized over a period of 7 years tentatively by 2025.	Company has earmarked Rs 23.00 Crores under Corporate Environment Responsibilities.
		• Pollution aspects should also be looked into.	OMPL has confirmed that they will take all major necessary actions to control the pollution from the proposed project	Adequate capacity APC devices and OCEMS (Online Continuous Emission Monitoring System) will be installed at relevant point in parallel with implementation of the plant.	Adequate funds will be deployed in CAPEX (Rs. 105.2 crores) and OPEX (11.35 Crores) for environmental protection measures and will not be diverted to other purposes**.**
8	Sri Uttam Ghosh, Village Barkola	• Provide job opportunities to land losers.	Management of OMPL stated that sincere efforts would be made to address the issue.	Job will be provided to the land losers on the basis of their academic qualifications. (upto 2025 tentatively)	-
9	Sri TrilochanDutta , Village Bargai	• Provide job opportunities to the unemployed and land losers.	OMPL has given priority to the local people for employment generation based on their academic qualification for their existing plants. And same will be done for the proposed project	Job will be provided to the land losers on the basis of their academic qualifications. (upto 2025 tentatively)	-
		• Request to look into the matter of land acquisition	The local land owners sell their land for industrialization (setting up greenfield plant and also for recreational work, greenbelt development/creation) after various discussion and proper negotiation only.	-	-

		• Look into the matter of pollution.	M/s Orissa Metaliks Private Limited stated that after detail engineering APC devices of adequate capacity are proposed in order to minimise the pollution.	Adequate capacity APC devices and OCEMS (Online Continuous Emission Monitoring System) will be installed at relevant point in parallel with implementation of the plant.	Adequate funds will be deployed in CAPEX (Rs. 105.2 crores) and OPEX (11.35 Crores) for environmental protection measures and will not be diverted to other purposes.

18.0 The company proposes to invest on the Corporate Environment Responsibility (CER) activities. For this purpose, the company proposes to 23.0 Crores. This fund shall be utilized over a period of 7 years. Company has identified certain areas, to be considered for implementing the CER activities in the context of the local scenario of the area:

Sl. No.	PROPOSED CER ACTIVITIES	INVESTMENT (IN LACS)						
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
PUBLIC HEARING RELATED ACTIVITIES								
1	Construction of 32 Toilets at16 school (@ Rs. 8.00 Lakhs per set of 2 Toilets, separately for Ladies & Gents)	48	48	32	32	32	32	32
2	Open Defecation free village by introducing community & Individual Toilets	10	10	10	10	10	10	10
3	Drinking Water Infrastructure (Tube well in nearby villages – 65 nos. @ Rs. 1.20 Lakhs); ATM Water Machine 28 nos. @ Rs 3 lakhs	24	24	24	24	24	24	18
4	Construction and repairing of metal road (27 km) in villages (@Rs. 24 Lakhs per km)	96	96	96	96	96	96	72
5	Development of Community Hall – Total 5 nos. (@ Rs. 15 Lakhs per Hall)	15	15	15	0	15	0	15
6	Local Village Pond up gradation, cleaning & maintenance - 15 ponds (@ Rs. 3 Lakhs per Pond)	9	6	6	6	6	6	6
7	Construction of charitable Dispensary (07 nos.)	12	12	12	12	12	12	12
8	Ambulance to nearby Panchayat	10	0	10	0	0	10	0
9	Providing equipment to the local hospitals	6	6	6	5	4	4	4

10	Primary health for the surrounding villages	8	8	6	6	6	5	5
11	Financial Support to the Local School for extension of building / class room/ development of library facilities	8	8	7	7	7	7	6
12	Skill development to unemployed local youth through National Skill Development Corporation, Govt. of India Scheme	27	27	26	26	24	24	20
13	Supporting schools for establishment of mini sports complex or playgrounds in providing the facilities like badminton court, tennis court and levelling of ground.	4	3	3	4	3	4	3
14	Workshop centre with latest tailoring machines for training women (like tailoring, stitching, Pickle & Sauces making, Soft Toys & Gem Jeweller, and Beautician Courses and for making affordable price of Sanitary Pads.)	7	7	7	6	6	5	5
15	Local villagers will be given employment on the basis of their eligibility. However a training camp shall be provided when new recruitment is done to enable check and select from the local pool of applicability.	8	8	8	7	7	6	6
16	Development of parks, plantation of trees in the nearby areas.	20	20	19	19	19	18	18
NEED BASED ACTIVITIES								
17	Transportation facility for school students	5	5	4	4	4	5	5
18	Street Lighting (Solar/Led) provision at suitable public places – 180 nos. (@ Rs. 0.40 Lakhs per Solar Light)	10.4	10.4	10	10	10.4	10.4	10.4
19	Creation of irrigation infrastructure in the peripheral villages(Water Harvesting Structure, Irrigation Channel)	7	7	7	6	6	6	6
20	Drainage Development - side drains & Construction of Culvert on drainage	13	12	13	14	13	13	12

21	Boundary wall & Burial grounds in three village and renovation of roads to burial ground	9	9	8	8	7	8	8
22	Financial Support to Local Temple	2	1	1	1	1	1	1
23	Scholarship award to unprivileged Students	6	6	6	6	5	4	4
24	Provide Dustbin in Village (under Swach Bharta Scheme)	6	6	6	5	5	4	4
TOTAL : 2300Lacs.								

19.0 The capital cost of the project is Rs 1700 Crores and the capital cost for environmental protection measures is proposed as Rs 105.2 Crores. The annual recurring cost towards the environmental protection measures is proposed as Rs 11.35Crores. 5500 in-direct employment & 3000 persons will get direct Employment during operational phase. The details of capital cost for environmental protection measures and annual recurring cost towards the environmental protection measures is as follows:

Item	**Capital Cost (in Crores)**	**Recurring Cost (in Crores)**
Cost of Air Pollution Control Devices/ System	58.0	5.1
Cost of Water conservation & Pollution Control	5.0	0.5
Cost of Solid Waste Management System	6.0	0.6
Green belt development	9.0	0.5
Noise Reduction Systems	8.0	1.0
Occupational Health Management	4.5	0.45
Risk Mitigation & Safety Plan	6.5	0.6
Online Monitoring Surveillance System	3.8	1.4
Setting Environmental Management Cell &	3.0	0.7
Setting Environmental Laboratory	1.5	0.5
GRAND TOTAL	**105.2**	**11.35**

20.0 Greenbelt will be developed in 41.4 Ha which is about 33% of the total acquired area. A 100-m wide greenbelt, consisting of at least 3 tiers around plant boundary will be developed as greenbelt and green cover as per CPCB/MoEF&CC, New Delhi guidelines. Local and native species will be planted with a density of 2500 trees per hectare. Total no. of 103500 saplings will be planted and nurtured in 41.40 Hectares in 7 years.

21.0 There is no court case or violation under EIA Notification to the project or related activity.

22.0 Name of Environmental Consultant: Envirotech East Pvt. Ltd., Kolkata-700 075, NABET certificate no. NABET/EIA/1011/010.

Recommendation of the committee:

23.0 After detailed deliberations, the committee sought the following additional information for further consideration of the proposal.

1. Details of Source of water, wastewater treatment process, revised water balance and water management.
2. Type of iron ore and source, process of beneficiation, details of slime management.
3. Management of Tar sludge generated from producer gas plant
4. Revised corporate environment policy
5. Modification of wet quenching process to dry quenching
6. Waste heat recovery from stove gases
7. Details of sinter cooler waste heat recovery
8. Disposal of sludge generated from the cold rolling mills, pickling and galvanizing process
9. Detailed plan for completion of green belt in two years
10. Revised CER plan alongwith budgetary requirement and time schedule for completion of CER activities
11. Chrome slag management, including option for use as green concrete
12. Details of rainwater harvesting
13. Scheme for skill development as per the programmes of Skill Development Council of India to improve the employability in the proposed project.

34.4. Proposed Greenfield Cement Plant of capacity 3.15 MTPA Clinker & 2.0 MTPA Cement and 2×25 MW Thermal Power Plant Kalvatala Village, Kolimigundla Mandal, Kurnool District, Andhra Pradesh of M/s The Ramco Cement Ltd. [Proposal No. IA/AP/IND/63579/2017, F.No. IA-J11011/135/2017-IA-II(I))] – Environmental Clearance

1.0 The proponent has made online application vide proposal no. **IA/AP/IND/63579/2017** dated 12th July 2018 along with copies of EIA/EMP report seeking environmental clearance under the provisions of the EIA Notification, 2006 for the project mentioned above. The proposed project activity is listed at Sl. No. 3(b) Cement Plants under Category "A" EIA Notification, 2006 and the proposal is appraised at Central level.

Details submitted by the Project Proponent

2.0 The Greenfield Cement Plant of M/s. The Ramco Cements Limited (Formerly Known as Madras Cements Ltd)) proposed to be located in Kalvatala Village, Kolimigundla Mandal, Kurnool District, Andhra Pradesh State was received online on 31.03.2017 vide Application no. IA/AP/IND/63579/2017. The project was appraised by the Expert Appraisal Committee (Industry) [EAC(I)] during its 18th meeting of EAC May, 2017 and prescribed Terms of Reference (ToR) to the project for undertaking detailed EIA study for obtaining environmental

List of Annexures

Annexure	Description
I	Details of Source of water, wastewater treatment process, revised water balance and water management
II	Type of iron ore and source, process of beneficiation, details of slime management
III	Management of Tar sludge generated from producer gas plant
IV	Revised corporate environment policy
V	Modification of wet quenching process to dry quenching
VI	Waste heat recovery from stove gases
VII	Details of sinter cooler waste heat recovery
VIII	Disposal of sludge generated from the cold rolling mills, pickling and galvanizing process
IX	Detailed plan for completion of green belt in two years
X	Revised CER plan along with budgetary requirement and time schedule for completion of CER activities
XI	Chrome slag management, including option for use as green concrete
XII	Details of rainwater harvesting
XIII	Scheme for skill development as per the programmes of Skill Development Council of India to improve the employability in the proposed project

A.D.S. POINT NO. I- Details of Source of water, Waste water Management, Revised Water Balance and Water Management.

- **Raw water requirement, Source, Water Balance**

As per an initial estimate, water to the tune of 22,248 KLD (927 Cu.m/hr.) will be required for the proposed project. The raw water will be sourced mainly from the supply system of Kharagpur Municipality & Kansabati River and partially from Bore Wells. The detail of sources of water is given in **Table 1.**

Table 1
Source of Water

Sl. no.	Permission Granted by	Permission Obtained for drawl of water		Total Daily Make up Water requirement for the proposed project
		Cu.m/hr	KLD	
1	Kharagpur Municipality (Refer Letter Memo No. 2623 PW dated 14-08-2018)	900	21,600	**22,248 KLD (927 Cu.m/hr.)**
2	State Water Investigation Directorate (SWID), West Bengal from Kansai River Bed	27.08	650	
TOTAL		**927.1**	**22,250**	

Water system for the steel complex shall comprise the following:

- ❖ Make up water
- ❖ Re circulating water
- ❖ Emergency water system
- ❖ Drinking water system
- ❖ Fire water system
- ❖ Dust suppression system

The break-up of water required for the proposed plant is given in **Table-2.**

Table 2
Water Use Statement

Sr. No.	Name of Unit	Daily Make up Water Demand	
		Cu.m/hour	KLD
1	Blast Furnace	160	3840
2	Sinter plant	08	192
3	Steel Melting Shop	35	840
4	Rolling Mill	69	1656
5	Cold Rolling Mill	20	480
6	Oxygen plant	02	48
7	Lime dolomite plant	02	48
8	Ductile Iron Pipe	19	456

9	Ferroalloy plant	10	240
10	I/O Beneficiation Plant	15	360
11	Captive Power Plant	560	13440
12	Utilities & MiscellaneousUses	07	168
13	Domestic Water	20	480
Total		**927**	**22,250**

Indicative Water Balance Diagram for the proposed project is presented in**Figure-1.**

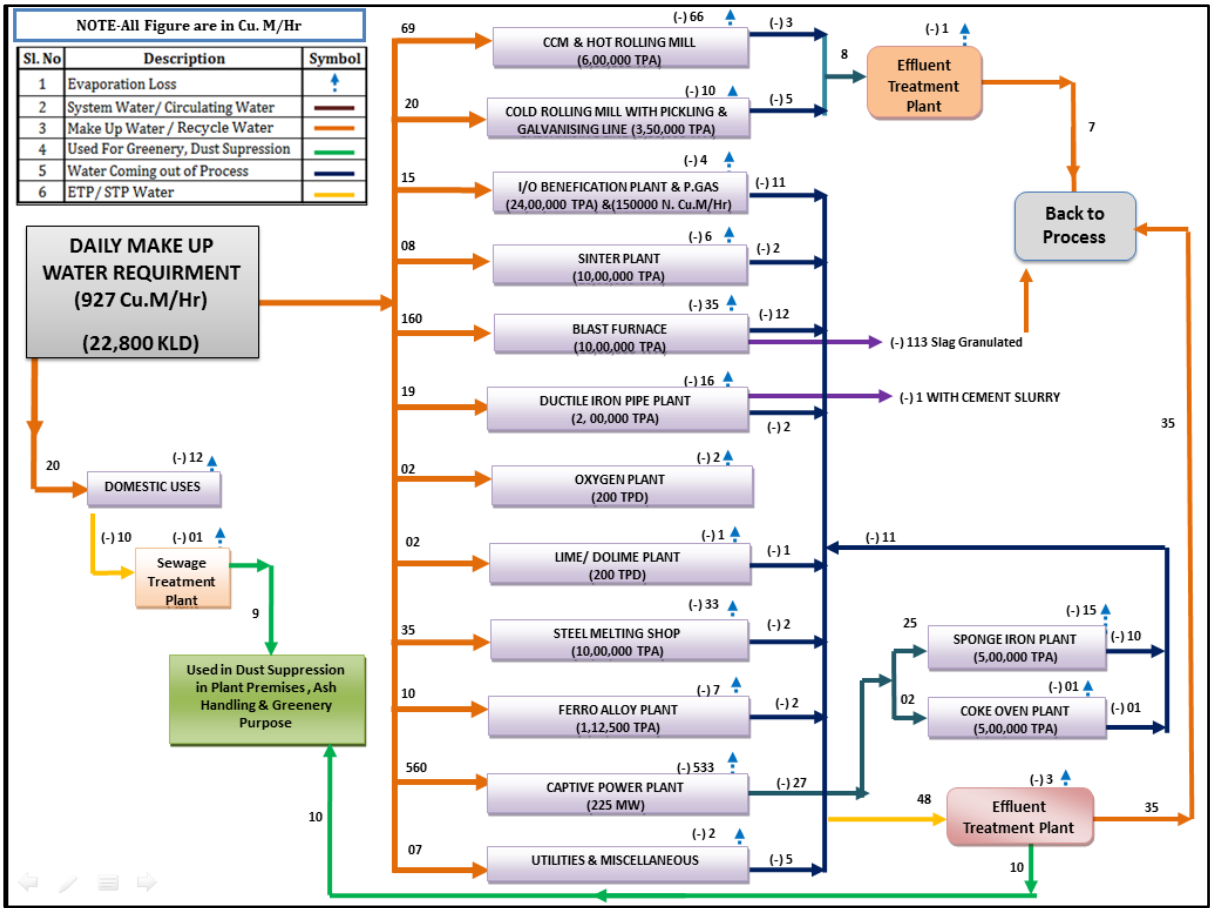


FIGURE-1: INDICATIVE WATER BALANCE DIAGRAM

- **Waste Water Treatment Process**

A. Domestic Wastewater Generation & Treatment
B. Industrial Wastewater Generation & Treatment

A. Domestic Wastewater Generation & Treatment

Plant will be in operation for 24 hours in 3 shifts. Total manpower involved at a time in proposed project is around 3000 numbers. Domestic wastewater to be generated from canteen, Toilet, Rest room & canteen at the tune of around 230 KLD.

Two numbers of Sewage treatment plant (STP) (2x115 KL capacity) based on SBR technology is proposed to be set-up in the proposed project. A well-designed sewer network will collect wastewater from

different sections of the plant area. The sewer network will convey the wastewater into the proposed STP. Treated sewage from the STP will be used in greening purpose within the plant area.

STP Details

The proposed STP will be designed for treatment of raw sewage during operation phase to maintain the desired quality of treated wastewater. The expected characteristics of raw sewage are as follows:

Sl.no	Parameters	Domestic Effluent
		Untreated
1	Flow Rate, m^3/day	115
2	pH	6.5-8.5
3	Suspended Solids	200 – 250 mg/l
4	BOD	250- 400 mg/l
5	COD	350- 430 mg/l
6	Oil & Grease	25 mg/l

The expected characteristics of the treated sewage on adopting the scheme of treatment are as follows:

Sl.no	Parameters	Domestic Effluent
		Treated
1	Flow Rate, m^3/day	110
2	pH	6.5-7.4
3	Suspended Solids	<20 mg/l
4	BOD	<10 mg/l
5	COD	<100 mg/l
6	Oil & Grease	<10 mg/l

Wastewater will be collected through a well-designed sewer network leading to the proposed STP. The STP (capacity 2 x 115 KL) will be based on SBR Technology (Sequential Batch Reactor) followed by tertiary treatment. Treated wastewater will be used within the project site for greenery purpose.

SBR technology is a fill and draw activated sludge treatment technology.

The process is identical to the conventional activated sludge process. SBR is a compact and time oriented system. The process is carried out sequentially in the same tank.

SBR is an upgraded conversion of conventional activated sludge process and is capable of removing nutrients from waste water besides very stable sludge characteristics because of cyclic process.

SBR system performs operations based on time frame rather than space since conventional activated sludge process requires more space. Housed in a single unit the reactor can accomplish biological treatment and secondary clarifications with a time controlled sequence thus achieving reasonably good outlet parameters after secondary pretreatment and thus eliminating need of multiple tanks or expensive membrane for treatment. This process achieves high quality of treated water with low nutrients levels ready for recycling.

The chain will comprise of Fill, Aerate, Settle and Decant stages.

The core of plant is reactor with sewage feed and treated water outlet. This reactor can be pre-engineered for different hydraulic and organic load capacities, modular design and can be constructed in RCC/ pre-fab steel/ plastic and FRP tanks.

SBR is a unique feature of very stable sludge characteristic and enhanced biological nutrient removal. The technology has advantages working on low cost of maintenance, operation and initial cost still most suitable and effective on the performances and meets all relevant standards and norms.

Data & Assumption:-

Influent sewage water characteristic

Design Flow = 115 KLD
Influent BOD = 400mg/L (Considering on higher side)
Total Suspended Solids = 250 mg/L

Target effluent water characteristic

Design Flow = 110 KLD
BOD <10mg/L
Total Suspended Solids <20mg/L

Assumption:
F/M Ratio = 0.18/day
MLSS = 4000mg/L
VSS/TSS = 0.8
Maximum Volume of BOD Loading = 3.2 Kg/m^3.d
Minimum Aeration Time = 2 Hr
Minimum Mean Cell Residence Time (MCRT) = 3 days

Design:

1. **Bar Screen Chamber:**

Max Flow = 115 KLD
Detention Time = 6.0 min
Bar Screen Chamber Volume = **0.25 m^3**

Let Side water depth (SWD) be 1.0 m
BSC Size = 2.0 m x 1.25m x 1.0
Screen is made out of MS Flat of Size 10mm x 50mm (10mm facing the flow)
Clear spacing between bars = 20mm
Inclination of bars with horizontal = 60° (For Manual Cleaning)

2. Equalization Tank:

Design average flow = 115 KLD
Detention Time = 12 Hr
Volume of Equalization tank = 140.0 m^3
Equalization tank dimension = **4.5m x 4.5m x 3.0m**

- **Mixing Facility Calculation**

Designed with mixing flow = 0.02 m^3/m^3/min (according to governmnet building design code)
Air Flow required for mixing = 0.02 m^3/m^3/min x 140 m^3 = 2.8 m^3/min

3. Bio Reactor:

No. of. Tanks = 1 No.
No. of. Sequential Batch = 1 No
Cycle duration = 16 Hr each
Average flow to the reactor, Q = 115 KLD
Total BOD entering STP, Y_0 = 400mg/L
BOD of the Effluent, Y_E = 10mg/L
BOD removal to be achieved = 390mg/L
MLSS, X = 4000mg/L
Influent VSS, X_t= 4000 x 0.8 = 3200mg/L
F/M ratio = 0.18/day
F = Q x Y_0
M V X
Bio reactor volume, V= **105.0 m^3**
Each Bio reactor dimension = **5.5m x 5.5m x 3.5m**

BOD Loading = $\frac{Q \times Y_0}{V}$ = 1.09 Kg/m^3.d

Hydraulic Retention Time = $\frac{V}{Q}$ = $\frac{105\ m^3}{115\ m^3}$ x 16 Hrs = 14.60 Hrs

Mean Cell Residence Time, θc (Sludge Age)

Influent VSS, X_t= 0.8 x 400mg/L = 320mg/L

$\Theta c = \frac{VX}{QX_t} = \frac{105 \times 4000}{115 \times 320}$ = 11.4 days (OK since >3 days)

4. Decant Tank:

Unlike Other treatment processes, in SBR the Clarified water tank is designed to hold decanted supernatant from each batch, i.e., 105.0 m^3/batch.

Thus Clarified Water Tank dimension = **5.5m x 5.5m x 3.5m**

5. Sludge Holding Tank:

Reactor Volume = 12 m^3
MLSS = 4000 mg/L
Weight of solid = 12m^3 x 4 kg/L = 48 Kg
Sludge retention time for 9 days, SRT 9 = $\frac{48 \text{ Kg}}{9}$ = 5.33 Kg Sludge/day
Wasting during Aeration phase = 25
Sludge holding tank dimension = **2.0m x 2.0m x 3.5m**

6. Tertiary treatment units

The wastewater after biological treatment still contains some solids, colour, odour and harmful micro-organisms. The pressure sand filter and activated carbon filter are used to remove the solids and colour. The disinfection process is used to remove the micro-organisms and odour.

- **Pressure sand filter**
  Pressure sand filter with various grades of pebbles and sand media help in the removal of residual suspended solids. The filter will be operating in the pressure range of 3-3.5 kg/cm^2.

  Residual suspended solids. The filter will be operating in the pressure range of 3-3.5 kg/cm^2.

  Assuming a loading rate of 6.0 m^3/ hr

  Design flow = 115 m^3/day and considering 20 hr/day of operations of PSF

  The recommended PSF dimension is 1.2 m diameter and height 3 m. Suitable designed backwashing system is adopted.

- **Activated Carbon Filter**
  Considering the same parameters for designing the activated carbon filter, the recommended dimensions for ACF is 1.2 m Diameter and height 3.0 m

7. Pre Aeration Tank:

Detention time = 4.0 Hrs
Volume of Final collection tank = **25.0 m^3**
Final Collection tank dimension = **3.0m x 3.0m x 3.5m**

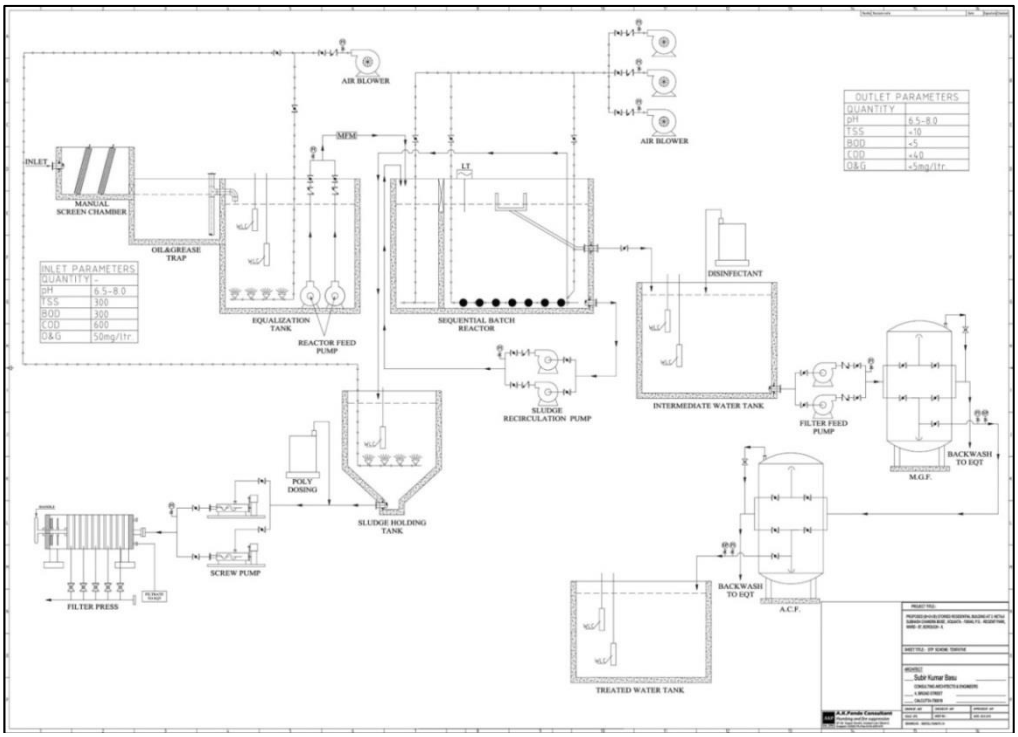
8. Final Collection Tank:

Detention time = 11.5 Hrs
Volume of Final collection tank = **70.0 m³**
Final Collection tank dimension = **4.5m x 5.0m x 3.5m**

9. Disinfection

In order to disinfect the treated effluent various disinfection methods like chlorination, ozonation etc can be used. However chlorination is proved to be cheaper and relatively effective. Hence the same system is adopted. The Chlorine can be administered in the form of liquid or solid (bleaching powder) into the treated effluent channel. An automatic electronic metering system can be adopted. The chlorine demand is calculated based on the 'break pointchlorination' and to allow residual chlorine of more than 1 mg/l in the treated effluent.

The treatment scheme of proposed STP is presented in **Figure below.**



SUDGE DISPOSAL: The sludge generated from STP 15 TPA which will be used as compost for green belt development**.**

B. INDUSTRIAL WASTEWATER GENERATION & TREATMENT

The plant will be designed as a zero discharge plant. The entire wastewater after necessary treatment will be used in Sponge Iron Unit and for dust suppression, gardening etc. inside the plant.

There will be two types of Industrial effluent:

- Type-I effluent i.e CT blow downs / other units for which physico-chemical treatment comprising of oil separation, settling, clarification, pH adjustment etc. would be employed.

- Type-II effluent from Rolling Mill & Pickling & galvanizing line would have to be treated in a separate bay where acidic and alkaline waste streams would be neutralized with separation of floating and emulsified oil.

  Spent acids from pickling line would be regenerated in an Acid Regeneration Plant (ARP) for in-plant recycling.

  - **Design Basis Plant Capacity: 48 m^3/hr (1152 KLD) for Type-I industrial effluent**

The expected characteristics of influent industrial waste water are as follows:

Inlet Parameter:

Sl.no	Parameters	Industrial Effluent
		Untreated
1	Flow Rate, m^3/hr	48
2	Temperature, ^oC	40-45
3	pH	6.5-8.5
4	Total Suspended Solids	1250 mg/l
5	Oil & Grease	25 mg/l

Outlet Parameter:

Sl.no	Parameters	Industrial Effluent
		Treated
1	Flow Rate, m^3/hr	45.6
2	Temperature, ^oC	38
3	pH	6.8-7.4
4	Total Suspended Solids	<100 mg/l
5	Oil & Grease	<10 mg/l

PROCESS DESCRIPTION:

The treatment system involves collection of Type –I industrial effluent followed by Primary Treatment (Fine Screening, Grit removal, Oil Removal, and Equalization) followed by Physico Chemical Treatment followed by tertiary treatment using Chlorination in Chlorine Contact Tank and sludge handling system. With the implementation of the proposed units, the system will meet the standards of treated effluent characteristics.

COMPONENTS OF THE TREATMENT SCHEME

A.	**Primary Treatment**	• Collection Sump with Coarse Screen Chamber • Inlet Chamber • Grit Removal Unit

		• Oil & Grease Removal Unit • Equalization Tank
B.	**Physico-Chemical Treatment**	• Flash Mixer • Clariflocculator • Sludge Sump-1
C.	**Tertiary Treatment**	• Filter Media Separation • Chlorination
D.	**Sludge Handling System**	• Filter Press • Sludge Drying Beds and Dry Sludge Storage

A. Primary Treatment

i. Collection Sump equipped with Coarse Screen Chamber - The industrial effluent originating from the different process units of the Industrial Area is received in a collection sump through the trunk drain line of 0.5m x 0.5 m in which the inlet coarse screen channel will be installed where the voluminous substances are arrested. The retained debris in the bar screen are removed manually by means of manual screen from where it shall be disposed of to a suitable site. Two no of collection sump of size of **9.0 m x 5.5 m x 5.0 m** shall be provided for Collection Sump.

Bar Screen Chamber:
Max Flow = 48m^3/hr
Detention Time = 6.0 min
Bar Screen Chamber Volume = **0.25 m^3**
Let Side water depth (SWD) be 1.0 m
BSC Size **= 2.0 m x 1.25m x 1.0m**
Screen is made out of MS Flat of Size 10mm x 50mm (10mm facing the flow)
Clear spacing between bars = 20mm
Inclination of bars with horizontal = 60° (For Manual Cleaning)

ii. Inlet Chamber- The effluent from Collection Sump shall be pumped to Inlet Chamber. The purpose of Inlet Chamber is to arrest the turbulence created by pumping of effluent so that laminar flow moves through Screens and further units. A size of **3.6 m x 3.6 m x 4.5 m**SWD shall be provided for Inlet Chamber.

iii. Grit Removal-The screened effluent shall flow by gravity to Grit Removal Unit in which particles of size greater than 0.15 shall settle down to the floor of Unit. 2 nos. units are provided, 1 running and 1 standby. The settled solids are removed periodically

through a sluice valve provided in down pipe installed in each unit. The size of each unit provided is **3.5 m x 2.5 m x 1.5 m** SWD.

iv. **Oil Removal Unit-** The effluent after Grit Removal Unit shall flow by gravity for removal of the oil present in effluent. The oil is scraped continuously by means of scrapperOil being lighter than water floats on the surface of unit, from where it is scooped through a rotating arm. The unit is additionally provided with sludge scrapper to scrap sludge from the bottom of tank. The settled solids will be withdrawn periodically into Chemical sludge sump-1 from where it is pumped to the Chemical sludge handling Unit. The size of oil Removal unit is Dia**. 3.5 m x 2.5 m** SWD +0.3 FB

v. **Equalization Tank-** After oil removal, the effluent shall be received in the equalization tank under gravity, where the effluent is sufficiently detained to attain uniformity in its physicochemical characteristics. The equalization tank is provided with air agitation which will not allow the solids to settle in the tank. From this unit, the effluent shall be pumped to downstream units for further treatment.

Equalization Tank Design Calculation:

Design average flow Q =48m^3/hr
Detention Time = 12 Hr
Design with k=1.0, T=12 Hrs.
V≧ [(Q/T)-(K×Q/24]) ×T
V≧ [(1152/12)-(1.0×1152/24)]×12
V ≧576m^3
Plant calculation:
a. Tank dimensions: : (**L13.0×W9.0×H5.0) m^3**
Effective tank volume: 585 m^3=585 m^3
b. Actual Detention Time
DT= (585÷1152) ×24=12(hr)
c. Mixing facility calculation
Designed with mixing flow =0.02m^3/m^3/min
Air flow required for mixing =0.02×585 =11.7 m^3/min

B. <u>Physico- Chemical Treatment</u>

I. **Flash Mixer-** The effluent after flow measurement shall flow under gravity through flash mixer where it is thoroughly mixed with calculated quantity of alum. Flash Mixing is carried out by means of turbine agitators provided in the Flash Mixer. The main objective of flash mixing is to achieve the uniform mixing of chemical with the effluent. During coagulation process, alum, Ferrous Sulphate or any other coagulants reacts with the effluent and results in positive

charged ions. These positive ions neutralize the electrical charges of colloidal particles in the effluent and precipitate out as hydroxide. Once the charge is neutralized, the unstable small suspended particles stick together to form microfilms. This process is called coagulation.

Detention Time in flash mixture, range	45.0	Sec
Volume required for every flash mixture	0.63	cum
Provide Diameter of Flash mixture	3.25	m
Required depth of Flash mixture	0.08	m
Provide depth of Flash mixture	3.50	m

The size of Flash Mixing tank provided is **3.25 x 0.08 x 3.50** SWD.

Consider an average of dose of alum at	10	ppm
Strength solution	10	%
Solution required for 8 hrs	40.17	litres
Solution required for 8 hrs	0.04	cum
Provide 3 tanks each of	**3.25×2.8×2.2**	**m*m*m**
Alum required for 90 days	1085	Kg
Taking alum density	1300	kg/m3
Volume of alum	0.83	cum
Taking stake height as ,	2	m
Area required for alum storage	0.42	sqm
Taking provision for movement and putting weighing scale etc., Provide additional storage area for Alum	20%	%
Additional area for movement, weight scale	0.08	sqm
Total Area required	0.50	sqm
Total Area required	10.00	sqm

II. Clariflocculator- The chemically treated effluent from the flash mixer enters the flocculation Zone of Clariflocculator. Slow speed flocculating paddles are provided which impart slow agitation to the water, to enhance the process of flocculation. The formed flocs from the flocculation zone then enter the clarifier zone of Clariflocculator. The clear water in the clarification zone flows upwards at a very slow rate and adequate detention period is provided for better gravitational settling of flocs at the bottom. The settled sludge is collected in a central sludge pit, by scrapper arms suspended from the rotating bridge. Clariflocculator is having a better efficiency as compared to

Flow in every Clariflocculator	50.2	cum/hour
Detention time in flocculation zone,	30.0	Minutes
Volume reqd. in flocculation zone	25.1	cum
Provide Water Depth in flocculation zone,	3.75	m

Required Diameter of flocculation tank	2.92	m
Provide Diameter of flocculation tank	3.00	m
Volume provided	26.49	cum
Assume surface loading	35	m/day
Surface area required	34.4	sqm
Area of Flocculation	7.065	sqm
Total Area of Clarifloculator including flocculation	41.5	sqm
Diameter of Clariflocculator	7.27	m
Provide Dia.	8.00	m
Detention time	2.0	hours
Volume required in Clarifying zone	100.4	cum
Water depth in clarifying zone	3	m
Volume provided in Clarifying zone,	103.30	cum
Provide outlet launder of , width	0.80	m
Provide outlet launder of , depth	0.80	m
Flow in Launder, for 50% flow length	25.11	m3/hr
Velocity of flow in launder for design flow	0.01	m/sec
Weir Loading taken	300.00	m3/d/m
Launder Perimeter required	4	m
Provide weir to have inlet from both sides, thus launder perimeter required is	2	m
Actual launder length provided	26.376	m

III. Chemical Sludge Sump- The sludge settled in the oil removal unit is withdrawn under gravity into the Chemical Sludge Sump. The sludge collected in the central sludge pit of Clariflocculator is also withdrawn periodically under gravity into Chemical Sludge Sump from where it is pumped to the Chemical Sludge handling Filter Press by means of Pumps.

C. Tertiary Treatment:

I. Filter Media Separation-The treated effluent from clarifier then passes through the filter. The detail of filter is:

Nos	2	Nos
Total output	50	cum/hour
Rate of Filtration	6	m/hour
Input to each of 10 filters	25.11	cum/hour
Area required for each filter	4.18	sqm
Provide twin bed filters section	3.60m×10.7m*2 No	
Area of each twin filter	77.04	Sqm
Inlet: sluice gate width	350	mm
Inlet: sluice gate depth	350	mm
Velocity	0.06	m/sec
Outlet: Provide Sluice Valve dia.	350	mm
Velocity in outlet sluice valve	0.07	m/sec
Wash Water rate	500	lpm/m2

Wash water rate reqd.	38.52	cum/minute
Wash water rate reqd.	0.642	cum/sec
Provide SV dia. for wash water	800	mm φ
Velocity	1.28	m/sec
Wash out; Provide gate / width	0.75	m
Wash out; Provide gate / depth	0.75	m
Velocity	1.1413	m/sec
Air – inlet required rate	750	lpm/m2
Air flow rate	57.78	cum/minute
Air flow rate	0.963	cum/sec
Sluice valve for Air inlet, Dia. for each filter bed	250	mm
Velocity	19.63	m/sec
Wash water Pump	2311.2	m^3/hr
Capacity required		
Provide 3 Submersible pump sets (2W+1S), working pumps=	2	Numbers
Capacity of each pump	1155.6	cum/hr
Capacity of each pump	19260	LPS

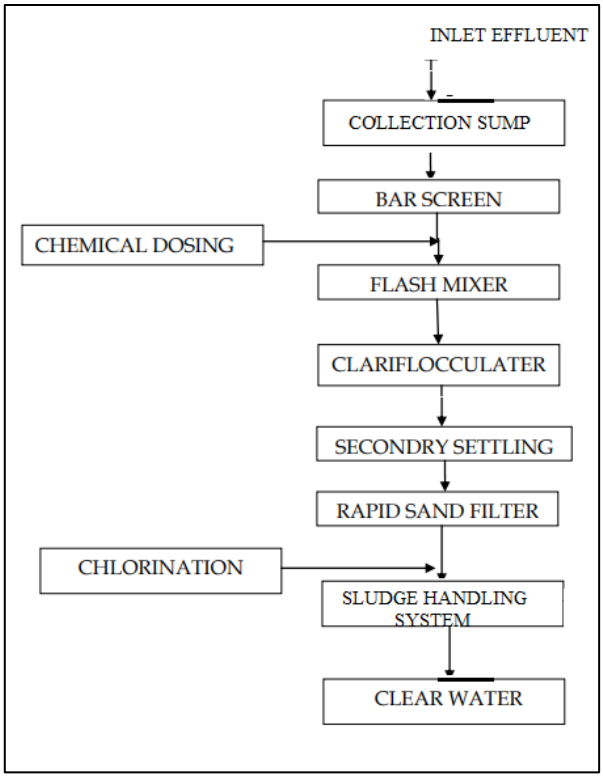
II. Chlorination Tank- The treated effluent coming out of the Dual Media filter shall be subjected to chlorination into chlorine contact tank. Chlorination is done through controlled dosing of Chlorine through vacuum chlorinators. Chlorine acts as disinfectant to the treated effluent. The treated effluent after chlorination will be stored in the existing storage tank and can be reused for gardening or can be discharged into river / land surface water.

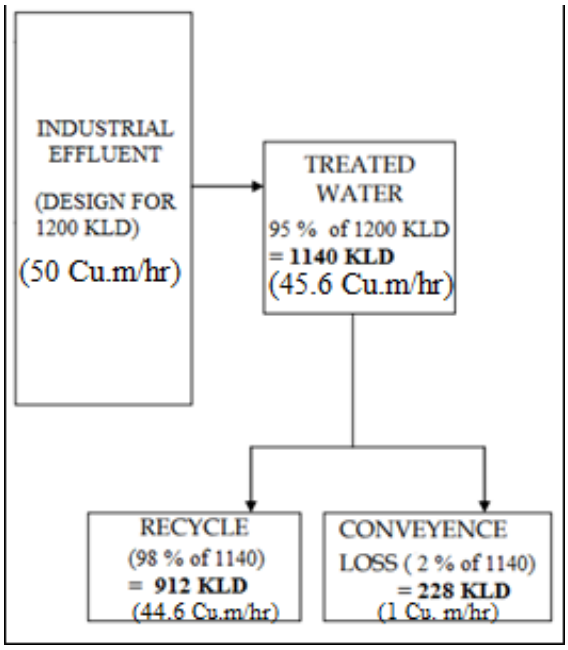
D. Sludge Handling

I. Chemical Sludge Sump cum Thickener- The sludge settled in the oil removal unit is withdrawn under gravity into the Chemical Sludge Sump. The sludge collected in the central sludge pit of Clariflocculator is also withdrawn periodically under gravity into Chemical Sludge Sump from where it is pumped to the Chemical Sludge handling Filter Press by means of Pumps. From the Chemical Sludge Sump Cum Thickener sludge of 5% consistency shall be pumped for further dewatering in Filter press. The filtrate from the thickener shall be recycled back to the collection tank.

II. Filter Press-Sludge of 5% consistency from Chemical Sludge Sump shall be pumped to the flocculation tank of Filter press. Polymer is dosed into the flocculation tank for enhancing the dewatering properties of sludge. From the flocculation tank sludge is conveyed to the thickener part and finally to the dewatering section. Ultimately the sludge coming out of the filter press will have solid content of 20¬25%. The dewatered sludge cake from Filter Press shall be collected in a trolley and shall be stored in Dry Sludge Store for a period of maximum 1 month. Later, the dry sludge shall be given to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

The schematic diagram of proposed ETP for TYPE-I Industrial effluent is presented in **Figure below.**





Schematic Diagram of TYPE-I Industrial Water Treatment

- **Design Basis Plant Capacity: 8 m^3/hr for Type-II Industrial Effluent**

Pickling, Galvanizing, cooling and lubrication process during rolling will give rise to waste water within cold rolling mill. The proposed Cold rolling mill with pickling & galvanizing line will generate waste acid

and alkaline effluent containing dissolved iron from acid pickling line and waste emulsion which need proper treatment and disposal.

The major sources of wastewater generation from the proposed CRM with water pollution potential are as follows:

1. Generation of acidic wastewater from the existing pickling line – This comprises of waste pickled liquor & rinse water containing HCl & dissolved ferrous/ferric chloride.
2. Release of acidic wastewater from Acid Regeneration Plant during regeneration of HCl acid from waste pickledliquor.
3. Generation of oily emulsion and other oily effluent from the Reversing Mill during cold rolling of hot rolled pickledcoil.
4. GenerationofSpent post-galvanizing chemicals (and other treatment bath sludge's)

WASTE WATER GENERATION DETAIL FROM CRM WITH GALVANIZING LINE

Sr.No	Description	Quantity (m^3/hr)
A. Existing Facilities		
1	Pickling line	4.0 m^3/hr with HCL concentration up to 0.8%
	Pump seal flushing	1.5
	Excess condensate	2.4
2	Acid Recovery Plant	0.5
3	Galvanizing line	3.5
Total		8

Acidic/ Alkaline effluents are obtained from following units.

- Pickling line – At a rate of 4 m^3/hr with 0.6-0.8% HCl and traces of Fe^{++} for about 12 hrs. aday.
- Acid Regeneration Plant (ARP)– At an average rate of 0.5m^3/hr with 0.6-0.8% HCl and traces of Fe^{++} for about 12 hrs a day.
- Spent post-galvanizing chemicals at a rate of 3.5 m^3/hr with 0.1-0.2% Flux and traces of Sodium dichromate

Oily effluents are obtained from following units.

a) Reversing Mill Roll Coolant system – A batch discharge of 35~55 m^3 once in six months containing 1-1.5% Quaker oil, iron particles anddust.

b) Reversing Mill Oil Cellar – Once in day about 1.5 m^3 containing 0.5~0.75% mineral oil, iron particles, dust and traces ofgrease.

c) Mill Washing with hot water – Once in 14 days of about 2.5 m^3 containing 0.5~0.75% mineral oil, iron particles, dust and traces ofgrease.

d) Waste from De-mister of Reversing Mill Fume Exhaust System – Twice a day eachtimeabout8m^3,containingtracesofmineraloilanddustandgrease.

1. Collection Sump equipped with Coarse Screen Chamber

The industrial effluent originating from the above two sources is received in a collection sump through the drain line in which the inlet coarse screen channel will be installed where the voluminous substances are arrested. The retained debris in the bar screen are removed manually by means of manual screen from where it shall be disposed of to a suitable site. The size of **6.0 m x 5. m x 4.0 m** shall be provided for Collection Sump.

2. EqualizationTank

The effluent from collection sump is being collected in the 96 m^3(6 m X 5.5 m X 3m) equalization tank. The pH level of effluent monitored by pH meter installed in the Equalization Tank which is aerated by 2 nos. of blowers (1W+1S).

Equalization Tank Design Calculation:

Design average flow Q =8m^3/hr
Detention Time = 12 Hr
Design with k=1.0, T=12 Hrs.
V≧ [(Q/T)-(K×Q/24]) ×T
V≧ [(192/12)-(1.0×192/24)]×12
V ≧96m^3
Plant calculation:
a. Tank dimensions: : (**L6.0×W5.50×H3.0) m^3**
Effective tank volume: 99 m^3=99 m^3
b. Actual Detention Time
DT= (585÷1152) ×24=12(hr)
c. Mixing facility calculation
Designed with mixing flow =0.02m^3/m^3/min
Air flow required for mixing =0.02×99 =1.98 m^3/min

3. Oil Removal Unit-

The effluent after equalization tank shall flow by gravity for removal of the oil present in effluent. The oil is scraped continuously by means of scrapper Oil being lighter than water floats on the surface of unit, from where it is scooped through a rotating arm. The unit is additionally provided with sludge scrapper to scrap sludge from the bottom of tank. The settled solids will be withdrawn periodically into Chemical sludge sump-1 from where it is pumped to the Chemical sludge handling Unit. The size of oil Removal unit is Dia**. 3.5 m x 2.5 m** SWD +0.3 FB.

4. DissolvedAirFloatationUnits(Flash Mixture)

OilyeffluentsfromtheEqualizationTankwill be pumpedto Flash Mixer. Emulsion breaking polymer (Polyelectrolyte solution) will be mixed in flash mixer of DAF. The oily effluents overflow from Flash Mixer to Flocculator of DAF where coagulated particles settle down in the Flocculator. The coagulated particles (i.e. sludge) from Flash Mixer and Flocculator will be drained to the sludge sump.

Oily scum separated by scrapper of DAF. Effluents in DAF circulated by DAF re- circulating pump (1W+1S) of 10 m3/hr capacity and 55 m head through air circulation vessel. Pressurized air circulated in ASV by compressor. Sludge is accumulated in the bottom of DAF and then drained to sludge sump.

5. Flocculator

The effluent from DAF enters in the Flocculator of 10 m^3/hr capacity; effluents are being treated with polyelectrolyte which is dosed by dosing pump. The suspended solids settled and coagulated.

6. Bio-Reactor

Effluent from launder of Flocculator tank is transferred to Bio-reactor of 250 m^3/day capacity. Phosphoric acid, Di-ammonium phosphate (DAP) and Urea mix in Bio-reactor tank to keep biological floc alive.

7. Chlorination Tank-

The treated effluent coming out of the Dual Media filter shall be subjected to chlorination into chlorine contact tank. Chlorination is done through controlled dosing of Chlorine through vacuum chlorinators. Chlorine acts as disinfectant to the treated effluent. The treated effluent after chlorination will be stored in the existing storage tank and can be reused for gardening or can be discharged into river / land surface water.

8. SettlingTank

Effluent from launder of Bio-reactor is transferred to Settling Tank. Effluents overflow to launder and sludge settle at the bottom. Sludge from bottom of Settling Tank transferred to Sludge Tank. Sludge from Sludge Tank pumpedto Distribution Well by 2 nos. of submersible pumps (1W+1S) of capacity 10 m3/hr and 12 m head.

9. SludgeThickener

Sludge from the Distribution Well is transferred to Sludge Thickener. Sludge gets settled in the bottom of Thickener. Clear water overflows to the launder and collected in 30 m^3 capacity sump and then pumped

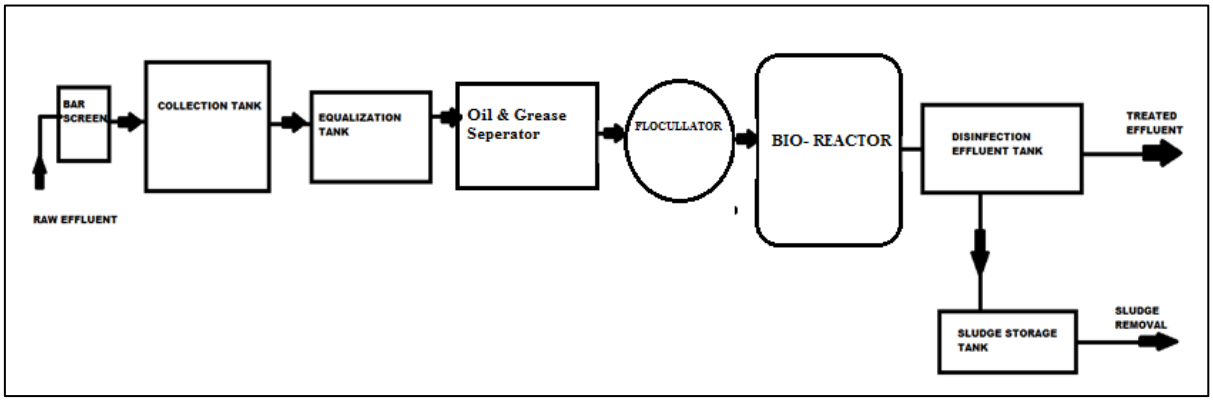
to Treated Water Storage Tank.

10. PlatePress

The solid cakes discharged from the Plate Press to the scrap bucket and disposed when the bucket becomes full. The squeezed out water recycled back to the Equalization Tank.

COMPONENTS OF THE TREATMENT SCHEME ADOPTED FOR 8 m^3/hr FOR TYPE-II INDUSTRIAL EFFLUENT

A.	**Primary Treatment**	• Collection Sump with Coarse Screen Chamber • Oil & Grease Removal Unit • Equalization Tank
B.	**Physico-Chemical Treatment**	• Flash Mixer (DissolvedAirFloatationUnits) • Flocculator • Sludge Sump-1
C.	**Tertiary Treatment**	• Bio Reactor
D.	**Sludge Handling System**	• Filter Press • Sludge Drying Beds and Dry Sludge Storage



Schematic Diagram of TYPE-II Industrial Water Treatment

SUDGE DISPOSAL:

The sludge generated from ETP from TYPE –I & TYPE-II industrial waste water will be **50 TPA** which will be given to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

The overall **Waste Water, Sludge Generation and Management practice that will be adopted is expressed in Table-3**

Waste Water, Sludge Generation and Management								
Sl. No	Type of Water	Source	Waste Water Generation (KLD)	Loss (Treatment & Evaporation) (KLD)	Reuse Quantity (KLD)		Sludge Generation (TPA)	Sludge Management Practice
					Gardening, Dust Suppression, Ash Handling	Back To Process		
1	Domestic	Canteen, Toilet, Washing	230	24	206	-	15	Will be used as compost for green belt development.
2	Industrial -TYPE-I	I/O Beneficiation, P. Gas	1152	80	240	832	50	Will be to send to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).
		Sinter Plant						
		Blast Furnace						
		DI Pipe Unit						
		SMS						
		Ferro Alloy Plant						
		CPP Blow Down use in DRI Plant & Coke oven Plant						
		Utilities						
3	Industrial -TYPE-II	Rolling Mill	192	24	-	168		
		Galvanising & Pickling Mill						
TOTAL			**1574**	**128**	**446**	**1000**	**65**	

A.D.S. POINT NO.2-Type of Iron Ore, Source, Process Detail of Iron Ore Beneficiation Plant& Tailing Management

In order to cater beneficiated iron ore to the pellet plant, it is proposed to set up iron ore beneficiation plant of capacity 24, 00,000 TPA to beneficiate iron ore fines from iron ore mine. The type of iron ore that will be procured will be mainly hematite ore. The detail is given in Table-1. Composition of Iron ore & Trace metal detail is given in Table-2.

Table-1 Type of Iron ore& Source

Sr. No.	Raw Materials	Grade	Source of Raw Materials	Mode of Transp.	Estimated Quantity for Beneficiation (in TPA)
1	Iron Ore Lump	58-62.3% Fe (Hematite Ore)	Barbil, Banspani & Jaruli, Odisha	Rail/ Road	28,23,534
2	Iron Ore Fines			Rail/ Road	

Table-2Typical Composition of Iron Ore & Trace Metal in Iron Ore

Sl.no	Test Parameter	Iron ore Sample Result obtained (% by mass)
1	Iron as Fe	58-62.3
2	Sulphur as S	Trace
3	Silica (SiO_2)	2.28
4	Alumina(Al_2O_3)	1.7
5	Phosphorous (P)	0.05
6	Moisture	6.0
7	LOI	3.2
Trace Metals		**ppm**
1	Chromium as Cr	23.4
2	Nickel as Ni	7.4
3	Arsenic as As	2.9
4	Lead as Pb	2.5
5	Zinc as Zn	9.3
6	Mercury as Hg	<0.1
7	Selenium as Se	0.1

Theseiron ore fines, after beneficiation, shall become suitable for production of pellets. Iron ore will be ground to a size of (-) 150 micron in grinding mill which shall then be beneficiated to upgrade it to (+) 65% Fe.

Plant will be comprising Iron ore unloading, stacking and storage, material handling to day Bins, Primary and secondary grinding , spiral launders, SGMs, Thickeners, Ceramic filters and Press filters and various pumps , slurry pump, Compressed air and water as utility.

Process of beneficiation to be adopted is wet process based on density separation. Brief process described for single module of 1.2 MTPA is described below:

A. Iron Ore Unloading and stacking

Iron Ore will be unloaded at storage yard at appropriated, pre-designated places, shall be size, quality and source wise. This will help in blending the Bulk raw material as per the needs of the operator time to time.

B. Handling of iron from ground Hopper to Day Bin

Iron ore fines will be handled to ground hopper in appropriate proposition. Two sets of Bins for two separate circuits will be installed, regulate the feed rate from vibrating feeder and transfer the iron ore fines from ground Hopper to these bins.

C. Pre grinding Handling with wet screening

Two sets of Disc feeders will be installed at underneath of each Bins, Disc feeder will be installed in order to establish free flow of materials from bins , bin opening will be 1400 Mm and hence clogging of the bins is avoided.

Two disc feeders in parallel, feeds material to the Conveyor belt, Belt weigher will be installed at this place in order to record the Material fed to this circuit. The feed rate of 65 – 135 TPH will be fed to the belt conveyor.Disc feeders will be provided with Inverter drive for speed control in turn to regulate the iron feed to the circuit.

First material will be fed to wet screen, screen is equipped with High pressure water jet cleaning , this will facilitate washing of iron ore and helps in removing the contamination and +3 mm fraction is separate which is further fed to Classifying cyclone , +3 MM fraction is handled to dewatering screen / dry screen where the fractions are separated. Less Than 3 Mm fraction of iron Ore in slurry from is fed to classifying spiral separator, form lower deck of the screen.

D. Spiral Classifier

The spiral classifier will be designed to provide the most effective pool area and overflow velocity requirements. By combining the proper submergence of the spiral with one of the tank designs a choice of 63 combinations is possible in Straight, Modified or Full fl are options. The proper combination of pool depth, area and spiral construction is important to secure a controlled turbulence in the slurry flow for accurate size separation.

The Particle more than 60 microns will be handled to primary ball and less than -60 Microns flows by gravity to pump Box - (Feed to primary spiral launder). The classifier is in close loop with the primary Mill.

E. Lauder & Spiral

Less than 60 microns fraction of iron ore will be pumped to the primary lauder measuring Box, The Two sets of spiral launder to handle coarse fraction of iron ore, Measuring Box will be provided with adjustable mechanical screw so that material flow to both the sets of spiral launder equally and enters a feed distributor that evenly distributes the feed to each spiral concentrator.

The design and shape of the spiral make it work, when combined with gravitational acceleration. As the slurry travels the spiraling path down the spiral, mineral grains settle and start sorting according to size, density and to a lesser extend shape. Low density particles are carried with the bulk of the water towards the outside of the spiral (perimeter), while particles with the greatest density migrate towards the inside of the spiral,

Concentrate and Tailing is collected at collection Box at underneath of the launder and transported by gravity to Pump Box – Cylindrical screen and tailing thickeners respectively.

Tailings collected in the pump box will be pumped to the distribution/ measuring Box of cylindrical screen, CF slurry pump will be equipped with variable speed drive enable to control the feed to the system, cylindrical screen.

It is cylindrical wired wet screen; where the oversize material is separated and water is removed from slurry to certain extent so that, density of flow flowing to magnetic separator is remains constant.

F. Discharge of the cylindrical screen flows gravitationally to the distribution box.

Distribution Box is spitted box in two parts by the screed /mesh so that over size material / foreign body is prevented flowing to rough the SGMS. After passing through screen material equally distributed into two splits and flows gravitationally to the SGMS feed box. Inclination of all such pipe where the media is flowing by Gravity

High gradient magnetic separator (HGMS) will be used at different magnetic field intensities to recover the fine Iron values from the hydro cyclone over flow or spiral tailings. Both the separators will have provision for different magnetic groves of width and matrix with variable currents to provide different magnetic intensities. A desired concentration of solids will pass through the magnetic separator.

Magnetic products will be cleaned in second stage to enhance the quality of the product from first stage separation.

Tailing collected at the bottom of the collection chute will get handled to tailing Thickener by gravity through closed launder which is inclining to the ground to facilitate the easy flow.

Similarly Concentrate will be collected and handled to Concentrate Thickener through incline launder.

G. THICKENER– solid to water separation sedimentation process

Concentrate collected at launder at underneath of the secondary magnetic separator shall be transported to the Thickener feed well by gravity, required inclination to the lauder will be provided so that transport velocity is maintain at all the turning points.

The high velocity feed will be split to two compartments with opposite tangential inlets that are positioned in two levels, an upper and a lower one. Between those compartments there is a narrow gap through which the flocculent solution is introduced and the high shear quickly distributes the polymer to a uniform mixture. Simultaneously, the shearing planes dampen the flow velocity to a point where the floc may grow without being interrupted by irregular flow patterns.

Result of the solid start setting at the lower part of the thickener, settlement rate of the thickener is considered to be 2.00 millimeters per hours. Slurry at maximum viscosity is pumped out at same rate as equal to settlement rate and hence the four x 100 Mm in diameter opening will be provided at the lower part / collection port of the Thickener. Three additional ports will also be provided of 250 Mm size so that in any emergency, operator can use this.

Control philosophy - The typical control of a High rate Thickener is as follows:

- Rake torque level monitoring
- Automatic rake lifting and lowering
- Drive temperature and oil level measurement
- Mud bed level indication
- Feed density & flow monitoring
- Underflow density & flow monitoring
- Overflow turbidity measurement
- Bed pressure measurement
- Feed well settling rate monitoring
- Flocculent dosing rate control.
- Visual and audible alarming

Under flow of thickeners after obtaining the desired density, sediments are pumped to the distribution for further dewatering using ceramic filter / pressure filter.

H. CERAMIC FILTER

Ceramic filter - one of most effective dewatering device for the iron ore application, machine is consisting of:

The Ceramic Vacuum Disc Filter consists of Ceramic Filter Plates, Rotator, Slurry Tank, Scrapers, Distributor, Agitating Device, Back-

Washing (including Ultrasonic & Acid cleaning); Frame, Vacuum System, Pipe System, Filtrate Discharge System, Discharge Chute, Valve And PLC Automatic Control System (can be built into remote control system). The system can be customized by adding cake washing system if required.

VCF has short downtime and improves productivity and operation rate. Because no needs of any filter cloth, the VCF can maintain high degree of vacuum and low moisture of filter cake. It is also featured by energy efficient. Compared with traditional disc filters with $45m^2$, the VCF with the same filter area saves over 85% of power energy.

In the meantime, because of the tiny size of micro pore, fine particles are block so as to increase metal recovery rate and help improve quality and transparency of filtrate (normally 21mg/l of solid content). Filtrate can be recycled. In general, VCF is a kind of environmentally friendly, highly efficient, and energy-saving solid-liquid separation equipment.

I. FILTER PRESS - FOR CONCENTRATE

Filter presses generally work in a "batch" manner. The plates are clamped together and then a pump starts feeding the slurry into the filter press to complete a filtering cycle and produce a batch of solid filtered material, called the filter cake. The stack of plates is opened, solid is removed, and the stack of plates is re-clamped and the filtering cycle is repeated.

A filter press uses increased pump pressure to maximize the rate of filtration and produce a final filter cake with water content under 65%. This is more efficient than regular filtration because of the increased filtration pressure applied by the pump that can reach anywhere between 50-200 PSI.

A filter press consists of a series of filter chambers formed between square, rectangular or round filter plates supported on a metal frame. Once the filter chambers are clamped, the filter press is loaded with slurry. The plates on the filter press are clamped together with hydraulic rams that generate pressures typically in the region of 3000 pounds per square inch.

In addition to the filter plate filtration medium, the growing filter cake enhances removal of fine particles in the slurry. The solution coming through the filter press water bibs, called the filtrate, will be pure.

The filtrate can be drained away for safe disposal, or it can be kept in a water tank for recycled use. At the end of filtration, the solid filter cake can be removed. The whole filtration process is often controlled by electronics to make it automatic or semi-automatic.

J. FILTER PRESS FOR IRON ORE TAILING

Two sets of Pressure filter of capacity 35 TPH will be installed for individual 1.2 MTPA I/O Beneficiation modules. Underflow from Tailing Thickener will be pumped to the Agitator. Agitator is a device which keeps the density of the slurry constant and works as intermediate storage, which in turn helps in feeding slurry to filter at constant rate / required higher rate so that feeding cycle time reduces. This will help in get higher throughput from the machine. Tailing in form of filter cake is handled to the stock pipe by the help of Belt conveyor. The belt conveyor will be 800 Mm in width having belt speed of 2.00 meters / sec.

Concentrate collected from the Ceramic filters as well press filters will be transported to Intermediate storage - concentrate shed which will be covered with stacking, blending and reclaiming facility. Various belt conveyor and Belt diverter will be used for this transportation.

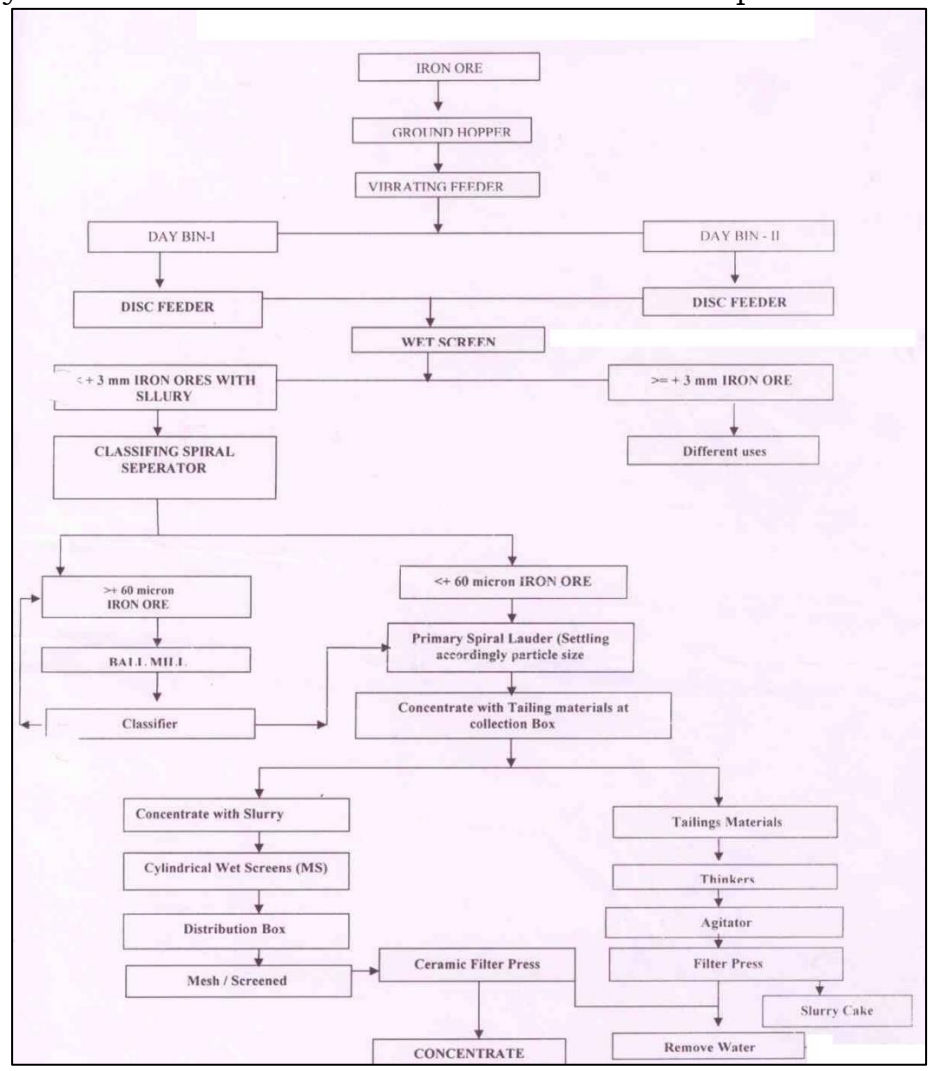


Figure-1: Schematic Process Flow of I/O Beneficiation Plant

Table 3: Material Balance of I/O Beneficiation Plant

SN	Input	Quantity in TPA	Output	Quantity in TPA
1	Iron ore fines	28,23,534	Iron ore	24,00,000

			Tailings	4,23,534
	Total	**28,23,534**		**28,23,534**

It is important to note that the tailing generation is around 4, 23,534 tons per year, which has left-over Fe contents of 10-20%. This solid waste is in the cake form, with 100-200 mesh particles containing 20-25% moisture after filter press. After natural drying, it loses moisture & becomes powder. This tailing can be used as raw material in cement plant, for brick manufacturing &as aggregate in concrete.The main chemical composition of iron ore tailing is shown in Table-4.

Table-4-Chemical composition of the IOT /wt%							
Materials	Loss	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	SO_3
Iron Ore Tailing	6-8	25-38	9-17	35-42	9-11	5-8	0.2-0.5

The proposed disposal method for tailings is as under

1. **For Brick making plants - 42% (1,78,000 TPA)**

Since these tailings are already 100-200 mesh powder containing substantial amounts of Al_2O_3& SiO_2, they are suitable for making bricks.

2. **In Sinter Plant – 49% (2,08,000 TPA)**

Chemical and mineralogical analysis of Iron Ore Tailing (IOT) has proven that it can be used as araw material mix in sinter plant.

3. **As aggregate in Concrete- 8 % (34,000 TPA)**

Chemical and mineralogical analysis of Iron Ore Tailing (IOT) has proven that it can be efficiently used in place of fine aggregate to gain good strength in concrete.

4. **For low Land Filling/ Abandoned Pits – (3,534 TPA)**

The iron ore tailing will be used for low land filling/ abandoned pitsit was originally from natural earth crust. Shallow pits where material is not available for back filling can be reclaimed provided slopes are suitably graded. The filled area then can be covered with soil mixed with organic manure and fertilizer. Planting hardy plants species like Eucalyptus, Acacia with the sole aim to green the area and create a biomass.

It is estimated that 49% of the tailings (2,08,00 TPA) will be used as raw material mix in sinter plant,42 %of the tailings (1,78,00 TPA) sold to the brick manufacturers, 8% of the tailings (34,000 TPA) as aggregate in concrete& the remaining less than 1% will be used for back-filling of the low land area/ abandoned pits.

Before using the IOT as raw material it need be dried/ partially dried (10-12 % moisture content) for that initially 6-8 months the iron ore tailing will be kept at tailing yard. Estimate of tailings yard is made calculating 1 year storagewhich can occupy an area 25000 sq. meters with 2.2 density. The heap shall be done by creating suitable slopes. The heap will be 500 meter long X 45 meter wide X 5 m height

The tailing yard occupies 25,000 sq. meters or 6.1 acres. An area of 6.1 acres have been provided for the storage of tailings, taking into consideration the need for having enough space for roads, water spraying system etc. The excess water from the tailing yard will be transferred to slurry pond 26,400 m^3 (110 m X 60 m X 4m) by garland drain 0.5 m x 0.5 m. The entire water from the slurry pond will be recycled.

During transportation of Iron ore tailing the loading of IOT will be within the Tailing Yard with the use of excavator and loaded to dumpers for transportation. Waste Water from ETP will be used for dust suppression through water tankers on the haul roads while loading and unloading activity. The trucks will be covered with Tarpaulin to avoid fugitive emission during transport. Hence, no significant impact on the neighbouring land, fugitive emission during transportation of IOT.

A.D.S POINT NO 3: MANAGEMENT OF TAR SLUDGE GENERATED IN PRODUCER GAS PLANT

M/s Orissa Metaliks Private Limitedproposes to install 20 x 7,500 Nm^3/ hr(1,50,000 Nm^3/ hr)coal Gasifier plant for producing coal gas with calorific value of 1250 Kcal/ Nm^3. The coal gas will be used as fuel to Iron ore Pelletization.

Pellet is proposed to be equipped with Multifuel fired burners and fuel is used at Rotary kin as well Travelling grate. Heat is provided to system at several places is various zones of travelling grate . The Burners can handle the gas at 400 degree centigrade.

Gas at 450 degree centigrade will be directly used at Pellet plant so entire volatile matter is used to generate heat , however to meet the emergency and plant will connected to ETP and allied equipment as described in Figure-1.

Producer Gas from first stage will be taken to Electric Tar separator, and ETP is insulated and equipped with heat traces too. Tar is collected at bottom and pump to the storage Bin. Water seals are equipped at all the coal gas pipe line, sealing water overflows are connected to underground concrete tank.

Underground water Tank is equipped with tar pumps , pumps are installed at -2.5 metre level , tar collected here will be pumped to tar overhead storage Bin , Bin is insulated and heat tracer are provided , having facility to load Tar Tanker directly . Storage capacities of the bins for Tar will be closed 90 Mt. Tar will be sold to the buyers and have good demand for construction of roads.

Over flow water, spillage water is connected to Underground tank, where the tar will be settled.Soft water plant is proposed to be installed of capacity 100 M^3 /hour so as PH is maintained.Plant will be designed for Zero discharge and spillage water will be used for spraying on coal and coke if necessitated.

Process water is recycled in the system and over flow of the under ground tank is reused /recycled for the water seals and secondary application in gasifier plant.

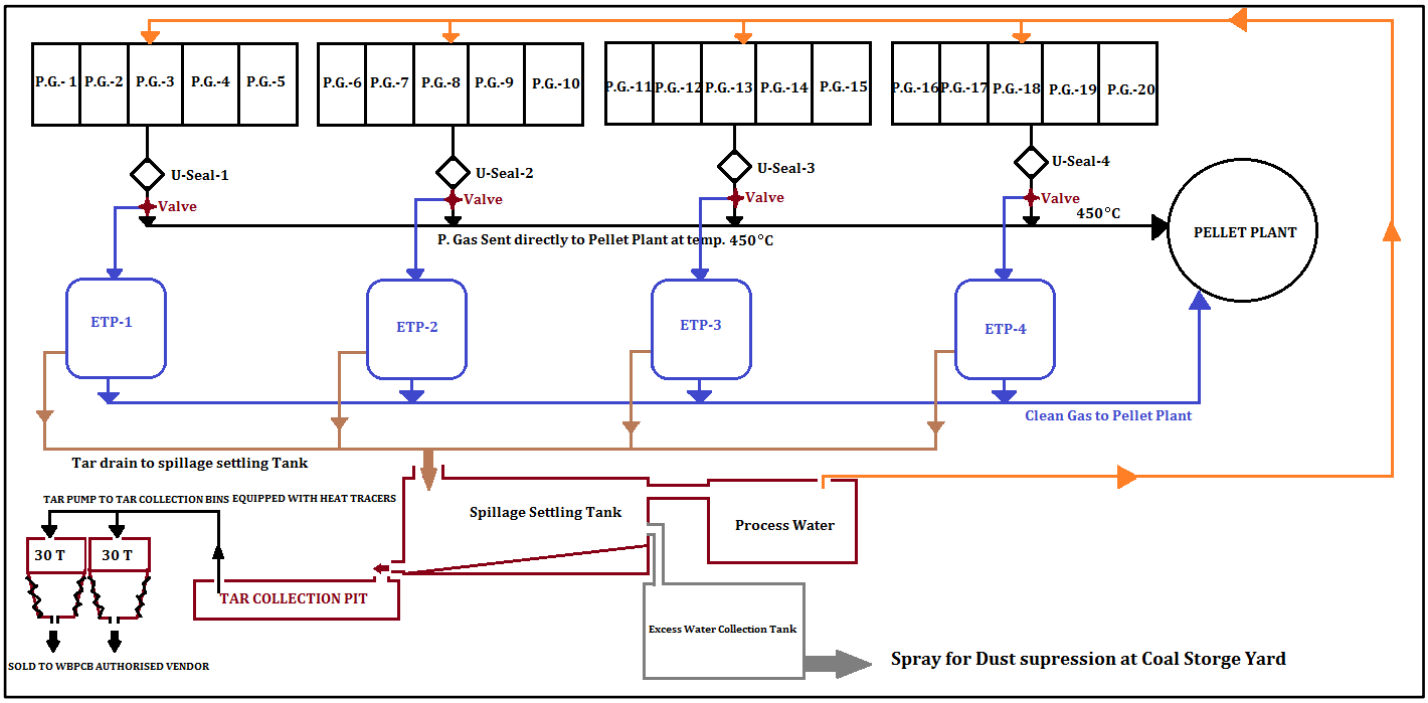


Figure-1-Process Flow Chart of Producer Gas Plant with Tar Sludge management

Annexure-IV

A.D.S. POINT NO-4 REVISED CORPORTAE ENVIRONMENT POLICY

ORISSA METALIKS PVT. LTD.
CORPORATE ENVIRONMENT POLICY

M/s. Orissa Metaliks Private Limited, a Private Limited company, was incorporated on 29th day of July 2006, having its registered office at 1, Grastin Place, 3rd floor; Kolkata-700 001 in West Bengal got impetus from its promoter through systematic funding. Orissa Metaliks of companies is a fast growing Group in the field of manufacturing steel and cement. The company has developed core competence in minerals, steel and cement with 18 years of experience. The growth of the group during last few years has been phenomenal and fast catching the attention of bankers, professionals and industry as a whole. With verticals that are exploring innovative and sustainable avenues in Steel, Energy, Technology and Cement, Orissa Metaliks is paving the way for India's emergence as a global superpower.

• The company, Orissa Metaliks Private Ltd. recognizes its joint responsibility with the Government and the Public to protect environment and is committed to regulate all its activities so as to follow best practicable means for minimizing adverse environmental impact arising out of its operations.

• The aim of the Policy is to do all that is reasonably practicable to prevent or minimize, encompassing all available knowledge and information, the risk of an adverse environmental impact arising from manufacturing and supply of our products.

• This Policy document reflects the continuing commitment of the Board for sound Environment Management of its operations. The Policy is applicable to all company operations covering manufacturing, sales and distribution and other offices. This document defines the aims and scope of the Policy as well as responsibilities for the achievement of the objectives laid down.

THE VISION

Our business approach not only seeks to minimize our environmental footprint but also contribute in enhancing the environmental quality in and around our work area. All of our operational units are certified under is an **ISO 9001, 14001 & OHSAS 18001** standards and strictly follow defined operating procedures.

ENVIRONMENT POLICY

Orissa Metaliks Private Limited (OMPL) is committed to meeting the needs of customers in an environmentally sound manner, through continuous improvement in environmental performance in all our activities. Management at all levels, jointly with employees, is responsible and will be held accountable for company's environmental performance.

Accordingly, OMPL aims to:

- Continuously assess our environmental impacts and measure and improve our environmental performance by adopting best practices for prevention and control of pollution.
- Ensure safety of its products and operations for the environment by using standards of environmental safety, which are scientifically sustainable and commonly acceptable.
- Develop, introduce and maintain environmental management systems across the company to meet the company standards as well as statutory requirements for environment. Verify compliance with these standards through regular auditing.
- Make continuous efforts to reduce water intensity and fresh water usage by increased use of harvested and recycled water in our operation.
- Reduce waste, conserve energy and explore opportunities for reuse and recycle.

- Conduct all our operations in an environmentally responsible manner that is better than statutory environment compliances and applicable standards.
- Involve all employees in the implementation of this Policy and provide appropriate training.
- Work in partnership with external bodies and Government agencies to promote environmental care, increase understanding of environmental issues and disseminate good practices.

CORPORATE RESPONSIBILITIES

The Directors/ Chairman of the Company is responsible for the Compliance of the Policy. The Directors/ Chairman shall constitute a Cell called as Corporate Environment Cell (CEC). The CEC is committed to conduct the company operations in an environmentally sound manner. The CEC will:

- Set standards and establish environmental improvement objectives and targets for OMPL as a whole and for individual units, and ensure these are included in the annual operating plans.
- Formally review environment performance of the company and report environmental performance to the Board of Directors/ Chairman of the company directly once every quarter.
- In case of emergency (non-compliance/deviation/violation/ major accident) immediate reporting to be done to the Directors/ Chairman of the Company.
- Review environment performance on monthly basis and recognise exemplary performance.

The overall responsibilities for environment management at plant level rest with Head of Environment Department. The Head of Environment Department will:

- Ensure implementation of Policy on environment at plant level and review, report environment performance of the plant to the Board of Directors/ Chairman of the company through CEC Cell once every quarter.
- In case of emergency (non-compliance/deviation/violation/ major accident) Head of Environment Department will do immediate reporting to the Directors/ Chairman of the Company.

The Corporate Environment Cell in coordination with Head of Environment Department will:

- Ensure implementation of Policy on environment and compliance with the Company's environmental standards and the standards stipulated as per law.
- Prevention of incidents or accidents that might result from abnormal operating conditions and
- Reduction of adverse effects that result from normal operating conditions.
- Establish appropriate management systems for environment management and ensure regular auditing to verify compliance.
- Establish systems for appropriate training in implementation of Environment Management Systems at work.
- Ensure periodic 3rd party environment audits through certification bodies to check efficacy of the Environment Management Systems
- Participate, wherever possible, with appropriate industry and Government bodies advising on environmental legislation and interact with national and local authorities concerned with protection of environment.

INDIVIDUAL UNITS RESPONSIBILITIES

The overall responsibility for environment management at each unit will rest with the unit's head who will ensure implementation of Policy on environment at unit level and report to Head of Environment Department

or CEC Cell as the case may be on monthly basis. Concerned line managers / heads of departments are responsible for environmental performance at department levels.

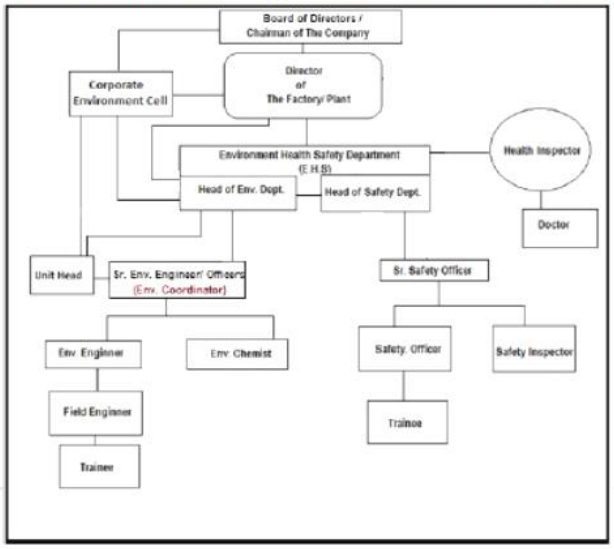
In order to full fill the requirements of the Policy at each site, the Unit Head will:

- Designate a unit environment coordinator who will be responsible for co-ordinating environmental activities at unit, collecting environmental data and providing expert advice and reporting environmental performance to the Unit Head on day to day or weekly basis as the case may be.
- Agree with the coordinator responsible for the unit specific environmental improvement objectives and targets for the unit and ensure that these are incorporated in the annual objectives of the concerned managers and officers and are reviewed periodically.
- Ensure that the unit complies with OMPL environmental standards and the relevant national and state regulations with respect to environment.
- Ensure that all new operations are subjected to a systematic and formal analysis to assess environmental impact. Findings of such exercises should be implemented prior to commencement of the activity.
- Regularly review environment performance of the unit against set objectives and targets and strive for continual improvement.

The Unit Head, through the Designate unit environment coordinator will:

- Ensure periodic audits to verify compliance with environment management systems.
- Ensure dissemination of relevant information on environment within the unit and to outside bodies, and regularly interact with Government authorities concerned for protection of environment.
- Maintain appropriate emergency procedures consistent with available technologies to prevent / control environmental incidents.
- Also ensure periodic 3rd party environment audits through certification bodies to check efficacy of the Environment Management Systems.
- Sustain a high degree of environmental awareness through regular promotional campaigns and employee participation through training, safety committees, emergency drills etc.
- Provide appropriate training to all employees.
- Report environmental performance to Corporate Environment Cell on a monthly basis.

The Hierarchy of our Corporate Environment management Cell that is being strictly followed is:



Date:-08.08.2018

A.D.S. POINT NO-5: MODIFICATION OF WET QUENCHING PROCESS TO DRY QUENCHING

Coke Oven Plant (2 x 0.25 MTPA)

The coke oven complex will have two identical modules, each producing 2,50,000 TPA coke. Each module will be arranged in two rows; there will be 4 Batteries, each battery having 35 ovens. 02 nos. Power plant (75 TPH steam generation) utilizing the waste heat of flue gases from coke ovens is also proposed to be built. The total capacity of the Coke oven complex shall be 5, 00,000 TPA (2x2, 50,000 TPA) of gross coke. In this process, the coal to be charged in oven is first converted into a cake through stamping process and then charged into oven. The oven will be provided with self-adjusting suction pressure controller for individual oven as well as a changer controller at chimney base in order to control thermal regime of Coke Oven Battery. The major facilities envisaged are as under:

- Coal Preparation and Proportioning Plant
- Coke Oven Battery Proper
- Coke Screening Plant
- Gas Cleaning Heat Recovery System and Power Plant
- Auxiliary production facilities like maintenance shop, laboratory, warehouse etc.

Coal Preparation & Proportioning Plant

The prime objective of a coal preparation plant is to feed consistent quality of coal to coke oven batteries for production of required quality of BF coke. A separate coal yard will be provided near the Coke oven battery. Coal will be received through rail wagons, self-discharging trucks & tipper system. The capacity of the Coke oven complex shall be 5,00,000 TPA (2 X2,50,000 TPA) of gross coke.

The unloading and loading system is designed to capacity of 100t/h, while the blending, crushing and feeding system is designed to capacity of 100t/h.

The cleaned coal shall be fed into the coal hopper. Appropriate number of coal blending hoppers shall be provided based on the coking coal types, and electronic belt scale shall be provide below the coal blending hopper for measuring the coal blending proportion. The coal blending hoppers shall be welded with steel, and electrical vibrator shall be provided on the outer wall to ensure no sticking or blocking.

Two back-impact plate hammer crushers shall be selected for crushing of raw material coal. Permanent magnetic iron remover shall be provided before raw materials enter the crusher.

The coal preparation plant is mainly composed of cleaned coal yard, coal receiving and blending hopper, crusher room and cleaned coal belt corridor, for purpose of stripping, loading, coal blending, crushing and other tasks so

that blended coal of required grain size shall be delivered to the coal tower of the coke oven.

The coal preparation plant shall be continuously operated to 330 Days every year and production personnel shall be allocated to three-shift operations

The major facilities envisaged are as under:

- **Supply of coals**

3-4 grades of coal Imported and indigenous will be blended to make charge mix. In actual practice, coal supply will depend upon actual over all receipt patterns and accordingly blend composition is to be adjusted keeping in view the qualitative parameters of BF coke required.

This would also require laboratory tests for establishing the most optimum coal blend.

- **Requirement of coals:**

Name of the Input Materials	**Quantity input in (TPA)**	**Name of the output Materials**	**Quantity output in (TPA)**
Coal	6,70,000	Coke	500000
		Coke Dust	15900
		LOI	154100
Total	**6,70,000**		**6,70,000**

- **Coke oven Battery Detail**
  A. Capacity: 2,50,000 TPA x 02 module
  B. Batteries: 4 x 35 Nos. x 02 module
  C. Boiler: 75 TPH x 02 module for tapping waste heat by using CDQ
  D. Product: Metallurgical Coke (Met Coke)
  E. Size Range per module:
     BF Grade (25-90 mm) -2, 16,200 TPA
     Nut Coke (10-25 mm) –18,800 TPA
     Breeze Coke (0-10 mm) -15,000 TPA

- **Brief Description of Structure of Coke Ovens**
  This design will use Heat-Recycle Stamping Clean Coke Oven, with following main features:

Oven body Structure design:

- Oven top: flat-top structure of mechanical coke oven.
- Arrangement of coking chamber oven wall flue and bottom combustion flue: main wall thickness 100 mm for coking chamber, uniform distribution of rectangular down flues and flame flues on the oven wall.
- There is flanged connection between the branch flue and the gas gathering flue to facilitate integral replacement.
- Coking chamber with small center distance and small wall thickness help to reduce refractories of coke oven.

- The waste heat boiler is provided against the emergency chimney in order to reduce length of the main flue.

➢ **Oven body Material**

The part from bottom of the coke oven combustion chamber to the coking chamber top shall be made of silica brick, while other parts shall be made of common clay brick, diatomite, brick or red brick, etc. depending on the strength and temperature changes as well as insulation effects in such parts.

➢ **Process device**

Iron parts for oven protection

- Iron parts for oven protection include buckstay, tie rod in length and breadth, spring, oven door and door frame.

Quenching

Red-hot coke taken out of the coke oven is normally cooled with a water spray in a quench tower, which is a process known as wet quenching (Coke Wet Quenching: CWQ). A dry quenching (Coke Dry Quenching: CDQ) equipment, on the other hand, recovers sensible waste heat from red-hot coke, which accounts for 40 to 50 % of heat loss in a coke oven, as steam, in order to recycle energy

The proposed project activity involves a process to convert part of wasted heat to electricity generation. In this proposed project activity, part of the waste-heat is planned to be used for the steam which will replace the steam generated elsewhere. In addition, the cokes treated with the CDQ will be used for the reduction of the iron ore in the blast furnace and it will improve the efficiency of iron making by decreased coke/iron ratio, which will also lead to the GHG emission reduction.

Moreover, this facility allows less leak of particulate during the process of feeding red-hot coke in the oven and of discharging the quenched coke. Furthermore it does not produce a massive amount of vapour as CWQ does.

Coke coming out of coke ovens is commonly quenched with water and waste heat is emitted without any use. Coke dry quenching is a process by which coke is cooled with low temperature inert gas (Nitrogen) in a shaft like cooling unit called cooling chamber in a CDQ plant (max 150 ton-cokes/hour).

CDQ technological components CDQ is mainly composed of red coke transport system, hoisting machine, coke dry quenching boiler, gas supply device, load device, coke discharge device and gas circulating device.

Table-1 CDQ technological components

Sl. No	System Name	Main Tasks
1	Red coke transport system	The red cokes from carbonization chambers are transported to the top of the CDQ boiler, matching with the input device. Put the cokes into CDQ boiler. The main equipments include the electric locomotives, coke tank truck (truck and coke tank), alignment device, hoister, etc. In case of annual overhaul or incidents occurring to CDQ devices, the motor vehicle draws and operates a stand-by coke wet quenching vehicle to CDQ tower for coke wet quenching.
2	Hoisting machine	It is responsible for lifting and transporting coking tanks. It mainly consists of a lifting device, a running gear, a safety device, a cargo sling, a coking tank cover, steel structure main framework, a lifting guide rail, a machinery room and platform and a running ladder, etc. Linkage between the hoister and other equipments shall be realized by PLC.
3	CDQ and gas supply device	The gas supply device positioned at the bottom of the CDQ boiler evenly feeds the cold circulating gas into the cooling chamber, and can make the cokes in the boiler evenly fall down. It is mainly made up of a cone, a wind cap, an air channel and a peripheral vane.
4	Load Device	Responsible for loading cokes, it is provided with a dust collecting pipe and doesn't generate dust escape during coke loading.
5	Coke discharge device	It is positioned at the bottom of the CDQ boiler, consecutively discharge the cooled cokes at the bottom of the CDQ boiler in a closed manner. Without the circulating gases being released out of the boiler, the cokes discharged continuously in a fixed quota are conveyed through the coke chute to the belt conveyer for output. The coke discharge device is also provided with a dust collecting pipe and doesn't generate

			dust escape during coke discharge.
6	Gas circulating system	Primary Dedusting machine	Being a gravity settling flute-type Dedusting device, it's used for removing coarse grain coke powders in the circulating gas, to reduce the wear on the CDQ boiler piping. Blank wall is provided in the dedusting machine. The bottom cone outlet of the primary dedusting machine is divided into funnel form, connecting two-fork flutes at the bottom to discharge the coke powders
		Secondary Dedusting machine	Arranged between the boiler and the circulating fan of gas circulating system, the secondary dust separator adopts the special dust collector suitable for the coke dry quenching process to further separate the thin coke dust from the circulating gas, ensuring the dust content of gas entering the circulating fan less than 1g/m^3 and the dust with the diameter smaller than 0.25 mm taking up over 95% of the total. In this way, the blades of circulating fan will be less worn by the coke dust.
		Circulating ventilator	After being pressurized, the gases in closed loop shall then be conveyed uninterruptedly into the CDQ boiler for recycled use and setup of one recycling ventilator. Ventilator shall be temperature and wear resistant
		Heat-pipe exchanger	The heat is transferred from the circulating gas to the boiler feed water through their heat exchanger, which is carried out by the repeated circulation of "evaporation-transfer-condensation".
7	Elevator		For facilitating the operations of inspection and overhaul personnel, an elevator is installed outside the framework of the CDQ boiler.

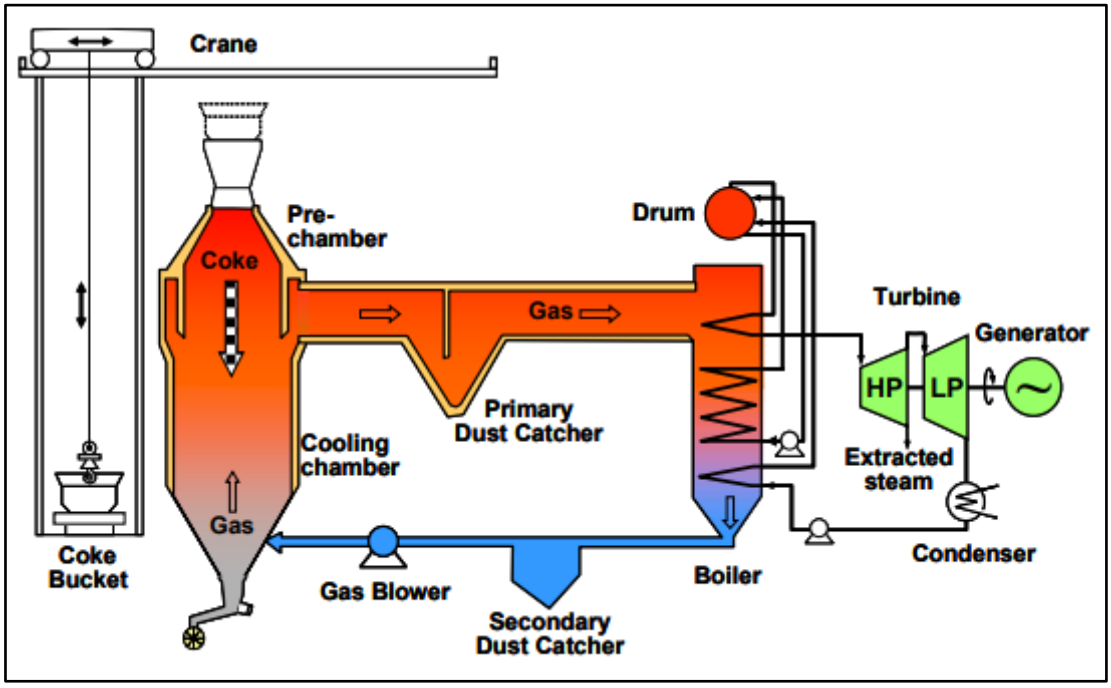


Figure-1-Process flow of the CDQ

As shown in the Fig. 1, a coke-bucket transfer car loaded with red-hot coke will be pulled by locomotive to the bottom of a derrick. An elevator will then send the coke bucket to the top of the CDQ oven. When pushed out of the coke oven, the coke has a temperature of about 1,000 °C and with the CDQ it is cooled to 200-250°C. The gas, through the process of heat exchanges (cooling coke), is heated to 900-950 °C and expel from upside of cooling chamber. Though the primary dust catcher, thick dusts in the hot gas are removed; then, the hot gas will be imported to the boiler. By the boiler, the hot gas exchanges its heat with boiler water and produces steam, produced steam will be imbibed to use as to generate electricity. The temperature of hot gas out of boiler will be cooled to 200°C, thin dusts in this gas can be collected again in the second dust catcher; then, the pressure of cooled and cleaned gas will be increased by the gas-flower, the gas will be insufflate into cooling chamber from chamber's bottom once again. Between gas-flower and cooling chamber, a water-pre-heater is set, therefore, the temperature of gas blown into cool chamber will be decreased to 130°C, and it can increase the efficiency of cooling coke in the cooling chamber.

The hot coke will be unloaded into the CDQ oven by the coke-charging unit. The cooled coke will be discharged to a conveyer belt and sent to the coke screening system. Although the technology of the CDQ is quite advanced technology which is obvious from the low penetration rate in the world.

Coke powders separated by the primary and secondary dedusting machines are collected into the storage tanks by special transmission devices, and used as the raw materials in sintering shops after being wetted.

Smokes and dusts, which are generated from coke loading, code discharge of CDQ devices, dispersed from pre-storage chamber and ventilator, etc., all

enter the CDQ ground station dedusting system for dispersing after dust removal

Buttress Wall

Reinforced concrete buttress walls shall be provided on both ends of the coke oven to bear thrust from individual parts of the coke oven.

Electrostatic Precipitator (ESP) will be installed in Coke Oven after Waste Heat Recovery Boiler. The outlet of ESP shall be vented to atmosphere through a stack.

Power from Coke Oven Plant: (34 MW Generations)

Waste gases generated from 2 X 0.25 MTPA coke ovens contain carbon monoxide and other volatile matter which after combusted releases significant heat. This heat contains significant calorific value (GCV of mixed fuel - about 2300 kcal/Nm^3). This heat will be used to produce steam through Waste Heat Recovery Boilers. The heated gas is used to produce steam (volume: 74 t/hr, pressure: 4.14 MPa, temperature: 450°C) in a 75 TPH boiler to generate electricity (capacity: 16 MW, amounts: 97.9 GWh/year from single module) with extraction-condensing turbines.

A.D.S. POINT NO- 6 : WAST HEAT RECOVERY FROM STOVES GAS

Cold Blast from the centrifugal or the axial flow Blower will be preheated to the Hot Blast Temperature and around 1250 degree centigrade is generated. In this process Blast Furnace Gas is used to increase the cold blast temperature.

Waste gas generated at temperature of 200 – 300 degree centigrade is used for preheating the combustion air from atmospheric temperature to 250 degree centigrade. Recuperate is proposed to induct at waste gas flue duct so as heat energy from Flue gas is used for preheating the combustion air to 250 degree centigrade and Blast furnace gas to 180 degree centigrade .

After necessary recovery of the heat, the gas at around 150 degree centigrade is used for drying the coke.

Coke Bin is proposed to be equipped with scattered opening at slopping sides and hot gas at around 250 pascals is forced though the holes. The heat from this Gas is used for reducing the moisture of the coke in turn to improve the overall plant efficiency. The Process flow diagram is shown in Figure-1.

It is estimated that we can reduce moisture by 3-4 percent so as energy used to remove this moisture in blast furnace is saved.

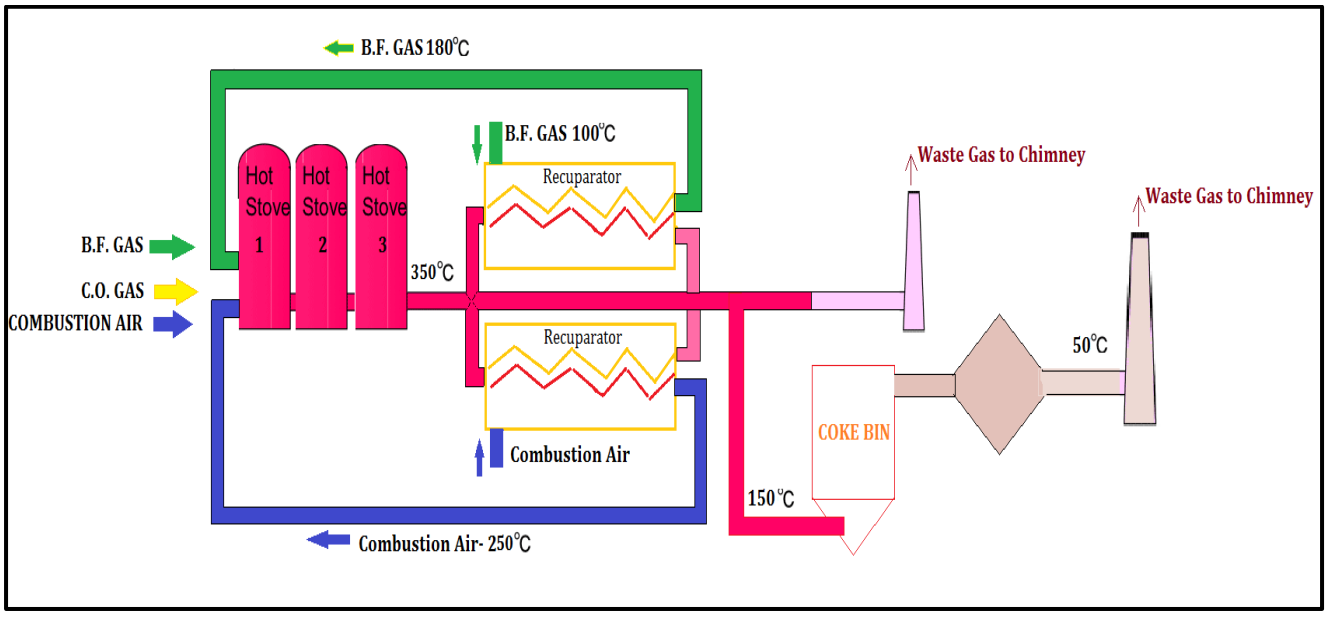


Figure-1-Blast Furnace Stove Gas Recovery System

A.D.S. POINT NO-7: SINTER COOLER WASTE HEAT RECOVERY

The sinter plant complex will consist of sinter machine of 1x175 m^2 grate area along with associated services facilities. The plant capacity has been selected as 1.0 MTPA for charging sinter in blast furnace. The sinter plant complex will consist of the following units,

1. Storage and proportioning unit
2. Combined mixing and balling unit
3. Sintering and cooling unit
4. Waste Gas Recovery System unit
5. Main exhaust fan unit
6. Cold sinter screening unit
7. Plant Dedusting unit

The above units will be interconnected by conveyor galleries and junction houses for conveying raw fix, finished sinter, and sinter return fines. All the iron bearing materials (iron ore fines, flue dust), 100% BF return fines, 80% of total requirement of limestone, 80% of total requirement of dolomite, 80% of total requirement of coke breeze are blended in the base blending yard. Blended mix and corrective additions of limestone (20% of total requirement), dolomite (20% of total requirement) and coke breeze (20% of total requirement) are received from the raw material blending yard to the sinter plant proportioning building. Burnt lime will be carried by lime tanker and fed to lime bin by pneumatic lime transportation system. A brief description of major facilities proposed for the sinter plant complex is given below.

Proportioning unit: Suitable capacity of storage and proportioning bins has been envisaged for the sinter plant. The bunkers for blended mix and return fines will have single outlet while bunkers for corrective additions of crushed limestone, crushed dolomite and crushed coke breeze will have twin outlets. All the bins will be suitably lined except return fines bin, which will be self-lined. The blended mix, corrective additions and in-plant returns will be fed to the common collecting conveyor by electronic belt weigh feeders, whereas, lime will be fed to common collecting belt conveyor by loss in weigh feeder. Proportioned material from belt weigh feeders below respective proportioning bins shall be transported to a combined mixing and nodulizing drum by a common belt conveyor.

Combined mixing and nodulizing unit: Material from belt weigh feeders below respective proportioning bins will be transported to a combined mixing and nodulizing drum by a belt conveyor where the various raw materials will be moistened and mixed in drum mixer. Lime from lime bins will be discharged onto common collecting conveyor through lime dosing equipment. A fixed quantity of water of about 60% of requirement will be added in the mixing part and the rest variable quantity will be

added in the nodulizing part depending on requirement. The raw mix discharged from mixing and nodulizing drum will be transported to sinter plant main building by a belt conveyor.

Sinter plant main building: The sinter plant main building will mainly consist of hearth layer and raw mix feeding units, ignition furnace, sinter machine, hot sinter breaker. The sintering machine will comprise charging and discharging sprockets, drive unit, spring loaded pallet cars with high chrome cast steel grate bars, rails, curved guides at charging and discharge ends, grate bar cleaning device, automatic lubrication system, provision for thermal expansion, wind boxes, wind main with dust hoppers and double cone dust valves, machine Spillage hoppers, sinter machine support structures. The hearth layer (15 - 25 mm) will be spread onto the sintering machine first, followed by sinter mix. The height of the sinter mix bed onto the machine will be 650 mm including 50 mm protective hearth layer height. The hearth layer is provided for the following reasons:

- Prevent plugging of the passage between grate bars
- Prevent the scaling and overheating of the grate bars
- Prevent the adhesion of fused sinter to grate bars
- Ensure uniform gas distribution through the sinter mix bed

The ignition furnace with post heat hood and pre-heating (before ignition furnace) will be installed just after the sinter mix drum feeder. The ignition furnace will have suitably located energy efficient type gas firing burner designed for 2000 kcal/Nm^3 of mixed gas. Gas mixing station and gas boosting station will be located outside sinter plant battery limit approximately 250 to 350 deg C hot air for the combustion is supplied from waste heat recovery system of sinter cooler. Multicylone will be provided at inlet of combustion air fan to supply clean hot air from discharge of cooler.

The hot air for combustion will have control by having intake in cold air. The ignition temperature will be 1200–1300^oC RC Lot burners will be provided for startup and safety. Hot air from waste heat recovery system of sinter cooler will be used for preheating of raw material before ignition furnace and post heat hood after ignition furnace. For suction of air through sinter mix bed on the sintering machine two numbers of exhausters will be provided.

Circular sinter cooler will be used to cool the sinter to less than 100 deg C after it is discharged from hot sinter breaker at approximately 800 deg C up to (-) 150 mm size, so that it can be transported through conventional conveyor system. Forced draught fans will be provided to cool the sinter in sinter cooler. Deep bed dip rail circular cooler of adequate capacity will be provided to match the sinter machine production with all the associated facilities like cooler fans, heat recovery system etc. Retention time for the coolers will be of approx. 60 minutes.

Cooling of sinter is achieved by up-drafting ambient air through the bed of hot sinter to be cooled. The sinter after being cooled in the sinter cooler is transported to the screening house. In the screening house, sinter screening will be carried out in single deck screens arranged vertically in series. The screen house in sinter plant is a separate building in which all the vibrating screens will be located. These screens are arranged one above the other in order to facilitate successive screening of the gross sinter.

Waste Heat Recovery System The recovered waste heat from sinter cooler will be used for the generation of steam with the installation of recovery boilers. This steam will be used to generate process steam which will be used in Blast furnace& cold rolling mill.

The process flow of sinter plant with waste heat recovery system is shown in Figure-1

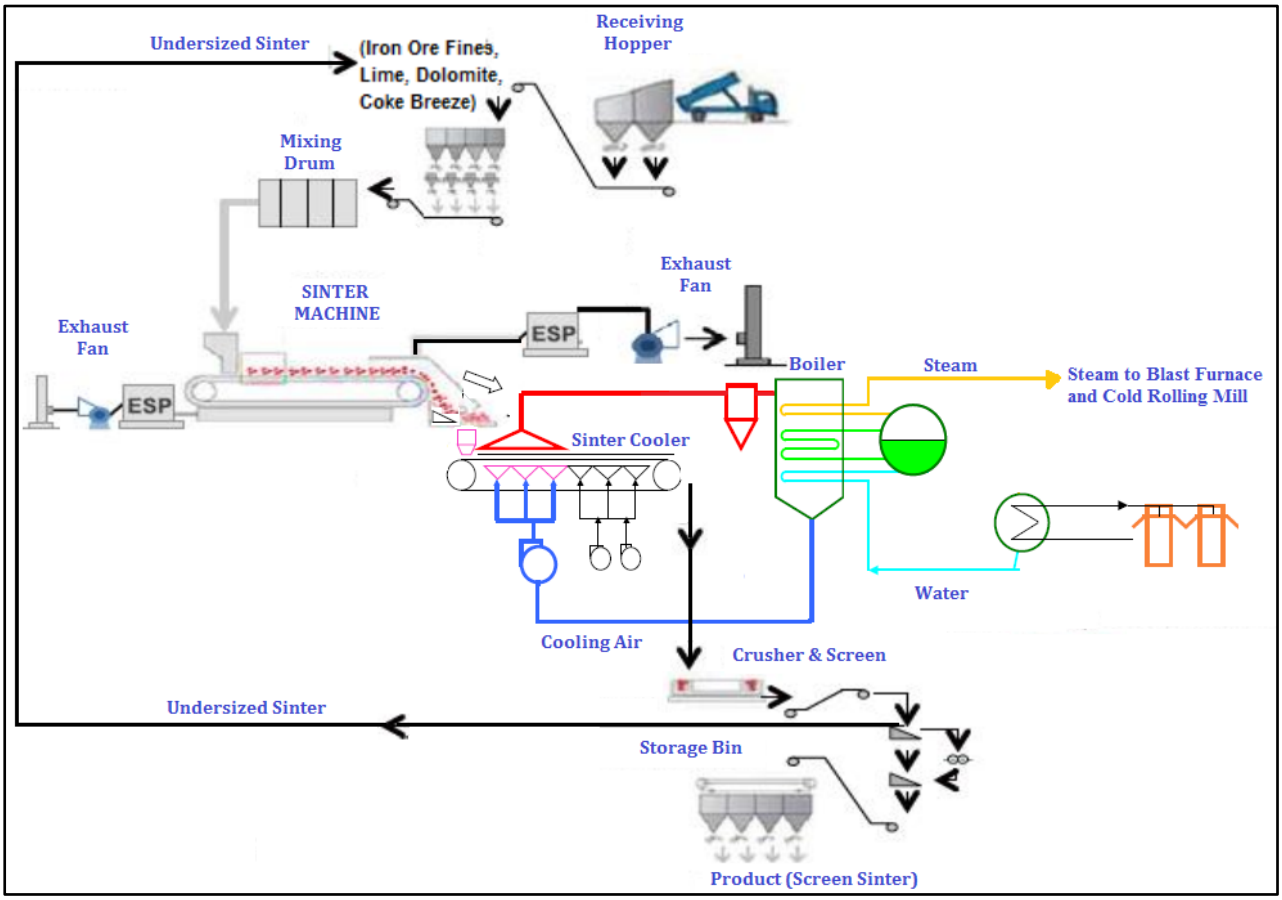


Figure 1:Process flow of sinter plant with Waste Heat Recovery System

A.D.S. POINT NO-8: DETAIL OF SLUDGE GENERATION FROM COLD ROLLING MILL, PICKLING & GALVANISING PROCESS

M/s Orissa Metaliks Private Limited has proposed 6,50,000 TPA Hot Rolling Mill & 3,50,000 TPA Cold Rolling Mill. The Hot Rolled Coil will be fed to cold rolling plant for getting various products Galvanized Sheet/ Plate and Coils/Flat Sheet, Checkered Sheet/Nail, Strips. The various processes involved in CRM with Pickling & Galvanising line is:

- Pickling: Rust (iron oxide) is removed from the surface of the steel coils in the pickling unit using hydrochloric acid. The pickled coils are rinsed and dried and will go further to the cold rolling process and hot dip galvanizing process.

- Cold Rolling: The pickled, rinsed and dried coils will undergo a cold rolling process where the coils are uncoiled, straightened, levelled and then passed through the rolling mill which will apply pressure to the strip, progressively reducing it to the required thickness. The strip is then recoiled and conveyed by the coil car to the rolled coil storage in the galvanizing bay.

- Galvanizing: The cold rolled strips will undergo flattening and welding of the strips. The welded strip will undergo cleaning which entails alkali spraying, alkali brushing, electrolytic cleaning, water brushing, hot water rinsing and hot air brushing to obtain a clean surface before entering the annealing furnace. The strips will then undergo preheating, heating, soaking and cooling in the annealing furnace before going to the zinc pot for hot dip galvanizing. For the galvanizing process, the strips are dipped into a zinc bath to be galvanized. The molten zinc on the strip surface will be cooled and solidified through air cooling, quenching and drying. Finally, the galvanized strips will undergo skin passing, tension levelling and chemical treatment before arriving at the exit looper. The strip from the exit looper then passes vertical inspection, oiling, cutting and coiling.

- Acid Recovery Plant-The acid regeneration facility functions as follows. The waste acid enters the separator at the bottom of the pre-concentrator of the acid regeneration plant; part of the acid is circulated by circulation pump in the pre-concentrator, and the other part is sent to the roaster. During the circulation process, the waste acid undergoes full heat exchange with the hot gas from the roaster, and the concentrated waste acid to the roaster is boosted and delivered by the liquid feed pump of the roaster to the two booms at the top of the roaster.

In the roaster, the acid drop and $FeCl_2$ react in the following way under a certain temperature:

$$4FeCl_2+4H_2O+O_2=2Fe_2O_3+8HCl$$

The solid Fe_2O_3 from reaction falls at the cone bottom of the roaster, and is discharged via breaker and rotary discharging valve. Water, HCl gas and fine Fe_2O_3 go from the top of the roaster to the double-cyclone separator, and separated oxide powder is returned via the rotary valve to the roaster. The dedusted gas enters the preconcentrator.

The gas from the preconcentrator with low HCl gas temperature and low content of iron powder goes to the bottom of the absorption column, where the gas contacts with the counterflow rinse water from top to bottom, and the HCl in the waste gas is absorbed in water to form hydrochloric acid solution. The gas from the absorption column goes to stage 1 & 2 scrubber followed by being exhausted via chimney to atmosphere.

The oxide powder discharged from the bottom of the roaster that is part of the acid regeneration plant is sucked to the storage bin by the negative pressure caused by the exhaust fan. It is then discharged via the rotary valve at the bottom of the bin to the bagging machine with weighing scale for packaging and bag sealing for sale.

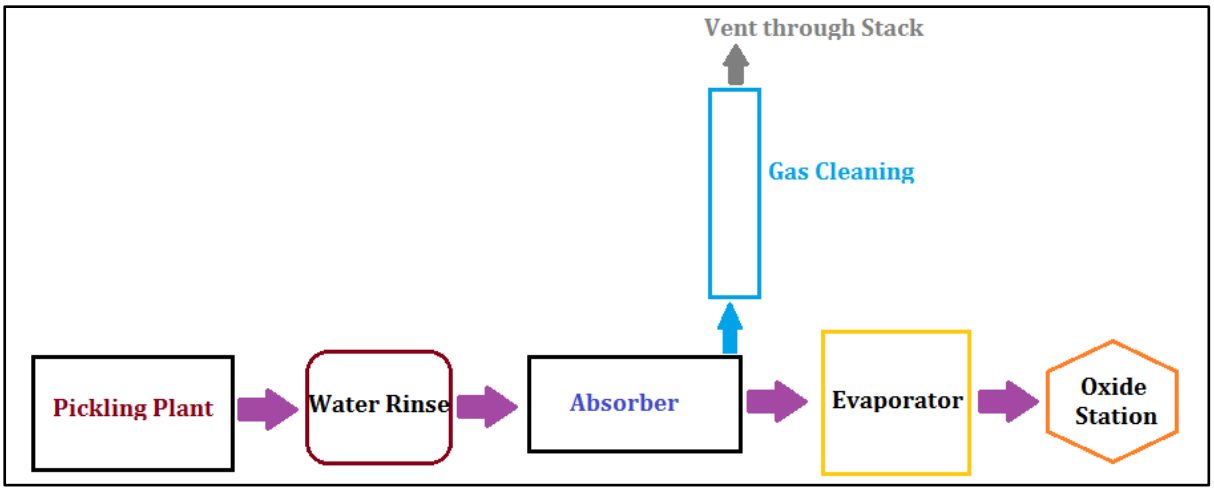


Figure-1-Process Flow Diagram of Acid Recovery Plant

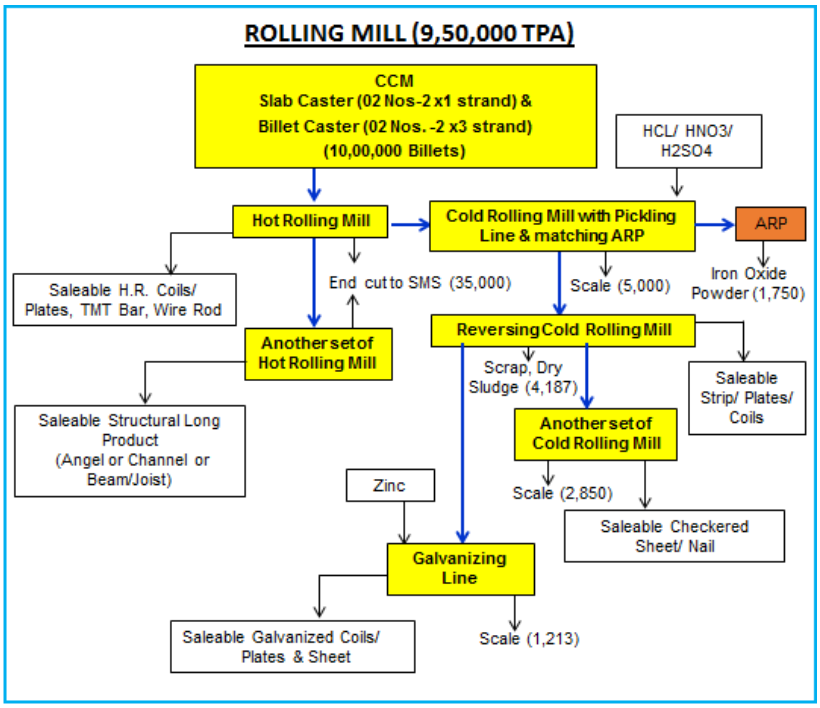


Figure-2-Process Flow Diagram of CRM with Pickling & Galvanising Line

The basic galvanising process step is:

a) Degrease Bath- The degrease solution aids removal of oils and grease from steelwork, and forms oily sludge that sinks to the bottom of the bath and is periodically removed for off-site disposal. At some of the Joseph Ash installations, degrease solution is also added to the pickling baths to further aid cleaning of the steelwork prior to galvanizing.

b) Pickle Bath- The pickling process ensures that the surface of the metal is free from dirt, grease, rustand scale. Hydrochloric acid is used as the picklingagent. In the specific operation, ammonium biflouride is added to the pickling bath onthe to enhance the cleaning operation due to the porous nature of cast metalcomponents, which are almost exclusive to this production line. Because of the aggressive nature of the acid it is necessary to add an inhibitor thatslows down the acid attack of the steelwork while allowing the cleaning activity toproceed. Typically, the inhibitor comprises a mixture of amines and surfactants.

c) Flux Bath- The pre-flux comprises a double salt of zinc ammonium chloride which serves todissolve any oxide that may have formed on the iron or steel surface after picklingand prevents further rust from forming. Because of the acid carry-over from the pickling baths it is necessary, periodically, toneutralise the flux by the addition of small quantities of buffered flux solution or bystripping of zinc coated jigs/components.

d) Galvanising Bath- The galvanizing baths contain molten zinc at a temperature of approximately 450°C. As a consequence of the

galvanizing process, the zinc within the bath must beperiodically replenished by the addition of metal ingots.Various metal additives are also added to the galvanizing bath to improve the quality of the zinc coating. The zinc is delivered to site as ingots and stored within the production building.

WASTE MANAGEMENT

There are four kinds of wastes that will be produced:

- Waste water
- Off-cut steel from the raw material and other solid waste
- Sludge from the various process tanks, including the waste water holding tank
- Iron oxide powder from Acid Recovery Plant

1. Waste Water

Waste water from the rolling mill with galvanising & pickling mill is first treated to remove oil and grease. The outlet water goes to the alkali waste water line and then to the holding tank. Concentrated oil from the buffer tank and oily sludge are passed to a filter press to further concentrate the oil for disposal. The detail effluent treatment plant is explained in industrial waste water treatment for TYPE-II effluent.

2. Off-cut steel from the raw material and other solid waste

Off cut, Scraps/ End cuts from rolling mill will be used in proposed induction furnace.

3. Sludge from the various process tanks, including the waste water holding tank.

The total sludge generation is 1578 TPA, Iron oxide generation from Acid Recovery plant -1750 TPA & Zinc Dust, Dross (845 TPA). The detail of sludge generation from the process is given below:

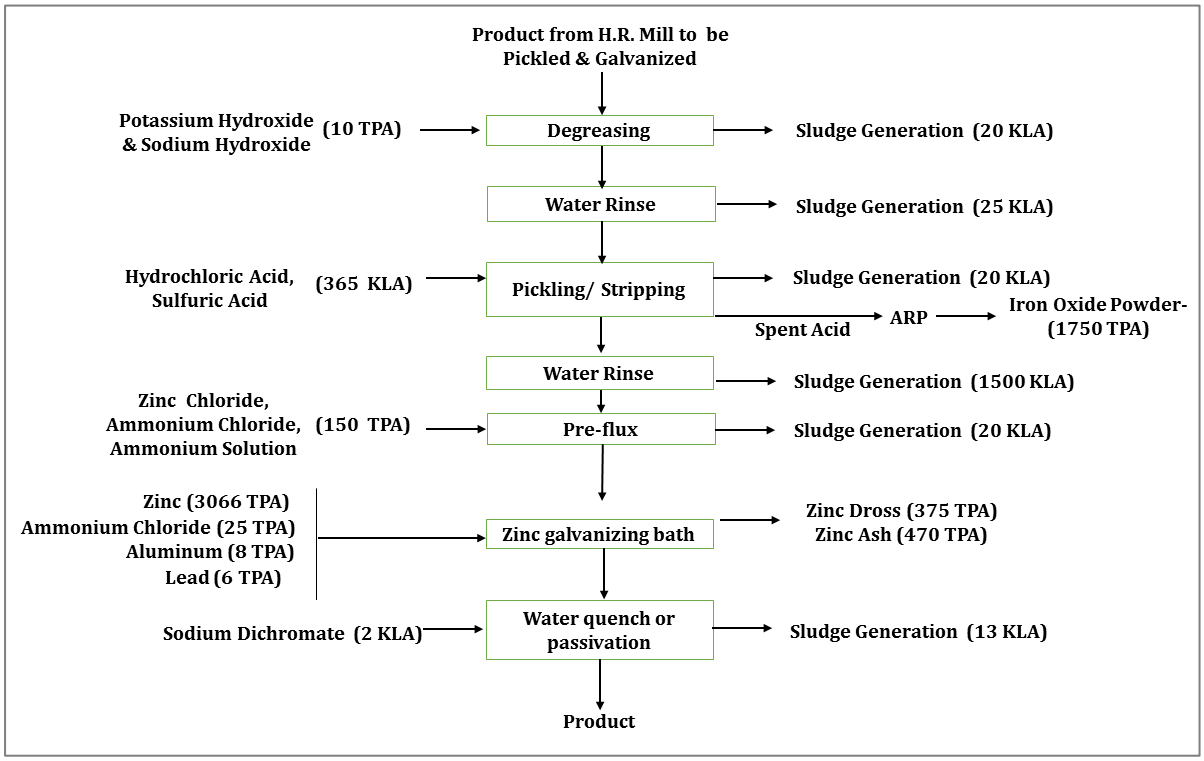


Figure-3-Sludge Generation Detail

The detail sludge management is as:

1. Degreasing tank, Tank 1: Approximately 20 kilo litre of sludge is generated per annum. The sludge contains oil, dirt and metal shavings. This is disposed to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

2. Rinse tank, Tank 2: 25 kilo litre of sludge is generated per annum. The sludge contains oil, dirt and metal shavings. This is disposed to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

3. Acid pickling tanks, Tanks 3 and Tank 4: Approximately 20 kilo litre of sludge is generated per annum. Spent acid is sent to acid recovery unit from where Iron Oxide powder 1750 TPA will be generated which will be used in proposed Sinter plant.

4. Rinsing / neutralising tanks, Tank 5 and Tank 6: Approximately 1500 kilo litre of sludge is generated per annum and disposed to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

5. Flux tank, Tank 7: Approximately 20 kilo litre of sludge is generated per annum and is sent to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

6. Passivation tank, Tank 8: Ash from internal venting of work pieces and zinc splatter from galvanize kettle. Approximately 13 kilo litre per annum sludge is generated and is disposed to Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

7. Zinc dross settles to the bottom of the galvanising tank and is removed monthly Zinc ash floats to the top and this is removed after each jig is dipped. The zinc ash and dross are sold to WBPCB authorised vendor. The zinc ash and zinc dross are therefore not considered to be waste but rather a valuable, re-usable by-product.

The detail inventory of Sludge management is given in Table-1.

TABLE-1- SLUDGE WASTE INVENTORY

DESCRIPTION OF WASTE	**WASTE CATEGORY**	**EXPECTED QUANTITY**	**DISPOSAL METHOD**
Sludge from Degreasing tank	**Hazardous**	20 KLA	Sent to WBPCB Authorize CHWTSDF
Sludge from Rinsing	**Non-Hazardous**	1525 KLA	Sent to WBPCB Authorized CHWTSDF
Iron oxide Powder from ARP	**Hazardous**	1750 TPA	To be used in Proposed Sinter plant
Sludge from Fluxing	**Hazardous**	20 KLA	Sent to WBPCB Authorized CHWTSDF
Zinc Ash	**Non-Hazardous**	375 TPA	Sell to WBPCB Authorized Vendors
Zinc Dross	**Non-Hazardous**	470 TPA	Sell to WBPCB Authorized Vendors
Sludge from Passivation	**Hazardous**	13 KLA	Sent to WBPCB Authorized CHWTSDF
TOTAL		**4173**	

A.D.S. POINT NO-9:DETAIL PLAN FOR COMPLETION OF GREEN BELT IN TWO YEARS

Implementation of afforestation program is of paramount importance for any industrial development. In addition to augmenting present vegetation, it will also check soil erosion, make the ecosystem more complex and functionally more stable, make the climate more conductive and restore water balance. It can also be employed to bring areas with special problems under vegetal cover and prevent further land deterioration.

The main objective of the greenbelt is to provide a barrier between the plant and the surrounding areas. The greenbelt helps to capture the fugitive assimilation of toxic gases and to attenuate the noise generated in the plant apart from improving the aesthetics of the plant site. Plantation program is undertaken in all available areas. This includes plantation in the refinery premises, along the internal and external roads, along the administrative buildings and the stacking yards.

The plant species selected for greenbelt is including the native species. These saplings are planted in several rows with 10m to 15m width with a tree density of about 2500 trees/ha.

The greenbelt development will cover 33% of the project area; i.e., about 41.40 Ha. of the total project area (125.45 Ha.).

The plantation program at the proposed plant site is taken into consideration of the existing social forestry in the region. The plantation program is covered under the following design aspects:

Greenbelt all around the plant facilities;

- Greenbelt around plant boundary; Guard Pond will be developed ;
- Development of greenery in colony/ Guest House;
- Greenbelt along the internal and external roads used for the project.
- The total number of trees is planted in this area at the rate of 2500 trees per hectare initially with the provision of increasing density based on survival and performance;
- Shrubs and trees is planted in encircling rows around the project site;
- The short trees (<10-m height) is planted in the first rows (towards plant side) of the greenbelt. The tall trees (>10 m height) is planted in the outer rows (away from plant side);
- Planting of trees in each row is in staggered orientation (Triangular form);
- Since the trunks of the tall trees are generally devoid of foliage, it will be useful to have shrubs in front of the trees so as to give coverage to this portion;

- The pit size will be either 45cm X 45cm X 45cm or 60cm X 60cm X 60 cm. bigger pit size is preferred on marginal and poor quality soils.
- The pits shall be filled using good soil from nearby agricultural fields (3 parts) and farm yard manure (1 part) at the rate of 2.5kg (on dry weight basis) and 3.6 kg (on dry weight basis) for 45cm X 45cm X 45cm or 60 cm X. The filling of soils should be completed at least 5-10 days before the actual plantation

Criteria for Selection of Species:

- Large crown volume
- Rapid growth
- Capacity to endure water stress and climatic conditions
- Difference in height and growth habits
- Mixed plantation will be carried out keeping optimum spacing between saplings
- Native Species will be preferred for plantation in consultation with local Horticulturists and Forest Officials.

Number of Saplings to be Planted and Budgetary Estimate of the Green Cover

The proposed plantation is at the rate of 2500 saplings per hectare. As the proposed green cover including greenbelt is 41.40 ha. The greenbelt plan for the year 2019-21 is given in **Table No1.**

Table No 1:Greenbelt Plan for 2019-2021

Sl. No	Year	Sapling Nos	Area to be Covered (Ha.)	Species Type	Location
1	2019-20	51750	20.7	Palash, Amaltas, Sisoo, Kadam, Peepal, Arjun, Neem, Mango, Siris, Ashoka, Saal, Akashmoni, Jackfruit, Bamboo, Radhachuda, Teak	Coal unloading, stacking and handling area, Guard Pond , Railway Siding area, Administrative & Canteen Area and Product Storage Yard, Car & Truck Parking area, Inside the plant boundary wall, slag/ coal crushing area, Near HFO tank, Water reservoir, Tailing Pond, Plant internal road.
2	20120-21	51750	20.7		
TOTAL			**41.4**		

Annexure-X

A.D.S POINT NO 10: REVISED CER PLAN ALONG WITH BUDGETARY REQUIREMENT AND TIME SCHEDULE FOR COMPLETION OF CER ACTIVITIES.

M/s Orissa Metaliks Private Limited has well established guideline for Corporate Environment Responsibility (CER) activities. The company has identified certain area for imparting the CER activities in the context of local scenario of the area and also considering the issues raised during public hearing. Three villages namely Samraipur, Bargai & Kalikapur within 10 km of area have been identified based on their Socio-economic conditions & survey conducted and accordingly emphasis will be given to certain areas that are being explored for ensuring their overall upliftment. The company proposes to invest Rs. 2300 Lakhs on the CER activities, this fund shall be utilized over a period of 7 years. The breakup of CER investment is as.

Sl. No.	PROPOSED CER ACTIVITIES	INVESTMENT (IN LACS)						
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
PUBLIC HEARING RELATED ACTIVITIES								
1	Construction of 32 Toilets at16 school (@ Rs. 8.00 Lakhs per set of 2 Toilets, separately for Ladies & Gents)	48	48	32	32	32	32	32
2	Open Defecation free village by introducing community & Individual Toilets	10	10	10	10	10	10	10
3	Drinking Water Infrastructure (Tube well in nearby villages – 65 nos. @ Rs. 1.20 Lakhs); ATM Water Machine 28 nos. @ Rs 3 lakhs	24	24	24	24	24	24	18
4	Construction and repairing of metal road (27 km) in villages (@Rs. 24 Lakhs per km)	96	96	96	96	96	96	72
5	Development of Community Hall – Total 5 nos. (@ Rs. 15 Lakhs per Hall)	15	15	15	0	15	0	15
6	Construction of charitable Dispensary (07 nos.)	12	12	12	12	12	12	12
7	Ambulance to nearby Panchayat	10	0	10	0	0	10	0
8	Providing equipment to the local hospitals, Developing/ up gradation of primary health centre	16	16	14	14	11	11	10
9	Financial Support to the Local School for extension of building / class room/ development of library facilities	8	8	7	7	7	7	6
10	Skill development to unemployed local youth through National Skill Development Corporation, Govt. of India Scheme	27	27	26	26	24	24	20

11	Supporting schools for establishment of mini sports complex or playgrounds in providing the facilities like badminton court, tennis court and levelling of ground.	4	3	3	4	3	4	3
12	Workshop centre with latest tailoring machines for training women (like tailoring, stitching, Pickle & Sauces making, Soft Toys & Gem Jeweller, and Beautician Courses and for making affordable price of Sanitary Pads.)	7	7	7	6	6	5	5
13	Local villagers will be given employment on the basis of their eligibility. However a training camp shall be provided when new recruitment is done to enable check and select from the local pool of applicability.	8	8	8	7	7	6	6
14	Development of parks, plantation of trees in the nearby areas.	20	20	20	19	19	18	18
NEED BASED ACTIVITIES								
15	Transportation facility for school students	5	5	5	4	4	5	5
16	Street Lighting (Solar/Led) provision at suitable public places – 180 nos. (@ Rs. 0.40 Lakhs per Solar Light)	10.4	10.4	10	10	10.4	10.4	10.4
17	Creation of irrigation infrastructure in the peripheral villages(Water Harvesting Structure, Up gradation of Pond, Irrigation Channel, Supply of Crop harvesting machine, Pest Control Machine)	15	13	13	12	12	12	12
18	Infrastructure facilities development for Welfare of the local villager	10	10	9	9	9	8	8
19	Drainage Development - side drains & Construction of Culvert on drainage	13	12	13	14	13	13	12
20	Scholarship award to unprivileged Students	6	6	6	6	5	4	4
21	Provide Dustbin in Village (under Swach Bharta Scheme)	4	4	4	3	3	3	3
TOTAL								**2300 Lacs**

Annexure-XI

ORISSA METALIKS PRIVATE LIMITED

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Website : www.orissametaliks.com, CIN : U27109WB2006PTC111146

Undertaking for Utilization of Ferro Chrome

M/s **Orissa Metaliks Private Limited**, has proposed to install proposed **1.2 MTPA Integrated Steel Plant with 225 MW Captive Power Plant at** Village Gokulpur, Post Office Shyamraipur, District Paschim Mednipur, West Bengal. The project sites lies between Latitude 22°21'39.58"N to 22°22'13.00"N & Longitude 87°17'54.24"E to 87°18'28.60"E in Survey of India topo sheet No. 73 N/7 at an elevation of 33.5 m AMSL. The proposed capacity for different products for new site area as below:

Sl. No	Particulars of Facilities	Capacity	Product
1.	Blast Furnace (2 x 550 m^3)	1.0 Million T.P.A	Hot Metal / Pig Iron
2.	Sinter (1 x 175 m^2)	1.0 Million T.P.A	Sinter
3.	DRI (2 X 500 TPD + 2 x 350 TPD)	0.5 Million T.P.A	Sponge Iron
4.	Steel Making Facilities [(20 T EIF X 10) + (50T EAF X 2)] with LRF and oxygen optimized furnace	1.0 Million T.P.A	Billets
5.	Ferro Alloy (FeMn, FeSi, SiMn, FeCr) Plant (10 x 9 MVA)	0.12 Million T.P.A	Ferro Alloys
6.	Fe-Cr Briquette Manufacturing plant	40 ton/hr	Fe-Cr Briquette
7.	Non-recovery type Coke Oven Plant (2 x 0.25 MTPA)	0.5 Million T.P.A	Coke
8.	Lime Dolomite Plant	200 TPD	Lime & Dolomite
9.	Oxygen Plant	200 TPD	Oxygen
10.	Hot Rolling Mill	0.6 Million T.P.A	H.R. Coils, Plates (Checkered or Flat)/ TMT Bar, Wire Rod & Wire/ Structural long product like- Angel, Channel & Beam
11.	Cold Rolling Plant with Pickling Line & Continuous Galvanizing	0.35 Million T.P.A	Galvanized Sheet/ Plate / Coils, Flat Sheet/ Checkered Sheet, Strip & Nail
12.	Ductile Iron Pipe Unit	0.2 Million T.P.A	DI Pipe
13.	Captive Power Plant	225 MW [WHRB Based 90 MW (54 MW from DRI Plant+ 34 MW from Coke Oven Plant + 2 MW from EAF + CFBC (Coal & Dolochar Mix based) 3 x 45 MW]	Power

ORISSA METALIKS PRIVATE LIMITED

14.	Pellet Plant	2.4 MTPA(2 x 1.2 MTPA)	Iron ore Pellet
15.	I/O Beneficiation Plant	2.4 MTPA (2 x 1.2 MTPA)	Iron Ore Concentrate
16.	Producer Gas Plant	1,50,000 (20 x 7,500 Nm^3/hr)	Producer Gas

From the proposed Ferro alloy plant Ferro chrome slag will be generated, which after doing TCLP test will be used for green concreting subject to getting approval from competent authority or else will be given to West Bengal Pollution Control Board authorised Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF).

I here by certified that, all the statements made in the above paragraphs here in above are true to the best of my knowledge and belief.

For **Orissa Meraliks Private Limited** **Date**-17.08.2018

(Authorized Signatory)

A.D.S POINT NO-12: DETAIL OF RAIN WATER HARVESTING PLAN

Rainwater harvesting broadly refers to the collection and storage of rainwater and recharge of groundwater. In general, water harvesting is an activity of direct collection and usage of rainwater to reduce the freshwater consumption from the source which is under constant pressure. Otherwise, the precious rainwater will run off, which can be stored for direct use or can be utilized to recharge the groundwater depending upon the technique used for harvesting.

Rainwater harvesting for OMPL Project

The geology of the plant site is favorable for rainwater harvesting. The scope of rainfall harvesting for plant site has been examined, with the view to supplement the water supply with natural rainwater, which is freely available and to reduce the freshwater conveying and consumption.

OMPL project will implement rainwater harvesting in following ways:

1. Roof top rainwater harvesting at guest house area
2. Collection of storm water in the Guard Pond.

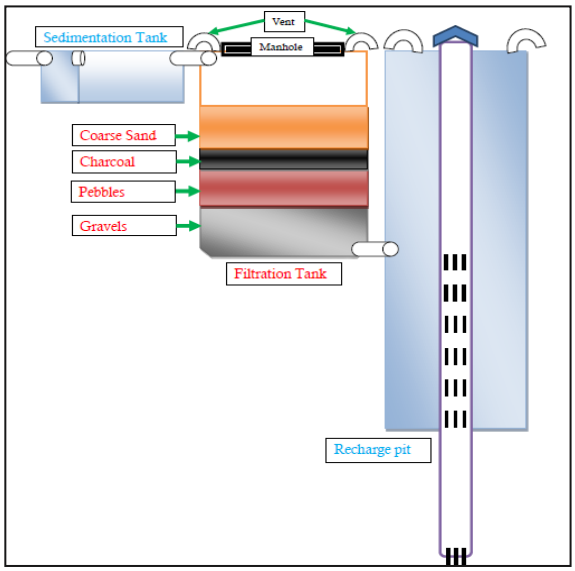
The above practices are descried separately

1. Roof top rainwater harvesting

Need for Rooftop Rain water harvesting:

a) To meet the ever increasing demand for water.
b) To avoid the flooding of roads.
c) To augment the ground water storage and control decline of water levels.
d) To reduce ground water pollution.
e) To improve the quality of ground water.
f) To supplement domestic water requirement during summer, drought etc.

The roof-top water collected can be made potable after suitable treatment. The excess water that flows can be stored in underground RCC rainwater harvesting tanks. The water collected from this source is mostly used for storage purposes to be used later for dust suppression on roads, constructional activities, washing of dumpers, dozers, cranes, coal haulers, etc., fire-fighting, floor washing etc. Theoverflow from the tank will be led to nearby storm water drain and will be further utilizedfor groundwater recharge. Fig.1 - shows the schematics of proposed roof top rainwaterharvesting.



Schematics of proposed roof top rainwaterharvesting.

2. Collection of storm water in the Guard Pond

Since water collected from the above source will be unfit for consumption, it can be used for storage and later used for many purposes as discussed in the above case. But the water collected from pavements can be diverted through gutters to underground masonry tanks, reinforced cement concrete tanks and surface guard pond for storage and to be used later.

Calculation of rain water harvesting potential:

Factors affecting rainwater harvesting potential is as follows:

- Rainfall
- Catchments area characteristics

Table 1 Runoff coefficients for various catchments surfaces

Type of Catchment		Coefficient
Roof Catchment		
1	Tiles	0.8-0.9
2	Corrugated Metal Sheet	0.7-0.9
Paved Area		
1	Concrete	0.6-0.8
2	Brick Pavement	0.5-0.6
Un Paved Area		
1	Soil on slopes less than 10 per cent	0.0-0.3
2	Rocky Natural Catchment	0.2-0.5

Based on the above factors the water harvesting potential of a site could be estimated using the formula given below.

Water harvesting potential = Rainfall (mm) x Area of catchments x Runoff Coefficient

The following are the detail of estimate:

Total plot area : 125 Ha
Un paved Area : 55 Ha (550000 Sq.m)
Paved Area (excluding roof top) : 40 Ha (400000 Sq.m)
Roof top area : 30 Ha (300000 Sq.m)

Considering the average annual rainfall of about 1400 mm (1.4 m), the storm water runoff calculation is:

Sl. No	Storm Water	Area (Sq. m)	Avg. Rainfall (m)	Run off Coefficient	Run Off (m^3)/ year
1	Roof Top (tiles)	3,00,000	1.4	0.7	2,94,000
2	Roof Top(Metal Sheet)				
3	Paved Area	4,00,000	1.4	0.5	2,80,000
4	Un Paved Area	5,50,000	1.4	0.1	77,000
TOTAL		**12,50,000**			**6,51,000**

The rain water falling over an area cannot be completely harvested because of evaporation, spillage, first flush waste etc. So, a constant co-efficient of 0.80 may be assumed for all situations.

Effectively Runoff Water – Run off x 0.80 = 6,51,000 x 0.8 = 5, 20,800 m^3/year

60% runoff water will follow the natural drainage pattern to the extent possible.

Remaining 40% (2,10,000 m^3) runoff water will be harvested. A network of drainage system having size 0.5m Depth × 0.5 m width will be provided to collect runoff water and diverted to surface 02 nos. Guard Pond of Dimension 100M x 100M x 5M.

The harvesting plan for 2, 10,000 m^3 runoff water is,

- 1,10,000 m^3 may be harvested on surface runoff water pond, out of which Net water available during dry period at Guard Pond- 90,000 m^3 because of trans evaporation loss and
- 1, 00,000 m^3 underground tank and stored suitably.

Runoff load to be utilized for artificial ground water recharge from Guest House outside the plant Area:

Peak hourly rainfall has been considered as 20 mm/hr. The length, breath and height of the recharge pit is 5 m, 4 m and 3 m respectively. Inside the recharge pit, a recharge bore will be constructed having adequate diameter and depth. At the bottom of the recharge well, a filter media will be provided to avoid choking of the recharge bore. Design specifications of the rain water harvesting plan are as follows:

- Catchments/roofs would be accessible for regular cleaning.
- The roof will have smooth, hard and dense surface which is less likely to be damaged allowing release of material into the water. Roof painting will be avoided since most paints contain toxic substances and may peel off.

- All gutter ends will be fitted with a wire mesh screen and a first flush device will be installed. Most of the debris carried by the water from the rooftop like leaves, plastic bags and paper pieces will get arrested by the mesh at the terrace outlet and to prevent contamination by ensuring that the runoff from the first 10-20 minutes of rainfall is flushed off.
- No sewage or wastewater will be admitted into the system.
- No wastewater from areas likely to have oil, grease, or other pollutants will be connected to the system.

Sl. No	Storm Water	Surface Area of roof (Sq. m)	Peak Hourly Rainfall (m/ hr)	Run off Coefficient	Run Off (m^3/ hr)
1	Roof Top (tiles)	1000	0.03	0.9	27
2	Roof Top(Metal Sheet)	1000	0.03	0.7	21
TOTAL		**2000**			**48**

Taking 15 minutes of retention time, total storm water load = 48/4 = 12 m^3/hr
Taking the effective length, breadth & depth of a Recharge pit 1 m, 1 m & 3 m respectively
Volume of a single Recharge pit = l × b × h = (5 × 4 × 3) = 3 m^3

Hence no. of pits required approx. = 12/3 = **4 Pits**

Thus, **4 number** Rain Water Harvesting pits @ the cost of 1.5 lakhs are proposed for artificial rain water recharge within the project premises.

Annexure-XIII

A.D.S POINT NO 13: SCHEME FOR SKILL DEVELOPMENT AS PER THE PROGRAMMES OF SKILL DEVELOPMENT COUNCIL OF INDIA TO IMPROVE THE EMPLOYABILITY IN THE PROPOSED PROJECT.

M/s Orissa Metaliks Private Limited in past has given priority to the local people for employment based on their academic qualification for their existing plants. The fund allocated under CER for Skill development to unemployed local youth through National Skill Development Corporation, Govt. of India Scheme, Workshop centre & Scholarship to unprivileged student is Rs. 304 lacs which will be spend in 7 years plans. The detail fund utilization breakup is:

Sl. No.	PROPOSED CER ACTIVITIES	INVESTMENT (IN LACS)						
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1	Skill development to unemployed local youth through National Skill Development Corporation, Govt. of India Scheme	27	27	26	26	24	24	20
2	Supporting schools for establishment of mini sports complex or playgrounds in providing the facilities like badminton court, tennis court and levelling of ground.	4	3	3	4	3	4	3
3	Workshop centre with latest tailoring machines for training women (like tailoring, stitching, Pickle & Sauces making, Soft Toys & Gem Jeweller, and Beautician Courses and for making affordable price of Sanitary Pads.)	7	7	7	6	6	5	5
4	Local villagers will be given employment on the basis of their eligibility. However a training camp shall be provided when new recruitment is done to enable check and select from the local pool of applicability.	8	8	8	7	7	6	6
TOTAL		**304 Lacs**						

Apart from that Apprenticeship will be provided to the local people on basis of their academic qualification as per provisions of Apprentices Act 1961 and Rules thereof to give on job training and develop their skill. The project will create employment in skilled, unskilled and semi-skilled categories during construction, commissioning & operational phase. Top most priority will be given to the local people based on their academic qualification and company requirement. 50 % of the manpower requirement will be fulfilled by local people.