



Ref: FAMD/SCM/242/FY20

Date: 28/SEP/2020

To
**The Member Secretary,
Odisha State Pollution Control Board,
Paribesh Bhawan,
A/118, Nilakantha Nagar,
Bhubaneswar, 751012**

Subject: Submission of Environmental Statement in FORM-V for the year ending 31st March 2019 in respect of Sukinda Chromite Mines of M/s Tata Steel Ltd.

Ref: Rule-14 under Environmental (Protection) Amendment Rule, 1993 (G.S.R.386,22.04.1993)

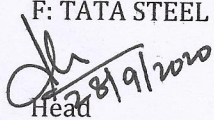
Dear Sir,

We are hereby submitting the Annual Environmental Statement in "FORM-V" prescribed under the provisions of above referenced statute, in respect of Sukinda Chromite Mines of M/s Tata Steel Ltd., At/Po- Kalarangiatta, Dist-Jajpur, Odisha, for the year ending 31st March 2020.

We would also like to inform your good office that our mining lease Sukinda Chromite Mine (406Ha) has expired on 31st March 2020. Indian Bureau of Mines through Joint Inspection along with DDM Office Jajpur official have certified the implementation of provisions of the approved Final Mine Closure Plan.

We have stopped mining operation at sukinda after 31st March 2020, except for activities permitted under the applicabe statute for the removal of movable assets and Ores already excavated during the currency of lease was pursued till Sep'2020. This is for your kind information and perusal please. Receipt of the same may please be acknowledged.

Thanking you,
Yours faithfully,
F: TATA STEEL LTD.


Head

Mine & Production Planning
Ferro Alloys Mineral Division

Enclosures: 1. Annual Environmental Statement (FORM-V) for the Financial Year ending 31st March 2020

Copy to: 1. Regional Officer, OSPCB, Kalinganagar, Dhabalagiri Chowk, Jajpur (Odisha)
2. MoEF&CC Eastern Regional Office, A/3, Chandrasekharapur, Bhubaneswar-751023
3. Zonal Office Kolkata, Central Pollution Control Board, South end Conclave, Block 502, 5th and 6th Floors, 1582 Rajdanga Main Road, Kolkata, West Bengal 700107.

TATA STEEL LIMITED

Sukinda Chromite Mine PO Kalarangiatta Dist Jajpur Odisha 755028
Phone no 91 6726 268763 Fax 91 6726 268734
Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001 India
Tel 91 22 6665 8282 Fax 91 22 66657724
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com



ENVIRONMENTAL STATEMENT

FORM-V [FY 2019-20]

**for
SUKINDA CHROMITE MINES**

Submitted By:

Sukinda Chromite Mine

M/s. Tata Steel Limited

At/Po: Kalarangiatta, Block-Sukinda

District- Jajpur, Odisha -755028

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

FORM - V

(See Rule -14)

ENVIRONMENT STATEMENT FOR THE FINANCIAL YEAR ENDING 31st MARCH, 2020

PART-A

i.	Name and address of the owner/Occupier of the industry, operation	:	Mr.T V Narendran (Owner) Address: Sukinda Chromite Mine, Tata Steel Ltd., At/P.O-Kalarangiatta, Dist. - Jajpur, Orissa -755028
ii.	Industry Category	:	Primary (SIC): 1000 (Metal Mining) Secondary (SIC): 1060 (Ferro Alloy Ore)
iii.	Production capacity	:	Chrome Ore (ROM): 2.4 MTPA* Pyroxenite Ore (ROM): 0.5 MTPA Chrome Concentrate: 0.65 MTPA
iv.	Year of establishment	:	1960. (20 th December 1960)
v.	Date of the last environmental statement submitted	:	28 th September 2019
<i>Note: *MTPA: Million tonnes per annum</i>			

PART-B

{WATER & RAW MATERIAL CONSUMPTION}

(1) Water Consumption:

A) Water Consumption for FY 2018-19 & FY 2019-20

S.No	Heads of Consumptions		Water Consumption (m ³)		Water Consumption (m ³ /day)	
			2018-19	2019-20	2018-19	2019-20
01	Process	*Spraying in mine pit	3,12,379	273625	855.8	749.7
		Vehicle Washing	3,370	3,275	9.2	9.0
		Beneficiation	1,95,252	205446.34	534.9	562.9
		Desludging	0	0	0.0	0.0
		Total Consumption	5,11,001	5,11,001	1400.0	1400.0
02	Cooling (Ac Cooling)		2,215	2725	6.07	6.1
03	Domestic	Drinking Purpose	7,71,382	684476	2113.4	1875.3
		Gardening Purpose	2,60,214	208787	712.9	572.0
		Total Consumption	10,31,596	10,31,596	2826.3	2826.3
04	Total Consumption (1+2+3)		15,44,812	15,45,322	4232.4	4234.8

*Note: * Spraying in mine pit or haul road dust suppression is not exactly a process driven parameter, which is linked with the extent of haul road in usage during mining operation.*

B. Specific Water Consumption- Water Consumption per unit of product output (m³/Tonne)

Name of Product	Production (Tonnes)		Water Consumption (Cu.M/Tonne)#	
	2018-19	2019-20	2018-19	2019-20

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

Chrome Ore (ROM)	1550375.084	1785991.903	0.202	0.155
Pyroxenite Ore (ROM)	7400	0.0	0.202	0.0
Chrome Concentrate	287374.227	92506.803	0.67	2.22

Note: # for computing specific water consumption (Heads considered for Sp. Water)

1. ROM-Chromite Ore+Pyroxenite: spraying in mine pit (KL) +Vehicle washing (KL)
2. Chrome Concentrates: Beneficiation & De-sludging have been considered. (Ref.Table.A above)
3. Production of Chrome Ore (ROM): Exclusive of the production from dump working (segregation from old dumps)

(ii) Raw Material Consumption

Tata Steel is involved in extraction of chrome ore and pyroxenite (Run off Mine) from the mine/quarry. Mining is not a manufacturing process thus there are no such raw materials involved in the process, however there are number of indirect raw materials/consumables used to support the process of mining and beneficiation of ore e.g chrome concentrations. The details of major consumables and resources utilized is reflected in the Table.5 below:

Table.5: Indirect Consumables/ Resource Consumed

Name of Raw materials/Consumables	Consumption of Raw Material (Indirect)	
	During previous financial Year (2018 - 19)	During current financial Year (2019 - 20)
High Speed Diesel (Ltrs)	7711145	6805922
Lubricants (Ltrs)	27141	13633
Grease (Kg)	5642	47
Explosives of all types	26211Kg,	713822Kg,
Electric Power Consumed (KhW)	12291450	16551864
Electric Power Generated(KhW)	68640	102960
Gas (Cu.M)	5465	4099
Tyres (Nos.)	40	74
Drill rods (Nos.)	18	04

PART-C**{POLLUTION DISCHARGED TO ENVIROMENT/ UNIT OF OUTPUT}****{Parameters as specified in the consent issued}****A. Water Pollution:**

- ❖ The major source of water for undertaking various activities is the mine pit water (rain fall and surface runoff accumulated in the pit and ground water seepage). Mine pit water is collected through stage pumping and drains at the Inlet of the ETP where; it is treated to correct the load of suspended solids, pH, Hexavalent Chromium, etc. Treated effluent is then reused for various purposes such as vehicle washing, haul road dust suppression, greenbelt development and maintenance, chrome ore beneficiation process and the balance treated effluent is discharged beyond the premises conforming to the prescribed norms.
- ❖ Water consumed for industrial cooling (AC Cooling): 100% Recycled.
- ❖ Water Consumed for Vehicle Washing: 100% Recycled at Oil-Water Separation Pit

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

- ❖ Chrome ore Beneficiation Plant: 100% Recycled at the parallel filter press to generated dry tailings.
- ❖ Slimes de-watering facility: 90-95% of the total slimes generated in the plant are being de-watered at the COB Plant (parallel filter press); Approx. max. 5-10% of slurry is discharged in to slime pond, from where clarified water is recycled back to the plant.
- ❖ The only point at which the potential for the discharge of pollutant is with the discharge end (outlet of the ETP) which has been put under real-time monitoring for the analysis of critical parameters such as, TSS, pH and Hexavalent Chromium. The summary of the treated effluent quality is outlined in the Table.2 below:

Details of Water Quality Monitoring-FY20:

❖ **Table. 6: Quality of Treated Effluent from ETP Outlet (discharged to Damsala Nala)**

Sl. No	Parameter	Unit	Detect ion Limit	Result (Range)	Max. Permissibl e Standard ##	Variation s from the prescribe d standard (%)	Remarks for the deviations if any
1	PH	--	--	7.1-7.46	6.0-9.0	0.0	Within the prescribed limit
2	Suspended Solids	mg/lt r	--	10.0 – 12.0	100	-86.0	Within the prescribed limit
3	Oil & Grease	mg/lt r	0.01	BDL	10	-100	Not Detected in any of the samples.
4	BOD (3) days at 27°C.	mg/lt r	1.8	<1.8	30	-100	Below detection limit.
5	COD	mg/lt r	--	ND	250	-100	Below detection limit.
6	Hexavalent Chromium as Cr ⁺⁶	mg/lt r	0.05	0.008-0.009	0.1	-100	Range of Cr+6 lies within 0.008 to 0.01
7	Total Chromium as Cr	mg/lt r	0.05	0.011 – 0.07	2	-100.0	Detected only in few samples
8	Nickel as Ni	mg/lt r	0.001	BDL	3	-100.0	Not detected in any of the samples
9	Iron as Fe	mg/lt r	--	0.11 – 0.24	3	-100.0	much below the permissible value

Note: ## Standards mention is as per the consent to operate and/or general standards for discharge of effluent for inland surface water (Part-A of Schedule-VI to Environmental Protection Rules,1986) whichever is capped at lower side of the max permissible value, BDL: Below Detection Limit)

B) Air Pollution:

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

❖ This is an opencast mine and does not have any potential point sources of emissions or processed stacks emanating pollutants to the environments. Hence, estimation of specific pollution load or air pollutants discharged in Kg/day cannot be ascertained, however ambient air quality for six core zone locations are monitored as per NAAQS-2009 and the summary of the monitoring results for FY 2019-20 is outlined as below in **Table.7: Ambient Air Quality at Sukinda Chromite Mines {average values}**

Monitoring Locations	Parameters (unit)	Results Annual Averages	Prescribed Standards 24 Average (NAAQS-2009)	Variations from prescribed standards (%) (variation w.r.t annual averages)	Reasons for +ive Variations (deviations from the standard values)
COB Plant	PM10 µg/m3	66.32	100	-35.7	Note: Annual average standard not prescribed in NAAQS-2009. <i>Average values of parameters based on 24 hourly reading is well within the NAAQS-2009 limits.</i>
	PM2.5 µg/m3	32.5	60	-40.7	
	SO2 µg/m3	6.34	80	-92.1	
	NOx µg/m3	14.9	80	-81.4	
	#CO mg/m3	0.38	4	-91.0	
Stack Yard	PM10 µg/m3	61.73	100	-34.3	Note: Annual average standard not prescribed in NAAQS-2009. <i>Average values of parameters based on 24 hourly reading is well within the NAAQS-2009 limits.</i>
	PM2.5 µg/m3	32.9	60	-38.5	
	SO2 µg/m3	5.2	80	-92.2	
	NOx µg/m3	13.10	80	-81.1	
	CO mg/m3	0.42	4	-89.8	
Laboratory Top	PM10 µg/m3	57.2	100	-40.8	Note: Annual average standard not prescribed in NAAQS-2009. <i>Average values of parameters based on 24 hourly reading is well within the NAAQS-2009 limits.</i>
	PM2.5 µg/m3	31.4	60	-47.7	
	SO2 µg/m3	5.79	80	-92.8	
	NOx µg/m3	14.05	80	-82.4	
	CO mg/m3	0.33	4	-91.8	
Hospital Top	PM10 µg/m3	55.20	100	-44.8	Note: Annual average standard not prescribed in NAAQS-2009. <i>Average values of parameters based on 24 hourly reading is well within the NAAQS-2009 limits.</i>
	PM2.5 µg/m3	30.22	60	-49.6	
	SO2 µg/m3	5.42	80	-93.2	
	NOx µg/m3	11.61	80	-85.5	
	CO mg/m3	0.29	4	-92.8	
Mining Complex	PM10 µg/m3	63.37	100	-36.6	Note: Annual average standard not
	PM2.5 µg/m3	35.72	60	-40.5	

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

Monitoring Locations	Parameters (unit)	Results Annual Averages	Prescribed Standards 24 Average (NAAQS-2009)	Variations from prescribed standards (%) (variation w.r.t annual averages)	Reasons for +ive Variations (deviations from the standard values)
	SO ₂ µg/m ³	6.51	80	-91.9	prescribed in NAAQS-2009. Average values of parameters based on
	NO _x µg/m ³	14.9	80	-82.4	
	CO mg/m ³	0.38	4	-91.0	
Near Tailing Pond	PM ₁₀ µg/m ³	59.2	100	-40.8	Note: Annual average standard not prescribed in NAAQS-2009. Average values of parameters based on 24 hourly reading is well within the NAAQS-2009 limits.
	PM _{2.5} µg/m ³	32.9	60	-46.8	
	SO ₂ µg/m ³	5.60	80	-92.6	
	NO _x µg/m ³	12.6	80	-84.2	
	CO mg/m ³	0.34	4	-92.3	

Note: # duration of monitoring is for 8hrs in a sampling event, (-) deviation implies values below the prescribed standards

- ❖ In addition to this there are five numbers of DG Sets of 1000KVA capacity installed and in operation for captive power utility purpose; however, these are not in continual operation on regular basis thus quantitative estimation (mass/day) of the air emissions is not carried out, however the stacks emission is monitored on quarterly basis and summarized result of the same is outlined in the Table-8 below.

Table.8: DG Set Emission Result:

	PARAMETERS	Average Range	Prescribed **Standards	Positive Variations from the prescribed standards (%)	Reasons for deviations if any
DG-1	Stack Temp °c (Range)	171.7	N/A	N/A	All the parameter
	Stack Velocity in (m/sec)	15.4	N/A	N/A	
	Particulate Matter, PM (mg/Nm ³)	71.9	150	Nil	
	Oxides of Nitrogen as NO _x (mg/Nm ³)	43.2	1100	Nil	
	Carbon Monoxide as (mg/Nm ³)	52.6	150	Nil	
	Non-Methyl Hydro Carbon (as C) (mg/Nm ³)	24.9	150	Nil	
DG-2	Stack Temp °c (Range)	183.4	N/A	N/A	

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

	PARAMETERS	Average Range	Prescribed **Standards	Positive Variations from the prescribed standards (%)	Reasons for deviations if any
	Stack Velocity in (m/sec)	16.8	N/A	N/A	Are well within the prescribed limits as per the reference to G.S.R. 489 (E), dated 9th July, 2001
	Particulate Matter, PM (mg/Nm ³)	64.6	150	Nil	
	Oxides of Nitrogen as NO _x (mg/Nm ³)	34.2	1100	Nil	
	Carbon Monoxide as (mg/Nm ³)	47.6	150	Nil	
	Non-Methyl Hydro Carbon (as C) (mg/Nm ³)	20.6	150	Nil	
DG-3	Stack Temp °c (Range)	179.5	N/A	N/A	
	Stack Velocity in (m/sec)	16.4	N/A	N/A	
	Particulate Matter, PM (mg/Nm ³)	64.30	150	Nil	
	Oxides of Nitrogen as NO _x (mg/Nm ³)	36	1100	Nil	
	Carbon Monoxide as (mg/Nm ³)	50.2	150	Nil	
	Non-Methyl Hydro Carbon (as C) (mg/Nm ³)	21.6	150	Nil	
DG-4	Stack Temp °c (Range)	183.5	N/A	N/A	
	Stack Velocity in (m/sec)	16.8	N/A	N/A	
	Particulate Matter, PM (mg/Nm ³)	67.6	150	Nil	
	Oxides of Nitrogen as NO _x (mg/Nm ³)	36.2	1100	Nil	
	Carbon Monoxide as (mg/Nm ³)	50.0	150	Nil	
	Non-Methyl Hydro Carbon (as C) (mg/Nm ³)	21.3	150	Nil	
DG-5	Stack Temp °c (Range)	171.4	N/A	N/A	
	Stack Velocity in (m/sec)	16.6	N/A	N/A	
	Particulate Matter, PM (mg/Nm ³)	66.4	150	-70.8	
	Oxides of Nitrogen as NO _x (mg/Nm ³)	37	1100	Nil	
	Carbon Monoxide as (mg/Nm ³)	51.3	150	Nil	

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

PARAMETERS	Average Range	Prescribed **Standards	Positive Variations from the prescribed standards (%)	Reasons for deviations if any
Non-Methyl Hydro Carbon (as C) (mg/Nm ³)	21.9	150	Nil	

*Note: ** Emission Standards For Diesel Engines (Engine Rating More Than 0.8 Mw (800 Kw) For Power Plant, Generator Set Applications And Other Requirements notified vide G.S.R 489 (E),dt. 9th July 2002*

PART-D
{HAZARDOUS WASTES}

(As specified under the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016)

Hazardous Wastes	Total Quantity generated	
	During the Previous Financial Year (2018-19)	During the Current Financial Year (2019-20)
Used Oil	60.90 KL	82.0 KL
Waste containing Oil	3.2MT	0.0MT
Waste Battery	260Nos	140Nos
ETP Sludge	314.05MT	296.0MT
From Pollution Control Facility: <ul style="list-style-type: none"> ▪ Waste oil from oil & grease separation pit ▪ Sludge from oil and grease separation pit 	} Included in the above Items	} Included in the above Items

PART-E
{SOLID WASTES}

Sources	TOTAL QUALITY	
	During the Current Year (2018-19)	During the Current Year (2019-20)
A. Generated from process		
A1 From Mining as Overburden	12232102 Tonnes	13152458 Tonnes
A2 From COB as Tailings	168561 Tonnes	141209 Tonnes
A3 Misc. waste from canteen/office/colony	0.65MT	0.54MT
B Generation from Pollution Control Facility	-Nil-	-Nil-

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

Sources	TOTAL QUALITY		
	During the Current Year (2018-19)	During the Current Year (2019-20)	
C	Quantity Recycled/Reused/Sold/disposed off		
C1	Quantity recycled or reused within the unit Used in backfilling	12232102 Tonnes	13152458 Tonnes
C2	Quantity Sold (General office waste)	0.65MT	0.54MT
C3	Quantity disposed-Overburden used in backfilling mine pit (as per FMCP)	15068432 Tonnes	13152458 Tonnes
C4	Quantity disposed-colony waste/office garbage, dry leaves, horticultural waste	Approx. 10Tonnes	Approx. 6-7Tonnes

PART-F

(PLEASE SPECIFY THE CHARACTERISTICS (IN TERMS OF COMPOSITION AND QUANTUM) OF HAZARDOUS AS WELL AS SOLID WASTES AND INDICATE DISPOSAL PRACTICE ADOPTED FOR BOTH THESE CATEGORIES OF WASTES)

The Table.11 below outlines the details pertaining to the management of solid waste and hazardous waste at our site. **Table.11: Waste Management Aspects:**

Sl. No	Waste Description	Nature of Waste	Composition/ Characteristics	Qty (2019-20)	Management (Methods of Collection & Disposal)
01	Overburden Material	Non-Hazardous (Solid Waste)	Quartzite and talk serpentine, Nickeliferrous limonite	13152458 Tonnes	-Used in backfilling the mine void.
02	Mine Tailings	Non-Hazardous	Chemical composition: SiO ₂ , Fe, MgO, CaO, Al ₂ O ₃ , Cr ₂ O ₃ , Mn, TiO ₂	141209 Tonnes	- Tailings produced are fed to thickener to increase the settling rate and producing clarified water - Thickener's discharge is fed to Tailings Dewatering Plant and Tailing pond. - Parallel Filter Press is in place for dry tailing generation. - Recently, company has installed one Tailing dewatering unit at the COB Plant to recover the water from the tailings and - Disposed in the form of dry cake in safe and

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

Sl. No	Waste Description	Nature of Waste	Composition/ Characteristics	Qty (2019-20)	Management (Methods of Collection & Disposal)
					environment friendly manner.
03	Solid Waste (from Canteen, camp, office)	Non-Hazardous & Solid Waste	Organic & biodegradable waste, garbage, dry leaves, etc.	Approx.:0.6MT	-Collected in buckets (3 cum capacity) disposed on the OB dumps to fasten the vegetation cover and reclamation process.
04	Food Waste (clubs, canteen, camps)	Non-Hazardous waste	Organic in nature	Approx..5-6MT	- Processed in bio-gas plant (two nos) and the gas recovered is used in cooking and the residual waste as manures
05	General Office Waste	Municipal Solid Waste & Other solid waste	Plastics, rubber, scraps, tins, jute bags, bottles, damaged stationaries	Approx..0.10MT	-recycled by a registered scrap recycler based at Cuttack. - construction waste (debris) used in backfilling.
06	Used Oil: Gear oil- SP460, 320, 220 & 90, Hydraulic oil: 68, 10, 46, and 100, Mobil oil: 20W40, 30, 40 Transformer oil, Grease: Senogem EP2, KG 10.	Hazardous Waste (HW-5.1)	PCBs, Lead, Arsenic, Cadmium, Chromium, Nickel, PAHs, etc.	Gen:82.0KL Recycled:82.0KL Bal:Nil Including the balance from the previous year stocks. (As on 31.03.2020)	- Collected and securely stored inside 200Ltr MS Barrels and stored above concrete pavement under shed. - Sold to M/s Raj Lubricants and M/s Jamshedpur Lubricants, authorized by SPCB.
07	ETP Sludge	Hazardous Waste (HW-35.3 & 35.4)	Contains-compounds of Cr, Fe, Ni, Al, Si, etc.	Gen:296.0MT Disposed off: 296.0MT Bal:Nil	-stored over impervious structure preventing spillage - disposed off at CHWTSDf of M/s Orissa Waste Management Ltd.
08	Residual waste containing oil	Hazardous Waste (HW-5.2)	Consists of oil filters, and residues such as soaked sand/soil, jutes, etc.	Gen:Nil Disposed off: Nil Bal:1.0MT (from previous year stock) Oil filters dealt as scrap and since no authorised recycler/party was available in Odisha for incineration the same waste was handed over along with ETP Sludge for	-Stored in HDPE lined placer dumper buckets - Soaked sand stored in vats at oil& grease separation system

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

Sl. No	Waste Description	Nature of Waste	Composition/ Characteristics	Qty (2019-20)	Management (Methods of Collection & Disposal)
				further treatment/disposal	

PART-G

{IMPACT OF POLLUTION ABATEMENT MEASURES TAKEN ON CONSERVATION OF NATURAL RESOURCES AND ON THE COST OF PRODUCTION}

A.) DUST SUPPRESSION:

- ❖ To limit the fugitive emissions, various control measures like water sprinkling on haul road, transfer points, Ore stack yard, etc. is being done and the ore transporting roads (except for mine haul roads) and areas in maintenance, stack yard and chrome ore beneficiation plant have been concreted and stationary water sprinklers have also been installed.
- ❖ Four graders have been deployed for grading all the haul roads to remove the accumulated muck. Ten water sprinklers (two of 28 KL, four of 25 KL, and four 8 KL) have been deployed in the mine area for dust suppression on haul road and at mineral storage yards.
- ❖ Water spraying is done through pressure water jets at feed hopper, transfer points, discharge chute to prevent dust generation. The process at COB Plant is totally wet and eliminates the chance of any dust generation. The concentrate stacks are now being covered using tarpaulin sheets to prevent finer concrete particle from getting air borne. The details of concrete road including provision of fixed water sprinkler is outlined in the Table.12 below:

Table.12: Dust Suppression/Control Measures at Sukinda Chromite Mines

Particulars	Location	Length(m)	Width(m)
Concrete road	Main Haulage road	1000	13
	COB Plant	100	10
	LOP Plant	200	06
	Workshop	200	06
Fixed water sprinkling system	Main Haulage road	1000	-
	COB Plant	100	-
	LOP Plant	200	-
	Workshop	100	-
	Mining Road	1500	11

- ❖ To reduce dust generation at dry tailing plant, floor concreting and peripheral drain construction had been made. Tarpaulin covers are being used in stack yard and COBP to reduce dust generation with the expenditure of Rs. 10 Lakh per year (Approx.)

B.) ENVIRONMENTAL MANAGEMENT AT ASSOCIATED MINERAL STORAGE AREAS:

- ❖ The process at COB Plant is totally wet and eliminates the chance of any dust generation. The concentrate stacks are now being covered using tarpaulin sheets to prevent finer concrete particle being getting air borne.

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

- ❖ Plantation of 5-20 m width has also been raised in between colony and mines to minimize any air borne problems to the inhabitants. All parameter w.r.t ambient air quality is complying with the prescribed limit.
- ❖ Garland drains around the mines of 15,755m stretch have been constructed and is maintained regularly at the toe of dumps, periphery of the quarries, stack yard, COB plant and camp area.

C.) ENVIRONMENTAL MANAGEMENT: OB Dump Reclamation:

- ❖ The maximum height of the overburden dumps from its toe to the top of the dump on sloping ground is being maintained within 110 m.
- ❖ Dump Stability Study was taken up in 2010-11 with IIT, Kharagpur as per advice of the Regional Office of the MoEF, Bhubaneswar, for assessing long term dump stability requirements. As per the Report of May'2011, dumps up to 110m height are stable. The topography of the already stabilised old area is undulated and hilly ranging from 140 mRL to 200 mRL. At present over burden is disposed only in to OB II quarry as backfilling. Benches have been provided and overall slope of the dumps are less than 28°.
- ❖ Each level of dump is provided with garland drain and water from upper level flow to next level via concrete patch path (channel) provided for same purpose at areas were feasible. The concrete patch path ensures less soil erosion and flow of water from designated path. Further, coir matting and vetiver plantation has been done on the dump slopes to prevent wash off during the monsoon. Garland drains with 10 nos. of settling pits for silt collection of 1.5 m-2m width and 1m-1.5m deep have been constructed on the toe of all the OB dumps to collect the surface run-off during rainy season. The collected run-off is treated in newly installed ETP of capacity 4500 m³/hr and is then discharged beyond the lease boundary.
- ❖ To prevent soil erosion and to stabilize the dump slope of associated minerals 1,40,000 nos. of saplings have been planted during FY 2019-20 over 44 ha of additional area allotted for overburden dumping. The density of tree more than 2500 trees per ha is being maintained.
- ❖ **SOLID WASTE MANAGEMENT:** The strategy for solid waste management basically focuses at Reduction and Source followed by proper segregation to explore the possibility of re-use /recycle and ultimately disposal in case becomes inevitable.
- ❖ Organic waste of canteen was put to the bio-gas plant made near canteen for the purpose. Organic waste of Hospital, Guest House & Valley club are also put to the bio-gas plant made near Valley club and other biodegradable waste including plant wastes are put in the overburden dumps to improve the nutrient content and thereby the plant growth.
- ❖ Each work place has been provided with containers for segregation of solid wastes depending on its characteristics for proper management and all the houses in the camp have been provided with two separate buckets for storage of degradable and non-degradable waste separately for safe disposal.

D.) WATER CONSERVATION: TREATMENT & RECYCLING:

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

- ❖ During 2019-20 company has spent Rs.146.8 Lakh (INR) towards mine water treatment to ensure that the water quality meets all the parameters as prescribe by the statutory authorities. This is excluding the cost of treatment of domestic effluent and cost of operating WTP (drinking water treatment facility).
- ❖ For the workshop effluents: An oil -Water Separation Pit equipped with belt skimmer is in place for trapping the oil and grease splits in the effluents generated from the vehicle washing.
- ❖ The system of treatment for Mine Pit Water consists of an ETP of 4500 m³/hr (108MLD) having the facilities like, settling pit, flash mixture, clarri-focculator, automatic dosing system, dry sludge collection system, multi sand filters etc as per the Direction of State Pollution Control Board.
- ❖ Herbal Treatment Plant is in use at our COB Plant for treatment of Hexavalent Chromium in the chrome concentrate. The water from tailing dam is recycled back to COBP for further reuse.
- ❖ Rain water harvesting study had been conducted and one roof top harvesting structure had been constructed inside General Office premises which will be also extended to other buildings.

E.) ENVIRONMETNAL MONITORING:

- ❖ An amount of Rs.25.5 Lakh (INR) was spent towards monitoring of various environmental parameters in FY 2019-20. This consists of air quality monitoring at a frequency of twice in a week with 24 hourly sampling and water quality monitoring once in a month for all the parameters as prescribed under various applicable statute.
- ❖ Weather monitoring is done through automatic weather monitoring station and compiled report on rain fall, humidity, temperature, wind speed, wind direction etc.
- ❖ Monitoring has been entrusted to one of the Odisha State Pollution Control Board empanelled category A consultant.

F.) PREVENTION OF LAND CONTAMINATION:

- ❖ The entire area of the HEMM maintenance workshop had been “Epoxy Flooring” for preventing any oil to reach the soil or ground and practices of using movable oil collection tray with built in pneumatic oil pump during any kind of HEMM maintenance to reduce oil leakage incidents.
- ❖ Targets have been put at various concerned locations to reduce the leakage/ spillage of oil which are monitored in as per the laid down EMS procedure.
- ❖ Introduction of barrel handler for handling of oil barrels to reduce oil leakage and spillage.
- ❖ Introduction of off line oil cleaner resulting in enhancement of oil life (increased oil replacement interval) and thereby reducing waste oil generation.
- ❖ Modification of the hose kits in CAT dumper that has resulted in oil consumption. Separate dust bins have been provided at COB Plant and workshop for collection of oil soaked waste to prevent contamination of land.

G.) AFFORESTATION:

- ❖ The plantation programme is being carried out as per the approved Mining Plan & Progressive Mine Closure Plan as that was envisaged in the EIA report.

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited

- ❖ During the past year ended on March' 20 total 140,000 no. of saplings were planted over 44 ha area in the Additional area of 100 ha allotted for overburden dumping.

H.) NOISE REDUCTION:

- ❖ Noise monitoring is being done once in three months both in work zone and in ambient. The data on noise level for the period Apr'19 to March'20 indicate that the values of noise levels are well within the prescribed limits of 85dB(A) at all the workplaces.
- ❖ Due precautions at source and at the receiver end are being taken adequately. Wherever possible the noise is controlled at the source by replacement of metallic screens by rubber screens & polyurethane panels etc at Chrome Ore Beneficiation and Lumpy Ore Processing plant. DG sets have also been provided with acoustic enclosures to prevent noise propagation.
- ❖ The operator's cabin of all the HEMM's including drills and dozers has been made air conditioned which serves as acoustic barriers. Controlled blasting technique like presplit blasting, use of Nonel and SME (Site Mixed Emulsion) is being followed as per CIMFR, Dhanbad's recommendation minimize noise pollution and fly rock generation. However, the people working in the noisy areas are provided with personal protective appliances to reduce exposure of high noise. Regular test of all the vehicles is being carried out to check whether the vehicles are meeting pollution under control (PUC) norms.
- ❖ In the crusher area polymer liners have been fitted to reduce noise.
- ❖ All the shovels and haul pack cabins have been air conditioned to prevent adverse impact of dust and noise on the operators. To start with two dozer cabins have been made air conditioned.
- ❖ The DG sets working inside the camp have been provided with acoustic enclosures. The noise outside the acoustic enclosure, at the time of running DG sets measures to be within 45 - 65 dB (A).

I.) BEAUTIFICATION:

- ❖ For landscaping and horticultural development in the colony and workplaces an amount of Rs.235 Lakh(INR) was spent including watering arrangement to different gardens and plantation sties, flower show exhibition, Mines and Mineral Conservation Week, etc.

J.) SANITATION & WATER SUPPLY:

- ❖ Towards potable water supply for the camp residents Rs.43.5Lakh (INR) was spent during financial year 2019-20 and Rs.67.0 Lakh (INR) on sanitation fonts incurred in maintenance of sewer lines and storm water drains.
- ❖ Towards operation & maintenance of full-fledged STP an amount of Rs.10.5 lakh was spent during 2019-20.

K.) MALARIA ERADICATION (expenditure of 5.6Lakhs INR):

- ❖ Integrated mosquito control management programme undertaken to eradicate malaria cases in the colony. TSRDS has done several mobile treatment programs in different villages regarding diseases and their remedial measures with full check-up.

- L.) RESOURCE CONSERVATION:** The establishment of Chrome ore beneficiation plant has been able to utilize low grade ore having no market to produce beneficiated ore of the desired market value. This has been the best example of our dedication towards the conservation of natural resources, which would otherwise have been wasted.

- ❖ Tailing dewatering plant has been established in the Chrome Ore Beneficiation (COB) plant premises. Higher and instant recovery of clear water is now possible using parallel filter press process.
- ❖ **Water Conservation:** Chrome Ore Beneficiation Plant is Zero Discharge Plant. Tailings generated are in the forms of dry cakes and disposed of in the designated tailing pond.
- ❖ **Energy Conservation-1:** In COB plant, translucent sheets have been fixed on the roof for reducing wastage of electricity and to reduce water consumption.

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited
PART-H

{Additional Measures/ Investment Proposal for Environmental Protection Including Abatement of Pollution, Prevention of Pollution}

The management of sukinda chromite mines plans to undertake the environmental protection measures aiming at specific areas with defined budgetary provisions earmarked towards the environmental protection measures every year. Funds earmarked for this purpose for the year 2019-20 is outlined in the table below reflecting the comparative status b/w the planned provision and the actual expenditure.

Table.13: Environmental Budgets (Planned Vs Actual) for FY 2019-20

Sl.No.	Item	Expenditure (Lakh(s) INR) Year-2019-20 (Approx)	
		Planned	Actual
1	Afforestation	250.0	235.0
2	Dust suppression	175	182.5
3	Treatment of mine discharge & recycling	142	146.8
4	Environment & weather, exhaust monitoring	24	25.5
5	Horticulture development	65	80
6	Drinking water supply	32	43.5
7	STP Operation & Maintenance	7.5	10.5
8	Sanitation	45	78.5
9	Herbal Treatment	0	1.2
10	Malaria Eradication	0	5.6
11	Garland drain & storm water drain	3.2	4.5
12	Family planning	1	0
13	Slime dam management	12	10.7
14	Environment awareness (EMS)	12	10.24
15	Community development through TSRDS	530	540.0
16	Hazardous waste management	25	35.5
17	Bio medical waste	4	2.15
18	Total	1327.7	1415.64

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited
PART-I

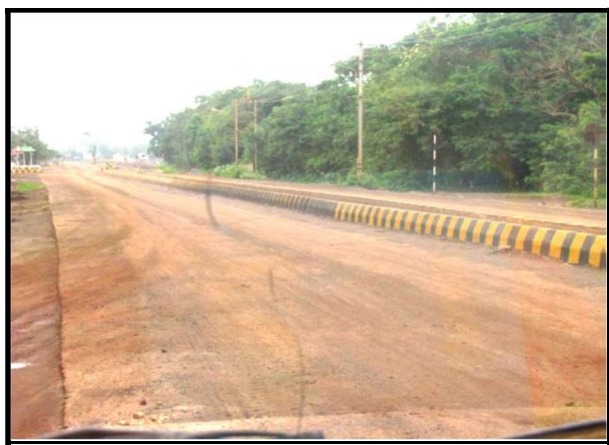
(ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT)

- ❖ Company is committed for prevention/abatement of pollution and minimize adverse environmental impacts of the business by ensuring continual improvement of environmental performance, and complying to the relevant environmental and other legislation, regulation & other requirements.
- ❖ The mine has already been certified with ISO-14001 (Environment Management System), ISO-9001 (Quality Management System), OHSAS-18001 (Occupational Health and Safety Assessment Series), (SA-8000) Social Accountability system and maintaining the systems satisfactorily. Apart from the above stated certifications our camp has also been certified with ISO-14001 (Environment Management System).
- ❖ The following sections depicts the environmental management practices undertaken at site. Photographs are attached for reflecting the environmental measures.

COVERING OF LOADED TRUCK BY TARPAULIN



CONCRETE PATH:



DUST CONTROLLING MEASURES



DUST SUPPRESSION AT HOPPER:



HAUL ROAD DUST SUPPRESSION SYSTEM:



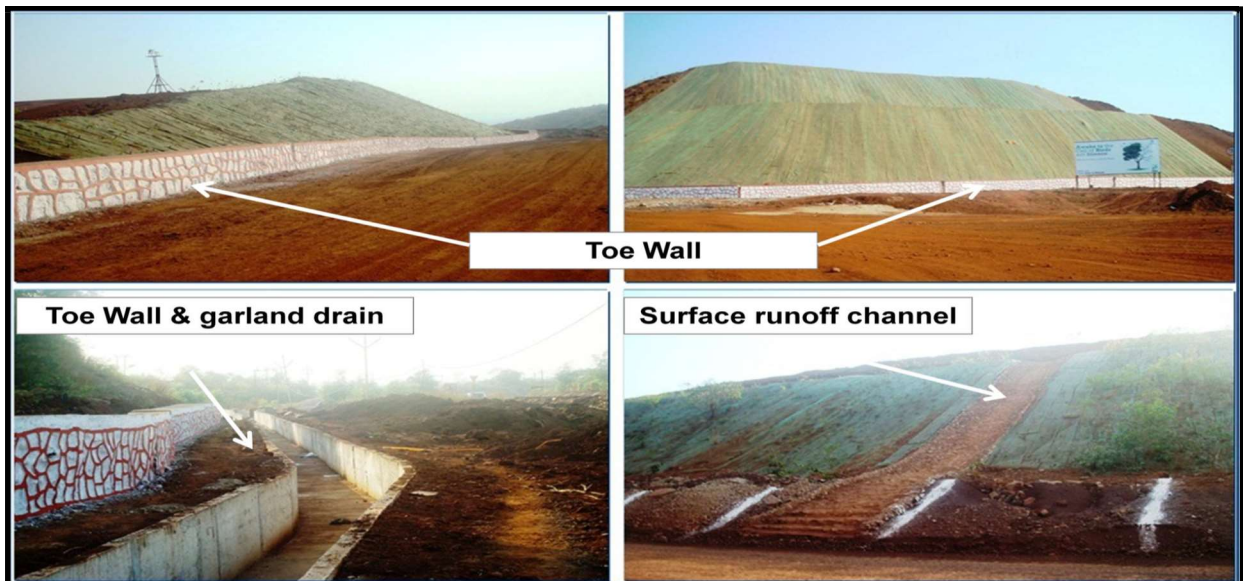
CONCRETE STACK WITH TRAUPLIN



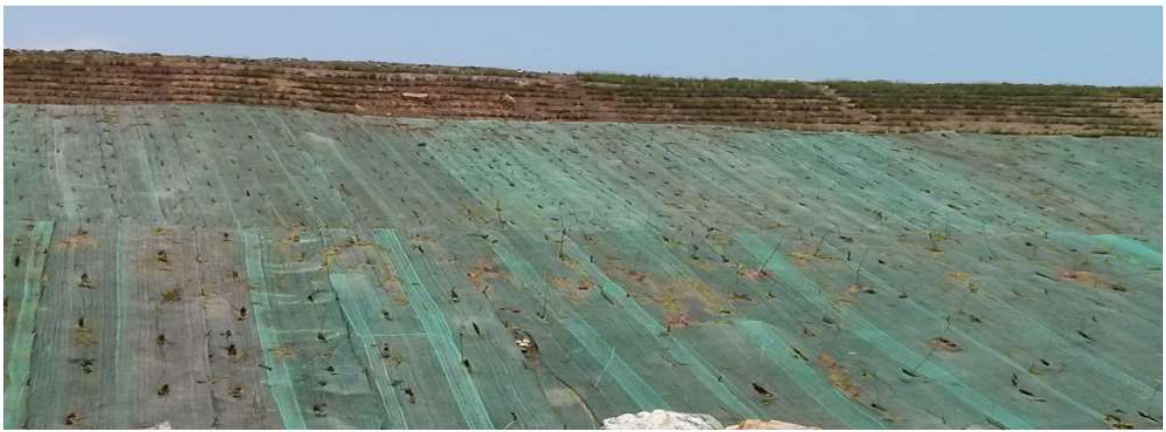
RAIN WATER HARVESTING STRUCTURE:



Toe wall, Garland Drain and Surface Runoff Channel



Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited
VERTIBER PLANTATION & GEONET APPROAC DUMP SLOPE:



Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited
EFFLUENT TREATMENT PLANT:



TAILING MANAGEMENT SYSTEM:



Thickener and Water Recirculation Arrangement



Tailing Dewatering Plant and Water Recirculation Arrangement

Environmental Statement (Form-V) 2019-20 for Sukinda Chromite Mine of M/s Tata Steel Limited
OIL-WATER SEPARATION



dh
Head 28/9/2020
Head (MPP)
Mine & Production Planning
F&M, JODA
Tata Steel Ltd.
Ferro Alloys Mineral Division
M/s Tata Steel Limited
(For Sukinda Chromite Mines)

Date: 28/9/20