



TSL/SPCB/BS-03/2022-14/249

September 29, 2022

The Member Secretary

State Pollution Control Board, Odisha
Parivesh Bhawan, A/118,
Nilakantha Nagar, Unit-VIII,
Bhubaneswar-751 012

Subject: Environmental Statement for the financial year 2021-22 for M/s. Tata Steel Ltd. Meramandali, Dhenkanal.

Reference: Consent Order No.4048/IND-I-CON-5440 dated 17.03.2021.

Dear Sir,

In reference to the captioned subject and letter cited above, we are submitting herewith the “**Annual Environmental Statement (Form-V)**” duly filled in the prescribed format for the 5.6 MTPA crude steel production at Integrated Steel Plant of Tata Steel Ltd. at: Narendrapur, Via: Meramandali, Dist.: Dhenkanal, Odisha, for the financial year 2021-22.

This is for your kind information and necessary record please.

Thanking you,

Yours faithfully,

For Tata Steel Limited

Anoop Srivastava

**Anoop Srivastava
Head Environment**

Encl: As above

Copy to:

1. Deputy Director General of Forests (C) Ministry of Environment Forest and Climate Change, Integrated Regional Office, A/3, Chandrasekharpur, Bhubaneswar – 751023.
2. Regional Officer, State Pollution Control Board, Odisha, Angul.

TATA STEEL LIMITED

Narendrapur Kusunpanga Meramandali Dhenkanal 759 121 Odisha India Tel 91 6762 352000
Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001 India Tel 91 22 66654282 Fax 91 22 66657724
Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

[FORM-V]
(See rule 14 of The Environment Protection Act, 1986)

Environment Statement for the financial year ending 31 March 2022

PART – A

General Information		
	Name of the Company	Tata Steel Limited, Meramandali
1.	Name & Address of the owner/occupier of the industry, operation or process	Sri Thachat Viswanath Narendran CEO& MD Tata Steel Limited, Meramandali At: Narendrapur, PO: Kusupanga Via: Meramandali, Dist.: Dhenkanal, Pin: 759121, Odisha
2.	Industry Category	Red-A
	Primary (STC Code),	Large Metallurgical Industry
	Secondary (STC Code)	Integrated Iron & Steel Industry
3.	Production capacity-Units	Production Capacity: 5.6 MTPA Crude Steel Production During 2021-22: 4.89 Million Tons Crude Steel (Major units are: RMHS & RMPP, Blast Furnaces, Coke Ovens, Sinter Plants, SMS,BOF,HSM,CRM,Captive Power Plant,Industrial By-Product Management Division and Utilities including Air Sepretaiion Units.)
4.	Year of establishment	2006
5.	Date of last environment statement submitted	September 29,2021 vide letter no.TSBSL/SPCB/BS-03/2021-15/97

PART – B

Water & Raw material Consumption		
1: Total Water Consumption (m³/d)		
Water Consumption	During the previous Financial Year (2020-21)	During the current Financial Year (2021-22)
Industrial Consumption (Inside Works as Makeup water)	40,154	54,185
Domestic Consumption (Inside Works as Drinking water)	2,637	3,054
2: Water Consumption per unit of the product (m³/tcs)		
Name of the Products	Process Water Consumption per unit of product m³/tcs)	
Crude Steel	2020-21	2021-22
Specific Water Consumption	4.02	3.42

3: Raw Material Consumption (Works):			
Name of Raw materials	Name of Products	Consumption of raw material per unit of product (MT/Tcs)	
		During the previous Financial Year (2020-21)	During the current Financial Year (2021-22)
Iron (Lump & Fine)	Crude Steel	1.40	1.31
Purchase Pellet		0.39	0.28
Limestone & Dolomite		0.42	0.28
Quartz		0.11	0.03
Coking Coal		0.58	0.25
Non-Coking coal		0.45	0.65
Scrap		0.07	0.07
DRI Lump & Fine		0.13	0.15
Total		3.55	3.02

PART – C

**Pollution discharged to Environment per unit of Output
(Parameters as specified in the Consent issued)**

(i) Works:

Pollutants	Quantity of pollutants discharged (mass/day)		Concentrations of pollutants discharged (mass/volume)		% of variation from prescribed standards
	(Tons/day)		(mg/l)		In % age (referring CTO)
(a) Water	2020-21	2021-22	2020-21	2021-22	2021-22
TSS	0.42	0.24	73	42	-23.2
COD	1.5	0.448	246	78	-68.8
Ammonia as N	0.0001	0.0001	0.014	0.01	-0.196
BOD	0.02	0.01	2.86	0.9	-11.64
Phenols	-	0.0001	-	0.009	-0.39
Cyanide as CN ⁻	0.0002	0.0002	0.03	0.03	-0.008
(b) Air	2020-21	2021-22	2020-21	2021-22	2021-22
	(Tons/day)		mg/Nm ³		In % age (referring CTO)
PM	8.04	8.30	17.38	19.71	-60.58
SO ₂	36.12	60.55	470	507.6	-15.4
NO _x	14.80	20.94	112	126.2	-57.9

1. Surface Water Quality

Parameter	UoM	Norms	Kisinda Nalla			Lingra Nalla		
			Min	Max	Avg	Min	Max	Avg
pH Value	-	6.5-8.5	7.56	8.33	8.12	7.92	8.35	8.17
Dissolved Oxygen	mg/l	4-6	5.3	5.72	5.49	4.5	5.7	5.42
BOD (3) days at 27 oC	mg/l	3	1.8	2.4	2.16	1.4	2.7	2.24
Total Suspended Solid (TSS)	mg/l	100	54	76	66.75	62	80	70.00
Total Hardness as CaCO ₃	mg/l	-	188	322	259.58	124	262	193.33
Calcium as Ca	mg/l	-	45.29	77.75	62.67	29.66	64.1	46.96
Magnesium as Mg	mg/l	-	18.3	34.16	25.34	12.2	25.4	18.55
Iron as Fe	mg/l	0.5	0.007	0.18	0.08	0.007	0.19	0.08
Chlorides as Cl-	mg/l	600	31.95	116.7	55.14	22.72	123.4	51.62
Fluoride as F	mg/l	1.5	1.3	5.8	2.62	0.8	2.3	1.31
Dissolved solids	mg/l	1500	276	447	339.25	210	365	273.00
Nitrate as NO ₃	mg/l	50	0.66	3.8	2.02	0.62	2.9	1.56
Alkalinity as CaCO ₃	mg/l	-	48	86	64.92	38	85	55.17
Phosphate as PO ₄	mg/l	-	0.42	0.8	0.59	0.51	0.92	0.68
Chemical Oxygen demand (COD)	mg/l	-	10	38	19.75	12	40	20.58

2. ETP Treated Water Quality

Parameter	UOM	Standard	BOD-1Treated effluent			BOD-2 Treated effluent		
			Min	Max	Avg	Min	Max	Avg
pH Value	-	5.5-9.0	7.01	8.09	7.42	7.17	8.13	7.61
Total suspended solids	mg/l	100	40	63	55.25	47	73	56.58
Oil & Grease	mg/l	10	5	8	6.58	5	9	6.33
Chemical Oxygen demand (COD)	mg/l	250	140	188	163.67	148	192	170.58
BOD (3) days at 27°C	mg/l	30	17.4	27.82	23.09	19.2	26.8	22.35
TCN	mg/l	0.2	0.1	0.18	0.13	0.1	0.34	0.15
Phenol	mg/l	1	0.63	1.2	0.81	0.57	1.2	0.76

Parameter	UOM	Std.	ETP-1			ETP-2			ETP-3		
			Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
pH Value		5.5-9.0	7.47	8.5	7.93	7.08	7.96	7.65	6.78	8.17	7.68
TSS	mg/l	100	42	63	51.75	42	69	54.83	38	63	52.17
COD	mg/l	250	32	60	43.33	29	60	46.92	48	96	70.75
BOD	mg/l	30	2.5	8.6	4.40	2.5	7.6	4.13	3.4	13.5	7.13
Iron as Fe	mg/l	1	0.02	0.17	0.08	0.03	0.19	0.10	0.05	0.21	0.12

3. Sewage Treatment Plant -Treated outlet quality

Parameter	UOM	Standard	Plant STP			Colony		
			Min	Max	Average	Min	Max	Average
pH Value		5.5-9.0	7.33	8.8	7.91	7.53	8.11	7.74
TSS	mg/l	100	36	59	47.83	44	212	66.42
BOD	mg/l	30	12	23.6	18.55	17.4	90.6	28.94
COD	mg/l	-	30	46	40.25	58	70	63.50

4. Ambient Air Quality

Parameters	UoM	Norm	CAAQMS- 1			CAAQMS- 2			CAAQMS- 3		
			Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
PM10	µg/m³	100	8.13	153.49	42.49	10.14	316.10	126.20	15.75	334.53	114.75
PM2.5	µg/m³	60	2.32	35.28	14.91	5.47	172.59	54.11	6.60	112.62	30.12
SO2	µg/m³	80	7.87	43.37	18.71	3.23	43.59	18.64	3.90	76.25	15.51
Nox	µg/m³	80	7.02	25.33	15.96	4.38	29.52	10.35	1.37	432.94	38.28
CO	mg/m³	2	0.10	3.33	0.52	0.62	1.04	0.84	0.10	1.97	0.44

CAAQMS- 4			CAAQMS- 5			CAAQMS- 6			CAAQMS- 7		
Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
15.36	226.59	72.07	24.45	219.73	75.65	17.60	298.37	113.53	9.41	333.34	129.15
4.01	266.36	20.33	4.71	76.96	23.01	7.97	183.28	37.16	5.21	154.23	50.40
4.96	89.19	11.13	6.13	86.47	13.68	2.01	59.00	15.01	5.78	31.28	8.89
1.60	63.06	19.56	2.50	76.33	17.02	0.34	123.14	28.35	4.58	42.79	32.55
0.02	43.99	0.63	0.27	1.80	0.47	0.01	1.50	0.64	0.10	2.80	0.55

CAAQMS 1: Near Township; CAAQMS 2: Near AEL Boundary; CAAQMS 3: Near CRM CAAQMS; 4: Near Water Complex; CAAQMS 5: Near Coke Oven 2; CAAQMS 6: Near Wagon Tippler; CAAQMS 7: Near Material Gate; UM: Under Maintenance.

Values are derived from 24 hourly average data except CO values are derived from 8 hourly average data.

PART – D

Hazardous Wastes (As specified under The Hazardous and Other Wastes (Management & Transboundary Movement) Rules, 2016)		
Hazardous waste	Total Quantity (MT)	
	During the previous Financial Year (2020-21)	During the current Financial Year (2021-22)
(a) From Process		
Used Oil	289.33	295.04
Waste residue containing oil	24.036	25.86
Spent Resin	1.25	3.0
Rejected Chemical Container	193.47	18.22
Insulation Material	83.47	114.21
Alkali Residue	17.66	23.17
Oily Sludge	93.33	101.6
Zinc Ash & Zinc Dross	480.85	471.41
(b) From Pollution Control Facilities		
BOD plant Sludge	1563.35	2496.53
Decanter Tar Sludge	1385	1396
ETP Sludge/Chemical Sludge from wastewater treatment plant	872.25	694.38
Exhaust Air or Gas cleaning residues	34363.9	179882

NB: Exhaust Air or Gas cleaning residues: GCP sludge of BF & BOF

PART – E

Solid Wastes

Total Quantity Generated

Name of the Waste	Total Quantity Generated (MT)	
	During the previous Financial Year (2020-21)	During the current Financial Year (2021-22)
(a) From Process		
1. Char	122642	186697
2. BF Slag	1519144	1754865
3. SMS Slag	831438	882264
4. Bottom Ash	38950	38583
(b) From Pollution Control Facilities		
1. Fly Ash	291348	347253
2. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust)	137535	198800
3. Mill Scale	58817	61764

(c) (1). Total Quantity Recycled/Reutilized within the Unit

Name of the Waste	Total Quantity Recycled/Reutilized within the Unit (MT)	
	During the previous Financial Year (2020-21)	During the current Financial Year (2021-22)
1. Char	106543	68512
2. SMS Slag	428571	470180
3. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust)	68048	86038
4. Mill Scale	61805	65701*

*3896 MT Mill Scale has been used from previous stock

(c) (2). Total Quantity Sold

Name of the Waste	Total Quantity Sold (MT)	
	During the previous Financial Year (2020-21)	During the current Financial Year (2021-22)
1. Char	Nil	163600
2. SMS Slag	117403	396316
3. BF Slag	1730873	1611678
4. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust)	20699	87958
5. Mill Scale	984	0

*45415 MT Char has been used from previous stock

(c) (3). Total Quantity Disposed/Stored

Name of the Waste	Total Quantity (MT)	
	2020-21	2021-22
1. Char	16099	Nil
2. SMS Slag (Stored inside the plant)	285464	15768
3. BF Slag (Stored inside the plant)	Nil	143187
4. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust) (Stored inside the plant)	48788	24804

Fly ash of 347253 MT and Bottom Ash of 38583 MT generated during 2021-22 were used outside the plant for NH construction, cement manufacturing, bricks making and reclamation of stone quarry.

PART – F

Chemical Composition of majority of waste as produced in process of Tata Steel, Meramandali operation is given below:

Name of the Wastes	Chemical Composition (%)	Disposal Method
ETP-Sludge	SiO ₂ : 39.21 Na ₂ O :0.41 Al ₂ O ₃ : 23.32 K ₂ O :1.65 Fe(T) : 10.3 P ₂ O ₅ :0.06 TiO ₂ :0.36 SO ₃ :0.28 MnO :0.049 C :3.51 CaO :0.78 Cl :0.23 MgO :1.21 LOI :16.28	Steel Making Process
ETP Sludge From CRM	SiO ₂ : 2.40 Na ₂ O : 1.22 Al ₂ O ₃ : 1.15 K ₂ O : 0.52 Fe(T) : 3.72 P ₂ O ₅ : 0.45 TiO ₂ : 0.03 SO ₃ : 0.17 MnO : 0.10 C : 17.5 CaO :21.81 Cl : 1.13 MgO : 2.54 LOI : 42.75	Stored in special containers followed by disposal at CHWTSDF.
BOD plant Sludge	Al ₂ O ₃ : 0.08 K ₂ O : 0.65 Fe(T) : 7.28 P ₂ O ₅ : 0.06 TiO ₂ : 0.36 SO ₃ : 0.45 MnO : 0.064 Cl : 0.23 CaO : 0.16 LOI : 80.2 MgO :0.02 Na ₂ O : 0.24	Reused in Coke oven plant
Decanter Tar Sludge	Al ₂ O ₃ : 0.04 K ₂ O : 0.026 Fe(T) : 0.01 P ₂ O ₅ : 0.16 TiO ₂ : 0.94 SO ₃ : 0.07 MnO : 0.001 Cl : 0.29 CaO : 0.015 LOI : 66.4 MgO :0.003 Na ₂ O : 0.005	Reused in Coke oven plant
Alkali Residue	Al ₂ O ₃ : 0.84 K ₂ O : 0.42 Fe(T) : 49.97 P ₂ O ₅ : 0.001 TiO ₂ : 0.21 SO ₃ : 0.85 MnO : 0.374 Cl : 0.16 CaO : 1.87 LOI : 43.2 MgO :1.13 Na ₂ O : 0.38	Stored in special containers followed by disposal at CHWTSDF.
Flue Dust	SiO ₂ : 4.18 Na ₂ O :1.13 Al ₂ O ₃ : 1.79 K ₂ O :1.37 Fe(T) : 57.7 P ₂ O ₅ :0.001 TiO ₂ :0.09 SO ₃ :1.78 MnO :0.056 C :10.24 CaO :2.28 Cl : 0.13 MgO :0.74 LOI :11.4	Reused in Sinter Plant

BOF GCP Sludge (LD Sludge)	SiO ₂ : 4.32 Al ₂ O ₃ : 1.78 Fe(T) : 53.1 TiO ₂ :0.12 MnO :0.095 CaO :12.45 MgO :4.02	Na ₂ O :1.16 K ₂ O :0.97 P ₂ O ₅ :0.001 SO ₃ :0.31 C :0.85 Cl :0.075 LOI :2.75	Reused in Sinter Plant
SMS Slag	SiO ₂ : 13.42 Al ₂ O ₃ : 1.78 Fe(T) : 26.7 TiO ₂ :0.84 MnO :0.022 CaO :45.22 MgO :10.80	Na ₂ O :1.58 K ₂ O :0.88 P ₂ O ₅ :0.20 SO ₃ :0.20 C :0.07 Cl : 0.27 LOI :0.52	Processed in MRP for separation of Mag and Non-Mag. Magnetic material recycled in steel making process. Non-Mag being used in sinter, brick manufacturing, & road making.
Lime Fine De-dusting Dust	SiO ₂ : 2.41 Al ₂ O ₃ : 1.12 Fe(T) : 2.68 TiO ₂ :0.10 MnO :0.066 CaO :45.63 MgO :12.8	Na ₂ O :3.01 K ₂ O :0.89 P ₂ O ₅ :0.03 SO ₃ :0.26 C :5.01 Cl : 0.58 LOI :23.15	Reused in Sinter Plant
Mill Scale	SiO ₂ : 0.09 Al ₂ O ₃ : 0.32 Fe(T) : 65.4 TiO ₂ :0.01 MnO :0.012 CaO :0.20 MgO :0.99	Na ₂ O :1.33 K ₂ O :0.74 P ₂ O ₅ :0.001 SO ₃ :0.03 C :0.13 Cl : 0.05 LOI :2.47	Reused in Sinter Plant
GCP Dust	SiO ₂ : 14.65 Al ₂ O ₃ : 1.94 Fe(T) : 29.3 TiO ₂ :0.15 MnO :0.049 CaO :3.44 MgO :1.45	Na ₂ O :1.33 K ₂ O :0.87 P ₂ O ₅ :0.001 SO ₃ : 1.46 C : 30.7 Cl : 0.45 LOI : 35.71	Reused in Sinter Plant
BF Granulated Slag	SiO ₂ : 32.99 Al ₂ O ₃ : 15.58 Fe(T) : 1.10 TiO ₂ :0.71 MnO :0.065 CaO :31.77 MgO :9.14	Na ₂ O :1.55 K ₂ O :1.34 P ₂ O ₅ :0.001 SO ₃ : 1.61 C : 0.24 Cl : 0.14 LOI : 0.61	Sold to cement plant

PART – G

Sl.N o	Pollution abatement Measures taken in 2021-22	Impact of pollution control measure on conservation of natural resources and cost of production
1	Water Management	Reduction of specific water consumption to be continued. Freshwater consumption in closed circuit has been reduced by increasing the Cycle of Concentration (COC) up to 8.
2	Installation of APCE	Reduction in specific PM emission and to be continued.
3	Green Belt Development	We have planted 71427 nos. saplings during April, 2021 to March, 2022 both inside and outside the plant.
4	Dust Suppression	05 Nos. of vehicle mounted mist canon cum road washers have been engaged to control fugitive dust. 41 KMs of road has been concreted/ paved and 04 Nos. of mechanical road sweeping machines have been engaged for road cleaning. Dust suppression system has been installed in Wagon Tippler to reduce fugitive dust emission during Wagon tipping along with facilities are also for pre wetting of railway wagons Spillage reduction in conveyor junction houses by installation of Martin lip double skirt rubber & thereby reducing fugitive emission. Installed 05 Nos. of wheel washing system at RMHS/RMPP, DRI, WHRB, Blast Furnace Power Plant (I&II).
5	PM10 Analyzer Installed	6 no. of Portable PM10 Analyzer have been installed at strategic location of different unit to assess Ground Level Concentration of PM10.
6	Mechanical covering of Hyvas	Mechanical covering of Fly ash carrying vehicle to avoid overload and spillage of fly ash on road.
7	Installed Fluoride treatment plant at Coke Oven	Commissioned Fluoride Treatment Plant for treatment of Fluoride in Coke Oven 2 wastewater.
8	Rainwater Harvesting at Colony.	Constructed Rainwater harvesting ponds of capacity 50000 m ³ in works area and 2500m ³ in township area .

Details of Plantation (nos.) done from April 2021 to March 2022

Month	Plantation inside the Plant	Plantation outside the Plant	Species	
Apr'21	0	0	Peltophorum, Terminalia cattapa, Pongamia, Kadamba, Pongamia Neem, Mimousops elangi, Michelia Champak, Samanea samam, Cassia seamea, Jacaranda, Cassia fistula, Momousops elangi, Custard apple, Mango, Jackfruit, Guava, Sapota	
May'21	0	0		
Jun'21	10057	20350		
Jul'21	10132	13750		
Aug'21	13359	162		
Sep'21	2755	410		
Oct'21	289	0		
Nov'21	0	0		
Dec'21	72	0		
Jan'22	20	0		
Feb'22	71	0		
Mar'22	0	0		
	36755	34672		Total: 71427

PART – H

Additional measures/investment proposals for environmental protection including abatement of pollution, and prevention of pollution.

- Upgradation of the existing pollution control equipment to further bring down levels of particulate matter (PM) emissions.
- Improvement in water recycling facility for reducing the specific water consumption.
- New pollution control equipment is with more stringent design emission value.
- Installation of decanter to recover water from sludge of primary treatment plant.
- Installation of wind screen along the boundary line at RMHS is in progress.

PART – I

Any other undertaken project for improving the quality of environment

- Boiler of Captive power plants have been converted from coal fired to gas fired, thus there is reduction in generation of fly ash in the power plant.
- LD slag after metal recovery is being used internally in the manufacturing process as well as externally in brick and road making works.
- BF Slag is being granulated through online slag granulated facilities available at BFs and made available to the Cement plants for cement making.
- Zero effluent discharge (ZED) has been achieved in 6 out of 8 designated outlets. Action plan to achieve ZED in remaining two is under progress and will be completed by FY.24.
- Energy efficiency improvement in operations of TSM works by installing variable Frequency Drive and Back Pressure Turbo Generator.
- Installation of high frequency transformer rectifier (HFTR) and micro-pulse at Sinter Plant to reduce stack emission.
- Installation of 05 Nos. of portable bag filter at conveyor line to minimize fugitive dust.
- Installation of industrial vacuum cleaner (IVC) at Junction house and material transfer point.