01C

TATA

TSL/SPCB/BS-03/2023-18/373
September 21, 2023

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 2022-23 for Tata Steel Ltd. Meramandali, Dhenkanal.

Reference: Consent Order No.4463/IND-I-CON-5440 dated 23.03.2023

Dear Sir,

In reference to the captioned subject and letter cited above, we are submitting herewith **"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 2022-23.

This is for your kind information and necessary record please.

Thanking you,

Yours faithfully,
For Tata Steel Limited

Anoop Srivastava

Anoop Srivastava
Chief Environment, TSM

Encl: As above

Copy to: 1. The Regional Officer, Odisha State Pollution Control Board, Angul, Odisha.
2. Deputy Director General, MoEF&CC, Integrated Regional Office (EZ), A/3, Chandrashekarpur, Bhubaneswar-751023.

Received
No. 25/9/23
25 SEP 2023
S.P.C. BOARD
BHUBANESWAR-12

TATA STEEL LIMITED
Narendrapur Kusupanga 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 66658282 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 2023

PART – A

General Information		
	Name of the Company	**Tata SteelLimited, Meramandali**
1.	Name & Address of the owner/occupier of the industry, operation or process	SriThachat 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 2022-23: 4.952Million Tons Crude Steel. (Major units are: RMHS & RMPP, Blast Furnaces, Coke Ovens, SinterPlants, SMS,BOF,HSM,CRM,Captive Power Plant,Industrial By-Product Management Division and Utilities including Air Sepretaion Units.)
4.	Year of establishment	2006
5.	Date of last environment statement submitted	September 29,2022 vide letter no.TSL/SPCB/BS-03/2022-14/249

PART – B

Water & Raw material Consumption		
1: Total Water Consumption (m^3/d)		
Water Consumption	**During the previous Financial Year (2021-22)**	**During the current Financial Year (2022-23)**
Industrial Consumption (Inside Works as Makeup water)	54,185	52,283
Domestic Consumption (Inside Works as Drinking water)	3,054	4,243
2: Water Consumption per unit of the product (m^3/tcs)		
Name of the Products:Crude Steel	**Process fresh waterconsumption per unit of product m^3/tcs)**	
	2021-22	**2022-23**
Specific fresh Water Consumption	3.42	3.55

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 (2021-22)	**During the current Financial Year (2022-23)**
Iron (Lump &Fine)	Crude Steel (Slab/Billet)	1.31	1.31
Purchase Pellet		0.28	0.37
Limestone & Dolomite		0.28	0.36
Quartz		0.03	0.02
Coking Coal		0.25	0.54
Non-Coking coal		0.65	0.48
Scrap		0.07	0.06
Ferro-Chromium		0.0002	0.0001
Ferro-Manganese		0.0026	0.0022
Ferro-Silicon		0.0002	0.0002
Silico-Manganese		0.0008	0.0006
Znic		0.001	0.001
Znic Alloy(Premix)		0.0008	0.0007

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	**2021-22**	**2022-23**	**2021-22**	**2022-23**	**2022-23**
TSS	0.24	0.189	42	63.13	(-) 37 %
COD	0.448	0.132	78	43.99	(-)82.4 %
Ammonia as N	0.0001	0.007	0.01	2.48	(-) 95 %
BOD	0.01	0.009	0.9	3.11	(-)90 %
Phenols	0.0001	Less than 0.0015	0.009	Less than 0.5*	(-) 50 %
Total Cyanide as CN	0.0002	Less than 0.0003	0.03	Less than 0.1*	(-) 50%
(b) Air	**2021-22**	**2022-23**	**2021-22**	**2022-23**	**2022-23**
	Tons/day		**mg/Nm3**		**In % age (referring CTO)**
PM	8.30	6.87	19.71	17.59	(-) 65 %
SO2	60.55	50.87	508	381	(-) 37 %

NOx	20.94	21.03	126	142	(-) 68 %

*Detection Limit for Phenols and Cyanide is 0.5 and 0.1 respectively.

1.Surface Water Quality

Parameter	Unit	Kisinda Nalla		Lingra Nalla	
		U/S	D/S	U/S	D/S
pH Value	-	6.95 - 8.11	6.82 - 8.21	7.66 - 8.21	7.1 - 8.33
Colour	Hazen	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)
Temperature	Deg C	25 - 31	25 - 33	25 - 29	24 - 25
Total Suspended Solids	mg/l	3.2 - 20.4	2 - 26.8	< 14.8	< 26
Ammoniacal Nitrogen	mg/l	-	-	BDL (DL:0.1)	BDL (DL:0.1)
Arsenic as As	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
BOD, 3days at 27°C	mg/l	BDL (DL:2.0)	< 3.4	BDL (DL:2.0)	< 2.7
Boron as B	mg/l	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)	BDL (DL:0.25)
Cadmium as Cd	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
Calcium as Ca	mg/l	40 - 110.88	11.88 - 54.88	31.68 - 48	28 - 102.96
Chlorides as Cl	mg/l	24.74 - 89.97	14.7 - 146.4	19.59 - 49.98	14.11 - 119.96
COD	mg/l	7.2 - 16.7	6.98 - 15.4	6.85 - 12	7.2 - 16
Copper (as Cu)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
Cyanide as CN	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Fluoride as F-	mg/l	0.35 - 4.7	0.22 - 2.4	0.24 - 1.06	0.33 - 2.17
Free Ammonia	mg/l	-	-	BDL(DL:0.1)	BDL(DL:0.1)
Hexa Chromium as Cr^{+6}	mg/l	0 - 0.052	< 0.088	< 0.032	BDL (DL:0.01)
Iron as Fe	mg/l	0.09 - 0.89	0.06 - 2.01	0.11 - 0.38	0.08 - 1.58
Lead (as Pb)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Manganese (as Mn)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
Mercury (as Hg)	mg/l	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)	BDL (DL:0.0002)
Nickel (as Ni)	mg/l	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Nitrate as N	mg/l	0.52 - 1.02	0.61 - 1.01	0.5 - 0.92	0.62 - 1.45
O&G	mg/l	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)	BDL (DL:1.4)
Phenolic Comp	mg/l	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)	BDL (DL:0.001)
Phosphate as P	mg/l	0.09 - 0.46	0.07 - 0.62	< 0.32	< 0.4
RFC	mg/l	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)
Selenium (as Se)	mg/l	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)	BDL (DL:0.005)
Sulphate mg/l	mg/l	-	-	BDL(DL:0.02)	BDL(DL:0.02)
TKN	mg/l	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)	BDL (DL:0.3)
Total Chromium(as Cr)	mg/l	-	-	BDL(DL:0.01)	BDL(DL:0.01)
Total Nitrogen Content	mg/l	-	-	0.84 - 3.6	1.02 - 5.1
Vanadium (as V)	mg/l	-	-	BDL(DL:0.05)	BDL(DL:0.05)

Zinc (as Zn)	mg/l	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)

NB: U/S: Upstream; D/S: Downstream; BDL: Below Detection Limit; DL: Detection Limit

2.ETP Treated Water Quality

Parameter	UOM	BOD-1Treated effluent			BOD-2 Treated effluent		
		Min	Max	Avg	Min	Max	Avg
pH	-	7.3	8.3	7.7	6.6	7.7	7.0
Total Suspended Solid	mg/l	6.8	90.0	48.8	32.0	78.0	51.0
Oil & Grease	mg/l	4.0	7.0	4.9	5.0	6.0	5.3
Chemical Oxygen Demand (COD)	mg/l	28.0	220	165	64.00	240	164
Biochemical Oxygen Demand (BOD)(27 ° C for 3 days)	mg/l	7.2	28.6	22.0	13.00	29.0	22.2
TCN	mg/l	0.10	0.15	0.12	0.07	0.18	0.12
Phenol	mg/l	0.49	0.93	0.69	0.65	0.88	0.73

Parameter	UOM	ETP-1			ETP-2		
		Min	Max	Avg	Min	Max	Avg
pH	-	7.3	8.3	7.8	6.6	8.1	7.4
Total Suspended Solid	mg/l	5.4	65.0	39.0	5.6	72.0	38.2
Oil & Grease	mg/l	<5	<5	<5	<5	<5	<5
Chemical Oxygen Demand (COD)	mg/l	20.0	80.0	39.4	25.6	68.0	43.6
Biochemical Oxygen Demand (BOD)(27 ° C for 3 days)	mg/l	4.3	8.8	6.5	4.7	9.2	6.6
Iron as Fe	mg/l	0.1	0.5	0.2	0.1	0.5	0.2

Parameter	UOM	ETP-3			CRM ETP		
		Min	Max	Avg	Min	Max	Avg
pH	-	6.5	8.1	7.4	6.4	7.7	6.9
Total Suspended Solid	mg/l	29.0	64.0	39.8	16.0	66.0	41.3
Oil & Grease	mg/l	<5	<5	<5	<5	<5	<5
Chemical Oxygen Demand (COD)	mg/l	31.2	76.0	54.3	100.0	188.0	154.0
Biochemical Oxygen Demand (BOD)(27 ° C for 3 days)	mg/l	4.7	10.7	8.1	16.7	28.0	22.7
Iron as Fe	mg/l	0.1	0.2	0.2	0.1	1.3	0.3

3.Sewage Treatment Plant -Treated outlet quality

Parameter	UOM	BF-1 STP			SMS-1 STP			AEL STP			Colony STP		
		Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
pH	-	7.2	8.2	7.9	7.6	8.3	7.9	7.2	8.0	7.6	7.0	8.3	7.5
TSS	mg/l	23.0	67.0	36.5	24.0	68.0	40.4	17.0	58.0	42.6	22.0	74.0	39.6
BOD	mg/l	8.0	23.0	13.8	11.1	21.0	14.4	10.0	24.0	16.5	7.2	22.0	15.0

4. Plant Discharge Water Quality Analysis report.

Parameter	UOM	Discharge to Lingra			Discharge to Kisinda		
		Min	Max	Avg	Min	Max	Avg
pH	-	6.63	8.39	8.13	7.84	8.23	8.08
Total Suspended Solid	mg/l	51.19	80.00	70.0	44.52	77.88	56.0
Oil & Grease	mg/l	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Chemical Oxygen Demand (COD)	mg/l	37.00	64.80	50.2	29.71	47.92	39.4
Biochemical Oxygen Demand (BOD)(27 ° C for 3 days)	mg/l	2.69	3.63	3.2	2.47	3.48	3.0
Phenol	mg/l	<0.5	0.57	<0.5	<0.5	<0.5	<0.5
Ammonia	mg/l	2.01	6.25	4.19	0.40	1.40	0.77
Total Cyanide	mg/l	<0.1	0.13	<0.1	<0.1	<0.1	<0.1

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	15.4	128.5	71.7	37.4	211.0	126.3	27.1	143.4	74.3
PM2.5	µg/m³	60	6.6	78.2	37.8	12.0	87.6	49.8	8.5	58.7	31.1
SO_2	µg/m³	80	11.5	14.2	12.6	11.4	29.1	17.8	9.2	25.7	12.8
NO_2	µg/m³	80	5.5	16.1	13.6	9.2	12.7	10.0	16.9	23.7	18.7
CO	mg/m³	2	0.2	0.7	0.55	0.3	0.9	0.64	0.3	0.9	0.42

Parameters	UoM	Norm	CAAQMS-4			CAAQMS-5			CAAQMS-6		
			Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
PM10	µg/m³	100	58.1	192.8	102.6	31.0	153.0	84.4	55.9	207.5	122.0
PM2.5	µg/m³	60	21.0	78.9	43.9	14.9	118.4	50.8	21.8	106.8	45.7
SO_2	µg/m³	80	5.6	10.1	6.9	7.6	22.2	12.7	5.7	32.5	16.5
NO_2	µg/m³	80	8.9	24.6	20.5	6.4	24.9	17.5	12.0	29.2	20.0
CO	mg/m³	2	0.2	0.6	0.36	0.4	1.1	0.61	0.4	0.9	0.66

Parameters	UoM	Norm	CAAQMS-7		
			Min	Max	Avg
PM10	µg/m³	100	59.8	258.7	129.4
PM2.5	µg/m³	60	23.0	102.8	52.1
SO_2	µg/m³	80	8.2	24.1	15.8
NO_2	µg/m³	80	22.7	33.1	31.0
CO	mg/m³	2	1.1	1.2	1.16

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
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 (2021-22)	During the current Financial Year (2022-23)
(a) From Process		
Used/ Spent Oil	295	256
Waste residue containing oil	25.9	36.7
Spent Ion Exchange Resin	3.0	0
Rejected Chemical Container	18.2	5957 Nos. & 20.18 MT
Insulation Material	114	85
Alkali Residue	23	12.1
Oily Sludge	102	122
Zinc Ash & Zinc Dross	471	510
Spent Solvent (Waste Thinner – Oily Waste)	39.63	3.95
(b) From Pollution Control Facilities		
BOD plant Sludge	2497	2457
Decanter Tar Sludge	1396	1499
ETP Sludge/Chemical Sludge from wastewater treatment plant	694	780
Exhaust Air or Gas cleaning residues	179882	188566

NB: Exhaust Air or Gas cleaning residues: GCP sludge of BF & BOF, FES dust& bag filter dust of SMS, and Exhaust air of BF.

PART – E

Solid Wastes

Total Quantity Generated

Name of the Waste	Total Quantity Generated (MT)	
	During the previous Financial Year (2021-22)	During the current Financial Year (2022-23)
(a) From Process		
1. Char	186697	162983
2. BF Slag	1754865	1847873
3. SMS Slag	882264	871195
4. Bottom Ash	38583	33669
(b) From Pollution Control Facilities		
1. Fly Ash	347253	324752
2. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust)	198800	155844
3. Mill Scale	61764	62026

(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 (2021-22)	During the current Financial Year (2022-23)
1. Char	68512	100838
2. SMS Slag	470180	469536
3. BF Slag	Nil	24
4. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust)	86038	29694
5. Mill Scale	65701	60830

(c) (2).Total Quantity Sold

Name of the Waste	Total QuantitySold (MT)	
	During the previous Financial Year (2021-22)	During the current Financial Year (2022-23)
1. Char*	163600	79792
2. SMS Slag**	396316	451662
3. BF Slag***	1611678	1921678
4. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust)	87958	101788

* 17647 MT Char utilized/ sold from legacy stock. **50002 MT SMS Slag utilized/ sold from legacy stock. ***99894 MT BF Slag sold from legacy stock.

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

Name of the Waste	Total Quantity (MT)	
	2021-22	2022-23
1. SMS Slag (Stored inside the plant)	15768	Nil
2. BF Slag(Stored inside the plant)	143187	26064
3. APC Dust (ESP, Bag filter Dust, DRI ESP dust, Lime fines dust, FES dust)(Stored inside the plant)	24804	24363
4. Mill Scale (Stored inside the plant)	Nil	1196
5. Fly Ash& Bottom Ash (Utilised externally)	385836	356629
6. Fly Ash (Stored inside the plant)	Nil	1792
Fly ash and Bottom Ashgenerated during 2022-23 were used outside the plant for NHconstruction, bricks making and reclamation of abandoned stone quarries.		

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_2O	:0.41	Steel Making Process
	Al_2O_3	: 23.32	K_2O	:1.65	
	Fe(T)	: 10.3	P_2O_5	:0.06	
	TiO_2	:0.36	$S0_3$	:0.28	
	MnO	:0.049	C	:3.51	
	CaO	:0.78	Cl	:0.23	
	MgO	:1.21	LOI	:16.28	
ETP Sludge From CRM	SiO_2	: 2.40	Na_2O	: 1.22	Stored in special containers followed by disposalat CHWTSDF.
	Al_2O_3	: 1.15	K_2O	: 0.52	
	Fe(T)	: 3.72	P_2O_5	: 0.45	
	TiO_2	: 0.03	$S0_3$	: 0.17	
	MnO	: 0.10	C	: 17.5	
	CaO	:21.81	Cl	: 1.13	
	MgO	: 2.54	LOI	: 42.75	
BOD plant Sludge	Al_2O_3	: 0.08	K_2O	: 0.65	Recycle in Coke Oven with inplantpermises
	Fe(T)	: 7.28	P_2O_5	: 0.06	
	TiO_2	: 0.36	$S0_3$	: 0.45	
	MnO	: 0.064	Cl	: 0.23	
	CaO	: 0.16	LOI	: 80.2	
	MgO	:0.02			
	Na_2O	: 0.24			
Decanter Tar Sludge	Al_2O_3	: 0.04	K_2O	: 0.026	Recycle in Coke Oven with inplantpermises
	Fe(T)	: 0.01	P_2O_5	: 0.16	
	TiO_2	: 0.94	$S0_3$	: 0.07	
	MnO	: 0.001	Cl	: 0.29	
	CaO	: 0.015	LOI	: 66.4	
	MgO	:0.003			
	Na_2O	: 0.005			
Alkali Residue	Al_2O_3	: 0.84	K_2O	: 0.42	Stored in designated containersfollowed by disposalat CHWTSDF.
	Fe(T)	: 49.97	P_2O_5	: 0.001	
	TiO_2	: 0.21	$S0_3$	: 0.85	
	MnO	: 0.374	Cl	: 0.16	
	CaO	: 1.87	LOI	: 43.2	
	MgO	:1.13			
	Na_2O	: 0.38			
Flue Dust	SiO_2	: 4.18	Na_2O	:1.13	Reused in Sinter Plantwith inplantpermises
	Al_2O_3	: 1.79	K_2O	:1.37	
	Fe(T)	: 57.7	P_2O_5	:0.001	
	TiO_2	:0.09	$S0_3$	:1.78	
	MnO	:0.056	C	:10.24	

	CaO MgO	:2.28 :0.74	Cl LOI	: 0.13 :11.4	
BOF GCP Sludge (LD Sludge)	SiO_2 Al_2O_3 Fe(T) TiO_2 MnO CaO MgO	: 4.32 : 1.78 : 53.1 :0.12 :0.095 :12.45 :4.02	Na_2O K_2O P_2O_5 SO_3 C Cl LOI	:1.16 :0.97 :0.001 :0.31 :0.85 :0.075 :2.75	Reused in Sinter Plantwith inplantpermises
SMS Slag	SiO_2 Al_2O_3 Fe(T) TiO_2 MnO CaO MgO	: 13.42 : 1.78 : 26.7 :0.84 :0.022 :45.22 :10.80	Na_2O K_2O P_2O_5 SO_3 C Cl LOI	:1.58 :0.88 :0.20 :0.20 :0.07 : 0.27 :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 Al_2O_3 Fe(T) TiO_2 MnO CaO MgO	: 2.41 : 1.12 : 2.68 :0.10 :0.066 :45.63 :12.8	Na_2O K_2O P_2O_5 SO_3 C Cl LOI	:3.01 :0.89 :0.03 :0.26 :5.01 : 0.58 :23.15	Reused in Sinter Plantwith inplantpermises
Mill Scale	SiO_2 Al_2O_3 Fe(T) TiO_2 MnO CaO MgO	: 0.09 : 0.32 : 65.4 :0.01 :0.012 :0.20 :0.99	Na_2O K_2O P_2O_5 SO_3 C Cl LOI	:1.33 :0.74 :0.001 :0.03 :0.13 : 0.05 :2.47	Reused in Sinter Plantwith inplantpermises
GCP Dust	SiO_2 Al_2O_3 Fe(T) TiO_2 MnO CaO MgO	: 14.65 : 1.94 : 29.3 :0.15 :0.049 :3.44 :1.45	Na_2O K_2O P_2O_5 SO_3 C Cl LOI	:1.33 :0.87 :0.001 : 1.46 : 30.7 : 0.45 : 35.71	Reused in Sinter Plantwith inplantpermises
BF Granulated Slag	SiO_2 Al_2O_3 Fe(T) TiO_2 MnO CaO MgO	: 32.99 : 15.58 : 1.10 :0.71 :0.065 :31.77 :9.14	Na_2O K_2O P_2O_5 SO_3 C Cl LOI	:1.55 :1.34 :0.001 : 1.61 : 0.24 : 0.14 : 0.61	Sold to cement plant

PART – G

SN	Pollution abatement Measures taken in 2022-23	Impact of pollution control measure on conservation of natural resources and cost of production
1	Water Management	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. Installation of high frequency transformer rectifier (HFTR) and micro-pulse at Sinter Plant and HFTR at DRI to reduce stack emission. New DE system (bag filters) were provided in Raw material handling.
3	Green Belt Development	We have planted19893nos. saplings during April2022 to March2023 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.
		42.8 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 tippling 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 and SMS	Commissioned Fluoride Treatment Plant for treatment of Fluoride in Coke Oven 2 and SMS wastewater.

Cost Estimation of Pollution Control (in Rs. Crores)		
Description	**Expenditure in crores during 2022-23**	
	Capital Expenditure	**Operational Expenditure**
Air Pollution Control	123	56

Water Pollution Control	17	31
Solid Waste Management	0	127
Hazardous Waste Management	0	2.1
Biomedical Waste Management	0	0.03
Green Belt Development	0.07	2.3
Miscellaneous[#]	0.37	10
Total	**140**	**229**

[#]Miscellaneous extenditureincludes Housekeeping, Lab Equipment (Capex), Study, consultancy fee, Statutory Fee, etc.

Details of Plantation (nos.) done from April 2022 to March 2023

Month	Plantation in Numbers		Species
	Inside	Outside	
April 2022	40	0	Peltophorum, Terminalia cattapa, Pongamia, Kadamba, Pongamia, Neem, Mimousopselangi, Michelia Champak, Samneasamam, Cassia seamea, Jacaranda, Cassia fistula, Momousops elangi, Custard apple, Mango, Jackfruit, Guava, Sapota
May 2022	0	0	
June 2022	643	0	
July 2022	5915	0	
August 2022	12810	10	
September 2022	60	0	
October 2022	100	0	
November 2022	115	0	
December 2022	200	0	
January 2023	0	0	
February 2023	0	0	
March 2023	0	0	
Total	**19883**	**10**	

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 minimize the 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.

- Installation of 7 Nos. of HD IP Camera 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. Slag Atomisation Plant is under commissioning.
- Zero effluent discharge (ZED) installation is in advance stage and will be completed by FY24.
- 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) at DRI to reduce stack emission.
- Installation of industrial vacuum cleaner (IVC) at Junction houses and material transfer point.