The Member Secretary
State Pollution Control Board, Odisha
Paribesh Bhawan
A/118, Nilakantha Nagar, Unit - VIII
Bhubaneswar - 751012

MD/ ENV/ 306 /120 / 2022
Date: 27th September 2022

Sub: Environmental Statement of Joda East Iron Mine, M/s Tata Steel Limited for 2021-22.

Dear Sir

Kindly find attach herewith the Environmental Statement in the prescribed format (Form V) as per "Environmental (Protection) Amendment Rules 1992" of our Joda East Iron Mine for your kind perusal.

Thanking you,

Yours faithfully
f: Tata Steel Limited

Sr Manager (Environment), OMQ

Encl: As above

Copy to: The Regional Officer, State Pollution Control Board, At: Baniapata, College Road, Keonjhar - 758001, Odisha

TATA STEEL LIMITED
Mines Division Noamundi 833 217 India
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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

ENVIRONMENT STATEMENT
2021-22


Joda East Iron Mine

JODA EAST IRON MINE

TATA STEEL LIMITED

September 2022

FORM - V
(See Rule -14)

ENVIRONMENT STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31st MARCH, 2022

KHONDBOND IRON & MANGANESE MINE, TATA STEEL LIMITED

PART–A

1	Name and address of the owner/ occupier of the industry, operation or process	:	Mr Saroj Banerjee, Chief (Joda) Joda East Iron Mine Tata Steel Limited, Joda Dist.- Keonjhar, Odisha – 758034 Mr Braj Binod Kumar, Mines Manager (Joda East) Joda East Iron Mine Tata Steel Limited, Joda Dist.- Keonjhar, Odisha – 758034
	Nominated Owner	:	Mr. Atul Bhatnagar, General Manager, OMQ division, Administrative Building, Noamundi Iron Mine, Tata Steel Limited PO.: Noamundi, Dist.-West Singhbhum Jharkhand – 833217 Mr T V Narendran, Managing Director & CEO, Tata Steel Limited, PO: Jamshedpur, Dist.: East Singhbhum, Jharkhand-831001
2	Industry Category	:	Opencast Iron mine with beneficiation plant & Dispatch facility (Major)
3	Production Capacity*	:	Mine: 12 MTPA Iron Ore Beneficiation & Dispatch: 12 MTPA Iron Ore
4	Year of Establishment	:	1956
5	Date of last Environmental Statement submitted.	:	22nd September 2021, vide letter no. MD/ENV/224/120/2021 for the year 2020-21.

*As per Environmental Clearance

PART–B
Water and Raw Material Consumption

(i) Water Consumption:

Consumption Head:	**2020-21 (in cu.m/day) (Annual Average)**	**2021-22 (in cu.m/day) (Annual Average)**
Process	3690.75	2302.88
Spraying in mine pit, services	398.91	427.26
Domestic	455.03	442.16
Name of the product	**Process water consumption per product output (m3/MT)**	
Iron Ore	0.113	0.087

*The colony of Joda east Iron Mine is situated outside the mining lease area. The domestic water consumption is shown by other adjacent Manganese Mine of separate unit.

ii) <u>Raw Material Consumption</u>

The following items have been consumed/ utilized:

Name of Raw Materials		Name of Product	Consumption of Raw Material	
			During previous financial year (2020-21)	During current financial year (2021-22)
High Speed Diesel		Iron ore of steel grade	5392910 Litre	6103898 Litre
Lubricants			336694 Litre	252252 Litre
Grease			5202 Kg	18564 Kg
Explosive	Slurry explosives		Small dia (up to 32 mm) – Nil Large dia (above 32 mm) – 2624600 Kg	Small dia (up to 32 mm) – Nil Large dia (above 32 mm) – 2455809 Kg
	Detonators		Ordinary – 0 Electrical – 8694 nos.	Ordinary – 0 Electrical – 15768 nos.
	Detonating Fuse		1875 Mts.	7850 Mts
Gas			8715 Cu.m	12545 Cu.m
Tyres			33 nos.	58 nos.
Drill rods			317 nos.	221 nos.
Electric Power in KWH				
Electricity Consumed		Iron ore of steel grade	27590288	33781556

<u>PART–C</u>
<u>POLLUTION DISCHARGED TO ENVIROMENT/ UNIT OF OUTPUT</u>
<u>(Parameters as specified in the consent issued)</u>

Pollutants	Quantity of Pollutants discharged (mass / day)	Concentration of Pollutants discharges (mass / day)	Percentage of variation from prescribed standards with reasons
a) Water	The Joda east Iron Mine with the processing plant is a zero effluent discharge unit; all the effluents generated from the processing of Iron ore is collected from slime pond and recycled & reused by 100% in various activities including dust suppression and iron processing. Six sewage treatment plant (STP) of (One – 630 KLD, One – 270 KLD, Two – 150 KLD, Two – 50 KLD, Two – 10KLD) are installed and operated smoothly. The treated water is recycled & reused for plantation and gardening purpose. Two Effluent treatment plant (ETP) of 10 KLD are installed & operational in Hospital & Canteen area and treated water is used in horticulture activities. The water quality results of ETP & STP are attached herewith in annexure-1. Additional 10 KLD ETP is installed at Equipment Maintenance department to treat the effluent generated from workshop.		

Pollutants	Quantity of Pollutants discharged (mass / day)	Concentration of Pollutants discharges (mass / day)	Percentage of variation from prescribed standards with reasons
b) Air	The Joda East Iron Mine is an opencast iron mine with processing plant & dispatch unit. The air quality in the form of fugitive, dust fall, ambient, respirable is been measured and monitored regularly. All the dust generating points such as loading -unloading devices are equipped with dust arresting system such as dry fog, fixed & mobile water sprinklers, mist spray, water scrubbers etc. Wet drilling is practiced in the mine with drills equipped with water injection system. Blasting is done using the controlled blasting technique. Dry fog system, fixed water sprinklers, mobile tankers and mist cannons are provided to prevent any fugitive emissions. 2nos of mobile tanker is in operation and fixed water sprinkler line has been installed from Top Centre to Equipment Maintenance office. Three Continuous Ambient Air Quality Monitoring station (CAAQMS) are installed in core and buffer zone of Joda area. Various air quality parameters such as PM10, PM2.5, SOx, NOX, CO etc. are monitored and the data of same is transmitted to State Pollution Control Board server online. The data of same is also being displayed publicly. A thick & dense vegetation is also placed in all surrounding the area which significantly reduced the pollution load. **The results of air quality monitoring is attached as annexure-2.**		

PART–D
HAZARDOUS WASTES

As specified under the Hazardous & Other Waste (Management & Trans boundary Movement) Rules, 2016 and amendment thereof

Hazardous Wastes	Total Quantity	
	During previous financial year (2020-21)	During current financial year (2021-22)
(a)From Process		
• Used Oil	123.6 MT	128.18 MT
• Waste containing Oil (Jute etc)	Nil	Nil
• Lead Bering residues (Batteries etc)	183 no.	5.46 MT
• Discarded containers (drums)	Nil	Nil
• Rej. & Scrap copper cables	Nil	11 MT
• Rej. and used hose pipes	Nil	14.36 MT
ii) From Pollution Control Facility • Waste oil from oil & grease separation pit • Sludge from oil and grease separation pit	Nil (Included in process) All the Hazardous waste generated is disposed as per the rules to authorised recyclers.	

PART–E
SOLID WASTES

Solid wastes from Joda East Iron Mine are categorized in two parts i.e., Overburden/rejects removed during mining operations and slime/tailings generated from beneficiation / processing of Iron Ore. All the overburden and tailings are stocked in designated place as per approved mining plan inside the mine.

Sources	Total Quantity	
	During previous financial year (2020-21)	**During current financial year (2021-22)**
a) From Process • From mining as Overburden	777958 Tonne	905315 Tonne
• From processing plant as Tailing	560323	280314
b) From Pollution Control Facility	Nil	Nil
c) i. Quantity recycled or reutilized within the unit		
ii. Quantity sold	Nil	Nil
iii. Quantity disposed • Mining overburden	102958 Tonne	280314 Tonne All the overburden generated is stacked at designated place inside the mine lease.

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 Joda East Iron Mine and processing / beneficiation generate hazardous waste mainly in the form of used oil due to HEMM operation & maintenance. The collected used oil disposed to authorized agency via sale for recycling and reuse. During maintenance of HEMM, the oil-soaked materials (jute etc.) is been kept and disposed in impervious pit. The hazardous waste such as used batteries is sold to authorized agency.

The other solid waste in the form of overburden and sub-grade mineral are stocked in designated place.

PART-G

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

- Joda East Iron Mine is continuously a star rated iron mine as per Sustainable Development Framework (SDF) by Indian Bureau of Mines, Ministry of Mines, Govt. of India and has won various prestigious prizes in Environment, Health & safety field and become a best sustainable mine of area.
- Various mineral conservation techniques are operated by mine including use of low grade ore, blending of waste / subgrade materials, etc as per steel plant quality requirements.
- Use of Paste Thickener technology for slime disposal which optimizes area utilization, increase in water conservation and safety. This has resulted in reduction of specific water consumption to ~0.090m3/Tp. The underflow of paste thickener is in the form of a paste and is pumped to the disposal location. The pulp ratio in case of a Paste thickener is 30:70 as compared to 70:30 in the case of conventional thickener. Thus, increasing water recovery and increasing the life of Tailing dam for storage of slime.
- For conservation of natural resources, high efficiency HEMM are used with adequate maintenance to reduce the fuel consumption. Zero effluent discharge is been maintained & all process water is recycled – reuse 100% back which reduces the freshwater consumption and withdrawal.
- For ground water augmentation, various rainwater harvesting structures are made, which harvest ~ 3 million m^3 per year. Various ground water augmentation structures are also been developed in surrounding villages also.
- Various Solar power based illumination such as high mass tower light etc & other measures are made at mine such as solar light pipes, solar street lights, solar geyser etc.

PART-H

ADDITIONAL MEASURES/ INVESTMENT PROPOSAL FOR ENVIRONMENTAL PROTECTION INCLUDING ABATEMENT OF POLLUTION, PREVENTION OF POLLUTION

- Joda East Iron Mine has installed & is operating various ETP & STP's in colony & Plant area. The treated water is recycled & reused.
- Dust-cum-noise barrier is proposed to be installed around the crushing and screening plants to act as windbreaker as well as attenuate the noise level and keep it below the prescribed noise levels at the boundary of plant.
- Online noise monitoring systems shall be installed at major noise generating sources and abatement measures shall be taken to reduce the amount of noise generation.
- Vetiver grass plots with drip irrigation facilities are developed.
- Coir/Geo-jute matting practice is being maintained to reduce/eliminate the erosion of dump slopes.
- Channelization of all surface runoff by the network of toe wall and garland drains around OB and waste dumps to the settling pit and slime dam. Plantation on slopes of dump yards to stabilize dumps and increase green cover inside the mine.
- Plan for upgradation of fleet to Electric Vehicles (EV) in Joda in future which offsets around 40 Tons of CO2 emission per year.

- For biodiversity conservation, various projects are implemented at Joda. An inhouse nursery of ~1 Lakh sapling developed in area and only local trees are planted.

PART-I

ANY OTHER PARTICULARS FOR IMPROVING THE QUALITY OF THE ENVIRONMENT

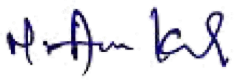
- Joda East Iron Mine of Tata Steel Ltd. is a captive mine and is certified for the Integrated Management System (ISO-9001:2015, ISO-14001:2015, ISO-45001:2018 & SA:8000) from last two decades. The unit has obtained various prestigious accolades from various agencies.

- The unit is having a full-fledged Environmental Management department with well qualified personnel from environmental background to take care of all aspects relating to mines and processing plant of unit.

- Various awareness programs throughout the year conducted in the area which included celebration of World Environment Day, World Water Day, Mine Environment & Mineral Conservation Week, Word Bio-diversity Week, Joda Festival etc. In which environment conservation models, current & future proposals are made, environment messages through Nukkad natak, poems, slogans, swachhata drive is been done every year.

- The mine has established plantation in mined out area, for conservation of biodiversity various initiatives are placed in area, Butterfly Park, Medicinal Park, Botanical Park etc. developed in area. The mines have performed various examples of mineral conservation, upgradation of low-grade mineral by various unique techniques, strengthening the social progress by various skill development and job orientation of programmes for stakeholders.

- All above efforts make the mine clean – green and sustainable. In the financial year 2021-22, Rs 6.63 Cr are spent on various environmental activities from Joda East Iron Mine.



Manager (Environment), Joda East

Annexure - I

WATER QUALITY DATA 2021-22
Joda East Iron Mine
(Annual Average)

Parameters	SEWAGE TREATMENT PLANT								EFFLUENT TREATMENT PLANT		Standard
	STP 630 KLD		STP 150 KLD		STP 50 KLD		STP 10 KLD		Joda Hospital ETP 10 KLD		
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	
pH	6.62	7.78	7.18	7.82	6,71	7.50	7.13	7.38	7.36	7.57	5.5–9.0
TSS (mg/l)	85.33	27.0	87.25	27.50	95.58	34.92	95.50	31.58	79.18	24.36	100
BOD 5 days (mg/l)	26.02	6.91	38.75	6.74	46.47	7.85	42.25	6.65	36.03	11.48	30
COD (mg/l)	95.35	25.24	124.23	18.58	147.37	23.47	129.15	22.77	149.2	27.64	250
Oil & Grease (mg/l)	BDL(DL-4)	BDL(DL-4)	BDL(DL-4)	BDL(DL-4)	BDL(DL-4)	BDL(DL-4)	BDL(DL-4)	BDL(DL-4)	BDL(DL-4	BDL(DL-4	10
Iron (mg/l)	0.21	0.25	0.28	0.24	0.25	0.22	0.25	0.27	0.44	0.31	3.0
Faecal Coliform	145.0	74.33	135.92	64.0	126.17	72	100.50	44.33	112.55	59.18	-

Note: BDL – Below detection limit.

WATER QUALITY DATA 2021-22
Joda East Iron Mine
(Annual Average)

Parameters	SURFACE WATER		Standard
	Kundra Nalla Upstream	Kundra Nalla Downstream	
pH*	7.45	7.38	5.5–9.0
TSS (mg/l)	21.58	22.33	100
BOD 5 days (mg/l)	2.25	2.34	30
COD (mg/l)	13.17	15.22	250
Iron (mg/l)	0.21	0.18	0.5
Total Coliform	BDL(DL-2)	BDL(DL-2)	5000

Note: BDL – Below detection limit.

Annexure - 2

AIR QUALITY DATA 2021-22
Annual Average Air quality of Joda East Iron Mine of FY'22

Pollutants	Concentration of pollutants ($\mu g/m^3$)	Standards ($\mu g/m^3$)
Manmora Slime Dam		
1. PM_{10}	55.08	100
2. $PM_{2.5}$	20.03	60
3. SO_2	9.41	80
4. NO_x	17.62	80
5. CO	0.22	4*
Near Rainwater Harvesting		
1. PM_{10}	54.38	100
2. $PM_{2.5}$	20.48	60
3. SO_2	8.78	80
4. NO_x	16.66	80
5. CO	0.23	4*
Near Magazine		
1. PM_{10}	55.64	100
2. $PM_{2.5}$	19.99	60
3. SO_2	9.06	80
4. NO_x	17.81	80
5. CO	0.22	4*
Near Equipment Maintenance		
1. PM_{10}	53.39	100
2. $PM_{2.5}$	20.02	60
3. SO_2	8.79	80
4. NO_x	17.95	80
5. CO	0.22	4*

*Unit of CO is mg/m^3