

**JSW Steel Limited  
Jajang Iron Ore Mine**



**ENVIRONMENTAL STATEMENT FOR  
JAJANG IRON ORE MINE  
(FINANCIAL YEAR ENDING MARCH 31<sup>ST</sup> 2022)**

**PREPARED & SUBMITTED BY**

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**Jajang Iron Ore Mine  
Of M/s JSW Steel Ltd  
Tehsil - Barbil, District – Keonjhar  
Odisha**

**Form V  
(See Rule 14)**

**Environment Statement for the Financial Year ending the 31<sup>st</sup> March 2022**

**Part A**

(i)	Name and address of the owner/occupier of the industry operation or process	Jajang Iron Ore of M/s JSW Steel Ltd in villages Jajang, Jodibahal, Palsa (Ka), Bandhuabeda, Tehsil Barbil, District Keonjhar, Odisha
(ii)	Industry Category Primary :- (STC Code) Secondary :- (SIC Code)	Red Category SIC (Standard Industrial Classification)- Code-1000 Industry Type- Metal Mining
(iii)	Production capacity: Units	Operating Mine as per approved Mine Plan and CTO of 12.80 MTPA Iron Ore (ROM) by fresh excavation only.
(iv)	Year of establishment	Mining operation commenced from the 01.07.2020
(v)	Date of the last Environment Statement Submitted	06 August 2021

**Part B**

**Water and Raw Material Consumption**

(i)	Water consumption m3/d	
	Process (Spraying in Mine pit or Haul Road Dust Suppression or dry fog dust suppression)*	410 m3/day**
	Cooling	Nil
	Domestic (Drinking purpose)	134.5 m3/day

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.

\*\*Maximum Rain water collected in the mine pits being reused for dust suppression purpose.

Name of Product	Process water consumption per unit of product output(cum/MT)	
	During the previous financial year	During the current financial year
	(1)	(2)
Iron Ore	0.017	

**Raw material consumption:** - Not Applicable

Name of raw material	Name of products	Consumption of raw material per unit of output MT	
		During the previous financial year	During the current financial year
Not Applicable			

Polluting Industry may use codes if disclosing details of raw material would violate contractual obligations, otherwise all industries have to name the raw material used.

**PART-C**

**Pollution discharged to environment/ unit of output**  
(Parameter as specified in the consent issued)

<b>Pollutants</b>	<b>Qty. of pollutants discharged (mass/day)</b>	<b>Concentrations of pollutants in discharged (mass/volume)</b>	<b>Percentage of variation from prescribed standard with reason</b>
<b>(a) Water</b>	There is no such trade effluent and source emissions discharge except surface run-off. The Consolidated Environmental Monitoring data of surface water quality is enclosed as <b>Annexure 1</b> .		
<b>(b) Air</b>	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 4 core zone & 4 buffer zone locations are monitored as per NAAQS-2009 and the Consolidated Environmental Monitoring data for FY 2021-22 is enclosed as <b>Annexure 1</b> .		

**PART- D**

**HAZARDOUS WASTES**

(as specified under Hazardous Wastes / Management and Handling Rules, 1989)

<b>Hazardous Wastes</b>	<b>Total Quantity ( Kg.)</b>	
	<b>During the previous financial year</b>	<b>During the current financial year</b>
(a) From process	NA	153.32 T
(b) From pollution control	NA	Nil

**PART- E**

**Solid Wastes**

	<b>Total Quantity</b>	
	<b>During the previous financial year</b>	<b>During the current financial year</b>
(a) From process	Not Applicable	Over Burden- 1500152315 tonnes
(b) From pollution control		Not Applicable
(c) (1) Quantity recycled or re-utilized within the unit		Nil
(2) Sold		Nil
(3) Disposed		It is disposed at ear marked area in of the mine as per Approved Mine Plan.

**PART-F**

Please specify the characterization (in terms of composition and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both the categories of wastes.

**Solid Waste-** Overburden of 1500152315 tonnes generated during the reporting period. The OB/Waste being disposed of at the earmarked area and after maturity same will be stabilized with plantation as per approved Mine Plan.

**Hazardous Waste-** Hazardous waste of 153.32 T was generated during the reporting period. The hazardous waste was being stored in a hazardous waste shed made as per specifications laid by SPCB and was sold to a certified hazardous waste dealer.

### **PART-G**

#### **Impact of the pollution abatement measures taken on conservation of natural resources and on the cost of production.**

Our aim is to preserve the long- term health of the natural environment affected by our operations. We set and achieve targets that promote efficient use of resources and include the reduction and prevention pollution.

#### **Air Management- Blasting Operation**

- Controlled blasting method is in practice by restriction of explosive charge in the holes.
- Well-designed blast by effective stemming and use of mili second delay detonators, Proper blasting designing to see that the optimum breakage occurs.
- To control ground vibrations and arrest fly rocks, advanced initiation system is being used for blasting.
- Ground vibrations are also being monitored and the results are well within limits.

#### **Excavation, Hauling and Crushing & Screening**

- Dry fog system for crusher & screen plants are provided.
- Using sharp teeth for shovels and other soil excavation equipment, and their periodical replacements.
- Acoustic enclosures for operator cabin.
- Avoiding overloading of dumpers
- Provision of dust filters / masks to workers working at highly dust prone and affected areas
- Imparting sufficient training to operators on safety and Environmental parameters.

#### **Transportation**

- Regular water sprinkling is being carried out by engaging mobile water tankers on the mine benches, mine haul, loading and unloading points and transfer points for dust suppressions.
- Maintenance of haul road by regular grading is carried out through grader, dozer.
- Ensuring that all mineral trucks are covered by tarpaulin.
- Vehicular emissions controlled through regular and proper preventive maintenance schedules.
- It is ensured that there is no overloading of trucks by having Quick Dispatch system at the weigh bridge near the dispatch gate.

- Regular water sprinkling arrangements have been made on the transportation roads/public road through mobile water tankers.
- Tarpaulin Covering in Railway Wagons.



**Wet Drilling and Dust Extractor System in Drilling Operation**



**Quick Dispatch System**



**Water Tanker Arrangement for Haul Road Dust Suppression**



**Dry Fog System in Mineral Handling Plants**



**Tarpaulin Covering on the Railway Wagons**



**Electronic Digital Display Board near Jajang Mine Gate No 6**

### **Water & OB Management**

- Garland drains maintained of suitable size around mine area and dump with proper gradients to prevent rain water descent into active mine area.
- Settling ponds maintained to prevent flow of fine particles from OB / Waste dumps, check dams, parapet / retaining walls & garland drains.
- Usage of stored water in the settling ponds for watering of haul roads, vehicle washing and green belt development etc.
- De- silting of garland drains & settling ponds are being carried out at regular intervals.
- Maintenance of all the runoff management structures.



**Retaining Wall, GeoCoir Matting & Plantation on Backfilled Area 2**



**Check Dam near railway siding**



**Wheel Washing System near Gate No 6.**



**Plantation on OB Dump no 2**



**Plantation in Safety Zone near Gate No 2**



**Plantation in Safety Zone and Road Side Plantation**



**Orchard in Jajang Mine**

**Noise Management**

- Providing sound proof operator's cabin for equipment like dumpers, shovel, tippers, etc.
- All HEMMs are monitored for any abnormal sound and rectified with due precaution by maintenance personnel.
- Providing workers with ear muffs & earplugs against high noise levels.
- Controlling the time of exposure of workers towards high noise areas.

**PART-G****Additional measures/investment proposal for environment protection including abatement of pollution /prevention of pollution.**

Jajang Environmental Protection Measures Expenditure (head wise breakup) incurred from in FY 2021-22 is given below-

<b>Particulars</b>	<b>Approximately Cost incurred (in Crores)</b>
Dust Suppression (Wet Drilling, Dry Fog System, Mobile Haul road water sprinkling system, etc.)	0.05
Fixed Water Sprinkling Project	0.20
Construction and maintenance of Retaining Walls	0.22
Construction and maintenance of garland drains	0.098
Geo Textiling and Coir-matting	0.15
Plantation with watch and care	0.028
Construction/Maintenance of Wheel washing system	0.18
Online Environmental Monitoring System (CAAQMS & Digital Display Board)	0.025
Manual Environment Monitoring	0.495
Construction and maintenance of Nursery	0.24
Water Sprinkling on National Highway/nearby village/transportation roads	0.10
Expenditure towards Waste Management (Collection, Segregation, Storing and Disposal)-all types of waste available in mine ( Hazardous non Hazardous, Biomedical, Electronic Waste etc.	0.0014
Biodiversity /EIA/EMP/Occupational Health/Hydrogeological Studies and any other environmental scientific assessment or studies conducted	0.03
<b>Grand Total (Rs. in Cr.)</b>	<b>1.817</b>

**PART-H****Any other particular 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) and OHSAS-45001 (Occupational Health and Safety Assessment Series) and maintaining the systems satisfactorily.

**Environmental Monitoring**

Regular monitoring of important and crucial environmental parameters is of immense importance to assess the status of environment during plants operation. With the knowledge of baseline conditions, the monitoring program can serve as an indicator for any deterioration in environmental conditions due to operation of the plants and suitable preventive steps could be taken in time to safeguard the environment. Monitoring is as important as that of control of pollution since the efficiency of control measures can only be determined by monitoring.

The environmental attributes being monitored are as given below:

- Air Pollution and Meteorological Aspects
- Surface and Ground Water Quality
- Noise Levels
- Soil Quality

## Consolidated Air Quality Monitoring Data of FY 2021-2022

JAJANG IRON ORE MINES										
AAQ DATA FOR THE PERIOD APRIL 2021 TO MARCH 2022										
	PM10 [µg/m3]		PM2.5 [µg/m3]		SO2 [µg/m3]		NO2 [µg/m3]		CO [mg/m3]	
	Maxi mum	Mini mum	Maxi mum	Mini mum	Maxi mum	Mini mum	Maxi mum	Mini mum	Maxi mum	Mini mum
<b>CORE ZONE</b>										
Mines Office	77.0	33.0	29.1	11.0	15.6	8.2	30.3	9.5	1.0	0.25
Entry & Exit Gate	93.0	32.0	35.0	11.0	18.6	9.0	30.6	10.3	0.92	0.41
Guest House	74.45	29.0	27.65	10.0	18.6	7.1	26.5	8.4	0.93	0.19
Work Shop Area	86.1	30.0	41.1	11.0	21.82	9.1	40.0	10.6	0.92	0.42
<b>BUFFER ZONE</b>										
Jajang Village	93.8	38.0	53.67	13.0	21.34	9.2	28.1	10.6	0.72	0.38
Jaraibahal Village	82.45	42.0	61.28	14.0	23.48	9.9	36.4	11.2	0.77	0.4
Bandabeda Village	74.3	39.0	31.5	13.0	21.4	9.1	34.4	10.8	0.69	0.39
Kamalpur Village	81.3	29.0	34.5	10.0	19.2	6.3	36.4	7.6	0.7	0.21
<b>NAAQ (24 hourly standard)</b>	<b>100 [µg/m3]</b>		<b>60 [µg/m3]</b>		<b>80 [µg/m3]</b>		<b>80 [µg/m3]</b>		<b>2 [mg/m3] (8 hourly)</b>	

## Consolidated Surface Water Quality Monitoring Data of FY 2021-2022

JAJANG IRON ORE MINE								
Baitarini River UpStream								
Parameter	Units	April	May	June	July	August	September	Limits for Stream Water Standards
PH	-	6.82	6.82	6.73	6.71	6.68	6.72	6.5-8.5
Total Dissolved Solids	mg/l	125	124	112	104	132	145	1500
Chlorides	mg/l	7	9	8	9	20	15	600
Iron	mg/l	0.34	0.29	0.24	0.28	0.25	0.21	50
Fluorides	mg/l	0.1	0.17	0.18	0.15	0.17	0.15	1.5
BOD	mg/l	3	3	4	4	5	8	3
DO	mg/l	5.2	5.3	5.2	5.4	5.5	5.2	4
Baitarini River UpStream								
Parameter	Units	October	November	December	January	February	March	Limits for Stream Water Standards
PH	-	6.58	6.63	6.61	6.42	6.38	6.23	6.5-8.5
Total Dissolved Solids	mg/l	158	162	172	128	97	45.6	1500
Chlorides	mg/l	25	21	15	16	15	16.0	600
Iron	mg/l	0.21	0.15	0.13	0.12	0.13	0.11	50
Fluorides	mg/l	0.14	0.2	0.12	0.13	0.11	0.12	1.5
BOD	mg/l	5	6	7	6.2	6.9	5.5	3
DO	mg/l	5.6	5.2	5.4	5.9	6.1	7.2	4

<b>Baitarini River DownStream</b>								
<b>Parameter</b>	<b>Units</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>Limits for Stream Water Standards</b>
<b>PH</b>	-	6.75	6.76	6.79	6.82	6.73	6.82	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	132	152	136	126	154	165	1500
<b>Chlorides</b>	mg/l	15	14	12	15	25	22	600
<b>Iron</b>	mg/l	0.65	0.46	0.35	0.32	0.29	0.26	50
<b>Fluorides</b>	mg/l	0.2	0.21	0.23	0.21	0.24	0.26	1.5
<b>BOD</b>	mg/l	4	6	5	6	7	9	3
<b>DO</b>	mg/l	5.2	4.9	4.8	4.9	5.1	5.4	4
<b>Baitarini River DownStream</b>								
<b>Parameter</b>	<b>Units</b>	<b>October</b>	<b>November</b>	<b>December</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>Limits for Stream Water Standards</b>
<b>PH</b>	-	6.79	6.82	6.76	6.51	6.72	6.70	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	182	175	196	141	197	174.0	1500
<b>Chlorides</b>	mg/l	35	30	30	25	35	18.0	600
<b>Iron</b>	mg/l	0.32	0.25	0.19	0.24	0.28	0.12	50
<b>Fluorides</b>	mg/l	0.21	0.2	0.15	0.17	0.16	0.14	1.5
<b>BOD</b>	mg/l	8	9	9	8.1	7.2	8.5	3
<b>DO</b>	mg/l	5	4.5	5.1	6.5	6.8	7.0	4

Suna River Upstream								
Parameter	Units	April	May	June	July	August	September	Limits for Stream Water Standards
<b>PH</b>	-	6.63	6.97	6.84	6.79	6.74	6.72	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	149	154	142	130	148	146	1500
<b>Chlorides</b>	mg/l	11	10	9.5	10	12	10	600
<b>Iron</b>	mg/l	0.25	0.24	0.21	0.18	0.15	0.2	50
<b>Fluorides</b>	mg/l	0.22	0.12	0.34	0.16	0.17	0.25	1.5
<b>BOD</b>	mg/l	2	2	3	3	3	2	3
<b>DO</b>	mg/l	5.4	5.6	5.4	5.5	5.6	5.6	4
Suna River Upstream								
Parameter	Units	October	November	December	January	February	March	Limits for Stream Water Standards
<b>PH</b>	-	6.64	6.63	6.61	6.56	6.62	6.66	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	164	175	178	174	178	138.0	1500
<b>Chlorides</b>	mg/l	15	20	25	24	23	16.0	600
<b>Iron</b>	mg/l	0.13	0.12	0.16	0.19	0.24	0.09	50
<b>Fluorides</b>	mg/l	0.17	0.2	0.14	0.15	0.18	0.12	1.5
<b>BOD</b>	mg/l	3	5	3	4	5	6.7	3
<b>DO</b>	mg/l	5.8	6.2	5.9	6.0	6.8	7.2	4

Suna River Downstream								
Parameter	Units	April	May	June	July	August	September	Limits for Stream Water Standards
<b>PH</b>	-	6.8	6.6	6.7	6.8	6.7	6.8	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	164	160	159	168	154	160	1500
<b>Chlorides</b>	mg/l	12	13	11	12	11	12	600
<b>Iron</b>	mg/l	0.19	0.17	0.18	0.16	0.18	0.15	50
<b>Fluorides</b>	mg/l	0.17	0.2	0.18	0.21	0.19	0.2	1.5
<b>BOD</b>	mg/l	2	3	2	3	2	3	3
<b>DO</b>	mg/l	5.3	5.1	5.4	5.6	5.2	4.5	4
Suna River Downstream								
Parameter	Units	October	November	December	January	February	March	Limits for Stream Water Standards
<b>PH</b>	-	6.69	6.75	6.75	6.82	6.88	6.96	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	184	175	192	188	165	151.0	1500
<b>Chlorides</b>	mg/l	25	20	40	44	20.1	20.0	600
<b>Iron</b>	mg/l	0.19	0.2	0.21	0.23	0.21	0.19	50
<b>Fluorides</b>	mg/l	0.23	0.25	0.19	0.20	0.28	0.32	1.5
<b>BOD</b>	mg/l	5	6	5	6	7	8.0	3
<b>DO</b>	mg/l	5.2	5.1	5.4	5.8	6.2	7.0	4

Kakarpani Nala Upstream								
Parameter	Units	April	May	June	July	August	September	Limits for Stream Water Standards
PH	-	6.74	6.71	6.68	6.62	6.67	6.52	6.5-8.5
Total Dissolved Solids	mg/l	147	138	124	116	128	125	1500
Chlorides	mg/l	9.7	8.5	9	8.5	9.5	9.1	600
Iron	mg/l	0.35	0.31	0.28	0.24	0.22	0.2	50
Fluorides	mg/l	0.16	0.15	0.17	0.18	0.19	0.2	1.5
BOD	mg/l	2	3	4	5	4	5	3
DO	mg/l	5.4	5.3	5.2	5.3	5.5	5.4	4
Kakarpani Nala Upstream								
Parameter	Units	October	November	December	January	February	March	Limits for Stream Water Standards
PH	-	6.64	6.75	6.58	6.61	6.64	6.9	6.5-8.5
Total Dissolved Solids	mg/l	152	163	172	178	172	133	1500
Chlorides	mg/l	10	12	20	21	22	22.0	600
Iron	mg/l	0.14	0.12	0.19	0.18	0.16	0.21	50
Fluorides	mg/l	0.12	0.1	0.15	0.17	0.18	0.23	1.5
BOD	mg/l	5	4	6	7	7.5	5.0	3
DO	mg/l	5.2	5	5.1	5.9	6.2	6.2	4

Kakarpani Nala Downstream								
Parameter	Units	April	May	June	July	August	September	Limits for Stream Water Standards
PH	-	6.9	6.7	6.8	6.6	6.7	6.8	6.5-8.5
Total Dissolved Solids	mg/l	154	149	146	138	142	140	1500
Chlorides	mg/l	10	11	10	11	10	9	600
Iron	mg/l	0.17	0.16	0.15	0.14	0.16	0.15	50
Fluorides	mg/l	0.19	0.18	0.17	0.16	0.17	0.14	1.5
BOD	mg/l	3	2	3	2	3	4	3
DO	mg/l	5.4	5.6	5.4	5.7	5.8	5.6	4
Kakarpani Nala Downstream								
Parameter	Units	October	November	December	January	February	March	Limits for Stream Water Standards
PH	-	6.71	6.82	6.67	6.7	6.8	6.89	6.5-8.5
Total Dissolved Solids	mg/l	184	175	208	184	172	148.0	1500
Chlorides	mg/l	20	16	40	23	22	12.0	600
Iron	mg/l	0.18	0.2	0.23	0.25	0.21	0.16	50
Fluorides	mg/l	0.19	0.2	0.21	0.24	0.23	0.25	1.5
BOD	mg/l	7	8	9	6	7	3.8	3
DO	mg/l	5.1	5	4.8	4.7	5.1	6.3	4

Jalpa Nadi Upstream								
Parameter	Units	April	May	June	July	August	September	Limits for Stream Water Standards
<b>PH</b>	-	6.62	6.68	6.75	6.75	6.72	6.8	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	184	182	164	164	146	140	1500
<b>Chlorides</b>	mg/l	14	15	12	12	15	25	600
<b>Iron</b>	mg/l	0.28	0.27	0.25	0.25	0.23	0.2	50
<b>Fluorides</b>	mg/l	0.15	0.14	0.16	0.16	0.14	0.12	1.5
<b>BOD</b>	mg/l	2	3	2	2	3	4	3
<b>DO</b>	mg/l	5.4	5.2	5.4	5.6	5.5	5.2	4
Jalpa Nadi Upstream								
Parameter	Units	October	November	December	January	February	March	Limits for Stream Water Standards
<b>PH</b>	-	6.79	6.56	6.65	6.7	6.8	6.89	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	132	125	164	168	170	148.0	1500
<b>Chlorides</b>	mg/l	10	12	15	14	15	12	600
<b>Iron</b>	mg/l	0.18	0.2	0.17	0.19	0.20	0.16	50
<b>Fluorides</b>	mg/l	0.12	0.16	0.16	0.18	0.23	0.25	1.5
<b>BOD</b>	mg/l	4	6	4	5	6	3.8	3
<b>DO</b>	mg/l	5.3	5.1	5.4	5.8	5.7	6.3	4

Jalpa Nadi Downstream								
Parameter	Units	April	May	June	July	August	September	Limits for Stream Water Standards
<b>PH</b>	-	6.7	6.6	6.8	6.6	6.7	6.82	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	169	172	162	154	149	145	1500
<b>Chlorides</b>	mg/l	19	18	20	21	22	24	600
<b>Iron</b>	mg/l	0.20	0.19	0.20	0.18	0.23	0.2	50
<b>Fluorides</b>	mg/l	0.21	0.20	0.22	0.19	0.20	0.2	1.5
<b>BOD</b>	mg/l	3	2	3	2	3	5	3
<b>DO</b>	mg/l	5.6	5.2	5.7	5.3	5.8	5.1	4
Jalpa Nadi Downstream								
Parameter	Units	October	November	December	January	February	March	Limits for Stream Water Standards
<b>PH</b>	-	7.05	7.1	6.82	6.7	6.73	6.87	6.5-8.5
<b>Total Dissolved Solids</b>	mg/l	178	172	192	188	174	164.0	1500
<b>Chlorides</b>	mg/l	20	15	30	28	22	10.0	600
<b>Iron</b>	mg/l	0.21	0.2	0.24	0.21	0.17	0.22	50
<b>Fluorides</b>	mg/l	0.16	0.18	0.19	0.20	0.18	0.22	1.5
<b>BOD</b>	mg/l	5	6	6	7	6.9	6.7	3
<b>DO</b>	mg/l	5.1	5	5.3	5.8	5.1	6.9	4