JSW Steel Limited
Nuagaon Iron Ore Mine

ENVIRONMENTAL STATEMENT FOR NUAGAON IRON ORE MINE (FINANCIAL YEAR ENDING MARCH 31ST 2022)

PREPARED & SUBMITTED BY

Nuagaon 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 31st March 2022

Part A

(i)	Name and address of the owner/occupier of the industry operation or process	Nuagaon Iron Ore of M/s JSW Steel Ltd in villages Nuagaon, Barapada, Gandhalpada, Guali, Katesahi, Parediposi, KohlaRudukela, Panduliposhi and Topadihi villages under Barbil Tehsil of Keonjhar District, Odisha state
(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 of 7.99 MTPA iron ore production. 2 MTPA Beneficiation Plant EC vested JSW (detailed engineering & procurement is in under progress and same will install within due course of time).
(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)*	353 m3/day**
	Cooling	Nil
	Domestic (Drinking purpose)	202 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	0.0323	

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)

Pollutants	Qty. of pollutants discharged (mass/day)	Concentrations of pollutants in discharged (mass/volume)	Percentage of variation from prescribed standard with reason
(a) Water	There is no such trade effluent and source emissions discharge except surface run-off. Mechanized Oil Grease Trap system having complete recirculation system in place. The Consolidated Environmental Monitoring data of surface water quality is enclosed as **Annexure 1.**		
(b) Air	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 **Annexure 1.**		

PART- D
HAZARDOUS WASTES
(as specified under Hazardous Wastes / Management and Handling Rules, 1989)

Hazardous Wastes	Total Quantity (Kg.)	
	During the previous financial year	**During the current financial year**
(a) From process (Used or spent Oil)	14.91	10.35
(b) From pollution control	NA	Nil

PART- E

Solid Wastes

	Total Quantity	
	During the previous financial year	**During the current financial year**
(a) From process	Not Applicable	Over Burden- 1125480 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 1125480 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-
Used Oil- A total of 10.35 T of hazardous waste was generated during the reporting period which was sold to an authorized dealer of Hazardous waste as per CPCB guidelines.

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, mineral transportation roads 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.

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

Electronic Digital Display Board at Nuagaon Mine Gate

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 at Katasahi

Check Dam Provided at Topadihi Nalla

Nalla Side Plantation

Dump Plantation

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.

Nuagaon Environmental Protection Measures Expenditure (head wise breakup) incurred from in FY 21-22 is given below-

Particulars	**Approximately Cost incurred (in Crores)**
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	0.45
Plantation with watch and care	0.001
Construction/Maintenance of Wheel washing system	0.18
Online Environmental Monitoring System (CAAQMS & Digital Display Board)	0.025
Manual Environment Monitoring	0.48
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.	0.0016
Biodiversity /EIA/EMP/Occupational Health/Hydrogeological Studies and any other environmental scientific assessment or studies conducted	0.055
Grand Total (Rs. in Cr.)	**1.54**

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

Annexure 1

Consolidated Air Quality Monitoring Data of FY 2021-2022

NUAGAON 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]	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
CORE ZONE										
MINES OFFICE	93.0	33.0	35.0	11.0	18.4	7.9	28.3	9.3	0.86	0.26
NEAR KATESAHI EXIT GATE AREA	85.1	35.0	43.6	12.0	20.9	9.0	40.3	10.0	0.81	0.28
NEAR LP 99	77.4	31.0	31.6	11.0	18.1	7.8	30.0	9.0	0.80	0.26
NEAR DISPENSARY	94.0	34.0	37.0	11.0	21.2	7.7	26.5	9.2	0.91	0.27
BUFFER ZONE										
Barpada Village	96.0	35.0	63.8	11.0	33.0	7.7	50.3	9.2	0.73	0.29
KateSahi Village	92.6	31.0	57.8	11.0	28.5	7.1	45.3	8.4	0.77	0.22
Rengelabeda Village	85.0	39.0	33.0	12.0	12.0	9.2	13.6	10.6	0.77	0.39
Panduluposi Village	100.3	35.0	53.5	12.0	22.5	7.9	35.1	9.2	0.72	0.37
NAAQ (24 hourly standard)	**100 [µg/m3]**		**60 [µg/m3]**		**80 [µg/m3]**		**80 [µg/m3]**		**2 [mg/m3] (8 hourly)**	

Consolidated Surface Water Quality Monitoring Data of FY 2021-2022

NUAGAON IRON ORE MINE								
Suna River Upstream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.8	6.72	6.64	6.71	6.68	6.74	6.5-8.5
Total Dissolved Solids	mg/l	80	104	98	106	96	92	1500
Chlorides	mg/l	6	8.5	7.5	8.5	7.5	7.1	600
Iron	mg/l	0.12	0.13	0.12	0.13	0.14	0.12	50
Fluorides	mg/l	0.1	0.11	0.13	0.11	0.13	0.1	1.5
BOD	mg/l	2	3	3	3	4	3	3
DO	mg/l	5.1	4.9	5.1	5.2	5.3	5.1	4
Suna River Upstream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.62	6.56	6.67	6.66	6.71	7.13	6.5-8.5
Total Dissolved Solids	mg/l	116	120	134	164	168	96.0	1500
Chlorides	mg/l	10	12	12	20	21	14.0	600
Iron	mg/l	0.13	0.12	0.15	0.18	0.22	0.11	50
Fluorides	mg/l	0.13	0.12	0.14	0.16	0.16	0.16	1.5
BOD	mg/l	7	9	6	5	6	4.3	3
DO	mg/l	4.9	4.8	5.1	5.9	6.0	6.4	4

Suna River Downstream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.7	6.8	6.6	6.7	6.8	6.82	6.5-8.5
Total Dissolved Solids	mg/l	160	158	162	169	138	92	1500
Chlorides	mg/l	12	13	11	12	11	7	600
Iron	mg/l	0.19	0.17	0.18	0.16	0.18	0.23	50
Fluorides	mg/l	0.17	0.2	0.18	0.21	0.19	0.26	1.5
BOD	mg/l	2	3	2	3	2	8	3
DO	mg/l	5.3	5.1	5.4	5.6	5.2	6.3	4
Suna River Downstream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.87	6.92	6.72	6.72	6.68	7.10	6.5-8.5
Total Dissolved Solids	mg/l	142	135	174	168	171	106.0	1500
Chlorides	mg/l	15	14	18	25	19.1	12.0	600
Iron	mg/l	0.17	0.18	0.13	0.18	0.20	0.09	50
Fluorides	mg/l	0.19	0.26	0.15	0.19	0.21	0.13	1.5
BOD	mg/l	9	8	9	5	6	5.8	3
DO	mg/l	4.7	4.6	4.8	5.1	5.0	6.0	4

Karo River Upstream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.75	6.69	6.72	6.65	6.61	6.77	6.5-8.5
Total Dissolved Solids	mg/l	114	136	122	134	118	125	1500
Chlorides	mg/l	10	15	10	15	12	10	600
Iron	mg/l	0.11	0.16	0.13	0.16	0.13	0.12	50
Fluorides	mg/l	0.12	0.17	0.16	0.13	0.11	0.15	1.5
BOD	mg/l	5	2	3	4	3	5	3
DO	mg/l	5.1	5.4	5.3	5.5	5.6	5.8	4
Karo River Upstream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.67	6.72	6.73	6.7	6.6	6.66	6.5-8.5
Total Dissolved Solids	mg/l	134	115	168	163.0	165	74.0	1500
Chlorides	mg/l	15	10	10	16.0	15.0	6.0	600
Iron	mg/l	0.16	0.2	0.13	0.17	0.15	0.09	50
Fluorides	mg/l	0.13	0.1	0.14	0.13	0.14	0.17	1.5
BOD	mg/l	5	4	5	5	4	6.3	3
DO	mg/l	5.4	5	5.6	5.4	5.3	7.2	4

Karo River Down stream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.9	6.77	6.81	6.72	6.69	6.82	6.5-8.5
Total Dissolved Solids	mg/l	165	158	146	158	136	120	1500
Chlorides	mg/l	24	20	15	20	17	16	600
Iron	mg/l	0.21	0.21	0.19	0.21	0.18	0.2	50
Fluorides	mg/l	0.2	0.21	0.23	0.15	0.14	0.2	1.5
BOD	mg/l	4	3	4	5	6	5	3
DO	mg/l	5	5.1	5.2	5.3	5.2	5.1	4
Karo River Down stream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.73	6.8	6.94	6.7	6.82	6.89	6.5-8.5
Total Dissolved Solids	mg/l	152	145	180	186	189.0	120.0	1500
Chlorides	mg/l	20	15	25	28	22.0	16.0	600
Iron	mg/l	0.21	0.2	0.15	0.18	0.20	0.05	50
Fluorides	mg/l	0.16	0.15	0.17	0.19	0.17	0.14	1.5
BOD	mg/l	7	6	8	7.2	8	7.2	3
DO	mg/l	5.1	5	5.2	5.4	5.5	6.9	4

Kakarpani Nala Upstream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.75	6.73	6.64	6.68	6.71	6.74	6.5-8.5
Total Dissolved Solids	mg/l	120	96	104	126	138	120	1500
Chlorides	mg/l	6.1	7	6.5	7.5	7	7.5	600
Iron	mg/l	0.1	0.09	0.08	0.09	0.08	0.1	50
Fluorides	mg/l	0.1	0.13	0.11	0.13	0.17	0.2	1.5
BOD	mg/l	3	2	2	3	4	3	3
DO	mg/l	6.5	6	5.9	5.8	5.6	5.2	4
Kakarpani Nala Upstream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.73	6.72	6.71	6.71	6.74	6.99	6.5-8.5
Total Dissolved Solids	mg/l	162	156	154	158	162	110.0	1500
Chlorides	mg/l	8.5	9.1	9	12	11	18.0	600
Iron	mg/l	0.07	0.08	0.06	0.09	0.11	0.11	50
Fluorides	mg/l	0.15	0.2	0.13	0.15	0.18	0.22	1.5
BOD	mg/l	5	6	6	7	7.1	5.5	3
DO	mg/l	5.4	5.1	5.2	5.8	5.6	6.0	4

Kakarpani Nala Downstream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.8	6.7	6.8	6.7	6.73	6.78	6.5-8.5
Total Dissolved Solids	mg/l	158	150	148	140	149	152	1500
Chlorides	mg/l	11	10	11	12	9	7.6	600
Iron	mg/l	0.16	0.15	0.16	0.17	0.14	0.15	50
Fluorides	mg/l	0.18	0.17	0.17	0.18	0.15	0.25	1.5
BOD	mg/l	2	3	2.9	3	4	4	3
DO	mg/l	5.1	5.4	5.6	5.8	5.7	6.2	4
Kakarpani Nala Downstream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.68	6.75	6.74	6.73	6.65	6.91	6.5-8.5
Total Dissolved Solids	mg/l	174	165	172	182	172	119.0	1500
Chlorides	mg/l	9	9.1	12	15	12	22.0	600
Iron	mg/l	0.08	0.09	0.07	0.1	0.14	0.14	50
Fluorides	mg/l	0.17	0.25	0.14	0.24	0.23	0.24	1.5
BOD	mg/l	5	4	7	6	7	6.3	3
DO	mg/l	5.5	5.6	5.6	4.8	5.2	5.8	4

Theherei Nala								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.75	6.84	6.77	6.72	6.64	6.74	6.5-8.5
Total Dissolved Solids	mg/l	90	116	118	132	140	148	1500
Chlorides	mg/l	7.5	8	8.5	8	8.5	8	600
Iron	mg/l	0.3	0.07	0.09	0.11	0.09	0.13	50
Fluorides	mg/l	0.15	0.14	0.15	0.14	0.13	0.15	1.5
BOD	mg/l	2	2	3	5	6	4	3
DO	mg/l	5	5.9	5.6	5.4	5.3	5.6	4
Theherei Nala								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.65	6.84	6.77	6.72	6.64	6.98	6.5-8.5
Total Dissolved Solids	mg/l	150	158	162	147	152	79.0	1500
Chlorides	mg/l	7	8.3	7.4	7.8	8.2	12.0	600
Iron	mg/l	0.15	0.17	0.19	0.16	0.19	0.20	50
Fluorides	mg/l	0.14	0.16	0.17	0.16	0.15	0.20	1.5
BOD	mg/l	3	4	5	6	5	4.4	3
DO	mg/l	5.3	5.7	5.4	5.3	5.2	6.5	4

Topadihi Nala Upstream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.85	6.65	6.69	6.71	6.67	6.81	6.5-8.5
Total Dissolved Solids	mg/l	142	136	148	134	142	124	1500
Chlorides	mg/l	16	15	20	25	20	6.3	600
Iron	mg/l	0.18	0.13	0.14	0.16	0.13	0.07	50
Fluorides	mg/l	0.2	0.13	0.16	0.12	0.11	0.2	1.5
BOD	mg/l	1	3	4	4	3	5	3
DO	mg/l	5.1	5.7	5.6	5.5	5.6	5.2	4
Topadihi Nala Upstream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.65	6.78	6.58	6.68	6.78	6.19	6.5-8.5
Total Dissolved Solids	mg/l	164	170	178	160	168	64.0	1500
Chlorides	mg/l	25	24	30	28	21	12.0	600
Iron	mg/l	0.15	0.2	0.12	0.16	0.15	0.12	50
Fluorides	mg/l	0.13	0.15	0.16	0.18	0.17	0.10	1.5
BOD	mg/l	5	4	5	3	4	4.5	3
DO	mg/l	5.3	5.1	5.4	5.2	5.2	6.5	4

Topadihi Nala Down stream								
Parameter	**Units**	**April**	**May**	**June**	**July**	**August**	**September**	**Limits for Stream Water Standards**
PH	-	6.95	6.82	6.74	6.82	6.79	6.8	6.5-8.5
Total Dissolved Solids	mg/l	110	164	172	156	160	155	1500
Chlorides	mg/l	26	25	25	30	35	7	600
Iron	mg/l	0.25	0.17	0.16	0.18	0.14	0.12	50
Fluorides	mg/l	0.2	0.15	0.19	0.17	0.13	0.25	1.5
BOD	mg/l	2	5	6	7	6	4	3
DO	mg/l	5	5.3	5.2	5.1	5.2	6.3	4
Topadihi Nala Down stream								
Parameter	**Units**	**October**	**November**	**December**	**January**	**February**	**March**	**Limits for Stream Water Standards**
PH	-	6.72	6.7	6.75	6.8	6.7	6.23	6.5-8.5
Total Dissolved Solids	mg/l	182	175	194	167	182	69.0	1500
Chlorides	mg/l	40	35	45	30	32	16.0	600
Iron	mg/l	0.19	0.2	0.16	0.18	0.17	0.13	50
Fluorides	mg/l	0.14	0.15	0.19	0.19	0.20	0.10	1.5
BOD	mg/l	8	6	9	7	8	6.7	3
DO	mg/l	4.9	4.5	5.1	5.1	5.4	6.1	4