



Regd. Office: JSW Centre
Bandra Kurla Complex,
Bandra (East), Mumbai – 400 051
CIN : L27102MH1994PLC152925
Phone : +91 22 4286 1000
Fax : +91 22 4286 3000
Website : www.jsw.in

No. JSW/S/CO/2022/840

Date: 30/11/2022

To,
Deputy Director General of Forests (C),
Ministry of Environment, Forest and Climate Change,
Regional Office (Eastern Zone),
A/3, Chandersekharpur, Bhubaneswar – 751023

Sub: - Submission of Six-monthly EC compliance report in respect of Narayanposhi Iron & Manganese Ore Mine of M/s JSW Steel Ltd for the period April 2022 to Sep 2022.

Ref: -1. Environment Clearance Letter dated 18.06.2019 issued by MOEF&CC, GOI.

Dear Sir,

We are submitting herewith six-monthly EC compliance report of Jajang Iron Ore Mine, M/s JSW Steel Ltd. for the period Apr 2022 to Sep 2022 as per EIA notification 2006. The same is also attached in Soft copy to your good office on e-mail to roez.bsr-mef@nic.in; for your ready reference.

We trust that the measures taken towards environmental safeguards comply with the stipulated conditions. We look forward to your guidance which shall certainly help us in our endeavor for improving upon our environmental management practices.

Seeking your co-operation as always.

Thanking you,

Yours Faithfully
For JSW Steel Ltd

Mrutyunjaya Mahapatra
(Authorized Signatory)

Encl: As above



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Copy to:

1. Zonal Office Kolkata, Central Pollution Control Board, South end Conclave, Block 502, 5th and 6th Floors, 1582 Razidanga Main Road, Kolkata, West Bengal 700107.
2. The Member Secretary, State Pollution Control Board, A/118, Nilakantha Nagar, Bhubaneswar, Odisha-751012.
3. The Regional Officer, Regional Office, Rourkela Office of the State Pollution Control Board Rourkela Town Engineering Office Premises, Sector – 5, Rourkela – 769 002, Odisha



Part of O. P. Jindal Group

ENVIRONMENT CLEARANCE COMPLIANCE STATUS –NARAYANPOSHI MINE

Compliance report of Environmental Clearance for Narayanposhi Iron & Manganese Ore Mine, JSW Steel Ltd.

Reference letter from MoEF&CC, New Delhi- J-11015/288/2008-IA.II(M), Dtd. 18.06.2019.

Capacity- 6.0 MTPA Iron Ore (ROM) & 0.036 MTPA Mn Ore and 2 MTPA Beneficiation Plant.

Sl. No.	Specific Conditions	Compliance
1	The enhance production shall be on pro-rata basis for the effective period of valid environment clearance granted herein. The PP shall ensure its compliance by getting concurrence in mining plan approved by concern authority in this regard.	Not Applicable
2	This EC for expansion proposal (iron ore production from 3.0 MTPA to 6.0 MTPA (ROM) and existing 0.036 MTPA Manganese ore and establishment of Beneficiation Plant with capacity of 2.0 Million TPA along with crusher and screening plant within the mine lease area) shall be operational after submission of an undertaking through affidavit to MoEF & CC within 15 days of receipt of this letter, for compliance of all the conditions prescribed herein.	2 MTPA Beneficiation Plant detailed engineering & procurement is in under progress and same will be install within due course of time. TOR has been approved from MOEF&CC on 31.12.2020 for the proposed project of 6 MTPA Beneficiation Plant and EIA/EMP report for the same is under progress.
3	Project Proponent and Department of Steel & mines, Govt. of Odisha shall ensure the implementation of recommendations of carrying capacity study report conducted by CSIR-NEERI w.r.t. mining proposal of iron Ore and/or manganese in the State of Odisha.	Not Applicable
4	Department of Steel & Mines, Govt. of Odisha should prepare 5 years' regional plan for annual iron ore requirement from the state, which in turn shall be met from different mines/zones (e.g. Joda, Koira.) in the state. Accordingly, sustainable annual production (SAP) for each zone/mine may be followed adopting necessary environmental protection measures.	Not Applicable
5	Project Proponent shall construct the cement concrete road from mine entrance and exit to the main road with proper drainage system and green belt development along the roads and also construction of road with minimum 300 m inside the mine. This should be done within one year for existing mines and new mine should have since beginning. The Department of Steel & Mines, Govt. of Odisha should ensure the compliance and should not issue the Mining Permits, if mine lease holder has not constructed proper cement concrete road as suggested. This Environmental Clearance for the expansion project shall be operated only after the	Being Complied. Existing cement concrete road from mine entrance and exit to the main road being maintained. In addition to existing, new cement concrete road, has been constructed in Gate No 2 area along with Automatic Wheel Washing facility.

	compliance of the above mentioned specific condition.	
6	The Committee observed that as per the recommendations of NEERI report the PP needs to do regular vacuum cleaning of all mineral carrying roads aiming at “zero dust re-suspension” within 3 months. This Environmental Clearance for the expansion project shall be operated only after the compliance of the above mentioned specific condition.	Regular water sprinkling through mobile water sprinkler tankers being carried out on haul roads and nearby mineral dispatch roads (NH) to avoid generation of dust during movement of vehicles. Regular maintenance of Haul roads is being carried out to avoid generation of dust during movement of vehicles. In addition to this, regular vacuum cleaning system procured from M/s TPS is under operation and photo for the same is attached as <u>Annexure 2a</u>
7	Project Proponent shall monitor the environmental quality parameters as per EC and CTE/CTO conditions, and implementation of suggested measures for control of road dust and air pollution. Odisha State Pollution Control Board has to ensure the compliance of CTE/CTO. Regional office of the MoEF&CC, Bhubaneswar shall monitor the compliance of the EC conditions. Regional office of the Indian Bureau of Mines (IBM) shall monitor the compliance of mining plan and progressive mine closure plan. Any violation by mine lease holder may invite actions per the provisions of applicable Acts.	Regular monitoring of environmental quality parameters as per EC and CTE/CTO conditions being carried out and Monitoring Reports are attached as <u>Annexure 1a, 1b & 1c</u> . Vendor is a recognized NABET, MoEF&CC accredited laboratory.
8	Project Proponent shall ensure the compliance of Suggested Ore Transport Mode (SOTM) with association of the State Government of Odisha. All existing mines should ensure adoption of SOTM within next 5 years. New mines or mines seeking expansion should incorporate provision of SOTM in the beginning itself, and should have system in place within next 5 years.	Project Proponent will follow the Suggested Ore Transport Mode (SOTM) in association with Government of Odisha. As proposed in new applied EC for which TOR approved on dated 31.12.2020, the ore will be transported through slurry pipeline/road/railway to the designated port or directly to the JSW Steel Plant or to Nuagaon Mine through road/pipe conveyor for onward transportation to end use plant through slurry pipe line.
9	The State Govt. of Odisha shall ensure dust free roads in mining areas wherever the road transportation of mineral is involved. The road shoulders shall be paved with fence besides compliance with IRC guidelines. All the roads should have proper drainage system and apart from paving of entire carriage width the remaining right of way should have native plantation (dust capturing species). Further, regular maintenance should also be ensured by the Govt. of Odisha. Progress on development of dust free roads, implementation of SOTM, increased use of existing rail network, development of additional railway network/conveyor belt/ pipelines etc. shall	The State Govt of Odisha will do the needful. Mobile water sprinkler tankers are provided for regular water sprinkling on nearby mineral dispatch roads (NH) to avoid generation of dust during movement of vehicles

	be submitted periodically to Regional office of the MoEF&CC.	
10	Project Proponent shall develop the parking plazas for trucks with proper basic amenities/ facilities inside the mine. This should be done within one year for existing mines and new mines should have since beginning. This Environmental Clearance for the expansion project shall be operated only after the compliance of the above mentioned specific condition.	Existing parking plaza being maintained. Additional basic amenities will be provided, if required.
11	Department of Steel & Mines shall ensure the construction of NH 215 as minimum 4 lane road with proper drainage system and plantation and subsequent regular maintenance of the road as per IRC guidelines. Construction of other mineral carrying roads with proper width and drainage system along with road side plantation to be carried out. This shall be completed within 2 Years.	Not Applicable.
12	Regular vacuum cleaning of all mineral carrying roads aiming at “Zero Dust Re- suspension” shall be adopted by PWD / NHAI/ Mine Lease Holders within a time Period of 3 months for existing roads. This Environmental Clearance for the expansion project shall be operated only after the compliance of the above mentioned specific condition.	Regular water sprinkling through mobile water sprinkler tankers being carried out on haul roads and nearby mineral dispatch roads (NH) to avoid generation of dust during movement of vehicles. 1.1 Km of fixed sprinklers from gate No. 2 to RF quarry has been installed in order to control the dust. Regular maintenance of Haul roads is being carried out to avoid generation of dust during movement of vehicles. In addition to this, regular vacuum cleaning system procurement order has been awarded to M/s TPS and same is in process of supply of the machines. Photos for the same is attached as <u>Annexure 2a, 2b & 2c</u>
13	In case the total requirement of iron ore exceeds the suggested limit for that year, permission for annual production by an individual mine may be decided depending on approved EC capacity (for total actual dispatch) and actual production rate of individual mine during last year or any other criteria set by the State Govt., i.e. Dept. of Steel & Mines. Department of Steel and Mines in consultation with Indian Bureau of Mines-RO should prepare in advance mine-wise annual production scenario so that demand for iron ore can be anticipated, and actual production/dispatch does not exceed the suggested annual production.	Not Applicable
14	R&D studies towards utilization of low-grade iron ore should be conducted through research/academic institutes like IMMT, Bhubaneswar, NML, Jamshedpur, and concerned metallurgical departments in IITs, NITs etc., targeting full	The low grade ores being stacked in earmarked area. Once technology through R & D study for the beneficiation & commercial use is established same will be utilised.

	utilization of low-grade iron ore (Fe content up to 45% by 2020 and up to 40% by 2025). In fact, life cycle assessment of whole process including environmental considerations should be done for techno-economic and environmental viability. R&D studies on utilization of mine wastewater having high concentration of Fe content for different commercial applications in industries such as cosmetics, pharmaceutical, paint industry should also be explored. Responsibility: IBM, Dept. of Steel & Mines, Individual Mine Lease Holders.	Approved TOR dated 31.12.2020 having proposal of 6 MTPA Beneficiation Plant and EIA/EMP report for the same is under progress.
15	The mining activity in Joda-Koira sector is expected to continue for another 100 years, therefore, it will be desirable to develop proper rail network in the region. Rail transport shall not only be pollution free mode but also will be much economical option for iron ore transport. The rail network and/or conveyor belt system up to public railway siding needs to be created. The total length of the conveyor belt system/ rail network to be developed from mines to nearest railway sidings by 11 mines in Joda region is estimated to be about 64 km. Similarly, in Koira region, total length of rail network/ conveyor system for 8 mines (under SOTM 1 & 2) is estimated to be around 95 km. Further, it is suggested to develop a rail network connecting Banspani (Joda region) and Roxy railway sidings in Koira region. Responsibility: Dept. of Steel & Mines, Govt. of Odisha and Concerned Mines along with Indian Railways. Time Period: Maximum 7 years (by 2025). The Department of Steel & Mines, Govt. of Odisha should follow-up with the concerned Departments and railways so that proposed proper rail network is in place by 2025.	Not Applicable
16	State Govt. of Odisha shall make all efforts to ensure exhausting all the iron & manganese ore resources in the existing working mines and from disturbed mining leases/zones in Joda and Koira region. The criteria suggested shall be applicable while suggesting appropriate lease area and sustainable mining rate. Responsibility: Dept. of Steel & Mines, Govt. of Odisha.	Not Applicable.
17	Mining Operations/Process Related: Project Proponent shall implement the following mitigation measures: (i) Appropriate mining process and machinery (viz. right capacity, fuel efficient) should be selected to carry out various mining operations that generate minimal dust/air pollution, noise, wastewater and solid waste. e.g. drills should either be operated with dust extractors or equipped with water injection system. (ii) After commencement of mining operation, a study should be conducted to	Mining being carried out as per approved mine plan. Dust Suppression System (Dry fog system) being provided at all appropriate places of mineral handling plants (crusher & screening plant) and other areas. Same are being maintained for proper dust control. Photo for the same is attached as <u>Annexure 3</u>

	assess and quantify emission load generation (in terms of air pollution, noise, waste water and solid waste) from each of the mining activity (including transportation) on annual basis. Efforts should be made to further eliminate/ minimize generation of air pollution/dust, noise, wastewater, solid waste generation in successive years through use of better technology. This shall be ensured by the respective mine lease holders. (iii) Various machineries/equipment selected (viz. dumpers, excavators, crushers, screen plants etc.) and transport means should have optimum fuel/power consumption, and their fuel/power consumption should be recorded on monthly basis. Further, inspection and maintenance of all the machineries/equipment/ transport vehicles should be followed as per manufacturer's instructions/ recommended time schedule and record should be maintained by the respective mine lease holders. (iv) Digital processing of the entire lease area using remote sensing technique should be carried out regularly once in 3 years for monitoring land use pattern and mining activity taken place. Further, the extent of pit area excavated should also be demarcated based on remote sensing analysis. This should be done by ORSAC (Odisha Space Applications Centre, Bhubaneswar) or an agency of national repute or if done by a private agency, the report shall be vetted/ authenticated by ORSAC, Bhubaneswar. Expenses towards the same shall be borne by the respective mine lease holders. Responsibility: Individual Mine Lease Holders.	DGPS Surveyed Mining lease boundary superimposed on High Resolution Satellite image of Narayanposhi Iron & Mn Mine duly vetted by M/s ORSAC has been attached as Annexure
18	Air Environment Related: Project Proponent shall implement the following mitigation measures: (i) Fugitive dust emissions from all the sources should be controlled regularly on daily basis. Water spraying arrangement on haul roads, loading and unloading and at other transfer points should be provided and properly maintained. Further, it will be desirable to use water fogging system to minimize water consumption. It should be ensured that the ambient air quality parameters conform to the norms prescribed by the CPCB in this regard. (ii) The core zone of mining activity should be monitored on daily basis. Minimum four ambient air quality monitoring stations should be established in the core zone for SPM, PM10, PM2.5, SO2, NOx and CO monitoring. Location of air quality monitoring stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken	Fixed auto sprinklers on both sides of major haul road and approach roads of the mine from gate no 2 to RF quarry has been also been installed. Whereas Mobile water tankers has also been engaged for the temporary haul roads. 215 out on haul roads and nearby mineral dispatch roads (NH) to avoid generation of dust during movement of vehicles. Regular maintenance of Haul roads is being carried out to avoid generation of dust during movement of vehicles. Regular Monitoring of ambient air quality parameters being carried out at four AAQ monitoring stations in core zone and four stations in buffer zone. Monitoring reports are attached as <u>Annexure 1a</u>.

	in consultation with the State Pollution Control Board (based on Emission Load Assessment Study). The number of monitoring locations may be more for larger capacity mines and working in larger area. Out of four stations, one should be online monitoring station in the mines having more than 3 MTPA EC Capacity. (iii) Monitoring in buffer zone should be carried out by SPCB or through NABET accredited agency. In addition, air quality parameters (SPM, PM10, PM2. 5, SO₂, NO_x and CO) shall be regularly monitored at locations of nearest human habitation including schools and other public amenities located nearest to source of the dust generation as applicable. (iv) Emissions from vehicles as well as heavy machinery should be kept under control and regularly monitored. Measures should be taken for regular maintenance of vehicles used in mining operations and in transportation of mineral. (v) The vehicles shall be covered with a tarpaulin and should not be overloaded. Further, possibility of closed container trucks should be explored for direct to destination movement of iron ore. Air quality monitoring at one location should also be carried out along the transport route within the mine (periodically, near truck entry and exit gate), Responsibility: Individual Mine Lease Holders and SPCB	Mineral carrying trucks are not allowed to go out of the lease area without tarpaulin cover and is being monitored by security personnel at the exit gate. Vehicular emissions will be regularly monitored. Also, Security personnel are also do not allow the vehicles to enter into the mines without having valid PUC.
19	Noise and Vibration Related: Project Proponent shall implement the following mitigation measures: (i) Blasting operation should be carried out only during daytime. Controlled blasting such as Nonel, should be practiced. The mitigation measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented. (ii) Appropriate measures should be taken for control of noise levels below 85 DB in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs/muffs. (iii) Noise levels should be monitored regularly (on weekly basis) near the major sources of noise generation within the core zone. Further, date, time and distance of measurement should also be indicated with the noise levels in the report. The data should be used to map the noise generation from different activities and efforts should be made to maintain the noise levels with the acceptable limits of CPCB (CPCB, 2000) (iv) Similarly, vibration at various sensitive locations should be monitored at least once in month, and mapped for any significant changes due to successive mining operations. Responsibility: Individual Mine Lease Holders.	Noise producing equipment's are covered as far as practicable. Workers engaged in Operations are provided with ear plugs / muffs. Besides this, acoustic enclosures are provided for all machines operating within the mines. Controlled blasting is in place. Regular Noise Monitoring being carried out at 10 stations in core zone and buffer zone and Monitoring reports are attached as <u>Annexure 1c</u>. Vendor is a recognized NABET, MoEF & CC accredited laboratory.

20	Water/Wastewater Related: Project Proponent shall implement the following mitigation measures: (i) In general, the mining operations should be restricted to above ground water table and it should not intersect groundwater table. However, if enough resources are estimated below the ground water table, the same may be explored after conducting detailed geological studies by GSI and hydro-geological studies by CGWB or NIH or institute of national repute, and ensuring that no damage to the land stability/ water aquifer system shall happen. The details/ outcome of such study may be reflected/incorporated in the EIA/EMP report of the mine appropriately. (ii) Natural watercourse and/or water resources should not be obstructed due to any mining operations. Regular monitoring of the flow rate of the springs and perennial nallas should be carried out and records should be maintained. Further, regular monitoring of water quality of nallas and river passing thorough the mine lease area (upstream and downstream locations) should be carried out on monthly basis. (iii) Regular monitoring of ground water level and its quality should be carried out within the mine lease area by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out on monthly basis. (iv) In order to optimize water requirement, suitable conservation measures to augment ground water resources in the area should be undertaken in consultation with Central Ground Water Board (CGWB). (v) Suitable rainwater harvesting measures on long term basis should be planned and implemented in consultation with CGWB, to recharge the ground water source. Further, CGWB can prepare a comprehensive plan for the whole region. (vi) Appropriate mitigation measures (viz. ETP, STP, garland drains, retaining walls, collection of runoff etc.) should be taken to prevent pollution of nearby river/other water bodies. Water quality monitoring study should be conducted by State Pollution Control Board to ensure quality of surface and ground water sources on regular basis. The study can be conducted through NABL/ NABET approved water testing laboratory. However, the report should be vetted by SPCB. (vii) Industrial wastewater (workshop and wastewater from the mine) should be properly collected, treated in ETP so as to conform to the discharge standards applicable. (viii) Oil and grease trap should be installed before discharge of workshop effluents. Further, sewage treatment plant should be installed for the employees/colony,	No natural water courses and/or water resources are obstructed due to mining operation. Majority of the runoff is channelized to in-pit settling cum percolation pits. Regular monitoring of water quality of upstream and downstream being carried out and Monitoring Reports are attached as <u>Annexure 1b</u>. Vendor is a recognized NABET, MoEF & CC accredited laboratory. Existing water conservation measures are being maintained for collecting rain water in the mining lease area. New conservation measures if required will be implemented in consultation with CGWB. The waste water generated from workshop will be treated by ETP/Mechanized Oil Grease Trap System and automatic wheel washing system (with complete recirculation system). Existing Retention wall, Garland drains and setting pits being maintained and will be desilted before monsoon season. Runoff discharge being maintained within standard. New Garland Drains, settling pit and retaining wall has been constructed as per approved mine plan requirement, if any, to prevent any direct flow of runoff to nearby water bodies. In order to prevent the erosion of dump Coir matting of 15000 m. sq. has been done on dump near quarry no.5. Subsequently plantation will be carried out just after first rain. Photos for the same is attached as <u>Annexure 4a, 4b,4c</u>
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	wherever applicable. (ix) Mine lease holder should ensure that no silt originating due to mining activity is transported in the surface water course or any other water body. Appropriate measures for prevention and control of soil erosion and management of silt should be undertaken. Quantity of silt/soil generated should be measured on regular basis for its better utilization. (x) Erosion from dumps site should be protected by providing geo-textile matting or other suitable material, and thick plantation of native trees and shrubs should be carried out at the dump slopes. Further, dumps should be protected by retaining walls. (xi) Trenches/ garland drain should be constructed at the foot of dumps to arrest silt from being carried to water bodies. Adequate number of check dams should be constructed across seasonal/perennial nallas (if any) flowing through the mine lease areas and silt be arrested. De-silting at regular intervals should be carried out and quantity should be recorded for its better utilization, after proper soil quality analysis. (xii) The water so collected in the reservoir within the mine should be utilized for the sprinkling on hauls roads, green belt development etc. (xiii) There should be zero waste water discharge from the mine. Based on actual water withdrawal and consumption/ utilization in different activities, water balance diagram should be prepared on monthly basis, and efforts should be made to optimize consumption of water per ton of ore production in successive years. Responsibility: Individual Mine Lease Holders, SPCB and CGWB.	
21	Land/Soil/Overburden Related: Project Proponent shall implement the following mitigation measures: (i) The top soil should temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long (not more than 3 years or as per provisions mentioned in the mine plan/ scheme). The topsoil should be used for land reclamation and plantation appropriately. (ii) Fodder plots should be developed in the non-mineralised area in lieu of use of grazing land, if any. (iii) Over burden/ low grade ore should be stacked at earmarked dump site (s) only and should not be kept active for long period. The dump height should be decided on case to case basis, depending on the size of mine and quantity of waste material generated. However, slope stability study should be conducted for larger heights, as per IBM approved mine plan and DGMS guidelines. The OB dump should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles should be	Working is restricted into broken-up area only. However, if any, Top soil generation, same will be stored at earmarked site and will be used for land reclamation, plantation purpose or stabilized with plantation. Over burden being generated and stacked at earmarked site as per approved Mine Plan. Active dump stabilization is under process, coir mat has already been installed, plantation will be carried out just after arrival of monsoon. Hazardous waste storage area having covered shed constructed in mine. Same is being used for storage of the hazardous waste and subsequently disposed to the authorised recyclers Existing Retention wall, Garland drains and setting pits being maintained and will be desilted before monsoon season. Runoff

	undertaken for stabilization of the dump. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Proper records should be maintained regarding species, their growth, area coverage etc. (iv) Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from mine operation, soil, OB and mineral dumps. The water so collected can be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly de-silted, particularly after monsoon and should be maintained properly. Appropriate documents should be maintained. Garland drain of appropriate size, gradient and length should be constructed for mine pit, soil. OB and mineral dumps and sump capacity should be designed with appropriate safety margin based on long term rainfall data. Sump capacity should be provided for adequate retention period to allow proper settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and de-silted at regular intervals. (v) Backfilling should be done as per approved mining plan/scheme. There should be no OB dumps outside the mine lease area. The backfilled area should be afforested, aiming to restore the normal ground level. Monitoring and management of rehabilitated areas should continue till the vegetation is established and becomes self-generating. (vi) Hazardous waste such as, waste oil, lubricants, resin, and coal tar etc. should be disposed off as per provisions of Hazardous Waste Management Rules, 2016, as amended from time to time. Responsibility: Individual Mine Lease Holders.	discharge being maintained within standard. New Garland Drains, settling pit has been constructed as per approved mine plan requirement, if any, to prevent any direct flow of runoff to nearby water bodies.
22	Ecology/Biodiversity (Flora-Fauna) Related: Project Proponent shall implement the following mitigation measures: (i) All precautionary measures should be taken during mining operation for conservation and protection of endangered fauna namely elephant, sloth bear etc. spotted in the study area. Action plan for conservation of flora and fauna should be prepared and implemented in consultation with the State Forest and Wildlife Department within the mine lease area, whereas outside the mine lease area, the same should be maintained by State Forest Department. (ii) Afforestation is to be done by using local and mixed species saplings within and outside the mining lease area. The reclamation and afforestation is to be done in such a manner like exploring the growth of fruit bearing trees which will attract the fauna and thus maintaining the biodiversity of the area. As	This instant mining lease was executed on 27.06.2020 and the working has been continuing with the strength of vesting order. More than 10000 Saplings have been planted in FY 2021-22 as per the approved mine plan in the safety zone area and in the old dump area. No Wild Life Sanctuary/Tiger Reserve/National Park/ Elephant corridor within the core as well as within the buffer zone of the project. As regards to Site specific conservation plan, New site specific wild life conservation plan has already been approved by Chief wildlife warden, PCCF with letter no. 988/CWLW-FDWC-FD-

	afforestation done so far is very less, forest department needs to identify adequate land and do afforestation by involving local people in a time bound manner. (iii) Green belt development carried out by mines should be monitored regularly in every season and parameters like area under vegetation/plantation, type of plantation, type of tree species /grass species/scrubs etc., distance between the plants and survival rate should be recorded. (iv) Green belt is an important sink of air pollutants including noise. Development of green cover in mining area will not only help reducing air and noise pollution but also will improve the ecological conditions and prevent soil erosion to a greater extent. Further, selection of tree species for green belt should constitute dust removal/dust capturing plants since plants can act as efficient biological filters removing significant amounts of particulate pollution. Thus, the identified native trees in the mine area may be encouraged for plantation. Tree species having small leaf area, dense hair on leaf surface (rough surface), deep channels on leaves should be included for plantation. (v) Vetiver plantation on inactive dumps may be encouraged as the grass species has high strength of anchoring besides medicinal value. (vi) Details of compensatory afforestation done should be recorded and documented by respective forest divisions, and State Forest Department should present mine-wise annual status, along with expenditure details. Responsibility: Individual Mine Lease Holders and State Forest & Wildlife Department.	0126-2021 dated 31-01-2022. Letter of approval is attached as <u>Annexure 5</u>
23	Socio-Economic Related: Project Proponent shall implement the following mitigation measures: (i) Public interaction should be done on regular basis and social welfare activities should be done to meet the requirements of the local communities. Further, basic amenities and infrastructure facilities like education, medical, roads, safe drinking water, sanitation, employment, skill development, training institute etc. should be developed to alleviate the quality of life of the people of the region. (ii) Land outeers and land losers/affected people, if any, should be compensated and rehabilitated as per the national/state policy on Resettlement and Rehabilitation. (iii) The socio-economic development in the region should be focused and aligned with the guidelines/initiatives of Govt. of India/ NITI Aayog around prosperity, equality, justice, cleanliness, transparency, employment, respect to women, hope etc. This can be achieved by providing adequate and quality facilities for	Being complied. Narayanposhi Mining operation was started from 1st July 2020 and various community development initiatives are under implementation for community upliftment. Need based assessment survey has been completed and action plan is under implementation for the compliance.

	education, medical and developing skills in the people of the region. District administration in association with mine lease holders should plan for “Samagra Vikas” of these blocks well as other blocks of the district. While planning for different schemes in the region, the activities should be prioritized as per Pradhan Mantri Khanij Kshetra Kalyan Yojna (PMKKKY), notified by Ministry of Mines, Govt. of India, vide letter no. 16/7/2017-M.VI (Part), dated September 16, 2015. Responsibility: District Administration and Individual Mine Lease Holders.	
24	Road Transport Related: Project Proponent shall implement the following mitigation measures: (i) All the mine lease holders should follow the suggested ore transport mode (SOTM), based on its EC capacity within next 5 years. (ii) The mine lease holders should ensure construction of cement road of appropriate width from and to the entry and exit gate of the mine. Further, maintenance of all the roads should be carried out as per the requirement to ensure dust free road transport. (iii) Transportation of ore should be done by covering the trucks with tarpaulin or other suitable mechanism so that no spillage of ore/dust takes place. Further, air quality in terms of dust, PM:t0 should be monitored near the roads towards entry & exit gate on regular basis, and be maintained within the acceptable limits. Responsibility: Individual Mine Lease Holders and Dept. of Steel & Mines.	Project Proponent will follow the Suggested Ore Transport Mode (SOTM) in association with Government of Odisha. As proposed in new applied EC for which TOR approved on dated 31.12.2020, the ore will be transported through slurry pipeline/road/railway to the designated port or directly to the JSW Steel Plant or to Nuagaon Mine through road/pipe conveyor for onward transportation to end use plant through slurry pipe line. Existing cement concrete road from mine entrance and exit to the main road being maintained. In addition to existing, new cement concrete road, has been constructed in Gate No 2 area along with Automatic Wheel Washing facility. Mineral carrying trucks are not allowed to go out of the lease area without tarpaulin cover and is being monitored by security personnel at the exit gate. Vehicular emissions will be regularly monitored. Also, Security personnel are also do not allow the vehicles to enter into the mines without having valid PUC.
25	Occupational Health Related: Project Proponent shall implement the following mitigation measures: (i) Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects periodically. (ii) Occupational health surveillance program for all the employees/workers (including casual workers) should be undertaken periodically (on annual basis) to observe any changes due to exposure to dust, and corrective measures should be taken immediately, if needed.	Personnel working in dusty areas are provided with nose mask, safety glass and ear plug with proper safety training. Dust Suppression System (Dry fog system) being provided at all appropriate places of mineral handling plants (crusher & screening plant) and other areas. Same are being maintained for proper dust control. Workers engaged in Operations are provided with PPE's. Besides this, acoustic enclosures are provided for all machines

	(iii) Occupational health and safety measures related awareness programs including identification of work related health hazard, training on malaria eradication, HIV and health effects on exposure to mineral dust etc., should be carried out for all the workers on regular basis. A full time qualified doctor should be engaged for the purpose. Periodic monitoring (on 6 monthly basis) for exposure to respirable minerals dust on the workers should be conducted, and record should be maintained including health record of all the workers. Review of impact of various health measures undertaken (at an interval of 3 years or less) should be conducted followed by follow-up of actions, wherever required. Occupational health centre should be established near mine site itself. Responsibility: Individual Mine Lease Holders and District Administration (District Medical Officer).	operating within the mines. The noise level is being monitored by Noise Level Meter; the results reveal that the parameter is well within the prescribed norms. Initial Medical Examination & Periodical Medical Examination of the workers engaged in the project are being carried periodically and records are maintained. A medical dispensary with full time Doctor has been appointed at mine area for the health check-up of employees and also the locals. Medical health camps will be organized in the nearby villages after the ongoing Covid-19 pandemic over and as per the Guidelines of State Government Existing Fixed water sprinkling being maintained and operated. In addition to this, fixed auto sprinklers on both sides of major haul road and approach roads of the mine from gate no 2 to RF quarry has been also been installed. Whereas Mobile water tankers has also been engaged for the temporary haul roads. Mobile water sprinkler tankers are provided for regular water sprinkling on haul roads and nearby mineral dispatch roads (NH) to avoid generation of dust during movement of vehicles. Regular maintenance of Haul roads is being carried out to avoid generation of dust during movement of vehicles. Regular Monitoring of ambient air quality parameters being carried out. Monitoring reports are attached as <u>Annexure 1a.</u>
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Sl. No.	Standard Conditions	Compliance
I. Statutory Compliance		
1	This Environmental Clearance (EC) is subject to orders/ judgment of Hon'ble Supreme Court of India, Hon'ble High Court, Hon'ble NGT and any other Court of Law, Common Cause Conditions as may be applicable.	Noted and abided with the conditions given by court of Law.

2	This EC is valid up to 31.03.2020 as the lease validity i.e. valid up to 31" March 2020 as Der the Amended MMDR Act. 2015	EC has been vested to JSW Steel Ltd for 2 years. As per MOEF&CC OM dated 13.07.2021, EC transfer till life of the mine has been applied and same is in process. TOR has been approved dated 31.12.2020 for new EC, and EIA report is under process.
3	The Project proponent complies with all the statutory requirements and judgment of Hon'ble Supreme Court dated 2nd August,2017 in Writ Petition (Civil) No. 114 of 2014 in matter of Common Cause versus Union of India & Ors. before commencing the mining operations.	Not applicable
4	The State Government concerned shall ensure that mining operation shall not be commenced till the entire compensation levied, if any, for illegal mining paid by the Project Proponent through their respective Department of Mining & Geology in strict compliance of Judgment of Hon'ble Supreme Court dated 2nd August, 2017 in Writ Petition (Civil} No. 114 of 2014 in matter of Common Cause versus Union of India & Ors.	Not applicable
5	This Environmental Clearance shall become operational only after receiving formal NBWL Clearance from MoEF&CC subsequent to the recommendations of the Standing Committee of National Board for Wildlife, if applicable to the Project.	No Wild Life Sanctuary/Tiger Reserve/National Park/ Elephant corridor within the core as well as within the buffer zone of the project. As regards to Site specific conservation plan, New site specific wild life conservation plan has already been approved by Chief wildlife warden, PCCF with letter no. 988/CWLW-FDWC-FD-0126-2021 dated 31-01-2022. Letter of approval is attached as <u>Annexure 5</u>
6	This Environmental Clearance shall become operational only after receiving formal Forest Clearance (FC) under the provision of Forest Conservation Act, 1980, if applicable to the Project.	The present mining operation is restricted within vested Forest area only as per FC F.No.8-34/2000-FC (Vol-I), Dt:15.11.2007 over 244.327 ha. The fresh FC proposal has been applied for 252.179 ha vide Proposal No. FP/OR/MIN/51059/2020 dated 14.10.2020 and same is under evaluation. Advance NPV has already been paid. Further, as per MMDR Amendment Act 2021, the Forest clearances and other permissions continue to be valid even after expiry or permission of lease till the minerals exhausted. Hence, the Forest Clearance for 244.327 ha. will be valid till life of the mine.
7	Project Proponent (PP) shall obtain Consent to Operate after grant of EC and effectively implement all the conditions stipulated therein.	Being Complied. CTO has been vested to JSW Steel Ltd for 2 years. New CTO vide letter no 4987/IND-I-CON-2258 dated

	The mining activity shall not commence prior to obtaining Consent to Establish / Consent to Operate from the concerned State Pollution Control Board/Committee.	29.03.2022 has been obtained from OSPCB.
8	The PP shall adhere to the provision of the Mines Act, 1952, Mines and Mineral (Development & Regulation), Act, 2015 and rules & regulations made there under. PP shall adhere to various circulars issued by Directorate General Mines Safety (DGMS) and Indian Bureau of Mines from time to time.	Noted and being complied.
9	The Project Proponent shall obtain consents from all the concerned land owners, before start of mining operations, as per the provisions of MMDR Act, 1957 and rules made there under in respect of lands which are not owned by it.	The present mining operation is restricted within vested Surface right granted over 324.800 ha for 2 years. Further, as per MMDR Amendment Act 2021, the Surface rights and other permissions continue to be valid even after expiry or permission of lease till the minerals exhausted.
10	The Project Proponent shall follow the mitigation measures provided in MoEFCC's Office Memorandum No. Z-11013/57/2014-IA.II (M), dated 29th October, 2014, titled "Impact of mining activities on Habitations-Issues related to the mining Projects wherein Habitations and villages are the part of mine lease areas or Habitations and villages are surrounded by the mine lease area".	Noted and being complied.
11	The Project Proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and from CGWA for withdrawal of ground water for the project.	NOC from CGWA for 1715 m3/day is already vested to JSW for 2 years. New application for the NOC has been applied vide application no. CGWA/NOC/MIN/REN/1/2019/5586
12	A copy of EC letter will be marked to concerned Panchayat / local NGO etc. if any, from whom suggestion / representation has been received while processing the proposal.	To be complied with the condition, On obtaining EC for the expansion project.
13	State Pollution Control Board/Committee shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tehsildar's Office for 30 days.	To be complied with given condition for the project expansion phase.
14	The Project Authorities should widely advertise about the grant of this EC letter by printing the same in at least two local newspapers, one of which shall be in vernacular language of the concerned area. The advertisement shall be done within 7 days of the issue of the clearance letter mentioning that the instant project has been accorded EC and copy of the EC letter is available with the State Pollution Control Board/Committee and web site of the Ministry of Environment, Forest and Climate Change (www.parivesh.nic.in). A copy of the advertisement may be forwarded to the concerned MoEFCC Regional Office for compliance and record.	To be complied with given condition for the project expansion phase.

15	The Project Proponent shall inform the MoEF&CC for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred than mining operation shall only be carried out after transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time	Noted and being complied.
II. Air quality monitoring and preservation		
16	The Project Proponent shall install a minimum of 3 (three) online Ambient Air Quality Monitoring Stations with 1 (one) in upwind and 2 (two) in downwind direction based on long term climatological data about wind direction such that an angle of 120° is made between the monitoring locations to monitor critical parameters, relevant for mining operations, of air pollution viz. PM10, PM2.5, NO2, CO and SO2 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/go/PCI/I, dated 18.11.2009 covering the aspects of transportation and use of heavy machinery in the impact zone. The ambient air quality shall also be monitored at prominent places like office building, canteen etc. as per the site condition to ascertain the exposure characteristics at specific places. The above data shall be digitally displayed within 03 months in front of the main Gate of the mine site.	Three Continuous Ambient Air Quality Monitoring Stations (CAAQMS) and Digital Display Board have been installed in consultation with Regional Officer, Rourkela. All 3 CAAQMS are equipped with data transfer facility to SPCB and we have authorized Phoenix Robotix Pvt. Ltd. (Datoms) for transmitting data to OSPCB and already completed the necessary setup for data transfer from all 3 locations to OSPCB Server. Data is transmitting from all 3 CAAQMS to OSPCB server. Regular Ambient air quality monitoring being carried out at four AAQ monitoring stations in core zone and four stations in buffer zone. Monitoring Reports are attached as <u>Annexure 1a</u>.
17	Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling, metalled road construction etc.) shall be carried out in areas prone to air pollution wherein high levels of PM10 and PM2.5 are evident such as haul road, loading and unloading point and transfer points. The Fugitive dust emissions from all sources shall be regularly controlled by installation of required equipment's/ machineries and preventive maintenance. Use of suitable water-soluble chemical dust suppressing agents may be explored for better effectiveness of dust control system. It shall be ensured that air pollution level conform to the standards prescribed by the MoEFCC/ Central Pollution Control Board.	Existing Fixed water sprinkling being maintained and operated. In addition to this, fixed auto sprinklers on both sides of major haul road and approach roads of the mine from gate no 2 to RF quarry has been also been installed. Whereas Mobile water tankers has also been engaged for the temporary haul roads. Regular Ambient air quality monitoring being carried out at four AAQ monitoring stations in core zone and four stations in buffer zone. Monitoring Reports are attached as <u>Annexure 1a</u>.
III. Water quality monitoring and preservation		
18	In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and	The mining plan envisages intersection of Ground water at Manganese working zone and NOC from CGWA for 1715 m3/day is already vested to JSW for 2 years. New application for the NOC has been applied vide application no. CGWA/NOC/MIN/REN/1/2019/5586

	MoEFCC is in place before such mining operations. The permission for intersection of ground water table shall essentially be based on detailed hydro- geological study of the area.	
19	Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground water table. The Report on changes in Ground water level and quality shall be submitted on six- monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board	No natural watercourse and water resources are obstructed due to mining operations & the same will be taken care of. Monitoring of flow rate measurement of the different water bodies is being carried out and Monitoring Reports are attached as <u>Annexure 1b.</u> Drinking water to the villagers being provided through mobile water tankers.
20	Project Proponent shall regularly monitor and maintain records w.r.t. ground water level and quality in and around the mine lease by establishing a network of existing wells as well as new piezo-meter installations during the mining operation in consultation with Central Ground Water Authority/ State Ground Water Department. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.	Regular monitoring of ground water level and quality being carried out and Monitoring Reports are attached as <u>Annexure 1b.</u>
21	The Project Proponent shall undertake regular monitoring of natural water course/ water resources/ springs and perennial nallahs existing/ flowing in and around the mine lease and maintain its records. The project proponent shall undertake regular monitoring of water quality upstream and downstream of water bodies passing within and nearby/ adjacent to the mine lease and maintain its records. Sufficient number of gullies shall be provided at appropriate places within the lease for management of water. PP shall Carryout regular monitoring w.r.t. pH and included the same in monitoring plan. The parameters to be monitored shall include their water quality vis-à-vis suitability for usage as per CPCB criteria and flow rate. It shall be ensured that no obstruction and/or alteration be made to water bodies during mining operations without justification and prior approval of MoEFCC. The monitoring of water courses/	Regular monitoring of water quality of upstream and downstream being carried out and Monitoring Reports are attached as <u>Annexure 1b.</u> Vendor is a recognized NABET, MoEF & CC accredited laboratory. No natural watercourse and water resources are obstructed due to mining operations & the same will be taken care of. Existing check dams being maintained to prevent any pollution of the nearby water bodies.

	bodies existing in lease area shall be carried out four times in a Year viz. pre- monsoon (April-May). monsoon (August), post-monsoon (November) and winter (January) and the record of monitored data may be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, Central Ground Water Authority and Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board. Clearly showing the trend analysis on six-monthly basis.	
22	Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off; acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J-20012/1/2006- IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.	No polluted water generated from the Mine. Regular monitoring of water quality of being carried out and Monitoring Reports are attached as Annexure 1b . Vendor is a recognized NABET, MoEF & CC accredited laboratory. Digital Display board showing monitored data being provided at Main Gate for general public. Monthly water quality monitoring data is regularly being uploaded in JSW website and Link of the same is https://www.jsw.in/investors/steel/jsw-steel-investor-information-environmental-clearances#
23	Project Proponent shall plan, develop and implement rainwater harvesting measures on long term basis to augment ground water resources in the area in consultation with Central Ground Water Board/ State Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office MoEFCC annually.	Maximum rain water has already been channelized to Mine Pits and same is being utilized in dust suppression and other mining activities. Existing surface run-off Retention wall, Garland drains, Check Dams and setting pits being maintained. Detailed Hydrology study is under progress, recommendations of the study and consultation with CGWB, additional rain water harvesting measures/structures will be implemented for rainwater harvesting.
24	Industrial waste water (workshop and waste water from the mine) should be properly collected and treated so as to conform to the notified standards prescribed from time to time. The standards shall be prescribed through Consent to Operate (CTO) issued by concerned State Pollution Control Board (SPCB). The workshop effluent shall be treated after its initial passage through Oil and grease trap.	Workshop along with ETP/Oil Grease Trap System being developed in the mine. No process water being discharged from the mine. The waste water generated from workshop being treated by ETP/Mechanized Oil Grease Trap System and automatic wheel washing system (with complete recirculation system). Regular Monitoring of water quality parameters being carried out by NABET Accredited laboratory.

25	The water balance/water auditing shall be carried out and measure for reducing the consumption of water shall be taken up and reported to the Regional Office of the MoEF&CC and State Pollution Control Board/Committee.	Rain water collected in pits being utilising for dust suppression in the mining operations. Fixed Sprinklers, Pressurised mobile water tankers, for dust suppression being provided for reducing the water consumption.
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IV. Noise and vibration monitoring and prevention

26	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.	Being Complied. Controlled blasting is in place.
27	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.	Mining is being carried out in the already broken up area as per approved mine plan. Illumination and sound is restricted into core zone only. No project sites disturb the villages in respect of both human and animal population.
28	The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment. The workers engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including labourers working in dusty areas shall be provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects. The PP shall be held responsible in case it has been found that workers/ personals/ labourers are working without personal protective equipment.	Noise producing equipment's are covered as far as practicable. Workers engaged in Operations are provided with ear plugs / muffs. Besides this, acoustic enclosures are provided for all machines operating within the mines. Regular Noise Monitoring being carried out and Monitoring reports are attached as <u>Annexure 1c</u> .

V. Mining Plan

29	The Project Proponent shall adhere to the working parameters of mining plan which was submitted at the time of EC appraisal wherein year-wise plan was mentioned for total excavation i.e. quantum of mineral, waste, over burden, inter burden and top soil etc. No change in basic mining proposal like mining technology, total excavation, mineral & waste production, lease area and scope of working (viz. method of mining, overburden & dump management, O.B & dump mining, mineral transportation mode, ultimate depth of mining etc.) shall not be carried out without prior approval of the Ministry of Environment, Forest and Climate Change, which entail adverse environmental impacts, even if it is a part of approved mining plan modified after grant of EC or granted by State	All mining activities being carried out in accordance with approved mining plan and EC conditions.
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	Govt. in the form to Short Term Permit (STP), Query license or any other name.	
30	The Project Proponent shall get the Final Mine Closure Plan along with Financial Assurance approved from Indian Bureau of Mines/Department of Mining & Geology as required under the Provision of the MMDR Act, 1957 and Rules/ Guidelines made there under. A copy of approved final mine closure plan shall be submitted within 2 months of the approval of the same from the competent authority to the concerned Regional Office of the Ministry of Environment, Forest and Climate Change for record and verification.	As per Fresh Approved Mining Plan in favour of JSW, the life of the mine is estimated ~18 years for iron ore and ~14 for manganese ore. The same will be submitted 2 years' prior the exhaustion of ore as per statutes.
31	The land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life shall be governed as per the approved Mining Plan. The excavation vis-à-vis backfilling in the mine lease area and corresponding afforestation to be raised in the reclaimed area shall be governed as per approved mining plan. PP shall ensure the monitoring and management of rehabilitated areas until the vegetation becomes self-sustaining. The compliance status shall be submitted half-yearly to the MoEFCC and its concerned Regional Office.	Noted and being complied as per approved mine plan.
VI. Land Reclamation		
32	The Overburden (O.B.) generated during the mining operations shall be stacked at earmarked OB dump site(s) only and it should not be kept active for a long period of time. The physical parameters of the OB dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by D.G.M.S w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of top soil/OB dumps. The topsoil shall be used for land reclamation and plantation.	Being complied. Over burden being stacked at earmarked site and stabilization for the same is under process, installation of coir matting has already been done and plantation has been carried out.
33	The reject/waste generated during the mining operations shall be stacked at earmarked waste dump site(s) only. The physical parameters of the waste dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of waste dumps.	Being complied.
34	The reclamation of waste dump sites shall be done in scientific manner as per the Approved Mining Plan cum Progressive Mine Closure Plan.	Noted and being complied as per approved Mine Plan.
35	The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the	Being complied. Over burden being stacked at earmarked site and stabilization

	slope stability, prevent erosion and surface run off. The selection of local species regulates local climatic parameters and help in adaptation of plant species to the microclimate. The gullies formed on slopes should be adequately taken care of as it impacts the overall stability of dumps. The dump mass should be consolidated with the help of dozer/ compactors thereby ensuring proper filling/ levelling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners / Bentonite etc. shall be undertaken for stabilization of the dump.	for the same is under process, installation of coir matting has already been done and plantation has been carried out.
36	The Project Proponent shall carry out slope stability study in case the dump height is more than 30 meters. The slope stability report shall be submitted to concerned regional office of MoEF&CC.	Noted and being complied.
37	Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and Top Soil/OB/Waste dumps to prevent run off of water and flow of sediments directly into the water bodies (Nallah/ River/ Pond etc.). The collected water should be utilized for watering the mine area, roads, green belt development, plantation etc. The drains/ sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained properly.	Existing Garland drains and siltation ponds being maintained to prevent any direct flow of runoff to nearby water bodies. New garland drains will be constructed as per requirement of approved mine plan. Desilting of the settling pond being carried out on regular interval.
38	Check dams of appropriate size, gradient and length shall be constructed around mine pit and OB dumps to prevent storm run-off and sediment flow into adjoining water bodies. A safety margin of 50% shall be kept for designing of sump structures over and above peak rainfall (based on 50 years' data) and maximum discharge in the mine and its adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits/ sumps shall be constructed at the corners of the garland drains.	Existing Check dams, Garland drains and siltation ponds being maintained to prevent any direct flow of runoff to nearby water bodies. New garland drains is being constructed as per requirement of approved mine plan. Desilting of the settling pond being carried out on regular interval.
39	The top soil, if any, shall temporarily be stored at earmarked site(s) within the mine lease only and should not be kept unutilized for long. The physical parameters of the top soil dumps like height, width and angle of slope shall be governed as per the approved Mining Plan and as per the guidelines framed by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of dumps. The topsoil shall be used for land reclamation and plantation purpose.	Working is restricted into broken-up area only. However, if any, Top soil generation, same will be stored at earmarked site and will be used for land reclamation, plantation purpose or stabilized with plantation.
VII. Transportation		
40	No Transportation of the minerals shall be allowed in case of roads passing through villages/	Regular water spraying being carried out at nearby mineral dispatch roads (NH) to

	habitations. In such cases, PP shall construct a 'bypass' road for the purpose of transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centres.	avoid generation of dust during movement of vehicles. Mineral carrying trucks are not allowed to go out of the lease area without tarpaulin cover and is being monitored by security personnel at the exit gate. Vehicular emissions will be regularly monitored. Also, Security personnel are also do not allow the vehicles to enter into the mines without having valid PUC. Regular Monitoring of ambient air quality parameters being carried out. Monitoring reports are attached as <u>Annexure 1a</u>.
41	The Main haulage road within the mine lease should be provided with a permanent water sprinkling arrangement for dust suppression. Other roads within the mine lease should be wetted regularly with tanker-mounted water sprinkling system. The other areas of dust generation like crushing zone, material transfer points, material yards etc. should invariably be provided with dust suppression arrangements. The air pollution control equipment's like bag filters, vacuum suction hoods, dry fogging system etc. shall be installed at Crushers, belt- conveyors and other areas prone to air pollution. The belt conveyor should be fully covered to avoid generation of dust while transportation. PP shall take necessary measures to avoid generation of fugitive dust emissions.	Fixed auto sprinklers on both sides of major haul road and approach roads of the mine are operational.. Mobile water sprinkling arrangement has been provided for the haul roads, processing area and loading / unloading points to minimize dispersion of air borne dust particles. Dust Suppression System (Dry fog system) being provided at all appropriate places of mineral handling plants (crusher & screening plant) and other areas. Same are being maintained for proper dust control. Wet drilling arrangement with acoustic enclosure is in practice to control dust right at the source.
VIII. Green Belt		
42	The Project Proponent shall develop greenbelt in 7.5m wide safety zone all along the mine lease boundary as per the guidelines of CPCB in order to arrest pollution emanating from mining operations within the lease. The whole Green belt shall be developed within first 5 years starting from windward side of the active mining area. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.	More than 10000 Saplings have been planted in FY 2021-22 and 2022-23 as per the approved mine plan in the safety zone area and in the old dump area. Photos for the same is attached as <u>Annexure 6</u>

43	The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.	Backfilling and reclamation will be carried out as per approved mine plan. More than 10000 Saplings have been planted in FY 2021-22 and 2022-23 as per the approved mine plan in the safety zone area and in the old dump area.
44	The Project Proponent shall make necessary alternative arrangements for livestock feed by developing grazing land with a view to compensate those areas which are coming within the mine lease. The development of such grazing land shall be done in consultation with the State Government. In this regard, Project Proponent should essentially implement the directions of the Hon'ble Supreme Court with regard to acquisition of grazing land. The sparse trees on such grazing ground, which provide mid-day shelter from the scorching sun, should be scrupulously guarded/ protected against felling and plantation of such trees should be promoted.	Noted and will be complied
45	The Project Proponent shall undertake all precautionary measures for conservation and protection of endangered flora and fauna and Schedule-I species during mining operation. A Wildlife Conservation Plan shall be prepared for the same clearly delineating action to be taken for conservation of flora and fauna. The Plan shall be approved by Chief Wild Life Warden of the State Govt.	No Wild Life Sanctuary/Tiger Reserve/National Park/ Elephant corridor within the core as well as within the buffer zone of the project. As regards to Site specific conservation plan, New site specific wild life conservation plan has already been approved by Chief wildlife warden, PCCF with letter no. 988/CWLW-FDWC-FD-0126-2021 dated 31-01-2022. Letter of approval is attached as <u>Annexure 5</u>
46	And implemented in consultation with the State Forest and Wild Life Department. A copy of Wildlife Conservation Plan and its implementation status (annual) shall be submitted to the Regional Office of the Ministry.	No Wild Life Sanctuary/Tiger Reserve/National Park/ Elephant corridor within the core as well as within the buffer zone of the project. As regards to Site specific conservation plan, New site specific wild life conservation plan has already been approved by Chief wildlife warden, PCCF with letter no. 988/CWLW-FDWC-FD-0126-2021 dated 31-01-2022. Letter of approval is attached as <u>Annexure 5</u>
IX. Public hearing and human health issues		

47	The Project Proponent shall appoint an Occupational Health Specialist for Regular as well as Periodical medical examination of the workers engaged in the mining activities, as per the DGMS guidelines. The records shall be maintained properly. PP shall also carryout Occupational health check-ups in respect of Workers which are having ailments like BP, diabetes, habitual smoking, etc. The check-ups shall be undertaken once in six months and necessary remedial/preventive measures be taken. A status report on the same may be sent to MoEFCC Regional Office and DGMS on half-yearly basis.	Workers engaged in Operations are provided with PPE's. Besides this, acoustic enclosures are provided for all machines operating within the mines. The noise level is being monitored by Noise Level Meter; the results reveal that the parameter is well within the prescribed norms. Initial Medical Examination & Periodical Medical Examination of the workers engaged in the project are being carried periodically and records are maintained. A medical dispensary with full time Doctor has been appointed at mine area for the health check-up of employees and also the locals. Medical health camps has been organized in the nearby villages after the ongoing Covid-19 pandemic over and as per the Guidelines of State Government.
48	The Project Proponent must demonstrate commitment to work towards 'Zero Harm' from their mining activities and carry out Health Risk Assessment (HRA) for identification workplace hazards and assess their potential risks to health and determine appropriate control measures to protect the health and wellbeing of workers and nearby community. The proponent shall maintain accurate and systematic records of the HRA. The HRA for neighbourhood has to focus on Public Health Problems like Malaria, Tuberculosis, HIV, Anaemia, Diarrhoea in children under five, respiratory infections due to bio mass cooking. The proponent shall also create awareness and educate the nearby community and workers for Sanitation, Personal Hygiene, Hand washing, not to defecate in open, Women Health and Hygiene (Providing Sanitary Napkins), hazard of tobacco and alcohol use. The Proponent shall carryout base line HRA for all the category of workers and thereafter every five years	Being complied.
49	The Proponent shall carry out Occupational health surveillance which be a part of HRA and include Biological Monitoring where practical and feasible, and the tests and investigations relevant to the exposure (e.g. for Dust a X-Ray chest; For Noise Audiometric; for Lead Exposure Blood Lead, For Welders Full Ophthalmologic Assessment; for Manganese Miners a complete Neurological Assessment by a Certified Neurologist, and Manganese (Pin) Estimation in Blood; For Inorganic Chromium- Fortnightly skin inspection of hands and forearms by a responsible person. Except routine tests all tests would be	Workers engaged in Operations are provided with PPE's. Besides this, acoustic enclosures are provided for all machines operating within the mines. The noise level is being monitored by Noise Level Meter; the results reveal that the parameter is well within the prescribed norms. Initial Medical Examination & Periodical Medical Examination of the workers engaged in the project are being carried periodically and records are maintained. A medical dispensary with full time Doctor has been appointed at mine area for the

	carried out in a Lab accredited by NABH. Records of Health Surveillance must be kept for 30 years, including the results of and the records of Physical examination and tests. The record of exposure due to materials like Asbestos, Hard Rock f4ining, Silica, Gold, Kaolin, Aluminium, Iron, Manganese, Chromium, Lead, Uranium need to be handed over to the Mining Department of the State in case the life of the mine is less than 30 years. It would be obligatory for the State Mines Departments to make arrangements for the safe and secure storage of the records including X- Ray. Only conventional X-Ray will be accepted for record purposes and not the digital one). X-Ray must meet ILO criteria (17 x14 inches and of good quality}.	health check-up of employees and also the locals. Medical health camps will be organized in the nearby villages after the ongoing Covid-19 pandemic over and as per the Guidelines of State Government.
50	The Proponent shall maintained a record of performance indicators for workers which includes (a) there should not be a significant decline in their Body Mass Index and it should stay between 18.5 -24.9, (b) the Final Chest X-Ray compared with the base line X-Ray should not show any capacities ,(c) At the end of their leaving job there should be no Diminution in their Lung Functions Forced Expiratory Volume in one second (FEVI),Forced Vital Capacity (FVC), and the ratio) unless they are smokers which has to be adjusted, and the effect of age, (d) their hearing should not be affected. As a proof an Audiogram (first and last need to be presented), (e) they should not have developed any Persistent Back Pain, Neck Pain, and the movement of their Hip, Knee and other joints should have normal range of movement, (f) they should not have suffered loss of any body part. The record of the same should be submitted to the Regional Office, MoEFCC annually along with details of the relief and compensation paid to workers having above indications.	Workers engaged in Operations are provided with PPE's. Besides this, acoustic enclosures are provided for all machines operating within the mines. The noise level is being monitored by Noise Level Meter; the results reveal that the parameter is well within the prescribed norms. Initial Medical Examination & Periodical Medical Examination of the workers engaged in the project are being carried periodically and records are maintained. A medical dispensary with full time Doctor has been appointed at mine area for the health check-up of employees and also the locals. Medical health camps has be organized in the nearby villages after the ongoing Covid-19 pandemic over and as per the Guidelines of State Government.
51	The Projects Proponent shall ensure that Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	Personnel working in dusty areas are provided with nose mask, safety glass and ear plug with proper safety training. Dust Suppression System (Dry fog system) being provided at all appropriate places of mineral handling plants (crusher & screening plant) and other areas. Same are being maintained for proper dust control. Pre-placement medical examination and periodical examination of the workers engaged are being conducted & record maintained.
52	Project Proponent shall make provision for the housing for workers/labours or shall construct labour camps within/outside (company owned	No colony provided in the working lease area. STP will be provided during colony construction.

	land) with necessary basic infrastructure/ facilities like fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche for kids etc. The housing may be provided in the form of temporary structures which can be removed after the completion of the project related infrastructure. The domestic waste water should be treated with STP in order to avoid contamination of underground water.	
53	The activities proposed in Action plan prepared for addressing the issues raised during the Public Hearing shall be completed as per the budgetary provisions mentioned in the Action Plan and within the stipulated time frame. The Status Report on implementation of Action Plan shall be submitted to the concerned Regional Office of the Ministry along with District Administration.	Noted. TOR has been approved same will be complied after obtaining the new EC
X. Corporate Environment Responsibility (CER)		
54	The activities and budget earmarked for Corporate Environmental Responsibility (CER) as per Ministry's O. M No 22-65/20 17-IA. II (M) dated 01.05.2018 or as proposed by EAC should be kept in a separate bank account. The activities proposed for CER shall be implemented in a time bound manner and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude & longitude of infrastructure developed & road constructed needs to be submitted to Regional Office MoEF&CC annually along with audited statement.	This instant mining lease was executed on 27.06.2020 and the working has been continuing with the strength of vesting order. We are in a process to obtain all the statutory clearances afresh. It would be pertinent to mention that TOR had been approved on 31.12.2020 & EIA/EMP report is under preparation and same will be complied after public hearing and as per new EC for proposed project.
55	Project Proponent shall keep the funds earmarked for environmental protection measures in a separate account and refrain from diverting the same for other purposes. The Year wise expenditure of such funds should be reported to the MoEF&CC and its concerned Regional Office.	We are in process for implementation of various measures undertaken for environment management plan since the operation started in July 2020. Details of environmental management measures expenditure (head wise breakup) has already been submitted along with half yearly EC compliance report vide letter dated 21.05.2021.
XI. Miscellaneous		
56	The Project Proponent shall prepare digital map (land use & land cover) of the entire lease area once in five Years purpose of monitoring land use pattern and submit a report to concerned Regional Office of the MoEF&CC.	DGPS Surveyed Mining lease boundary superimposed on High Resolution Satellite image of Narayanposhi Iron & Mn Ore Mine duly vetted by M/s ORSAC has already been submitted along with last half yearly EC compliance report vide letter dated 21.05.2021.
57	The Project Authorities should inform to the Regional Office regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	Noted and being complied.

58	The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MOEFCC & its concerned Regional Office, Central Pollution Control Board and State Pollution Control Board.	Being complied. Last six monthly compliance report along with monitoring data vide letter no JSW/S/O/2022/359 dated 31.05.2022 was submitted to Regional Office, MOEF&CC, Bhubaneswar, Zonal Office, CPCB, Kolkata, MS and RO Offices SPCB, Odisha.
59	A separate Environmental Management Cell' with suitable qualified manpower should be set-up under the control of a Senior Executive. The Senior Executive shall directly report to Head of the Organization. Adequate number of qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEF&CC.	A dedicated Environment Management Cell under the leadership of AVP Environment has been formed and reporting to Mine Senior Management i.e. Head of Operations (VP).
60	The concerned Regional Office of the MoEF&CC shall randomly monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the MoEF & CC officer(s) by furnishing the requisite data / information / monitoring reports.	We will extend full co-operation to the officers of the Regional Office during their visit and furnish the required data, information and monitoring reports.

SUMMARY
OF
ENVIRONMENTAL MONITORING REPORT
(APRIL 2022 TO SEPTEMBER 2022)
FOR
NARAYANPOSHI IRON & MANGANESE ORE MINE
DISTRICT—SUNDARGARD, ODISHA
OF



M/S JSW STEEL LIMITED, ODISHA

ENV MONITORING CARRIED OUT

BY



ECOMEN LABORATORIES PVT.LTD

Ecomen Laboratories Pvt. Ltd.
(An approved Laboratory from MoEF & CC & NABL)
B-1/8, Sector-H, Aliganj, Lucknow 226 024 (U.P.)
Phone No.: (91-522) 2746282; Fax No.: (91-522) 2745726
E-mail: contactus@ecomen.in

**Environmental Monitoring Report- Narayanposhi Iron &
Manganese Ore Mine of
M/s JSW Steel Limited, Odisha during the period
(April 2022 to September 2022)**

1. Ambient Air Quality Lease Area

Si. No.	Location	Month	Concentration	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³
1.	Gate No-1	April'22	Maximum	72.5	29.5	16.4	26.0	0.95
			Minimum	46.9	16.1	9.0	12.0	0.31
			Average	57.5	21.5	12.4	18.5	0.59
		May'22	Maximum	64.2	23.4	15.8	21.5	0.71
			Minimum	49.3	14.6	9.3	13.2	0.40
			Average	58.3	18.8	12.6	17.5	0.58
		June'22	Maximum	62.5	22.6	14.2	21.4	0.62
			Minimum	43.5	14.6	8.2	10.7	0.36
			Average	55.6	18.2	11.1	15.7	0.49
		July'22	Maximum	56.3	20.4	16.3	20.4	0.56
			Minimum	41.6	14.2	9.3	10.2	0.39
			Average	49.8	17.2	12.0	14.2	0.48
		August'22	Maximum	49.5	16.5	16.6	15.3	0.49
			Minimum	40.3	11.2	11.6	10.5	0.31
			Average	45.9	13.7	13.9	12.7	0.42
		September'22	Maximum	56.7	17.9	15.9	18.9	0.6
			Minimum	51.1	14.1	13.1	15.1	0.48
			Average	53.9	16.1	14.5	16.8	0.54
		April'22	Maximum	76.8	30.2	17.3	15.3	0.89
			Minimum	39.6	16.0	10.3	10.3	0.30
			Average	57.9	22.2	13.0	12.5	0.62

Si. No.	Location	Month	Concentration	PII ₁₀ μg/m ³	PM _{2.5} μg/m ³	SO ₂ μg/m ³	NO ₂ μg/m ³	CO mg/m ³
2.	Near Babamath Area	May'22	Maximum	68.1	26.5	15.6	15.3	0.74
			Minimum	55.4	15.4	10.1	10.4	0.45
			Average	62.0	21.1	13.1	13.0	0.60
		June'22	Maximum	63.6	22.4	14.7	19.1	0.69
			Minimum	42.3	16.3	9.1	10.2	0.42
			Average	55.2	18.5	12.1	12.8	0.54
		July'22	Maximum	55.8	21.4	13.9	18.1	0.57
			Minimum	42.2	14.6	10.3	9.8	0.44
			Average	49.0	17.4	11.9	12.7	0.50
		August'22	Maximum	49.8	18.2	14.4	16.4	0.49
			Minimum	40.2	12.1	9.4	11.2	0.40
			Average	44.1	15.0	12.2	13.2	0.45
		September'22	Maximum	56.8	18.2	15.9	18.7	0.61
			Minimum	51.0	14.2	13.1	15.1	0.49
			Average	54.2	16.4	14.4	16.9	0.54
3.	Near Mines office	April'22	Maximum	60.3	30.5	16.0	19.0	0.89
			Minimum	45.2	14.6	10.3	11.7	0.30
			Average	53.3	22.1	12.9	16.0	0.59
		May'22	Maximum	60.3	27.4	15.2	15.9	0.65
			Minimum	51.5	13.4	10.4	11.5	0.48
			Average	56.9	19.4	12.9	13.3	0.57
		June'22	Maximum	62.5	24.2	13.7	14.5	0.61
			Minimum	40.5	15.4	9.8	9.4	0.41
			Average	52.8	19.7	11.9	12.4	0.50
		July'22	Maximum	56.0	21.4	14.2	14.5	0.55
			Minimum	42.2	15.3	10.2	10.1	0.39
			Average	48.8	18.3	12.0	12.2	0.46

Sl. No.	Location	Month	Concentration	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³		
		August'22	Maximum	48.3	18.5	13.4	14.9	0.49		
			Minimum	40.2	12.5	10.1	10.3	0.40		
			Average	43.7	15.0	12.3	12.1	0.44		
		September'22	Maximum	56.6	18.2	15.9	19.2	0.61		
			Minimum	51.3	14.1	13.2	15.3	0.48		
			Average	54.3	15.9	14.3	17.3	0.55		
4.	Rest Shelter	April'22	Maximum	80.3	35.0	17.6	36.3	0.84		
			Minimum	52.5	18.3	11.0	11.8	0.25		
			Average	63.6	27.6	13.5	17.5	0.60		
		May'22	Maximum	74.8	27.1	18.3	22.4	0.69		
			Minimum	52.1	16.2	10.6	10.5	0.45		
			Average	62.9	22.6	13.7	15.2	0.56		
		June'22	Maximum	64.9	23.8	15.1	20.2	0.6		
			Minimum	41.5	13.2	10.1	11.2	0.38		
			Average	55.1	18.5	12.2	14.6	0.52		
		July'22	Maximum	58.2	21.8	14.1	19.2	0.59		
			Minimum	42.1	12.7	10.1	10.2	0.39		
			Average	51.6	17.5	12.1	13.9	0.51		
		August'22	Maximum	49.3	17.5	14.1	15.3	0.49		
			Minimum	40.2	11.3	10.1	9.7	0.39		
			Average	43.7	14.1	12.5	12.5	0.44		
		September'22	Maximum	56.9	17.9	15.7	18.9	0.61		
			Minimum	51.3	14.2	13.0	15.2	0.50		
			Average	54.4	16.1	14.4	17.3	0.55		
		CPCB Standard			24 Hrly	100	60	80	80	4 (1Hrly)
					Annual Average	60	40	40	50	--

2. Ambient Air Quality Buffer Area

Si. No.	Location	Month	Concentration	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³
1.	Koirra Basti	April'22	Maximum	66.4	24.4	14.4	18.3	0.84
			Minimum	56.4	19.4	11.3	14.2	0.48
			Average	60.8	22.0	12.8	16.0	0.66
		May'22	Maximum	68.3	21.6	14.1	15.7	0.65
			Minimum	58.5	17.2	10.5	11.3	0.44
			Average	62.4	19.9	12.9	13.6	0.57
		June'22	Maximum	67.6	22.1	15.9	14.7	0.61
			Minimum	52.1	18.3	10.6	11.2	0.46
			Average	61.3	19.7	12.8	13.0	0.53
		July'22	Maximum	58.7	20.1	14.9	14.5	0.59
			Minimum	42.1	17.3	10.3	10.9	0.44
			Average	52.2	18.6	12.4	12.6	0.53
		August'22	Maximum	49.2	16.3	16.4	13.5	0.48
			Minimum	40.7	11.2	12.3	10.1	0.41
			Average	45.4	13.4	14.9	11.7	0.44
		September'22	Maximum	56.3	17.8	16.1	18.9	0.59
			Minimum	51.2	14.3	13.1	15.5	0.48
			Average	54.2	16.0	14.4	17.6	0.54
		April'22	Maximum	62.3	27.0	13.4	19.4	0.63
			Minimum	48.6	16.4	11.2	12.9	0.39
			Average	56.0	21.5	12.3	15.5	0.52

Si. No.	Location	Month	Concentration	PIIio μg/m ³	PM2.5 lug/m ³	SO2 lug/m ³	NO2 lug/m ³	CO mg/m ³
2.	Kashira Basti	May'22	Maximum	59.3	21.1	14.2	19.1	0.6
			Minimum	51.8	16.6	11.2	11.5	0.49
			Average	55.1	18.6	12.4	14.9	0.56
		June'22	Maximum	56.1	20.7	13.8	15.5	0.59
			Minimum	49.1	16.6	10.5	11.4	0.43
			Average	52.6	18.4	12.0	13.8	0.53
		July'22	Maximum	55.1	19.7	14.5	14.5	0.57
			Minimum	49.1	15.9	11.1	10.4	0.48
			Average	53.0	17.5	12.6	12.8	0.53
		August'22	Maximum	49.2	15.8	15.2	13.7	0.49
			Minimum	40.5	12.8	12.1	11.2	0.4
			Average	44.6	14.1	13.8	12.3	0.45
		September'22	Maximum	56.1	16.6	14.2	19.2	0.59
			Minimum	51.1	14.1	12.1	15.5	0.51
			Average	54.1	15.4	13.2	17.3	0.54
3.	Bhanjpali Village	April'22	Maximum	67.9	24.5	14.0	17.7	0.98
			Minimum	38.9	17.3	11.3	14.9	0.38
			Average	59.3	21.9	12.6	16.4	0.61
		May'22	Maximum	67.1	22.6	14.6	16.1	0.58
			Minimum	48.6	15.3	11.1	12.5	0.49
			Average	61.6	20.1	13.2	14.3	0.53
		June'22	Maximum	64.6	21.9	14.1	15.5	0.55
			Minimum	46.5	15.7	11.2	11.2	0.47
			Average	59.5	19.5	12.6	13.1	0.51
		July'22	Maximum	56.5	21.5	14.1	14.3	0.54
			Minimum	50.8	16.7	11.2	11.2	0.44
			Average	53.2	19.1	12.6	12.3	0.50

Sl. No.	Location	Month	Concentration	PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	SO ₂ µg/m ³	NO ₂ µg/m ³	CO mg/m ³
		August'22	Maximum	49.4	17.4	14.7	13.5	0.49
			Minimum	41.5	12.1	11.4	10.5	0.41
			Average	46.0	15.7	12.8	12.1	0.44
		September'22	Maximum	56.5	17.8	14.2	18.9	0.6
			Minimum	51.2	14.1	12.5	15.1	0.49
			Average	53.3	16.2	13.3	17.0	0.55
4.	Segasagi village	April'22	Maximum	57.9	21.1	15.1	19.8	0.6
			Minimum	42.1	17.0	12.0	13.6	0.38
			Average	52.0	19.9	13.1	16.2	0.54
		May'22	Maximum	59.1	21.7	14.1	14.7	0.61
			Minimum	49.8	16.5	11.9	11.6	0.41
			Average	54.5	19.2	13.0	12.9	0.52
		June'22	Maximum	55.4	20.9	13.5	15.7	0.6
			Minimum	44.4	16.3	11.2	11.6	0.39
			Average	52.0	18.5	12.6	13.2	0.50
		July'22	Maximum	48.6	19.9	14.5	14.7	0.52
			Minimum	42.2	15.3	10.8	10.6	0.38
			Average	44.6	17.5	12.3	12.8	0.47
		August'22	Maximum	45.9	15.1	16.6	14.7	0.48
			Minimum	40.1	10.6	11.3	10.5	0.4
			Average	43.1	12.8	13.4	12.1	0.43
		September'22	Maximum	56.8	16.8	13.9	18.7	0.59
			Minimum	51.5	13.8	12.3	15.2	0.49
			Average	53.9	15.2	13.0	17.2	0.53
CPCB Standard			24 Hrly	100	60	80	80	4 (1Hrly)
			Annual Average	60	40	40	50	--

3. Fugitive Emission Monitoring ($\mu\text{g}/\text{m}^3$)

Sl. No.	Month	Screen Plant		Crusher Plant		Ore Storage & Loading Point	
		Max	Min	Max	Min	Max	Min
1.	April'22	954.0	692.0	932.0	609.0	956.0	570.7
2.	May'22	930.2	762.8	926.4	769.0	930.3	728.6
3.	June'22	915.3	515.2	907.5	501.5	899.5	507.3
4.	July'22	694.3	536.2	695.4	601.5	699.5	619.4
5.	August'22	589.9	502.2	586.7	517.3	593.7	502.6
6.	September'22	696.7	611.7	699.3	570.7	696.6	603.5
Six Month Average		796.7	603.4	791.2	594.8	795.9	588.7
Sl. No.	Month	Mines Haulage Road		Mines Face Bench		Waste Dump	
		Max	Min	Max	Min	Max	Min
1.	April'22	949.0	665.0	920.0	629.0	937.0	609.0
2.	May'22	939.9	691.4	923.4	723.4	919.9	815.2



NARAYANPOSHI IRON & MANGANESE ORE MINE

3.	June'22	897.3	538.6	898.4	520.2	895.4	522.3
4.	July'22	697.3	535.6	698.4	523.8	696.5	562.3
5.	August'22	597.4	535.5	599.0	515.6	599.5	502.3
6.	September'22	698.4	604.1	697.4	606.2	697.7	605.5
Six Month Average		796.6	595.0	789.4	586.4	791.0	602.8

4. ILLUMINATION MONITORING (Lux)

	April 22		May 22		June22	
LOCATION	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
Workshop Area	171.0	135.0	175.0	140.0	38.0	78.0
Screen Plant	160.0	125.0	175.0	154.0	110.0	140
Haul Road	90.0	60.0	70.0	50.0	14.0	32.0
Loading Point	80.0	45.0	85.0	60.0	42.0	65.0
Crusher Plant	178.0	120.0	165.0	130.0	62.0	85.0
Parking Yard	135.0	90.0	130.0	95.0	52.0	55.0
Permanent Path	85.0	42.0	90.0	46.0	23.0	45.0
Electric Substation	183.0	123.0	175.0	120.0	40.0	65.0
Rest Shelter	81.0	58.0	75.0	56.0	18.0	39.0
Mines Bench Foot Path	60.0	30.0	48.0	28.0	42.0	70.0
	July 22		August 22		September 22	
LOCATION	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
Workshop Area	70.0	85.0	112.0	79.0	35.6	120.3
Screen Plant	53.0	65.0	NC	NC	41.1	83.4
Haul Road	65.0	75.0	73.0	47.0	34.9	40.6
Loading Point	40.0	70.0	53.0	30.0	10.3	17.5
Crusher Plant	85.0	110.0	68.0	45.0	33.9	60.5
Parking Yard	26.0	46.0	24.0	21.0	23.6	30.5
Permanent Path	40.0	60.0	89.0	53.0	27.9	35.8
Electric Substation	180.0	212.0	85.0	117.0	115.4	150.9
Rest Shelter	90.0	110.0	25.0	12.0	3.8	9.8
Mines Bench Foot Path	35.0	55.0	23.0	12.0	28.6	39.7



5. Noise Level {dB(A)}

A. Ambient Noise Monitoring

Location	April-22		May-22		June-22		Standards	
	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night
KASHIRA BASTI	60.0	42.0	62.8	47.4	63.6	48.5	55 dB(A)	45 dB(A)
KOIRA BASTI	53.0	38.0	58.4	42.2	59.2	44.3	55 dB(A)	45 dB(A)
EAST BOUNDARY	83.0	63.9	76.1	64.6	73.2	66.1	75 dB(A)	70 dB(A)
WEST BOUNDARY	61.0	45.0	63.4	58.4	64.2	59.3	75 dB(A)	70 dB(A)
NORTH BOUNDARY	66.0	73.0	65.7	59.3	66.3	60.4	75 dB(A)	70 dB(A)
SOUTH BOUNDARY	76.3	74.8	72.5	71.4	71.4	70.1	75 dB(A)	70 dB(A)
Location	July-22		August-22		September-22		Standards	
	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night
KASHIRA BASTI	54.6	41.7	52.4	42.8	51.6	40.9	55 dB(A)	45 dB(A)
KOIRA BASTI	52.4	42.4	51.2	41.6	53.4	42.5	55 dB(A)	45 dB(A)
EAST BOUNDARY	72.3	67.6	70.8	68.1	69.4	65.9	75 dB(A)	70 dB(A)
WEST BOUNDARY	65.8	60.7	64.7	63.3	67.4	62.3	75 dB(A)	70 dB(A)
NORTH BOUNDARY	67.6	64.7	69.3	63.9	70.2	68.7	75 dB(A)	70 dB(A)
SOUTH BOUNDARY	72.7	67.1	71.6	68.7	71.4	69.8	75 dB(A)	70 dB(A)

B. Source Noise Monitoring

CORE ZONE	April-22				May-22			
	Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4
-	<u>Leq</u>				<u>Leq</u>			
Magazine Area	68.05	62.32	72.05	70.72	66.3	63.1	71.1	73.8
ML Boundary Pillar No.1	69.27	68.58	68.38	65.90	65.6	66.5	67.6	64.8
Mile Face / Bench	68.53	59.74	72.22	60.50	67.1	61.2	73.8	62.3
Haulage Road	65.78	67.66	69.72	72.47	63.4	68.8	67.7	73.9
Crusher Plant	71.23	61.35	58.43	68.00	73.2	64.3	59.1	69.1
Screen Plant	66.56	70.62	62.47	62.57	68.1	71.4	66.7	64.5
Ore Storage & Loading Point	73.49	63.68	55.65	70.00	72.8	66.4	57.8	71.1
Waste Dump	65.39	64.46	61.25	58.54	67.5	65.5	63.8	60.0

CORE ZONE	June-22				July-22			
-	Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4
-	Leq				Leq			
Magazine Area	67.2	64.2	72.2	73.8	66.2	63.2	71.2	72.8
ML Boundary Pillar No.1	66.4	67.5	68.5	64.8	65.4	66.5	67.5	63.8
Mile Face / Bench	68.3	62.2	72.3	62.3	67.3	61.2	71.3	61.3
Haulage Road	64.2	69.8	69.7	73.9	63.2	68.8	68.7	72.9
Crusher Plant	72.5	63.3	60.1	69.1	71.5	62.3	59.1	68.1
Screen Plant	69.4	70.4	65.7	64.5	68.4	69.4	64.7	65.5
Ore Storage & Loading Point	71.7	65.4	58.8	71.1	70.7	64.4	57.8	70.1
Waste Dump	68.6	64.5	64.8	60.0	67.6	63.5	63.8	62.0
CORE ZONE	August-22				September-22			
-	Week-1	Week-2	Week-3	Week-4	Week-1	Week-2	Week-3	Week-4
-	Leq				Leq			
Magazine Area	72.8	70.1	69.2	64.3	70.6	72.2	69.5	68.7
ML Boundary Pillar No.1	63.8	66.6	66.5	63.6	72.3	71.3	68.3	71.8
Mile Face / Bench	61.3	72.8	70.3	65.1	69.5	68.3	68.7	72.1
Haulage Road	72.9	66.7	67.7	61.4	71.9	69.7	72.6	68.5
Crusher Plant	68.1	58.1	58.1	70.2	71.7	71.3	72.8	71.8
Screen Plant	63.5	65.7	63.7	67.1	72.2	68.5	68.2	68.3
Ore Storage & Loading Point	70.1	56.8	56.8	71.8	71.5	69.9	70.9	69.1
Waste Dump	59.0	62.8	62.8	66.5	72.5	68.1	68.8	70.2

6. Surface Water Quality

NARAYANPOSHI IRON ORE MINE								
Karo River UpStream								
Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Limits for Stream Water Standards
PH	-	6.58	6.88	6.80	6.70	6.58	6.86	6.5-8.5
Total Dissolved Solids	mg/l	184.0	192.0	180.0	168.0	192.0	210.0	1500
Chlorides	mg/l	28.0	32.0	19.0	16.0	19.6	22.9	600
Iron	mg/l	0.16	0.17	0.14	0.12	0.10	0.27	50
Fluorides	mg/l	0.40	0.42	0.28	0.24	0.27	0.34	1.5
BOD	mg/l	14.0	15.20	16.0	14.0	16.0	21.0	3
DO	mg/l	5.60	5.80	5.8	5.6	5.8	5.5	4
Karo River DownStream								



NARAYANPOSHI IRON & MANGANESE ORE MINE

Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Limits for Stream Water Standards
PH	-	6.49	6.56	6.48	6.63	6.98	7.25	6.5-8.5
Total Dissolved Solids	mg/l	204.0	206.0	200.0	196.0	214.0	252.0	1500
Chlorides	mg/l	18.0	36.0	196.0	24.0	26.0	32.0	600
Iron	mg/l	0.14	0.18	24.0	0.20	0.25	0.28	50
Fluorides	mg/l	0.20	0.48	0.20	0.28	0.20	0.31	1.5
BOD	mg/l	10.38	18.0	22.0	22.0	28.0	24.0	3
DO	mg/l	4.6	5.4	5.7	5.7	5.5	5.2	4

Orhari Nala Upstream

Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Limits for Stream Water Standards
PH	-	6.80	6.96	7.34	6.62	6.57	6.63	6.5-8.5
Total Dissolved Solids	mg/l	84.00	96	78	128	124	145	1500
Chlorides	mg/l	28.0	24.0	19.8	15.20	16.80	20.0	600
Iron	mg/l	0.28	0.24	0.24	0.20	0.18	0.15	50
Fluorides	mg/l	0.14	0.12	0.12	0.14	0.24	0.22	1.5
BOD	mg/l	4.60	4.80	5.20	12.0	11.0	10.0	3
DO	mg/l	5.4	5.4	5.2	5.5	5.40	5.2	4

Orhari Nala Downstream

Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Limits for Stream Water Standards
PH	-	6.48	6.72	6.38	6.38	6.52	6.89	6.5-8.5
Total Dissolved Solids	mg/l	232.0	112	112.0	134	142	166	1500
Chlorides	mg/l	44.20	28.0	26.0	22.0	23.0	40.0	600
Iron	mg/l	0.14	0.28	0.28	0.24	0.27	0.22	50
Fluorides	mg/l	0.20	0.14	0.17	0.14	0.16	0.26	1.5
BOD	mg/l	6.80	5.60	8.20	24.0	28.0	15.0	3
DO	mg/l	4.60	5.80	4.6	4.8	5.0	5.0	4

Manganese Quarry

Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Limits for Stream Water Standards
PH	-	7.30	7.28	7.28	7.25	7.16	7.32	6.5-8.5
Total Dissolved Solids	mg/l	148.0	168	138	156.0	160.0	142.0	1500
Chlorides	mg/l	21.40	23.4	21.40	20.42	22.6	23.5	600
Iron	mg/l	0.23	0.23	0.22	0.21	0.20	0.25	50



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Fluorides	mg/l	0.40	0.44	0.38	0.42	0.45	0.41	1.5
BOD	mg/l	2.4	3.60	2.8	2.6	3.40	2.9	3
DO	mg/l	4.80	5.04	4.80	4.68	5.01	4.92	4
Kashira nala								
Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Limits for Stream Water Standards
PH	-	6.79	6.62	6.86	6.72	6.56	6.76	6.5-8.5
Total Dissolved Solids	mg/l	180.0	153.0	178.0	164.0	172.0	231.0	1500
Chlorides	mg/l	30.0	35.0	34.0	28.40	24.0	40.0	600
Iron	mg/l	0.56	0.46	0.56	0.29	0.20	0.14	50
Fluorides	mg/l	0.40	0.35	0.42	0.38	0.31	0.34	1.5
BOD	mg/l	2.6	3.2	BDL	BDL	BDL	6.0	3
DO	mg/l	6.4	6.8	5.4	5.60	5.40	5.2	4

7. Surface Water Flow Rate

LOCATION NAME	April-21	May-22	June-22	July-22	August-22	September-22
Karo River Upstream	0.44	0.41	0.46	0.41	0.47	0.61
Karo River Downstream	0.44	0.41	0.46	0.41	0.47	0.61
Orahari Nala Upstream	0.23	0.22	0.20	0.22	0.50	0.69
Orahari Nala Downstream	0.23	0.22	0.20	0.22	0.50	0.69
Kashira Nala Upstream	-	-	-	-	-	0.85
Kashira Nala Downstream	-	-	-	-	-	0.85

8. Ground Water Quality

Location		Site Sand (PZ-1)	Near 650 Crusher (PZ-2)	Crusher Plant Area (PZ-3)	Kashira Village	Koira Basti
Parameter	Units	June-22				
PH	-	6.10	5.27	5.18	6.51	6.21
Total Hardness	mg/l	64.0	76.0	28.0	88.0	98.0
Iron	mg/l	0.10	0.21	BDL	0.20	0.21
Chlorides	mg/l	14.0	16.0	BDL	18.0	18.0
Total Dissolved Solids	mg/l	160.0	176.0	64.0	204.0	210.0
Sulphates	mg/l	9.50	7.0	BDL	12.75	10.75
Fluoride	mg/l	0.20	0.25	BDL	0.26	0.24



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Location		Bore well Near Gate No.2	Near 650 Crusher (PZ-2)	Kashira Village	Koira Basti
Parameter	Units	August-22			
PH	-	6.90	7.08	6.84	6.77
Total Hardness	mg/l	76.0	84.0	60.0	88.0
Iron	mg/l	0.12	0.14	0.10	0.09
Chlorides	mg/l	18.0	12.0	14.0	10.0
Total Dissolved Solids	mg/l	163.0	171.0	160.0	180.0
Sulphates	mg/l	13.5	14.8	13.1	18.6
Fluoride	mg/l	0.21	0.27	0.17	0.21

9. Drinking Water Quality

Near Mines Office									
Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Acceptable Limits	Permissible Limits
PH	-	6.65	6.76	6.78	6.78	6.72	6.90	6.5-8.5	No Relaxation
Total Hardness	mg/l	52.0	64.4	62.0	78.0	82.58	80.0	200	600
Iron	mg/l	0.11	0.12	0.19	0.17	0.14	0.18	1	No Relaxation
Chlorides	mg/l	15.8	16.8	8.0	11.8	9.80	12.0	250	1000
Total Dissolved Solids	mg/l	110.0	118.0	116.0	122.0	142.0	161.0	500	2000
Sulphates	mg/l	14.0	16.0	5.75	9.60	10.28	13.4	200	400
Fluoride	mg/l	0.24	0.21	0.16	0.14	0.12	0.17	1	1.5

10. ETP Monitoring (Inlet & Outlet)

Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Acceptable Limits
ETP Inlet								
pH	-	6.70	6.80	6.87	6.75	6.80	6.56	6.5-9.0
Total Suspended Solid as TSS	mg/l	35.90	38.0	52.0	58.0	52.20	71.0	100.0
Total Dissolved Solids as TDS	mg/l	1128.0	1184.0	560.0	576.0	568.0	623.0	-
Biochemical Oxygen Demand as BOD 3days at 27°C	mg/l	5.4	5.6	27.5	30.0	38.0	42.0	30.0
Chemical Oxygen Demand as COD	mg/l	42.0	46.0	216.0	248.0	218.0	240.0	250.0
Oil & Grease as O & G	mg/l	BDL	BDL	6.40	7.20	7.52	8.10	10.0
Parameter	Units	April-22	May-22	June-22	July-22	August-22	September-22	Acceptable Limits
ETP Outlet								
pH	-	6.73	6.40	6.73	6.82	6.94	7.03	6.5-9.0
Total Suspended Solid as TSS	mg/l	49.80	46.0	32.0	30.0	64.0	42.1	100.0
Total Dissolved Solids as TDS	mg/l	1398.0	1316.0	490.0	476.0	523.0	590.0	-
Biochemical Oxygen Demand as BOD 3days at 27°C	mg/l	23.60	6.4	20.0	18.0	23.20	20.0	30.0
Chemical Oxygen Demand as COD	mg/l	164.0	78.0	124.0	116.0	120.0	104.0	250.0
Oil & Grease as O & G	mg/l	5.90	5.8	BDL	BDL	BDL	BDL	10.0

11. Mines Run Off

Parameter	Unit	July-22				August-22				INDIAN STANDARDS as IS-2296(C)
		Crusher Plant	Gate No.1	Loading point	Nr. Electric Substation	Haulage Road	Mine Office	Loading point	Workshop	
Colour	Hazen	25.0	35.0	20.0	15.0	20.0	15.0	10.0	25.0	300
pH	-	6.91	7.8	7.73	7.32	6.80	7.24	7.20	7.2	6.5-8.5



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Total Suspended Solids as TSS	mg/l	43.0	32.0	55.0	28.5	37.20	58.0	42.0	30.0	-
Total Dissolved Solids as TDS	mg/l	333.0	287.0	390.0	415.0	314.0	362.0	396.0	268.0	1500
Biochemical Oxygen Demand as BOD	mg/l	21.0	19.0	23.0	12.0	18.0	21.0	16.0	22.0	3.0
Chemical Oxygen Demand as COD	mg/l	164.0	124.0	188.0	80.0	138.0	167.0	82.0	140.0	-
Oil & Grease as O&G	mg/l	5.85	BDL	5.5	BDL	6.20	5.8	BDL	BDL	0.1
Dissolved Oxygen as DO	mg/l	4.89	5.2	4.3	5.6	4.20	4.40	5.6	5.5	4
Chloride as Cl	mg/l	18	22.0	36.0	40.0	22.0	26.4	37.4	23.0	600
Sulfate as SO4	mg/l	27.3	29.3	30.2	35.9	30.0	32.80	36.0	28.4	400
Nitrate Nitrogen as NO3	mg/l	5.3	8.3	5.3	9.2	7.20	5.6	8.60	7.80	50
Fluorides as F	mg/l	0.39	0.16	0.10	0.20	0.32	0.24	0.22	0.12	1.5
Iron as Fe	mg/l	0.35	0.19	0.30	0.30	0.34	0.29	0.27	0.16	50.0
Arsenic as As	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.2
Hexavalent Chromium as Cr+6	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.05
Copper as Cu	mg/l	0.05	BDL	BDL	BDL	0.06	BDL	BDL	BDL	1.5
Zinc as Zn	mg/l	0.10	BDL	0.10	0.14	0.11	0.13	0.12	BDL	15
Phenolic Compound as C6H5OH	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.005
Anionic Detergent as MBAS	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.0
Selenium as Se	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.05
Cyanide as CN	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.05
Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.1
Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.01
Parameter	Unit	September-22								INDIAN STANDARDS as IS-2296(C)
		Haulage Road	Mine Office	Loading point	Workshop					
Colour	Hazen	15.0	25.0	18.0	40.0					300
pH	-	7.05	7.33	7.29	7.12					6.5-8.5

**NARAYANPOSHI IRON & MANGANESE ORE MINE**

Total Suspended Solids as TSS	mg/l	32.8	43.0	33.2	27.4					-
Total Dissolved Solids as TDS	mg/l	342.0	377.0	371.0	286.0					1500
Biochemical Oxygen Demand as BOD	mg/l	21.0	19.0	22.0	19.0					3.0
Chemical Oxygen Demand as COD	mg/l	158.0	140.0	98.0	153.0					-
Oil & Grease as O&G	mg/l	6.88	6.77	BDL	BDL					0.1
Dissolved Oxygen as DO	mg/l	4.5	4.9	6.3	5.8					4
Chloride as Cl	mg/l	26.0	16.0	30.0	20.0					600
Sulfate as SO4	mg/l	29.4	28.9	38.0	25.7					400
Nitrate Nitrogen as NO3	mg/l	7.09	6.88	7.22	6.5					50
Fluorides as F	mg/l	0.38	0.29	0.33	0.24					1.5
Iron as Fe	mg/l	0.25	0.21	0.21	0.13					50.0
Arsenic as As	mg/l	BDL	BDL	BDL	BDL					0.2
Hexavalent Chromium as Cr+6	mg/l	BDL	BDL	BDL	BDL					0.05
Copper as Cu	mg/l	BDL	BDL	BDL	BDL					1.5
Zinc as Zn	mg/l	0.09	0.04	0.09	0.05					15
Phenolic Compound as C6H5OH	mg/l	BDL	BDL	BDL	BDL					0.005
Anionic Detergent as MBAS	mg/l	BDL	BDL	BDL	BDL					1.0
Selenium as Se	mg/l	BDL	BDL	BDL	BDL					0.05
Cyanide as CN	mg/l	BDL	BDL	BDL	BDL					0.05
Lead as Pb	mg/l	BDL	BDL	BDL	BDL					0.1
Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL					0.01

12. Vibration Monitoring

Sl no.	Station Name	Instrument location	Season (Summer/Winter/Monsoon/post monsoon)	Peak particle velocity	Air Over pressure	Frequency	Remark
1	RF Quarry	(150m away from blasting location)	Summer	2.44 mm/s	112.6 dBL @ 3.2Hz / .0085kPa	5.7 Hz	Within Permissible limits
				2.28 mm/s	108.4 dBL @ 4.1Hz / .0052kPa	8.5 Hz	
				2.18 mm/s	117.4 dBL @ 8.5Hz / .0147kPa	4.7 Hz	
2	RF Quarry	Near Mines Face Bench (150m away from blasting location)	Monsoon	0.92 mm/s	91.5 dBL @ 0Hz / .0007kPa	46.5 Hz	Within Permissible limits
				1.81 mm/s	137.5 dBL @ 8.1Hz / .1502kPa	64.0 Hz	
				1.2 mm/s	112.6 dBL @ 8Hz / .0085kPa	8.0 Hz	
				1.33 mm/s	102.8 dBL @ 256Hz / .0027kPa	73.1 Hz	
				1.63 mm/s	103.5 dBL @ 2.8Hz / .003kPa	102.4 Hz	
3	RF Quarry	Near Mines Face Bench (500m away from blasting location)	Monsoon	1.22 mm/s	117.9 dBL @ 28.4Hz / .0157kPa	5.2 Hz	Within Permissible limits
4	RF Quarry	Near Hathi Canteen		1.79 mm/s	108.0 dBL @	5.0 Hz	



NARAYANPOSHI IRON & MANGANESE ORE MINE

		(200m away from blasting location)	Monsoon		5.5Hz / .005kPa		Within Permissible limits
				4.55 mm/s	112.3 dBL @ 5.6Hz / .0082kPa	2.5 Hz	
				2.28 mm/s	94.0 dBL @ 6.5Hz / .001kPa	3.1 Hz	
5	RF Quarry (RL-582)	Near Diesel Pump Area (200m away from blasting location)	Monsoon	11.55 mm/s	91.5 dBL @ 0Hz / .0007kPa	2.4 Hz	Within Permissible limits
				1.98 mm/s	109.9 dBL @ 13.8Hz / .0062kPa	6.2 Hz	

Verified By


Technical Manager

Authorized By


Quality Manager

—End of Report—

Ecumen Laboratories Pvt. Ltd.
Second Floor Hall, House No. B-18,
Sector-H, Aliganj, Lucknow-226024

Annexure 2a



Water Tanker Arrangement for Haul Road Dust Suppression

Annexure 2b



Fixed Sprinkling System

Annexure 2c



ROAD SWEEPING MACHINE

Annexure 3



Wet Drilling and Dust Extractor System in Drilling Operation

Annexure 4a



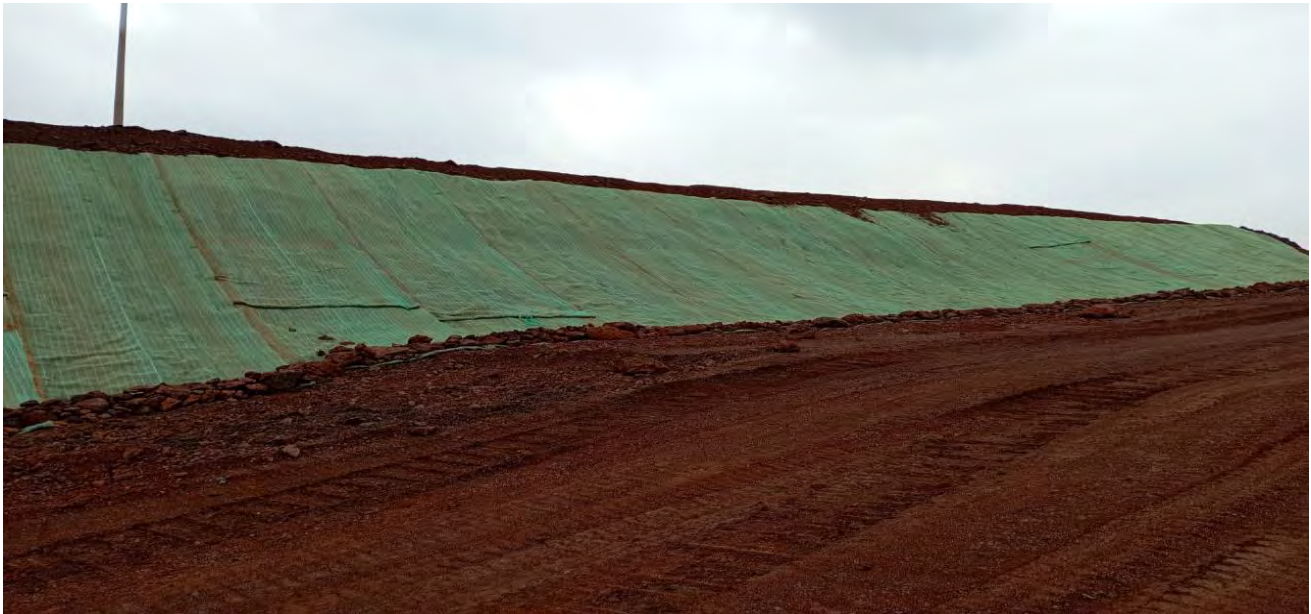
ETP

Annexure 4b



Retaining wall/ Garland drain

Annexure 4c



Coir Matting

Annexure 6



Plantation



**OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS (WILDLIFE)
& CHIEF WILDLIFE WARDEN, ODISHA**

Government of Odisha, Forest, Environment & Climate Change Department

PRAKRUTI BHAWAN, PLOT NO.1459, SAHEED NAGAR, BHUBANESWAR- 751007

Phone: 0674-2602250, Website: www.wildlife.odisha.gov.in, Email: odishawildlife@gmail.com

No. 988 / CWLW-FDWC-FD-0126-2021
Bhubaneswar, Dated the 31 January, 2022

To

M/s JSW Steel Limited,
JSW Centre Bandra Kurla Complex,
Bandra West, Mumbai – 400051

Sub: Approval of Site Specific Wildlife Conservation Plan for Narayanposhi Iron & Manganese Ore mines of M/s JSW Steel Ltd. In Bonai Forest Division of Sundargarh District

Sir,

It is to intimate that you have to implement one Site Specific Wildlife Conservation Plan for the above project in compliance to ToR No.B-37, C-18 & D-26(iii) of letter in F.No.J-11015/62/2020-IA.II(M) dt 31.12.2020 while granting ToR for expansion of the project. The Site Specific Wildlife Conservation Plan in respect of the above project is hereby approved with financial forecast of **₹746.173 lakh** (Rupees seven crore forty-six lakh seventeen thousand three hundred) only for implementation of activities in project impact area as detailed in the approved plan.

The cost of ₹746.173 lakh (Rupees seven crore forty-six lakh seventeen thousand three hundred) only may kindly be deposited in State CAMPA fund for implementation of activities in project impact area by the DFO, Bonai Division and DFO, Keonjhar Division as per jurisdiction. It is further requested to take note of the following conditions for future compliance.

- The Plan may be revisited after 5 years and the User Agency will give undertaking to contribute towards the revised cost of the Conservation Plan till the project period, if any.
- Should there be need for Site Specific Wildlife Conservation Plan after expiry of the present plan period, the User agency shall submit another such plan at least one year before the expiry of the present Conservation Plan and deposit the outlay amount upon its approval. In case of delay, it will be dealt as per law for violations of Forest (Conservation) Act, 1980/ Environment (Protection) Act, 1986.
- The User Agency shall give an undertaking to bear the differential cost in case of enhancement of wage rate during implementation of the Plan.

Yours faithfully

Encl: Copy of approved SSWLCP

Principal CCF (WL) & CWLW, Odisha

Memo No. 989 /dt 31/01/2022
Copy forwarded for information and necessary action to the -

1. Special Secretary to Government of Odisha, FE&CC Department, Bhubaneswar
2. Principal Chief Conservator of Forests, Odisha with reference to memo No.53 dt 05.01.2022 of RCCF, Rourkela Circle
3. Regional Chief Conservator of Forests, Rourkela Circle with reference to his memo No.52 dt 05.01.2022
4. DFO, Bonai/ Keonjhar Division alongwith a copy of the approved SSWLCP

Principal CCF (WL) & CWLW, Odisha



LANDUSE / LANDCOVER MAP OF NARAYANPOSI IRON & MN ORE MINE IN SUNDERGARH DISTRICT OF M/S JSW STEEL LTD.



SCALE - 1:5,000



Legend

- Habitation
- Orchard
- Dense Forest
- Open Forest
- Degraded Forest
- Forest Plantation
- Plantation Over Dump
- Tree Clad Area
- Land With Scrub
- Land Without Scrub
- Waterlogging / Marshy / Swampy
- River / Stream
- Tank / Pond
- Mining Quarry
- Old Quarry
- Top Soil Dump
- OB Dump
- Stock Yard / Ore Stack
- Settling Pond
- Site Services
- Workshop
- Processing Yard
- Weigh Bridge
- Magazine
- National Highway
- State Highway
- Haul Road
- Other Road
- Bridge / Culvert
- Parking Plaza
- Safety Zone
- Forest Boundary
- Mining Lease Boundary

SOURCE :-

Drone Image Supplied By M/s JSW Steel Ltd.
Month - August , Year - 2021

