JSW Steel Limited

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No. JSW/S/O/2022/839 Date: 30/11/2022

To,
The 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 for the **Nuagaon Iron Ore Mine of M/s JSW Steel Ltd for the period April 2022 to September 2022.**

Ref: 2. Environment Clearance Letter dated 05.08.2021 for Mines issued by MOEF&CC, GOI.

Dear Sir,

We are submitting herewith six-monthly EC compliance report of Nuagaon Iron Ore Mine, M/s JSW Steel Ltd. for the period April 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

MrutyunjayaMahapatra
(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, State Pollution Control Board, Baniapat, DD College Road, Keonjhar, Odisha-758001.

ENVIRONMENT CLEARANCE COMPLIANCE STATUS –NUAGAON MINE

Compliance report of Environmental Clearance for Nuagaon Iron Ore Mine, JSW Steel Ltd.

Reference letter from MoEF&CC, New Delhi- F. No. J-11015/1156/2007-IA.II (M) dated 05.08.2021.

Capacity- 7.99 MTPA Iron Ore (ROM)

Sl. No.	Environment Clearance Conditions	Compliance
A.	**Specific Conditions**	
1	The new lessee, after obtaining Letter of Intent (LoI), shall obtain approval under the FCA-1980 following due procedure, for non-forestry use of forest land falling in such mining lease for continuing mining operation beyond two years during which it has deemed to have acquired rights to undertake mining operation. In case, approval under the FCA-1980 is not obtained within the stipulated time of two years of commencement of lease by the new lessee, the mining operations shall be stopped till such approval has been obtained.	The present mining operation is restricted within vested Forest area as per FC vide letter no F. No. 8-17/2001-FC, Dtd. 21/22.04.2004 over 476.205 ha (371.192 Ha approved). Fresh Forest Clearance under FC Act, 1980 for diversion of 626.295 Ha of Forest land has also been applied vide Proposal No. FP/OR/MIN/50899/2020 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 till the minerals exhausted. Hence, the Forest Clearance for 476.205 ha (371.192 Ha approved) will be valid till life of the mine.
2	While obtaining approval under the provisions of FCA-1980 as per clause (b) above, the new lessee shall pay the Net Present Value (NPV) for the total forest area located within the mining lease, along with any other amount due as per guidelines issued by Government of India from time to time. However, on the date of issuance of LoI, the state government shall realize a lump sum amount at the rate of Rs 7.50 lakh per ha (for the total forest area within the mining lease) from the new LoI holder. This amount shall be deposited into the account of CAMPA, which will be adjusted against actual compensatory levies payable on the forest land, at the time of approval as per clause (b) above.	Advance NPV has already been paid.
3	The budget of Rs. 1452.43 Lakhs to address the concerns raised by the public including in the public hearing to be completed within 3 years from the date of start of mining operations. PP shall comply all action plans made for public hearing concerns and make regular maintenance and record the progressive activity outcomes.	Will be complied.
4	The Project Proponent shall undertake the adequate plantation in peripheral zone as well as gap plantation with the seeding of 6-8 ft height with at least 90% survival rate to control the dust at source and should be completed within 3 years from the date of commencement of mining operations.	Plantation has been carried out in safety zone, OB dump area, haul road, railway siding area, colony etc. Around 11,000 Plants have been planted against the 5000 plants target provided in the approved mine plan. Avenue plantation and plantation in

	Causalities of the previous year should be replaced other than the saplings proposed to be planted every year.	nearby villages shall be taken-up in consultation with DFO/Horticulture Department. Photos for the same is attached as **Annexure 4c**
5	PP shall construct garland drains with protective bunds around excavated area, to avoid entrance of surface run off into pit and mixing with ground water. Furthermore, PP shall make garland drains/storm water drains along with siltation/settling tanks	Existing Retention wall, Garland drains and siltation ponds being maintained to prevent any direct flow of runoff to nearby water bodies. New garland drains and Retaining wall has been constructed near Katasahi Dump as per requirement of approved mine plan. Desilting of the settling pond being carried out on regular interval. Photos for the same is attached as **Annexure 4b**
6	Appropriate mitigative measures should be taken to prevent pollution of the Karo River and the SunaNadi in consultation with the State Pollution Control Board.	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.
7	The conservation plan in consultation with the Forest Department shall be implemented and compliance of the same shall be submitted to IRO of MOEF&CC before 1st July of every year.	No Wild Life Sanctuary/Tiger Reserve/National Park/ Elephant corridor within the core as well as within the buffer zone of the project. Site Specific Conservation plan has been submitted with duly approval of PCCF (WL) cum Chief Wildlife Warden vide letter no.1834/CWLW-FDWC-FD-0125-2021 dated 25th Feb 2022. Letter for the same is attached as **Annexure 5**
8	Project proponent shall furnish a certificate from DFO regarding satisfactory compliance of site specific wildlife conservation plan prepared by earlier lessee.	Compliance certificate from DFO regarding satisfactory compliance of site specific wildlife conservation plan complied by earlier lessee is enclosed as **Annexure 5**
9	No mining activities will be allowed in the part of forest land involved in the lease area i.e. 163.618 Ha (639.823 Ha- 476.205 Ha) for which the forest clearance is not available.	The present mining operation is restricted within vested Forest area as per FC vide letter no F. No. 8-17/2001-FC, Dtd. 21/22.04.2004 over 371.192 Ha approved. Fresh Forest Clearance under FC Act, 1980 for diversion of 626.295 Ha of Forest land has also been applied vide Proposal No. FP/OR/MIN/50899/2020 dated 14.10.2020 and same is under evaluation. Advance NPV has already been paid
B.	**Recommendation of CSIR-NEERI Report on "Carrying Capacity Study for Environmentally Sustainable Iron and Manganese Ore Mining Activity in Keonjhar, Sundargarh and Mayurbhanj districts of Odisha State**	
1	Project Proponent and Department of Steel & wines, Govt. of Odisha shall ensure the implementation of recommendations of carrying capacity study report conducted by CSIR-NEERI	Not Applicable

	w.r.t. mining proposal of iron Ore and/or manganese in the State of Odisha.	
2	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
3	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 compliance of the above mentioned specific condition.	Being Complied. Existing cement concrete road from mine entrance and exit to the main road being maintained. For, additional cement concrete road at Guali gate has also been constructed.
4	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 has been engaged. Along with this 5.6 Km fixed sprinkler has been installed within the mine lease area. Photos for the same is attached as **Annexure 2a, 2b, 2c**
5	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 **Annexure 1a, 1b & 1c**. Monitoring data is well within the prescribed limits. Vendor is a recognized NABET, MoEF&CC accredited laboratory.

6	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 29.12.2020, 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.
7	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 be submitted periodically to Regional office of the MoEF&CC.	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
8	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 Parking plaza has also been constructed near Guali gate.
9	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.
10	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. 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 has been engaged.

		Along with this 5.6 Km fixed sprinkler has been installed within the mine lease area. Photos for the same is attached as **Annexure 2a, 2b, 2c**
11	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
12	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 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.	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. Approved TOR dated 29.12.2020 having proposal of 30 MTPA Beneficiation Plant and EIA/EMP report for the same is under progress.
13	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	Not Applicable

	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.	
14	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.
15	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 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	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. Photos for the same is attached as **Annexure 6a** DGPS Surveyed Mining lease boundary superimposed on High Resolution Satellite image of Nuagaon Iron Mine duly vetted by M/s ORSAC certified image has been attached as Annexure.

	borne by the respective mine lease holders. Responsibility: Individual Mine Lease Holders.	
16	**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 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, 5O2, NOx 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	Fixed auto sprinklers on both sides of major haul road and approach roads of the mine has been installed from Guali gate to Chenaguda quarry of 5.6 Km. Also, Mobile water tankers has been deployed to suppress the dust emission generated due to transportation of vehicles for temporary haul roads. 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. 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 **Annexure 1a**. 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.
17	**Noise and Vibration Related**: Project Proponent shall implement the following mitigation measures:	Noise producing equipment's are covered as far as practicable. Workers engaged in

	(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.	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 in core zone and buffer zone and Monitoring reports are attached as **Annexure 1c**. Vendor is a recognized NABET, MoEF & CC accredited laboratory.
18	**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	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 **Annexure 1b**. 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 being 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 has been constructed as per approved mine

	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, 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	plan requirement, if any, to prevent any direct flow of runoff to nearby water bodies. Photos for the same is attached as **Annexure 4a, Annexure 4b.**

	ore production in successive years. Responsibility: Individual Mine Lease Holders, SPCB and CGWB.	
19	**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 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,	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 will be stabilised with plantation after maturity. However, some parts of the dump have been covered with Coir matting and plantation will be carried out just after the arrival of monsoon. Hazardous waste storage area having covered shed provided 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 discharge being maintained within standard. New Garland Drains, settling pit will be constructed as per approved mine plan requirement, if any, to prevent any direct flow of runoff to nearby water bodies.

	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.	
20	**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 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	This instant mining lease was executed on 27.06.2020 and the working has been continuing with the strength of vesting order. Approx. 11000 Saplings have been planted in FY 2021-22 and 22-23 as per the approved mine plan in the safety zone area and in the old dump area. Photos for the same is attached as **Annexure 5** 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, we would like to submit that new Site Specific Conservation plan has been approved from PCCF (WL) cum Chief Wildlife Warden vide letter no.1834/CWLW-FDWC-FD-0125-2021 dated 25th Feb 2022. Letter for the same is attached as **Annexure 6 a**

	expenditure details. Responsibility: Individual Mine Lease Holders and State Forest & Wildlife Department.	
21	**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 outees 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 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.	Being complied. Nuagaon 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.
22	**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 29.12.2020, 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. Additionally cement concrete road has also been constructed near Guali gate.

		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.
23	**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. (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).	Personnel working in dusty areas are provided with nose mask, safety glass and ear plug with proper safety training. 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 will be organized in the nearby villages after the ongoing Covid-19 pandemic over and as per the Guidelines of State Government Fixed auto sprinklers on both sides of major haul road and approach roads of the mine is in commissioning phase. However, as an interim arrangement frequency of the Mobile water tankers sprinkling has been increased to suppress the dust emission generated due to transportation of vehicles.
C.	**Standard Conditions**	
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.	Not applicable

2	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
3	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
4	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".	Being Complied
5	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.	Complied. Letter has been submitted to Guali and Loidapada Gram Panchayats.
6	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.	Noted
7	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.	Complied. Nuagaon Iron Ore Mine Environment Clearance advertisement publication in two local newspapers i.e. "The New Indian Express" dated 10.08.2021 and "The Samaja" dated 11.08.2021 (vernacular language). Copies of the newspaper publications are submitted to ERO MOEF&CC vide letter No. JSW/S/O/2021/185 Date: 11/08/2021
8	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 1I of EIA Notification, 2006 as amended from time to time	Noted
II	**Air quality monitoring and preservation**	

9	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-29016/2o/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.	Complied. We have installed Three Continuous Ambient Air Quality Monitoring Stations (CAAQMS) and Digital Display Board in consultation with Regional Officer, Keonjhar. Location are as below- **CAAQMS 1.** Nuagaon_Mines Office **CAAQMS 2.** Nuagaon_Pilar 99 **CAAQMS 3.** Nuagaon_Dispensary **Digital Display Board-** Near MDH Gate area 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. Photos for the same is attached as **Annexure 7**
10	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.	Fixed auto sprinklers on both sides of major haul road and approach roads of the mine has been installed from Guali gate to Chenaguda quarry of 5.6 Km. Also, Mobile water tankers has been deployed to suppress the dust emission generated due to transportation of vehicles for temporary haul roads. 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. 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 **Annexure 1a**.
III	**Water quality monitoring and preservation**	
11	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	NOC from CGWA for 1225 m3/day is already vested to JSW for 2 years and has been transferred in the name of JSW vide application No. 21-4(92)/SER/CGWA/2008/831 dated 3rd

	ensure that prior approval from CGWA and 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.	Nov. 2017. Similarly JSW has applied for NOC renewal.
12	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 **Annexure 1b**.
13	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/ 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 (3anuary) 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.	Regular monitoring of water quality of upstream and downstream being carried out and Monitoring Reports are attached as **Annexure 1b**. 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.
14	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	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

	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.	accredited laboratory. Digital Display board showing monitored data being provided at Main Gate for general public.
15	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.
16	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 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.
17	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, Mist Gun for dust suppression being provided for reducing the water consumption.
IV	**Noise and vibration monitoring and prevention**	
18	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.
19	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	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.

	floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.	
20	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 **Annexure 1c**.
V	**Mining Plan**	
21	The Project Proponent shall adhere to approved mining plan, inter alia, including, total excavation (quantum of mineral, waste, over burden, inter burden and top soil etc.); mining technology; lease area; scope of working (method of mining, overburden & dump management, O.B & dump mining, mineral transportation mode, ultimate depth of mining, concurrent reclamation and reclamation at mine closure; land-use of the mine lease area at various stages of mining scheme as well as at the end-of-life; etc.).	All mining activities being carried out in accordance with approved mining plan and EC conditions.
22	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-â-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**	
23	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 after maturity same will be stabilized with plantation.
24	The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface run off. The selection of local species regulates local	Being complied. Over burden being stacked at earmarked site and after maturity same will be stabilized with plantation. However some part has been

	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.	covered with coir matting and plantation will be carried out just after the arrival of monsoon.
25	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 Retention wall, Garland drains and siltation ponds being maintained to prevent any direct flow of runoff to nearby water bodies. New garland drains and Retaining wall has been constructed near Katasahi Dump as per requirement of approved mine plan. Desilting of the settling pond being carried out on regular interval. Photos for the same is attached as **Annexure 4b**
26	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 Retention wall, Garland drains and siltation ponds being maintained to prevent any direct flow of runoff to nearby water bodies. New garland drains and Retaining wall has been constructed near Katasahi Dump as per requirement of approved mine plan. Desilting of the settling pond being carried out on regular interval. Photos for the same is attached as **Annexure 4b**
VII	**Transportation**	
27	No Transportation of the minerals shall be allowed in case of roads passing through villages/ 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.	Regular water spraying being carried out at nearby mineral dispatch roads (NH) to avoid generation of dust during movement of vehicles. Along with this Wheel washing system has been provided on both sides of the transportation road i.e. Guali gate and Katasai gate. Photos for the same is attached as **Annexure 6b** 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.

	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. (If applicable in case of road transport).	Regular Monitoring of ambient air quality parameters being carried out. Monitoring reports are attached as **Annexure 1a.**
28	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 has been installed from Guali gate to Chenaguda quarry of 5.6 Km. Also, Mobile water tankers has been deployed to suppress the dust emission generated due. 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 through M/s BS Envi tech. Monitoring reports are attached as **Annexure 1a.** 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**	
29	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.	Existing Safety zone plantation being maintained. Approx. 11000 Saplings has been planted as per approved mine plan in safety zone and old dump area.
30	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	Backfilling and reclamation will be carry out as per approved mine plan. Plantation will be carried out after maturity of the same.

	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.	
31	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
IX	**Public hearing and human health issues**	
32	Project Proponent shall make provision for the housing for workers/labours or shall construct labour camps within/outside (company owned 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.	No colony provided in the working lease area. STP will be provided during colony construction.
X	**Corporate Environment Responsibility (CER)**	
33	The Project Proponent shall submit the time-bound action plan to the concerned regional office of the Ministry within 6 months from the date of issuance of environmental clearance for undertaking the activities committed during public consultation by the project proponent and as discussed by the EAC, in terms of the provisions of the MoEF&CC Office Memorandum No.22-65/2017-IA.III dated 30 September, 2020. The action plan shall be implemented within three years of commencement of the project.	Will be complied.
XI.	**Miscellaneous**	
34	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 Nuagaon Iron Ore Mine duly vetted by M/s ORSAC has been attached as Annexure.

35	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.
36	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/2022/360 dated 31.05.2022 was submitted to Regional Office, MOEF&CC, Bhubaneswar, Zonal Office, CPCB, Kolkata, MS and RO Offices SPCB, Odisha.
37	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).
38	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.
39	In pursuant to Ministry's O.M No 22-34/2018-IA.III dated 16.01.2020 to comply with the direction made by Hon'ble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, the mining lease holder shall after ceasing mining operations, undertake regressing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.	Will be complied.
40	The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.	Noted
41	Concealing factual data failure to comply with any of submission of false/ fabricated data and of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Noted
28	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection)Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments	Noted

	and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court and any other Court of Law relating to the subject matter.	
29	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Noted
30	This issues with the approval of Competent Authority	Noted

SUMMARY

OF

ENVIRONMENTAL MONITORING REPORT

(APRIL 2022 TO SEPTEMBER 2022)

FOR

NUAGAON IRON ORE MINE

DISTRICT—KEONJHAR, ODISHA

OF

M/S JSW STEEL LIMITED, ODISHA

ENV MONITORING CARRIED OUT

BY

ECOMEN LABORATORIES PVT.LTD

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Environmental Monitoring Report- Nuagaon Iron Ore Mines 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} $\mu g/m^3$	$PM_{2.5}$ lug/m^3	SO_2 lug/m^3	NO_2 lug/m^3	CO mg/m^3
1.	Near LP99(Nr CRECHE)	April'22	Maximum	74.0	29.3	17.8	26.3	0.86
			Minimum	49.0	20.2	9.0	16.8	0.26
			Average	60.1	23.4	12.2	20.9	0.6
		May'22	Maximum	71.4	24.4	13.3	20.2	0.75
			Minimum	51.3	17.4	8.8	15.5	0.41
			Average	59.8	20.9	10.9	84.0	0.5
		June'22	Maximum	70.2	22.8	13.4	22.6	0.73
			Minimum	47.9	16.4	9.1	14.9	0.39
			Average	57.4	19.7	11.1	18.5	0.5
		July'22	Maximum	58.4	21.2	14.4	20.2	0.59
			Minimum	47.2	15.4	9.7	13.9	0.38
			Average	52.3	18.5	11.8	17.4	0.5
		August'22	Maximum	49.5	16.4	15.10	16.4	0.49
			Minimum	40.5	10.5	11.1	10.3	0.4
			Average	45.0	13.9	12.8	13.0	0.4
		September'22	Maximum	56.5	18.3	15.8	18.6	0.61
			Minimum	51.3	14.1	13.1	15.1	0.48
			Average	53.5	16.1	14.4	16.7	0.5
		April'22	Maximum	77.6	32.1	17.2	28.3	0.9
			Minimum	55.3	21.4	10.4	17.3	0.29
			Average	65.8	26.4	12.8	23.3	0.6

Si. No.	Location	Month	Concentration	PIlio µg/m³	PM2.5 lug/m³	SO2 lug/m³	NO2 lug/m³	CO mg/m³
2.	NrMINES OFICE	May'22	Maximum	74.5	27.7	16.8	25.4	0.7
			Minimum	57.4	21.0	10.8	19.0	0.41
			Average	66.2	24.0	12.9	22.5	0.5
		June'22	Maximum	64.2	23.2	15.60	21.6	0.6
			Minimum	52.4	15.4	9.1	13.2	0.41
			Average	58.1	19.2	12.1	18.3	0.5
		July'22	Maximum	54.2	21.6	14.6	20.6	0.59
			Minimum	42.4	12.4	10.1	12.2	0.42
			Average	48.0	17.4	12.1	17.2	0.5
		August'22	Maximum	49.4	16.3	14.6	14.6	0.49
			Minimum	40.2	11.3	11.2	11.1	0.4
			Average	45.9	13.3	12.9	12.8	0.4
		September'22	Maximum	57.2	17.9	15.9	18.9	0.6
			Minimum	51.2	14.4	12.8	15.1	0.48
			Average	53.9	16.3	14.6	16.9	0.5
3.	DISPENSARY	April'22	Maximum	70.6	29.2	21.24	26.2	0.83
			Minimum	40.9	21.2	10.4	16.2	0.38
			Average	60.7	24.6	13.7	20.1	0.5
		May'22	Maximum	68.4	27.5	17.6	19.81	0.67
			Minimum	52.7	21.3	10.9	13.8	0.46
			Average	61.5	23.2	12.9	16.9	0.5
		June'22	Maximum	63.1	25.4	15.2	19.9	0.59
			Minimum	42.5	18.3	10.2	13.2	0.39
			Average	55.8	20.9	12.3	16.7	0.5
		July'22	Maximum	53.1	21.9	14.2	18.9	0.58
			Minimum	41.1	16.6	9.8	12.2	0.38
			Average	47.5	19.3	12.3	15.9	0.5

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	15.4	14.6	13.7	0.49
			Minimum	40.5	11.3	11.3	10.3	0.4
			Average	45.3	13.0	13.0	12.1	0.5
		September'22	Maximum	56.9	17.6	16.4	18.9	0.61
			Minimum	51.1	14.1	13.1	15.3	0.48
			Average	53.8	15.8	14.5	17.3	0.5
4. KATESAHI EXIT GATE		April'22	Maximum	80.2	41.3	24.3	29.2	0.84
			Minimum	49.7	19.2	10.2	19.0	0.38
			Average	70.3	32.5	16.2	23.8	0.6
		May'22	Maximum	74.9	37.4	21.8	24.3	0.62
			Minimum	64.7	20.2	11.7	18.1	0.42
			Average	71.3	29.8	16.3	22.6	0.5
		June'22	Maximum	69.7	25.3	21.8	18.7	0.59
			Minimum	50.2	20.2	10.6	11.2	0.41
			Average	62.3	22.5	14.9	14.9	0.5
		July'22	Maximum	59.7	22.3	19.4	17.7	0.57
			Minimum	40.2	15.0	9.6	11.2	0.42
			Average	52.2	18.8	14.5	14.0	0.5
		August'22	Maximum	49.6	16.5	14.3	14.5	0.49
			Minimum	40.3	11.4	10.4	10.3	0.4
			Average	45.4	13.2	12.4	12.7	0.4
		September'22	Maximum	56.3	18.2	15.6	18.9	0.62
			Minimum	51.4	14.2	13.1	15.1	0.48
			Average	53.5	16.0	14.4	17.1	0.5
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	$PM_{2.5}$ lug/m^3	SO_2 lug/m^3	NO_2 lug/m^3	CO mg/m^3
1.	Panduliposhi Village	April'22	Maximum	89.4	56.2	22.80	24.36	0.58
			Minimum	78.0	30.3	17.4	16.7	0.42
			Average	84.1	45.8	19.9	20.6	0.5
		May'22	Maximum	85.2	53.7	22.74	22.35	0.54
			Minimum	73.3	44.2	18.6	15.8	0.42
			Average	81.1	49.6	20.4	19.5	0.5
		June'22	Maximum	85.7	54.4	23.13	22.87	0.52
			Minimum	72.7	45.3	17.5	16.6	0.46
			Average	80.1	50.2	20.1	19.6	0.5
		July'22	Maximum	55.7	32.9	20.24	20.87	0.54
			Minimum	42.7	22.7	16.5	15.6	0.45
			Average	50.1	28.0	18.4	18.3	0.5
		August'22	Maximum	47.5	16.5	13.60	13.1	0.47
			Minimum	42.4	12.8	11.6	10.1	0.4
			Average	45.2	14.7	12.5	11.9	0.4
		September'22	Maximum	56.6	17.9	13.80	18.5	0.59
			Minimum	51.4	14.3	12.2	14.7	0.48
			Average	53.8	16.3	13.0	16.4	0.5
		April'22	Maximum	84.3	59.4	21.78	22.12	0.55
			Minimum	77.4	48.5	16.0	19.4	0.35
			Average	80.5	54.8	19.2	20.7	0.4

Si. No.	Location	Month	Concentration	PIlio µg/m³	PM2.5 lug/m³	SO2 lug/m³	NO2 lug/m³	CO mg/m³
2.	Katesahi village	May'22	Maximum	82.9	53.5	20.85	22.29	0.49
			Minimum	80.4	50.2	17.2	18.4	0.38
			Average	81.5	52.0	18.8	20.2	0.4
		June'22	Maximum	82.9	54.6	19.87	22.75	0.49
			Minimum	78.2	50.1	17.9	17.6	0.39
			Average	80.9	51.9	18.7	20.3	0.4
		July'22	Maximum	52.9	33.5	18.87	20.96	0.48
			Minimum	48.2	22.4	16.9	16.6	0.38
			Average	50.9	29.4	17.7	18.6	0.4
		August'22	Maximum	48.6	14.3	14.20	14.6	0.49
			Minimum	42.1	11.4	10.1	11.2	0.41
			Average	45.7	13.2	12.4	12.5	0.4
		September'22	Maximum	56.9	17.8	13.90	18.6	0.59
			Minimum	51.5	15.6	12.4	16.1	0.48
			Average	54.1	16.7	13.2	17.5	0.5
3.	Barpada Village	April'22	Maximum	82.1	85.3	22.18	25.24	0.49
			Minimum	73.2	52.4	19.4	19.5	0.34
			Average	77.5	62.2	20.6	22.0	0.4
		May'22	Maximum	81.5	67.7	22.34	23.26	0.49
			Minimum	75.5	54.4	19.8	20.5	0.39
			Average	78.6	60.5	20.9	21.8	0.4
		June'22	Maximum	81.6	61.3	22.12	22.14	0.47
			Minimum	75.2	53.3	19.4	19.9	0.37
			Average	79.0	57.7	20.7	20.9	0.4
		July'22	Maximum	51.6	38.8	20.12	19.14	0.45
			Minimum	45.2	21.0	17.7	16.0	0.38
			Average	49.0	28.9	18.9	17.6	0.4

Sl. No.	Location	Month	Concentration	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	SO_2 µg/m³	NO_2 µg/m³	CO mg/m³
		August'22	Maximum	49.3	14.6	13.40	13.3	0.49
			Minimum	41.8	12.6	12.3	10.3	0.4
			Average	44.8	13.6	12.9	12.0	0.4
		September'22	Maximum	57.4	16.5	13.80	18.5	0.6
			Minimum	52.4	14.7	12.1	15.6	0.5
			Average	54.5	15.7	13.0	16.8	0.5
4.	Rengelabeda Village	April'22	Maximum	83.0	50.1	22.20	21.25	0.49
			Minimum	76.3	39.7	18.2	18.2	0.39
			Average	79.2	44.7	20.5	19.8	0.4
		May'22	Maximum	82.5	51.4	23.48	23.47	0.52
			Minimum	74.4	41.9	19.4	19.2	0.42
			Average	78.3	45.6	20.9	21.1	0.5
		June'22	Maximum	82.2	52.5	22.52	22.91	0.53
			Minimum	75.3	39.8	18.6	18.3	0.42
			Average	78.5	46.6	20.6	21.0	0.5
		July'22	Maximum	52.2	32.5	21.52	21.35	0.52
			Minimum	45.3	19.8	17.3	17.3	0.41
			Average	48.5	26.6	19.0	19.4	0.5
		August'22	Maximum	49.4	16.1	14.70	13.6	0.49
			Minimum	40.5	12.1	11.2	10.4	0.4
			Average	45.8	13.6	12.9	12.2	0.4
		September'22	Maximum	57.2	17.8	13.30	18.7	0.61
			Minimum	51.2	14.1	12.1	15.1	0.48
			Average	54.4	16.2	12.7	17.1	0.6

3. Fugitive Emission Monitoring (µg/m³)

Sl. No.	Month	Screen Plant		Waste Dump		Mines Face Bench	
		21° 58' 7.25"N 85° 23' 12.0"E		21° 57' 56.21"N 85° 23' 3.51"E		21°58'8.65"N 85°22'49.65"E	
		Max	Min	Max	Min	Max	Min
1.	April'22	940	812.5	962	749	967.4	702
2.	May'22	928.6	839.7	954.2	820.9	895.2	756.4
3.	June'22	932.8	531.6	941.3	527.3	891.8	528.7
4.	July'22	732.8	543.5	741.3	545.1	705.3	508.9
5.	August'22	599.5	515.2	594.2	518.2	596.7	500.8
6.	September'22	696.2	601.5	692.2	600.3	693.2	604.3
Six Month Average		804.98	640.7	808.65	630.1	809.55	622.3

Sl. No.	Month	Crusher Plant		Ore storage & Loading Point		Mines Haulage Road	
		21° 58' 7.25"N 85° 23' 12.0"E		21° 57' 56.21"N 85° 23' 3.51"E		21°58'8.65"N 85°22'49.65"E	
		Max	Min	Max	Min	Max	Min
1.	April'22	923	629.4	948	745	941	739.4
2.	May'22	901.1	721.5	876.6	800.9	916.6	820.4

3.	June'22	884.9	426.8	869.1	507.1	937.8	541.6
4.	July'22	686.1	526.8	669.1	503.6	739.1	519.7
5.	August'22	589.5	502.3	599.5	514.3	576.9	512.4
6.	September'22	696.1	603.6	692.5	608.6	697.4	605.2
Six Month Average		802.15	610.2	806.32	629.4	805.15	628.5

4. ILLUMINATION MONITORING (Lux)

	April 22		May 22		June22	
LOCATION	**Horizontal**	**Vertical**	**Horizontal**	**Vertical**	**Horizontal**	**Vertical**
Workshop Area	170.0	149.0	130.0	145.0	201.0	234.0
Screen Plant	135.0	95.0	175.0	154.0	72.0	110.0
Haul Road	55.0	24.0	70.0	45.0	38.0	80.0
Loading Point	115.0	51.0	85.0	60.0	47.0	102.0
Crusher Plant	102.0	88.0	165.0	130.0	58.0	109.0
Parking Yard	135.0	119.0	130.0	95.0	65.0	110.0
Permanent Path	56.0	32.0	90.0	46.0	59.0	85.0
Electric Substation	21o.0	195.0	175.0	120.0	180.0	229.0
Rest Shelter	160.0	75.0	75.0	56.0	53.0	110.0
Mines Bench Foot Path	103.0	60.0	48.0	28.0	78.0	93.0
	July 22		**August 22**		**September 22**	
LOCATION	**Horizontal**	**Vertical**	**Horizontal**	**Vertical**	**Horizontal**	**Vertical**
Workshop Area	90.0	110.0	73.0	49.0	53.5	72.2
Screen Plant	70.0	90.0	42.0	23.0	72.4	27.0
Haul Road	26.0	30.0	24.0	16.0	19.2	22.1
Loading Point	75.0	95.0	64.0	37.0	34.5	70.1
Crusher Plant	50.0	60.0	117.0	87.0	-	-
Parking Yard	38.0	46.0	60.0	33.0	36.8	51.6
Permanent Path	40.0	50.0	54.0	27.0	25.6	45.4
Electric Substation	168.0	80.0	85.0	62.0	60.3	49.8
Rest Shelter	7.0	10.0	87.0	57.0	71.3	97.8
Mines Bench Foot Path	20.0	26.0	89.0	65.0	72.3	124.1

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
PANDULIPOSHI VILLAGE	53.5	43.8	56.2	44.7	52.1	45.6	55 dB(A)	45 dB(A)
KATESAHI VILLAGE	43.6	39.8	42.2	38.6	43.1	39.5	55 dB(A)	45 dB(A)
BARPADA VILLAGE	50.7	40.0	51.4	41.6	52.7	42.8	55 dB(A)	45 dB(A)
RENGELABEDA VILLAGE	54.8	43.0	55.3	43.9	56.2	44.7	55 dB(A)	45 dB(A)
EAST BOUNDARY	70.0	54.0	69.5	57.3	70.6	58.4	75 dB(A)	70 dB(A)
WEST BOUNDARY	65.0	54.4	63.2	52.2	65.4	54.3	75 dB(A)	70 dB(A)
NORTH BOUNDARY	74.9	61.2	72.9	58.6	73.7	59.8	75 dB(A)	70 dB(A)
SOUTH BOUNDARY	66.0	54.3	69.0	56.4	70.6	58.7	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
PANDULIPOSHI VILLAGE	51.3	42.8	50.2	41.6	49.4	40.7	55 dB(A)	45 dB(A)
KATESAHI VILLAGE	44.7	41.6	46.8	40.8	44.2	39.7	55 dB(A)	45 dB(A)
BARPADA VILLAGE	51.9	44.6	50.4	42.8	52.6	43.7	55 dB(A)	45 dB(A)
RENGELABEDA VILLAGE	52.3	43.8	50.5	41.9	52.4	42.8	55 dB(A)	45 dB(A)
EAST BOUNDARY	71.8	62.5	68.9	60.4	70.8	69.7	75 dB(A)	70 dB(A)
WEST BOUNDARY	67.2	57.9	69.1	66.2	69.4	67.6	75 dB(A)	70 dB(A)
NORTH BOUNDARY	72.8	60.4	69.2	62.5	73.4	72.6	75 dB(A)	70 dB(A)
SOUTH BOUNDARY	69.7	59.8	67.8	57.3	68.4	62.4	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
	Leq				Leq			
Magazine Area	64.46	63.39	73.08	71.20	62.2	64.4	74.1	73.5
Drilling Machine	64.63	60.07	56.90	58.90	66.8	62.3	57.2	56.4
Mines Face/Bench	72.45	77.09	72.00	70.90	70.2	75.1	73.4	71.2
Haulage Road	60.53	68.08	67.90	67.76	58.6	66.7	68.3	68.2
Workshop Area	65.30	72.09	71.80	73.40	64.8	71.9	73.2	74.7
Ore Crusher Plant	66.40	66.40	60.80	70.30	63.4	65.3	61.7	71.8
Mobile Screen Plant	63.20	63.20	62.60	67.70	61.3	61.6	63.5	66.2

Ore Storage And Loading Point	61.50	68.09	63.90	63.00	63.2	66.1	62.1	61.7
Waste Dump	69.05	67.66	72.00	59.78	45.3	45.3	56.1	64.2
Excavator	56.09	58.67	71.96	65.40	67.5	66.4	73.4	58.6
Dozer	69.60	64.90	69.80	66.50	54.3	59.2	72.6	62.7
Dumper	66.60	69.00	70.00	67.70	67.3	67.1	70.2	64.3
Loader	75.40	74.94	76.90	67.90	65.2	67.8	72.3	65.2
DG Set	53.90	53.00	63.80	61.30	74.1	72.2	75.0	65.3
Mine Office	64.46	63.39	73.08	71.20	55.6	51.9	66.2	62.1
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	63.3	65.2	73.2	72.6	62.3	64.2	71.2	70.6
Drilling Machine	65.5	63.3	58.3	57.2	64.5	62.3	57.3	58.2
Mines Face/Bench	71.1	72.4	72.5	72.8	70.1	71.4	70.5	71.8
Haulage Road	59.4	67.5	69.4	69.3	58.4	66.5	68.4	68.3
Workshop Area	65.7	73.9	72.1	73.1	66.7	72.9	71.1	72.1
Ore Crusher Plant	64.6	66.3	62.6	72.6	63.6	64.3	63.6	71.6
Mobile Screen Plant	62.2	62.6	64.7	67.4	61.2	63.6	65.7	68.4
Ore Storage And Loading Point	64.1	67.1	63.3	62.5	63.1	66.1	64.3	61.5
Waste Dump	46.4	46.3	57.2	65.1	47.4	47.3	56.2	64.1
Excavator	68.9	67.4	72.5	59.9	69.9	68.4	71.5	58.9
Dozer	55.8	60.2	71.7	63.8	54.8	61.2	70.7	62.8
Dumper	68.7	68.1	73.8	65.6	69.7	67.1	72.8	66.6
Loader	66.3	68.8	73.6	66.5	67.3	69.8	71.6	67.5
DG Set	75.2	71.2	71.9	67.4	74.2	70.2	70.9	68.4
Mine Office	56.5	52.9	67.2	63.2	55.4	53.9	68.2	62.2
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	72.5	72.1	63.4	61.2	72.4	69.1	71.8	68.3
Drilling Machine	55.4	56.2	61.3	65.8	72.8	70.6	68.8	69.5
Mines Face/Bench	70.2	72.4	74.1	69.2	71.5	72.5	71.7	68.1
Haulage Road	67.2	67.3	62.7	57.6	70.6	73.6	72.3	69.3
Workshop Area	73.7	72.2	70.9	63.8	68.3	71.4	68.7	68.9
Ore Crusher Plant	70.8	60.7	64.3	62.4	72.5	69.1	70.7	70.3
Mobile Screen Plant	67.2	62.5	60.6	60.3	71.3	68.3	70.0	69.5
Ore Storage And Loading Point	60.7	61.1	65.1	62.2	73.5	69.9	71.3	72.1
Waste Dump	63.2	55.1	44.3	44.3	71.1	73.9	70.7	70.8
Excavator	57.6	72.4	65.4	66.5	69.8	72.7	69.5	68.9
Dozer	61.7	71.6	58.2	53.3	69.4	67.9	70.2	72.7

Dumper	63.3	69.2	66.1	66.3	69.1	66.1	69.0	71.9
Loader	64.2	71.3	66.8	64.2	68.4	68.3	69.9	69.5
DG Set	64.3	74.0	71.2	73.1	72.9	71.2	70.6	70.5
Mine Office	61.1	65.2	50.9	54.6	71.4	72.6	70.3	71.3

6. Surface Water Quality

NUAGAON IRON ORE MINE								
Topadihi nala UpStream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	-	6.57	6.62	6.70	6.86	6.78	6.84	6.5-8.5
Total Dissolved Solids	**mg/l**	85.0	102.0	96.0	124.0	130.0	145.0	1500
Chlorides	**mg/l**	14.0	18.0	16.0	18.0	16.0	24.0	600
Iron	**mg/l**	0.09	0.12	0.07	0.08	0.07	0.11	50
Fluorides	**mg/l**	0.11	0.14	0.12	0.17	0.17	0.14	1.5
BOD	**mg/l**	07.0	8.20	5.8	6.60	3.0	2.9	3
DO	**mg/l**	6.0	5.80	5.8	5.70	6.0	6.4	4
Topadihi nala DownStream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	-	6.3	6.70	6.50	6.34	6.96	7.2	6.5-8.5
Total Dissolved Solids	**mg/l**	75.0	68.0	114.0	148.0	152.0	167.0	1500
Chlorides	**mg/l**	17.0	22.0	23.4	26.0	32.0	29.2	600
Iron	**mg/l**	0.12	0.14	0.08	0.12	0.13	0.10	50
Fluorides	**mg/l**	0.12	0.18	0.14	0.24	0.27	0.25	1.5
BOD	**mg/l**	6.0	12.0	9.20	14.80	16.0	18.0	3
DO	**mg/l**	5.8	5.4	5.0	4.90	4.7	5.1	4
Karo nala Upstream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	-	6.64	6.28	6.86	6.78	6.97	6.9	6.5-8.5
Total Dissolved Solids	**mg/l**	82.0	76.0	95.0	98.0	104.0	122.0	1500
Chlorides	**mg/l**	7.0	14.2	5.90	8.16	11.6	12.0	600
Iron	**mg/l**	0.10	0.12	0.13	0.14	0.13	0.17	50

Fluorides	**mg/l**	0.14	0.18	0.19	0.16	0.12	0.10	1.5
BOD	**mg/l**	5.9	5.6	5.4	5.20	5.6	5.0	3
DO	**mg/l**	6.0	6.2	6.20	6.0	5.9	6.2	4
Karo nala Downstream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	**-**	6.82	6.49	6.52	6.92	7.3	7.21	6.5-8.5
Total Dissolved Solids	**mg/l**	126.0	89.0	116.0	120.0	142.0	156.0	1500
Chlorides	**mg/l**	20.0	19.6	8.40	14.80	16.0	18.0	600
Iron	**mg/l**	0.07	0.14	0.18	0.17	0.14	0.17	50
Fluorides	**mg/l**	0.15	0.20	0.24	0.28	0.24	0.20	1.5
BOD	**mg/l**	9.0	5.8	5.80	7.20	9.6	8.0	3
DO	**mg/l**	6.0	5.8	5.6	6.80	6.58	7.0	4
Teheri nala UpStream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	**-**	6.9	6.8	6.81	6.88	6.78	6.83	6.5-8.5
Total Dissolved Solids	**mg/l**	81.0	96.0	72.0	68.0	76.0	91.0	1500
Chlorides	**mg/l**	150.0	16.0	132.0	40.0	38.0	30.0	600
Iron	**mg/l**	0.21	0.24	0.20	0.22	0.23	0.20	50
Fluorides	**mg/l**	0.22	0.18	0.24	0.28	0.22	0.20	1.5
BOD	**mg/l**	4.1	4.8	5.60	6.0	5.8	5.5	3
DO	**mg/l**	6.4	6.7	6.2	5.80	5.6	5.8	4
Teheri nala DownStream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	**-**	6.70	6.58	6.58	6.92	7.18	7.45	6.5-8.5
Total Dissolved Solids	**mg/l**	82.0	106.0	96.0	114.0	120.0	134.0	1500
Chlorides	**mg/l**	17.0	18.0	158.0	60.0	58.0	52.0	600
Iron	**mg/l**	0.78	0.28	0.28	0.26	0.27	0.23	50
Fluorides	**mg/l**	0.23	0.20	0.23	0.38	0.33	0.30	1.5
BOD	**mg/l**	6.2	5.20	8.20	13.8	12.0	16.0	3
DO	**mg/l**	6.6	6.20	5.80	5.20	5.4	5.2	4
Kakara pani nala Upstream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	**-**	6.82	6.28	6.96	6.87	6.86	6.78	6.5-8.5

Total Dissolved Solids	**mg/l**	112.0	76.0	116.0	106.0	98.0	110.0	1500
Chlorides	**mg/l**	17.5	14.2	18.5	16.0	18.0	18.0	600
Iron	**mg/l**	0.14	0.12	0.18	0.18	0.12	0.10	50
Fluorides	**mg/l**	0.21	0.18	0.24	0.28	0.24	0.22	1.5
BOD	**mg/l**	5.8	5.6	6.4	7.40	9.6	10.0	3
DO	**mg/l**	6.3	6.2	6.0	6.2	5.6	5.2	4
Kakara pani nala Downstream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	**-**	6.75	6.49	6.72	6.8	6.42	6.89	6.5-8.5
Total Dissolved Solids	**mg/l**	115.0	89.0	124.0	132.0	140.0	177.0	1500
Chlorides	**mg/l**	21.5	19.6	21.6	20.6	24.0	28.0	600
Iron	**mg/l**	0.15	0.14	0.16	0.20	0.23	0.20	50
Fluorides	**mg/l**	0.22	0.20	0.29	0.32	0.34	0.30	1.5
BOD	**mg/l**	6.5	5.8	8.80	10.4	13.4	17.0	3
DO	**mg/l**	5.9	5.8	5.7	5.48	5.4	5.1	4
Sona river UpStream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	**-**	7.20	6.98	7.32	7.38	7.18	7.08	6.5-8.5
Total Dissolved Solids	**mg/l**	97.5	88.0	88.0	76.0	80.0	117.0	1500
Chlorides	**mg/l**	15.7	17.0	14.0	16.0	17.2	22.0	600
Iron	**mg/l**	0.18	0.14	0.17	0.13	0.14	0.19	50
Fluorides	**mg/l**	0.13	0.19	0.15	0.14	0.16	0.13	1.5
BOD	**mg/l**	4.8	5.20	5.0	10.4	12.4	10.0	3
DO	**mg/l**	6.3	6.4	6.0	5.8	6.2	6.8	4
Sona river Downstream								
Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Limits for Stream Water Standards**
PH	**-**	7.14	6.61	6.48	6.58	6.83	7.18	6.5-8.5
Total Dissolved Solids	**mg/l**	102.0	110.0	120.0	112.0	110.2	137.0	1500
Chlorides	**mg/l**	13.5	22.0	17.6	26.0	24.0	30.0	600
Iron	**mg/l**	0.10	0.18	0.20	0.20	0.23	0.17	50
Fluorides	**mg/l**	0.15	0.20	0.18	0.27	0.22	0.20	1.5
BOD	**mg/l**	6.1	7.6	9.60	12.8	13.8	14.0	3
DO	**mg/l**	6.1	6.2	5.70	5.4	5.32	6.4	4

7. Surface Water Flow Rate

LOCATION NAME	April-21	May-22	June-22	July-22	August-22	September-22
Karo Nala	0.47	0.41	0.35	0.41	0.47	0.46
Teherai Nala	0.42	0.39	0.40	0.39	0.44	0.55
Kakarpani Nala	0.45	0.40	0.31	0.40	0.52	0.60
Suna Nala	0.44	0.31	0.52	0.31	0.75	0.70
Topadihi Nala	No Flow	No Flow	0.15	0.21	0.88	0.62

8. Ground Water Quality

June- 2022					
Location		**RENGELBEDA VILLAGE**	**NUAGAON VILLAGE**	**GWALI VILLAGE-1**	**BARPADA VILLAGE**
Parameter	**Units**				
pH	-	5.28	5.73	5.78	6.51
Total Dissolved Solids as TDS	mg/l	72	62	158	160
Total Hardness as CaCO3	mg/l	36	32	72	80
Chloride as Cl	mg/l	4	6	12	12
Fluorides as F	mg/l	0.17	0.19	0.24	0.23
Iron as Fe	mg/l	0.1	0.08	0.12	0.16
Location		KATESAHI VILLAGE	MALDA VILLAGE	PANDULIPOSHI VILLAGE	GWALI VILLAGE -2
Parameter	**Units**				
pH	-	5.67	5.6	5.82	**5.63**
Total Dissolved Solids as TDS	mg/l	124	56	36	44.0
Total Hardness as CaCO3	mg/l	60	24	16	20.0
Chloride as Cl	mg/l	10	4	BDL	BDL
Fluorides as F	mg/l	0.24	0.08	0.07	0.06
Iron as Fe	mg/l	0.13	BDL	0.05	0.04

June- 2022					
Location		**RENGELBEDA VILLAGE**	**NUAGAON VILLAGE**	**GWALI VILLAGE-1**	**BARPADA VILLAGE**
Parameter	**Units**				
pH	-	6.98	7.01	7.36	6.78
Total Dissolved Solids as TDS	mg/l	144.0	147.0	133.0	123.0
Total Hardness as CaCO3	mg/l	56.0	60.0	52.0	68.0
Chloride as Cl	mg/l	18.0	10.6	12.0	18.0
Fluorides as F	mg/l	0.25	0.17	0.17	0.24
Iron as Fe	mg/l	0.20	0.09	0.15	0.10
Location		KATESAHI VILLAGE	MALDA VILLAGE	PANDULIPOSHI VILLAGE	
Parameter	**Units**				
pH	-	**6.90**	6.78	6.91	
Total Dissolved Solids as TDS	mg/l	148.0	108.0	110.0	
Total Hardness as CaCO3	mg/l	72.0	60.0	48.0	
Chloride as Cl	mg/l	14.0	18.0	14.0	
Fluorides as F	mg/l	0.24	0.17	0.18	
Iron as Fe	mg/l	0.13	0.16	0.06	

9. Drinking Water Quality

Parameter	**Units**	**April-22**	**May-22**	**June-22**	**July-22**	**August-22**	**September-22**	**Acceptable Limits**	**Permissible Limits**
PH	-	6.65	6.71	6.75	6.80	7.02	7.1	**6.5-8.5**	**No Relaxation**
Total Hardness	mg/l	56.0	64.0	66.0	57.0	63.0	68.0	**200**	**600**
Iron	mg/l	013	0.14	0.12	0.14	0.11	0.12	**1**	**No Relaxation**
Chlorides	mg/l	14.0	15.6	8.0	6.20	7.60	10.0	**250**	**1000**
Total Dissolved Solids	mg/l	114.0	128.0	132.0	146.0	160.0	167.0	**500**	**2000**
Sulphates	mg/l	15.3	16.0	5.45	10.40	11.80	13.3	**200**	**400**
Fluoride	mg/l	0.20	0.22	0.22	0.23	0.28	0.26	**1**	**1.5**

10. ETP

TESTS	Unit	April-22	May-22	June-22	July-22	August-22	September-22	Detection Range
ETP INLET								
Ph	-	6.90	6.82	5.89	5.96	6.20	6.12	2.0 -12
Total Suspended Solids as TSS	mg/l	66.9	64.0	32.0	52.0	52.0	48.0	5 – 5000
Total Dissolved Solids as TDS	mg/l	1223.0	1232.0	48.0	128.0	130.0	187.0	10-10000
Biochemical Oxygen Demand as BOD 3Days at 270C	mg/l	23.2	24.8	25.0	32.0	32.0	31.0	5-10000
Chemical Oxygen Demand as COD	mg/l	168.0	172.0	268.0	282.0	302.0	280.0	5-50000
Oil & Grease	mg/l	6.4	6.6	6.30	6.50	8.20	7.34	5-600
TESTS	Unit	April-22	May-22	June-22	July-22	August-22	September-22	Detection Range
ETP OUTLET								
pH	-	6.43	6.52	6.72	6.58	6.92	6.95	2.0 -12
Total Suspended Solids as TSS	mg/l	37.3	39.20	32.0	40.0	38.0	34.3	5 - 5000
Total Dissolved Solids as TDS	mg/l	1078.0	1048.0	704.0	714.0	684.0	712.0	10-10000
Biochemical Oxygen Demand as BOD 3Days at 270C	mg/l	5.3	5.4	21.0	24.0	23.80	20.0	5-10000
Chemical Oxygen Demand as COD	mg/l	56.0	62.0	184.0	192.0	182.0	152.0	5-50000
Oil & Grease	mg/l	2.4	5.30	BDL	BDL	BDL	BDL	5-600

11. Mines Run Off

Parameter	Unit	July-22				August-22				INDIAN STANDARDS as IS-2296(C)
		Mine Office	Screen Plant	Crusher Plant	Loading Point	Mine Office	Screen Plant	Crusher Plant	Loading Point	
Colour	Hazen	18.0	10.0	25.0	40.0	15.0	10.0	25.0	35.0	300
pH	-	8.32	7.8	7.49	7.78	7.28	7.30	7.62	7.52	6.5-8.5
Total Suspended Solids as TSS	mg/l	30.5	42.3	34.3	53.4	28.0	38.0	38.0	58.0	-
Total Dissolved Solids as TDS	mg/l	\360.0	317.0	363.0	340.0	\280.0	302.0	312.0	380.0	1500
Biochemical Oxygen Demand as BOD	mg/l	14.0	16.0	17.0	19.0	13.20	15.0	18.0	20.0	3.0
Chemical Oxygen Demand as COD	mg/l	104.0	112.0	126.0	140.0	96.40	110.0	122.0	152.0	-
Oil & Grease as O&G	mg/l	5.02	BDL	6.39	BDL	6.40	BDL	8.0	BDL	0.1
Dissolved Oxygen as DO	mg/l	5.1	4.9	4.5	4.1	5.70	5.60	4.80	6.20	4
Chloride as Cl	mg/l	30.0	22.0	18.0	44.0	26.0	23.08	21.40	38.50	600
Sulfate as SO4	mg/l	28.9	26.3	21.0	38.3	36.0	28.0	26.0	42.0	400
Nitrate Nitrogen as NO3	mg/l	5.9	7.22	BDL	8.5	6.20	6.80	BDL	8.80	50
Fluorides as F	mg/l	0.25	0.25	0.18	0.23	0.24	0.22	0.20	0.24	1.5
Iron as Fe	mg/l	0.32	0.34	0.26	0.33	0.29	0.30	0.20	0.32	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	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1.5
Zinc as Zn	mg/l	0.16	0.16	0.11	0.08	0.18	0.17	0.13	0.28	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	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.01

Cd										
Parameter	Unit	September-22					July-22		August-22	INDIAN STANDARDS as IS-2296(C)
		Mine Office	Screen Plant	Crusher Plant	Loading Point	Haulage Road		Haulage Road	Haulage Road	
Colour	Hazen	10.0	5.0	30.0	20.0	10.0		25.0	20.0	300
pH	-	7.13	7.44	7.75	7.78	7.60		7.13	7.24	6.5-8.5
Total Suspended Solids as TSS	mg/l	20.0	35.7	47.4	87.0	36.5		46.7	42.0	-
Total Dissolved Solids as TDS	mg/l	\277.0	354.0	343.0	413.0	435.0		380.0	392.0	1500
Biochemical Oxygen Demand as BOD	mg/l	11.0	13.0	22.0	24.0	19.0		22.0	17.2	3.0
Chemical Oxygen Demand as COD	mg/l	92.0	144.0	189.0	168.0	160.0		168.0	152.0	-
Oil & Grease as O&G	mg/l	5.8	BDL	7.57	BDL	6.8		6.7	7.20	0.1
Dissolved Oxygen as DO	mg/l	5.3	5.7	4.4	6.5	5.2		4.8	5.0	4
Chloride as Cl	mg/l	20.0	34.0	18.0	33.2	40.0		34.0	30.0	600
Sulfate as SO4	mg/l	31.0	41.7	36.0	47.9	35.2		39.4	40.0	400
Nitrate Nitrogen as NO3	mg/l	7.20	8.7	BDL	8.90	9.3		11.4	11.80	50
Fluorides as F	mg/l	0.23	0.20	0.27	0.25	0.20		0.35	0.32	1.5
Iron as Fe	mg/l	0.24	0.24	0.25	0.43	0.19		0.42	0.20	50.0
Arsenic as As	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	0.2
Hexavalent Chromium as Cr+6	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	0.05
Copper as Cu	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	1.5
Zinc as Zn	mg/l	0.15	0.14	0.10	0.22	0.23		0.19	0.18	15
Phenolic Compound as C6H5OH	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	0.005
Anionic Detergent as MBAS	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	1.0
Selenium as Se	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	0.05
Cyanide as CN	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	0.05
Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	0.1
Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL		BDL	BDL	0.01

12. Vibration Monitoring

Station no.	Station Name	Instrument location	Season (Summer/Winter/Monsoon/post monsoon	Peak particle velocity	Air Over pressure	Frequency	Remark
1	: KANHUSAHI QUARRY BENCH-3	KANHUSAHI QUARRY CHENAGODA ROAD	MONSOON	6.37 mm/s	115.6 dBL @ 32Hz / .012kPa	10.4 Hz	Within Permissible Limit
2	KANHUSAHI QUARRY BENCH-2	KANHUSAHI QUARRY CHENAGODA ROAD	MONSOON	5.45 mm/s	111.5 dBL @ 10.6Hz / .0075kPa	12.2 Hz	Within Permissible Limit
3	CHENAGODA BENCH 10-11	TIME OFFICE ROAD	SUMMER	4.064 mm/s	120.3 dBL @ 32Hz / .0207kPa	4.7 Hz	Within Permissible Limit
				6.604 mm/s	111.2 dBL @ 13.4Hz / .0072kPa	3.7 Hz	
				1.143 mm/s	88.0 dBL @ 0Hz / .0005kPa	2.7 Hz	
	CHENAGODA BENCH NO 12	TIME OFFICE	MONSOON	8.636 mm/s	109.5 dBL @ 6.3Hz / .006kPa	2.9Hz	
				1.270 mm/s	88.0 dBL @ 0Hz / .0005kPa	2.7Hz	
4	CHENAGODA BENCH NO 10	AT CANTEEN CENTRE	MONSOON	4.0 mm/s	81.9 dBL @ 0 Hz / 0.0002 kPA	46.5 Hz	Within Permissible Limit
				5.63 mm/s	119.2 dBL @ 15.5 Hz/ 0.0182 kPA	3.9 Hz.	
5	RF QUARRY	NEAR JSPL CANTEEN	SUMMER	2.9 mm/s	130.3 dBL @ 39.3Hz / .0657kPa	8.1 Hz	Within Permissible Limit

Verified By
Technical Manager

---End of Report---

Authorized By
Quality Manager
Ecomen Laboratories Pvt. Ltd.
Second Floor Hall, House No. B-[illegible], Sector-H, Aliganj, Lucknow-226024

Annexure 2a

Water Tanker Arrangement for Haul Road Dust Suppression

Annexure 2b

Fixed Sprinklers

Annexure 2c

ROAD SWEEPING MACHINE

Annexure 3

Annexure 4a

ETP

Annexure 4b

Retaining wall/Garland drain/Settling Pond

Annexure 4c

Annexure 6a

Dry Fog

Annexure 6b

Wheel washing

Annexure 7

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. 1834 / CWLW-FDWC-FD-0125-2021
Bhubaneswar, Dated the 25th February, 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 Nuagaon Iron Ore mines of M/s JSW Steel Ltd. in Keonjhar Forest Division of Keonjhar District

Sir,

It is to intimate that you have to implement one Site Specific Wildlife Conservation Plan for the above project in compliance to Standard ToR No.16 & 18 for Mining project and ToR No.26 (i) to (iii) as per Recommendation of CSIR-NEERI Report on "Carrying Capacity Study for Environmentally Sustainable Iron & Manganese Ore Mining Activity in Keonjhar, Sundargarh and Mayurbhanj districts of Odisha State" prescribed by MoEF&CC, IA Division vide their letter in F.No.J-11015/66/2020-IA.II(M) dt 29.12.2020 while considering the expansion proposal of the above project.

The Site Specific Wildlife Conservation Plan in respect of the above project is hereby approved with financial forecast of ₹899.198 lakh (Rupees eight crore ninety-nine lakh nineteen thousand eight hundred) only for implementation of activities in project impact area as detailed in the approved plan. The total cost of ₹899.198 lakh (Rupees eight crore ninety-nine lakh nineteen thousand eight hundred) only may kindly be deposited in State CAMPA fund for implementation of activities in project impact area by the DFO, Keonjhar Division and DFO, Bonai 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. 1835 /dt 25/02/2022
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
3. Regional Chief Conservator of Forests, Rourkela Circle with reference to his memo No.3704 dt 14.12.2021
4. DFO, Keonjhar/ Bonai Division alongwith a copy of the approved SSWLCP

Principal CCF (WL) & CWLW, Odisha

LANDUSE / LANDCOVER MAP OF NUAGAON IRON ORE MINE IN KEONJHAR DISTRICT OF M/S JSW STEEL LTD.

0 0.5 1 2 Kilometers

SCALE - 1:5,000

Legend

- Habitation
- Agricultural Land
- Forest Plantation
- Plantation Over Dump
- Tree Clad Area
- Land With Scrub
- Land Without Scrub
- River / Stream
- Tank / Pond
- Reservoir / Check Dam / WHS
- Mining Quarry
- Old Quarry
- Sub - Grade Dump
- OB Dump
- Stock Yard / Ore Stack
- Site Services
- Workshop
- Mine Office
- Processing Yard
- Crusher Unit
- Weigh Bridge
- Magazine
- National Highway
- Haul Road
- Other Road
- Railway Line
- Parking Plaza
- Industry
- Safety Zone
- Mining Lease Boundary

ORISSA SPACE APPLICATIONS CENTRE
Memo No. 26001/
Date 09-12-2021

SOURCE : -

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