

COMPLIANCE REPORT FOR CONDITIONS IN ENVIRONMENT CLEARANCE ACCORDED VIDE. EC IDENTIFICATION No. EC22B0010R152352 DATED. 27.12.2022 IN RESPECT OF M/S. GEETARANI MOHANTY, RAIKELA IRON ORE MINES IN FOR PRODUCTION OF IRON ORE 4.99MTPA AT-RAIKELA, KOIRA IN THE DISTRICT OF SUNDARGARH, ODISHA.

Specific Conditions

Sl.No.	Conditions	Compliance
(i)	The proponent shall implement the Pollution Control Measures and Safeguards as proposed in the Environmental Management Plan (EMP) or as committed to SEIAA/SEAC.As proposed, the PP has allocated a budgetary provision towards implementation of EMP (revised) as Rs.816.00 Lakhs as a capital cost & Rs. 145.98 Lakhs /annum as recurring cost.	The project proponent has implemented the Environmental Management Plan and has expended Rs. 807.74 Lakhs towards capital cost & Rs.222.03 lakhs as recurring cost. Compiled expenditure attached as Annexure- I

A. Standard Conditions

I. Statutory compliance

Sl. No.	Conditions	Compliance
(i)	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.	There is no case/s pending before any court of law.
(ii)	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	The Project proponent has obtained all the statutory clearances from the concerned statutory authority for undertaking mining operation. 1. Forest Clearance for area of 66.671 Ha vide letter No. F No.8-37 /2007-FC dated 22.10.2014. Attached as Annexure II 2. SEIAA Environment clearance vide EC Identification No. EC22B0010R152352, dated 27.12.2022. Attached as Annexure III

		3.Consent to Operate from OSPCB, Vide letter No. 4185/IND-I-CON-2572, Consent Order No. 1586 dated 31.03.2024 valid till 31.03.2027. Attached as Annexure IV 4. The project proponent has obtained Consent to Establish vide letter No. 14891/IND-II-CTE-6693 Dated 19.08.2022 from State Pollution Control Board, Odisha for production of iron ore of 4.99 MTPA. The copy of the order is enclosed as Annexure-IV A. 5. Mining Plan approval from Indian Bureau of Mines vide letter no IBM/5796/2011/ 30ORI13034 dated 12.07.2023. Attached as Annexure V
(iii)	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.	In pursuance to the The Project proponent 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, the project proponent has paid the compensation amount for Rs. 207,94,42000.00 as per the demand letter issued by state govt. vide letter dated. 02.09.2017. A copy of the letter along with payment details is enclosed here with as Annexure-VI
(iv)	This Environmental Clearance shall become operational only after receiving formal NBWL Clearance from MoEF & CC subsequent to the recommendations of the Standing Committee of National Board for Wildlife, if applicable to the Project	The project is not located within eco-sensitive zone of any national park or sanctuary therefor NBWL clearance is not required.
(v)	This Environmental Clearance shall become operational only after receiving formal Forest Clearance (FC) under the provision of Forest Conservation Act, 1980, if applicable to the project.	Out of the 67.586Ha of total Mining Lease area, forest land under DLC category is 66.671Ha and 0.915Ha is non-forest land. Ministry of Environment and Forest, Govt of India

		has accorded the Stage-II Forest Clearance over an area of 66.671Ha vide letter No. F No.8-37/2007-FC dated 22.10.2014. The copy of the Forest clearance is enclosed as Annexure-II .
(vi)	Project Proponent (PP) shall obtain Consent to Operate after grant of EC and effectively implement all the conditions stipulated therein. The mining activity shall not commence prior to obtaining Consent to Establish / Consent to Operate from the concerned State Pollution Control Board.	The consent to operate has been obtained vide letter No. 4185/IND-I-CON-2572 Dt 23.03.2024 valid till 31.03.2027 after grant of EC and the conditions stipulated in the CTO are effectively implemented. Copy of the Consent to Operate order is enclosed as Annexure -IV. The project proponent has obtained Consent to Establish vide letter No. 14891/IND-II-CTE-6693 Dated 19.08.2022 from State Pollution Control Board, Odisha for production of iron ore of 4.99 MTPA. The copy of the order is enclosed as Annexure-IV A.
(vii)	The PP shall adhere to the provision of the Mines Act, 1952, Mines and Mineral (Development & Regulation), Act, 2015 and rules & regulations made there under. PP shall adhere to various circulars issued by Directorate General Mines Safety (DGMS) and Indian Bureau of Mines from time to time	The project proponent is adhering all the Rules & Regulations and the various circular issued by the respective statutory authorities from DGMS & IBM time to time.
(viii)	The Project Proponent shall obtain consents from all the concerned land owners, before start of mining operations, as per the provisions of MMDR Act, 1957 and rules made thereunder in respect of lands which are not owned by it	Not Applicable as the project area does not falls under any tenant/Private land.
(ix)	The Project Proponent shall follow the mitigation measures provided in MoEF & CC's Office Memorandum No.Z-l1013/57/2014-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	The Project Proponent has constructed check dams, retaining walls/ structures, garland drains and settling pits to arrest the wash-off with rainwater in catchment area. The natural water bodies and or streams which are flowing in and around the village are not disturbed.

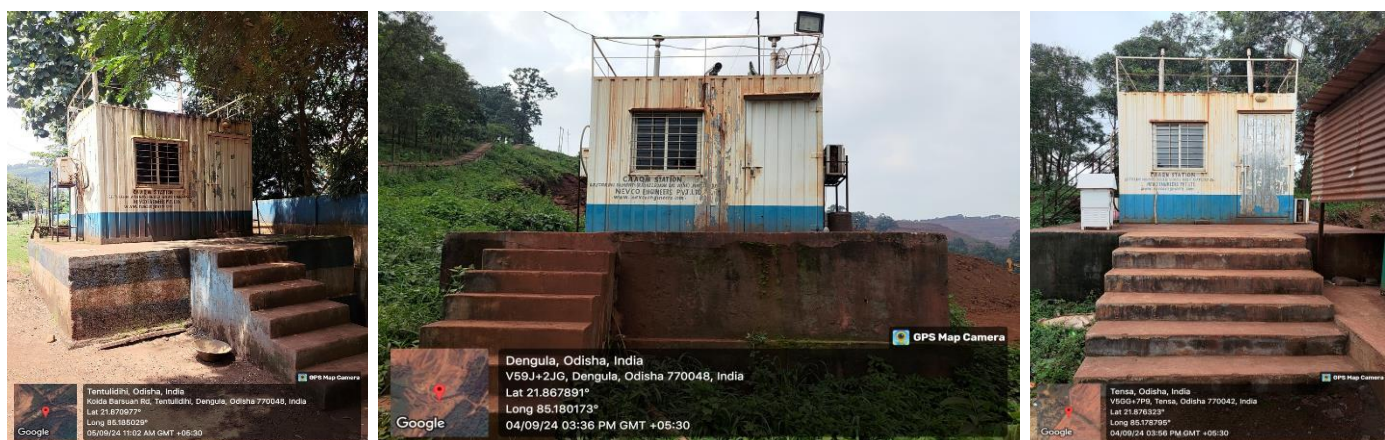
	Habitations and villages are surrounded by the mine lease area”.	Rain water harvesting pond and a roof top recharge pit has been constructed to utilize rain water as well as recharge ground water. The Project Proponent has provided pipe water facility to the villagers for their use. Piezometer has been installed to monitor the fluctuation of ground water. For mitigation of noise level blasting has been scheduled only during the daytime, flood lights have been hooded so that the focus is only confined to the mining area. To abate dust, main haulage road has been provided with permanent water sprinklers and roads are regularly wetted with water tankers, also road sweeper is provided to remove dust from paved roads. Crusher and material transfer is provided with dry fogging system, belt conveyors are covered to avoid dust dispersion. Transportation of minerals is carried over Koida-Barsuan Road and there is more than 200m gap between road and village. No foot paths, by lanes, cart roads, and village infrastructure/public utilities or roads have been acquired for the purpose. The Project Proponent has implemented Social-Economic Development activities in the neighborhood villages. A detailed socio-economic study has been carried out by the project Proponent.
(x)	The Project Proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and from CGWA for withdrawal of ground water for the project.	Necessary permission (NoC) has been accorded by CGWA for withdrawal of 170cum/day of ground water vide letter no. CGWA/NOC/MIN/REN/1/2023/8368 valid up to dated 30/01/2025. Copy of

		the permission letter is enclosed herewith as Annexure-VII
(xi)	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.	The EC letter has been intimated to local Gram Panchayat, Municipality, Zila Parishad.
(xii)	State Pollution Control Board 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	Complied.
(xiii)	The Project Authorities should widely advertise about the grant of this EC letter by printing the same 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 and web site of the Ministry of Environment, Forest and Climate Change (www.environmentclearance.nic.in). A copy of the advertisement may be forwarded to the concerned MoEF&CC Regional Office for compliance and record	News Paper advertisement about grant of EC has been published in Odia newspaper "The Samaja" on 11.03.2023 and national daily "The Times of Indian" on 11.03.2023. A copy of the same is enclosed as Annexure-VIII .
(xiv)	The Project Proponent shall inform the MoEF& CC / SEIAA, Odisha for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred than mining operation shall only be carried out after transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.	The Project Proponent will communicate if there is any change in ownership of the mining lease as per the provisions of the para 11 of EIA notification, 2006 as amended from time to time.

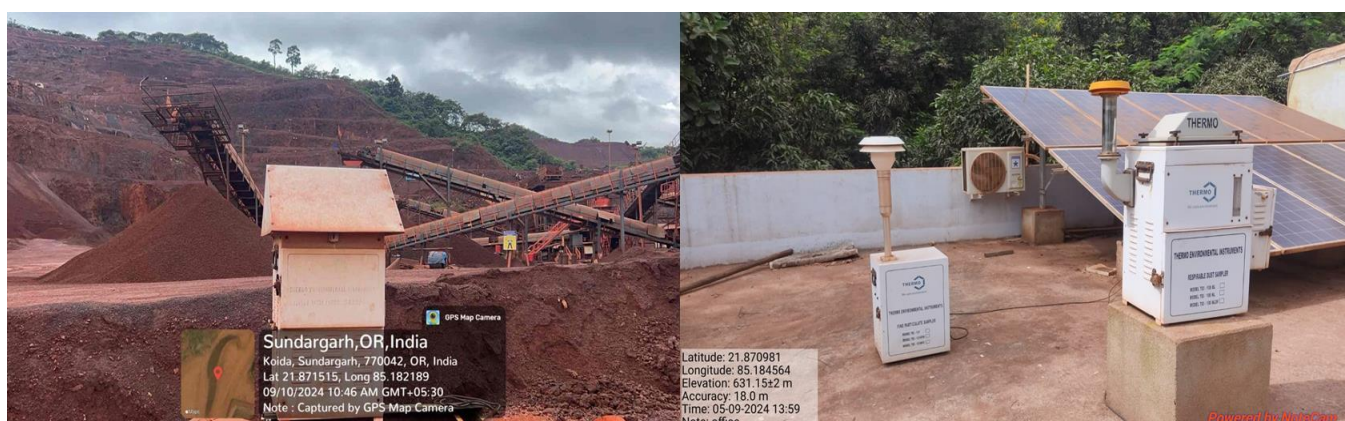
I. Air Quality monitoring and preservation

Sl. No.	CONDITIONS	COMPLIANCES
(i)	The Project Proponent shall install a minimum of 3 (three) online Ambient Air Quality Monitoring Stations with 1 (one)	Project Proponent has already installed 3 nos. of online monitoring stations for air pollution viz. PM10, PM2.5, NO2; CO

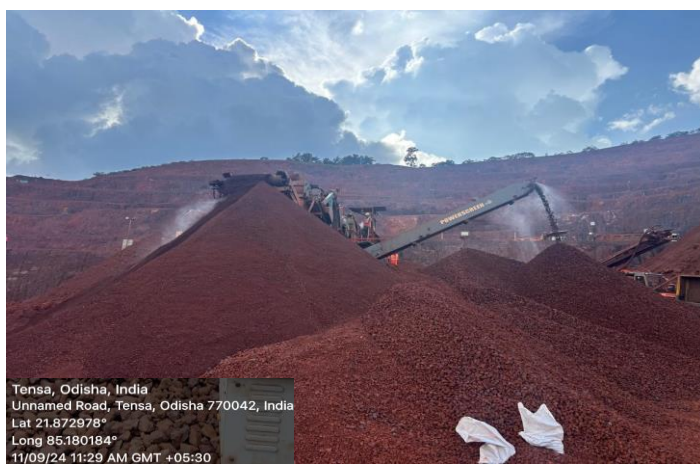
in upwind and 2 (two) in downwind direction based on long term climatological data about wind direction such that an angle of 120° is made between the monitoring locations to monitor critical parameters, relevant for mining operations, of air pollution viz. PM10, PM2.5, NO2; CO and SO2 etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/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.	and SO2 etc. with 1 (one) in upwind and 2 (two) in downwind direction at an angle of 120° as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/PCI/I, dated 18.11.2009 The AAQ continuous monitored data is displayed on the electronic display board covering the prescribed parameters. The photographs of online continuous ambient air monitoring is attached below. At present we are carrying out AAQ monitoring as per CTO conditions in buffer area through NABL Accredited Lab. The monitoring report are attached as Annexure IX
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Installation of continuous ambient air quality monitoring station



(ii)	Effective safeguard measures for prevention of dust generation and subsequent suppression (like regular water sprinkling, metaled 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/ 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 MoEF&CC/ Central Pollution Control Board.	Effective safeguard measures for prevention of dust generation and subsequent suppression like regular water sprinkling; a 300 m metaled road construction, regular water sprinkling is followed wherever fugitive dust emission is envisaged such as haul road, loading and unloading point, crushing & screening plant and transfer points. The Fugitive dust emission is being regularly monitored by NABL Accredited Lab and controlled by installation of fixed sprinklers & water sprinklers with dust binding chemicals. The dry fog system works in ore processing plants and drill rigs. The monitoring result is enclosed as Annexure IX .
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(Arrangement of dry fog system at Crushing & Screening)



(Water Sprinkling on Haul Road)

II. Water quality monitoring and preservation

Sl. No.	CONDITIONS	COMPLIANCES
(i)	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	As per the information from the approved Mining Plan, the minimum depth of working at present is 638m.RL. During the plan period, it is planned to work up to 620m.RL. Hence, ground water intersection will not be taken place

	ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEF & CC 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.	as the water table is at 610m.RL. As and when ground water intersection takes place, the project proponent will take prior approval from CGWA and MoEF & CC before mining operations.
(ii)	Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintained. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug well located in village should be incorporated to ascertain the impact of mining over ground water table. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board	❖ No perennial nalla is flowing within the lease area. However, Karo Nallah is flowing at a distance of 2 km from the lease area. The flow rate of Karo nalla is being monitored on a regular basis and the records of flow rate is being maintained. As per the record the flow rate of Karo nala varies from 0.43m³/sec to 1.80m³/sec. ❖ The Karo nalla is not being disturbed due to mining activity. ❖ For nurturing water table Project Proponent has constructed roof top rainwater recharge structure within the office premises & Rainwater Harvesting Pond, check dam, settling tanks so as not to go down below the pre-mining period. ❖ The Project Proponent is supplying water through pipeline to Dengula & Raikela as well as by water tanker. ❖ Provision of online piezometer for regular monitoring of water table and telemetric flow meters has been made at the bore well as per CGWA NOC conditions located in the lease area to ascertain the impact of mining over ground water table. As the result there are no changes in ground water level and quality.
(iii)	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	Monitoring of the ground water quality at 3 locations namely Mines office, Tensa Tube Well & Tentuldhi dug well village has been undertaken and the records are maintained. The results are within the permissible limit. Piezometer has already been installed in consultation with Central Ground Water

	Central Ground Water Authority/ State GroundWater 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	Authority in the lease area of mines in 625 m RL. The depth of water level is 610 m RL. The reports being complied to CGWA with self-Inspection report & self-Compliance.
(iv)	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 carry out regular monitoring w.r.t. pH and included the same in monitoring plan. The parameters to be monitored shall include their water quality vis-a-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 MoEF&CC / SEIAA, Odisha. 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 (January) and the record of monitored data be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, SEIAA, Odisha, 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	There is no natural water course/ water resources/ springs and perennial nallahs existing/ flowing within the ML area. However, monitoring of surface water flowing within the buffer zone is being carried out as per the norms in Karo Nallah at the upstream and downstream and record of monitoring data is maintained and submitted to Ministry of Environment, Forests and Climate Change, its Regional Office, Bhubaneswar, Central Ground Water Board, State Pollution Control Board, Odisha. Copy of the Surface water quality monitoring report is attached as Annexure-X (A)

(v)	Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off; acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids(TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at 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.	The wastewater from the various activities is treated in ETP & STP and is reused in the process, the quality is being monitored by a NABL Lab fortnightly and regular monitoring in the Mines in-house lab. The runoff from mine is treated in settling pond and then routed to natural water course. There is no natural water course/ water resources/ springs and perennial nallahs existing/ flowing within the ML area. However, monitoring is being carried out as per MoEF&CC norms from Karo Nallah at the upstream and downstream and record of monitoring data is maintained and submitted to MoEFCC, its Regional Office, Bhubaneswar, Central Ground Water Board, State Pollution Control Board, Odisha. A copy of the Ground water quality monitoring report is attached as Annexure-X(B) The monitored data is being 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 MoEFCC may also be referred in this regard.
(vi)	The project proponent shall construct retaining wall and settling pond within the lease area. Further, check dams shall be constructed at strategic locations in which rainwater passes in rainy season. Finally, the excess super anted after sedimentation shall be allowed to spill away through stone pitch structure to the nearby valley.	The project proponent has constructed a retaining wall and garland drain with settling pond to retain the wash off dump materials. A total of 1942m of retaining wall, 1635m garland drain and 3 nos of settling pond and 2 nos of check dams has been constructed at strategic locations to slow down the flow of water during rainy season.



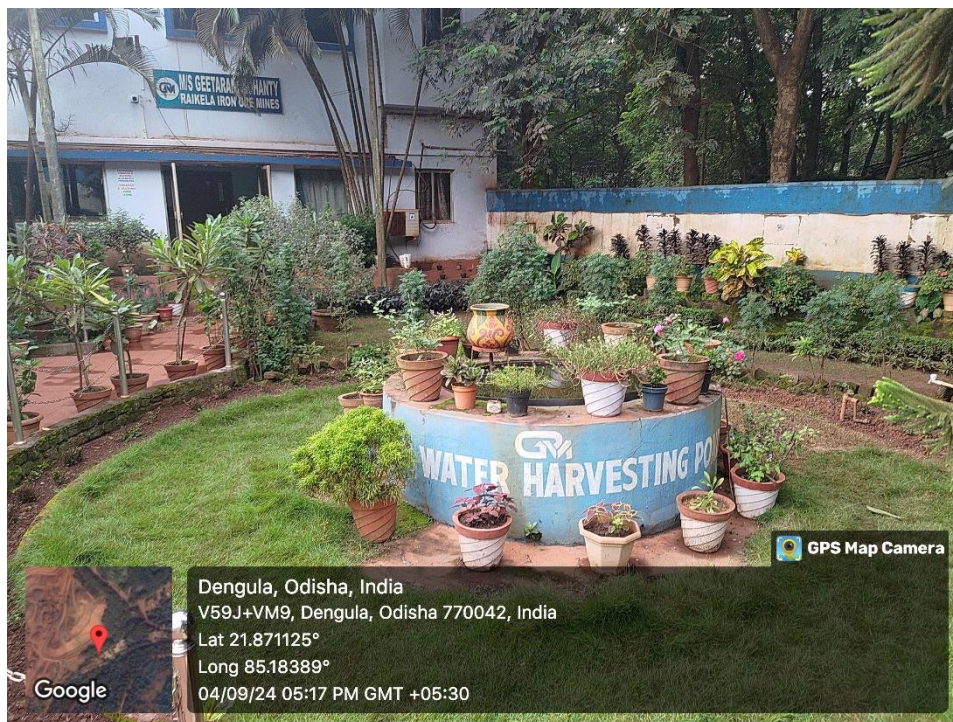
(Settling pond)



Check Dam

(vii)	De-silting of agricultural lands in buffer zone and beyond including nearby Nalas/rivers perennially periodically and perpetually caused due to wash up of minerals/OB/dumps shall be done as per SOP submitted. A legal affidavit shall be submitted within 6 months from the date of issue of Environmental Clearance to this effect with periodicity of de-silting	De-silting of agricultural lands in buffer zone and beyond, including nearby Nalas/rivers perennially periodically and perpetually caused due to wash up of minerals/OB/dumps is done whenever situation arises per SOP submitted if required. In this regard, a legal affidavit is submitted as Annexure-XI .
(viii)	Detail design of the existing retaining wall and the proposed for the expansion from a chartered Civil Engineer shall be submitted within 6 months from the date of issue of Environmental Clearance to ensure that no silt after wash up is escaped from the core / buffer zone of the mines.	The design of the existing retaining wall certified by a chartered Civil Engineer is submitted herewith as Annexure-XII .
(ix)	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	A roof top rainwater recharge pit is constructed in the office premises. As per the provision Rainwater Harvesting measures along with Roof Top Rainwater recharge, check

	Groundwater Department. A report on amount of water recharged needs to be submitted to Regional Office, MoEF & CC annually.	dam, garland drains are constructed to channelize runoff and collect and utilized water for mines activities.
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(View of Roof Top Rainwater Harvesting structure)

(x)	Industrial wastewater (workshop and waste water from the mine) should be properly collected and treated in an ETP as proposed 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.	Industrial wastewater from the workshop and wastewater from the mine are properly collected and treated in an ETP as proposed. In this regard the PP has constructed 12 KLD capacity ETP. The standards are as per Consent to Operate (CTO) issued by Odisha State Pollution Control Board (SPCB) is being maintained. The workshop effluents are being treated after its initial passage through Oil and grease trap. Wastewater Analysis report is attached as Annexure XIII
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(12 KLD ETP)

(xi)	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.	The present NOC from CGWA is 170 KLD. The project proponent has already undertaken a water audit to explore the possibility to reduce the consumption of water and subsequently through FICCI. enclosed as Annexure-XIV .
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(View of 60 KLD STP)

III. Noise and vibration monitoring and prevention

Sl. No.	Conditions	Compliances
(i)	The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.	Blasting vibration study has been carried out by CMRI, Dhanbad. As per the study, the peak particle velocity at 500m distance or within the nearest habitation is being monitored periodically as per applicable DGMS guidelines
(ii)	The illumination and sound at night at project sites disturb the villagers in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/masks away from the villagers and keeping the noise levels well within the prescribed limits for day/night hours.	Is being followed.
(iii)	The Project Proponent shall take measures for control of noise levels below 85dBA in the work environment.	All the heavy machinery is being lubricated & maintained in regular intervals. The worker engaged in

	The worker engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers 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/ laborers are working without personal protective equipment.	operations of HEMM, etc. is provided with ear plugs/muffs. All measures for control of noise levels are being implemented. Noise level monitoring at strategic locations is being carried out regularly. Online noise monitoring stations have been installed. Copy of the Noise level monitoring results is attached as Annexure XV. All personnel including laborers working in dusty areas is provided with protective respiratory devices along with adequate training, awareness and information on safety and health aspects.
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Noise Monitoring Locations

IV. Mining Plan

Sl. No.	Conditions	Compliances
(i)	The Project Proponent shall adhere to the working parameters of mining plan which was submitted at the time of EC appraisal where in year-wise plan was mentioned for total excavation i.e. quantum of mineral, waste, over burden, inter burden and top soil etc. No change in basic mining proposal like mining technology, total excavation, mineral & waste production, lease area and scope of working (viz. method of mining, overburden & dump management, O.B & dump mining, mineral transportation mode, ultimate depth of mining etc.) shall not be carried out without prior approval	The latest mining plan has been approved by IBM vide letter no IBM/5796/2011/ 300RI13034 dated 12.07.2023.for the period is from 12.07.2023 to 31.03.2026. Copy of the approval letter is enclosed as Annexure V The project proponent is implementing the system of operation as proposed in the approved mining plan. No change in basic mining proposal like mining technology, total

	of the Ministry of Environment, Forest and Climate Change, which entail adverse environmental impacts, even if it is a part of approved mining plan modified after grant of EC or granted by State Govt. in the form to Short Term Permit (STP), Query license or any other name.	excavation, mineral & waste production, lease area and scope of working (viz. method of mining, overburden & dump management, O.B & dump mining, mineral transportation mode, ultimate depth of mining etc.) shall not be carried out without prior approval of the Ministry of Environment, Forest and Climate Change.
(ii)	The Project Proponent shall get the Final Mine Closure Plan along with Financial Assurance approved from Indian Bureau of Mines/Department of Mining & Geology as required under the Provision of the MMDR Act, 1957 and Rules/Guidelines made there under. A copy of approved final mine closure plan shall be submitted within 2 months of the approval of the same from the competent authority to the concerned Regional Office of the Ministry of Environment, Forest and Climate Change for record and verification.	The Project Proponent will get the Final Mine Closure Plan along with Financial Assurance approved from Indian Bureau of Mines as required under the Provision of the MMDR Act, 1957 and Rules/Guidelines made there under before exhaust of iron ore within the Mining Lease area. A copy of approved final mine closure plan will be submitted within 2 months of the approval of the same from the competent authority to the Regional Office of MoEF & CC.
(iii)	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-a-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 MoEF & CC and its concerned Regional Office / SEIAA, Odisha.	The land-use of the mine lease area at various stages of mining plan/scheme as well as at the end-of-life is being governed as per the approved Mining Plan and will be continued till the end of the life of the mine. The excavation vis-a-vis backfilling in the mine lease area and corresponding afforestation will be raised in the reclaimed area as per approved mining plan. The monitoring and management of rehabilitated areas will be done until the vegetation becomes self-sustaining. The compliance status is being submitted half-yearly to the MoEF&CC and Integrate Regional Office MoEF&CC Bhubaneswar/ SEIAA, Odisha.

V. Land reclamation.

Sl. No.	Conditions	Compliances
(i)	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	The over burden dumping is being carried out as per the approved mining plan. The physical parameters of the OB dumps like height, width and angle of slope is being undertaken as per an approved Mining Plan based on the guidelines/circulars issued by D.G.M.S w.r.t. safety in mining operations. There is no topsoil generation as per approved mining plan.
(ii)	The reject/waste generated during the mining operations shall be stacked at earmarked waste dump site(s) only. The physical parameters of the waste dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of waste dumps.	The reject/waste generated during the mining operations is being stacked in the earmarked place, height & slope gradient is maintained and being carried out as per the approved mining plan. The physical parameters of the OB dumps like height, width and angle of slope are being undertaken as per approved Mining Plan based on the guidelines/circulars issued by D.G.M.S w.r.t. safety in mining operations.
(iii)	The reclamation of waste dump sites shall be done in scientific manner as per the Approved Mining Plan cum Progressive Mine Closure Plan	The reclamation of waste dump site will be done as per approved mining plan and coir matting with re-grassing is carried out as per the Progressive Mine Closure Plan
(iv)	The slope of dumps shall be vegetated in scientific manner with suitable native species to maintain the slope stability, prevent erosion and surface runoff. The selection of local species regulates local climatic parameters and helps 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	The slope of dumps has already been vegetated with coir matting & Gabion nets to maintain slope stability. Suitable grass species been planted to maintain the slope stability, prevent erosion and surface runoff. Proper maintenance RCC structures for retaining walls. Garland drain with berms to check runoff speed of dump slope and to avoid formation

	proper filling/ leveling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners/Bentonite etc. shall be undertaken for stabilization of the dump.	of gullies for better stability of dump.
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(v)	The Project Proponent shall carry out slope stability study in case the dump height is more than 30 meters. The slope stability report shall be submitted to concerned regional office of MoEF&CC, Govt. of India, Bhubaneswar as well as SEIAA, Odisha.	The existing dump has not reached a height of 30m. However, slope stability study has already been undertaken by CIMFR, Dhanbad. The copy of the report has already been submitted to SEIAA, Odisha as well as MoEF & CC.
(vi)	Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and topsoil / OB / waste dumps to prevent runoff 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	The project proponent has constructed retaining wall and garland drain with settling pond to retain the wash offs of dump materials. A total of 1942m of retaining wall, 1635m garland drain and 3nos of settling pond has been constructed at strategic locations to retain the wash offs of dump materials. As per the approved mining plan, it is planned to construct a retaining wall of 1431 m, garland drain of 2159 m and 5 nos. of settling ponds and one RWH pond at different locations during plan period. Further, 2nos of check dams have been constructed at strategic locations to slow down the flow of water during rainy season.
(vii)	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	Check dams of 33m long, already constructed around mine pit and OB dumps to prevent storm run-off and sediment flow into adjoining water bodies. Free Board margin of 50% is being kept for designing of sump structures over and above peak rainfall and maximum discharge in the mine and its

	help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits/ sumps shall be constructed at the comers of the garland drains	adjoining area which shall also help in providing adequate retention time period thereby allowing proper settling of sediments/ silt material. The sedimentation pits/ sumps are being constructed at the corners of the garland drains.
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(View of Retaining wall around OB Dump)

(viii)	The topsoil, if any, shall temporarily be stored at earmarked site(s) within the mine lease only and should not be kept unutilized for long. The physical parameters of the top soil dumps like height, width and angle of slope shall be governed as per the approved Mining Plan and as per the guidelines framed by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of dumps. The topsoil shall be used for land reclamation and plantation purpose	As per the approved Mining Plan, there is no topsoil stack since generation of topsoil generation is nil.
(ix)	The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any	An additional Supplementary Lease deed has been executed with state government to undertake re-

	other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.	grassing the mining area any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna, etc. after ceasing of mining operations,
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VI. Transportation

Sl. No.	Conditions	Compliances
(i)	No transportation of the minerals shall be allowed in case of roads passing through transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.	Transportation vehicles are being dispatched after proper maintenance with wheel washing at a suitable time interval to avoid adverse impact of sound and dust. The immediate approach from the lease area is NH 520 which can accommodate the traffic. Project Proponent is taking necessary measures to monitor that the vehicles carrying minerals from the mines are having vehicular emission certificates. Air quality monitoring equipment is stationed at the entry & exit location of the mine.



(Mineral transportation in covered vehicles)

(ii)	The Main haulage road within the mine lease should be provided with a permanent water 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 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 water sprinklers have already been installed in main haulage roads. The photographs of fixed water sprinkler are attached. However, dust suppression is being carried out regularly by deploying water tankers at haulage roads and operation of dry fog systems at crushing areas. The crusher & conveyor belt is kept covered.
(iii)	Traffic management shall be done as per recommendation of Traffic Management Study Report	Traffic Study has been undertaken by CMRI, Dhanbad. Based on the suggestion, Traffic Management is being carried out.

(iv)	The Project Proponent shall provide parking plaza for the heavy vehicles within the lease area as recommendation of NEERI.	As per the NEERI recommendation, Parking Plaza for the heavy vehicles has been provided for this project.
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VII. Green Belt

Sl. No.	CONDITIONS	COMPLIANCES
(i)	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, backfilled area, quarry benches, roads etc. The development of greenbelt shall be governed as per the EC granted by the Ministry irrespective of the stipulation made in approved mine plan.	Green belt has been developed in 7.5 m 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 Project Proponent has already undertaken plantation within lease area at Safety Zone, covering 2.977 ha @2500 saplings per ha., with 85% survival rate. In admission to this plantation has been carried out in Raikela village, Dengula village, Tentuldihi village in about 11.05 ha.
(ii)	The Project Proponent shall carryout plantation/afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/Agriculture Department/Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.	Till now the quarries are in working condition, therefore there is no back filled & reclaimed area. Plantation will be taken up after reclamation is over. However, project proponents has carried out plantation all along the safety zone, toe of the waste dump, along mine road sides Plantation of local species has been carried out at the said locations @ 2500nos of saplings per hectare. The details of plantation area as follows: Area covered: 2.977 Ha over safety zone. The detailed future budgetary expenditure is enclosed as Annexure XVI



(Safety zone plantation)

(iii)	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 andplantation of such trees should be promoted	There is no grazing land within the lease area. Hence, no alternative arrangement for livestock feed by developing grazing land is required for this project. The Project Proponent has paid all the levies as per Stage 1 & Stage II Forest Diversion and SSWLCP, before execution of mining activity.
(iv)	The Project Proponent shall undertake all precautionary measures for conservation and protection of endangered flora and fauna and Schedule-I species during mining operation. A Wildlife Conservation Plan shall be prepared for the same clearly delineating action to be taken for	The Site Specific Wildlife Conservation Plan got prepared in consultation with state forest department an estimated cost of Rs. 100 lakhs of which Rs. 28.00 lakhs has been earmarked for implementation of Site Specific

	conservation of flora and fauna. The Plan shall be approved by Chief Wildlife Warden of the State Govt.	Wildlife Conservation Plan within the Mining Lease area and Rs. 72.00 Lakh has been earmarked for implementation for the purpose in the buffer zone i.e. within the zone of influence and it's approved by Pr. Chief Conservator of Forests and Chief Wildlife Warden, Bhubaneswar vide letter No.5582-1/ WL-C-SSP-212/10 dated 07.08.2010. Copy of the approval letter of site specific wildlife conservation plan is attached as Annexure XVII . All types of precautionary measures are being adopted by PP for conservation and protection of endangered flora and fauna and Schedule-I species during mining operation as per the conditions stipulated in the Site-Specific Conservation Plan.
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VIII. Public Hearing and Human health issues:

Sl. No.	CONDITIONS	COMPLIANCES
(i)	The Project Proponent shall appoint an Occupational Health Specialist for Regular as well as Periodical medical examination of the workers engaged in the mining activities, as per the DGMS guidelines. The records shall be maintained properly. PP shall also carry out Occupational health check-ups in respect of workers which are having ailments like BP, diabetes, habitual smoking, etc. The check-ups shall be undertaken once in six months and necessary remedial/ preventive measures be taken. A status report on the same may be sent to MoEF & CC Regional Office and DGMS on half-yearly basis.	Initial Medical Examination & Periodical Medical Examination of the workers engaged in the project is being undertaken periodically for permanent and outsider employees as per the DGMS guidelines through EZMA. The records of Health status of permanent and outsider employees is being maintained properly. PP is carrying out occupational health check-ups in respect of workers which are having ailments like BP, diabetes, habitual smoking, etc. The health check-ups are being undertaken once in six months. The PP has already established a dispensary near the lease area for regular health monitoring of workers and villagers as a preventive measure. The copy of the status report is attached as Annexure-XVIII .
(ii)	A commitment in form of an undertaking for periodical occupational health checkup of the employee and the local	Initial Medical Examination & Periodical Medical Examination of the workers engaged in the project is being undertaken

	people shall be done through an occupational health expert as per the detailed action plan submitted with the proposal within 6 months from the date of issue of Environmental Clearance	periodically for permanent and outsider employees as per the DGMS guidelines through EZMA. An undertaking is attached as an Annexure-XIX for carrying out periodical occupational health checkup of the employee and local people through EZMA.
(iii)	The Project Proponent must demonstrate commitment to work towards 'Zero Harm' from their mining activities and carry out Health Risk Assessment (HRA) for identification workplace hazards and assess their potential risks to health and determine appropriate control measures to protect the health and wellbeing of workers and nearby community. The proponent shall maintain accurate and systematic records of the HRA. The HRA for neighborhood has to focus on Public Health Problems like Malaria, Tuberculosis, HIV, Anemia, Diarrhea in children under five, respiratory infections due to bio mass cooking. The proponent shall also create awareness and educate the nearby community and workers for Sanitation, Personal Hygiene, Hand washing, notto defecate in open, Women Health and Hygiene (Providing Sanitary Napkins), hazard of tobacco and alcohol use. The Proponent shall carryout base line HRA for all the category of workers and thereafter every five years.	Project Proponent regularly monitoring the health status of the workers and the villagers. A regular pharmacist has been appointed and a dispensary is functioning, and the health records of the workers and the villagers have been maintained.
(iv)	The Proponent shall carry out Occupational health surveillance which be a part of HRA and include Biological Monitoring where practical and feasible, and the tests and investigations relevant to the exposure (e.g. for Dust a X-Ray chest; For Noise Audiometric; for Lead Exposure Blood Lead, For Welders Full Ophthalmologic Assessment; for Manganese Miners a complete Neurological Assessment by a Certified Neurologist, and Manganese (Mn)	The project proponent has already conducted a health camp during 2024. The villagers from the nearby villages of Raikela, Dengula, Kurla, Bandal and Rengua attended the health camp. The Occupational health surveillance of employees has been carried out, where no major health related hazard was observed.

	estimation in Blood; For Inorganic Chromium - Fortnightly skin inspection of hands and forearms by a responsible person. Except routine tests all tests would be carried out in a Lab accredited by NABH. Records of Health Surveillance must be kept for 30 years, including the results of and the records of Physical examination and tests. The record of exposure due to materials like Asbestos, Hard Rock Mining, Silica, Gold, Kaolin, Aluminum, Iron, Manganese, Chromium, Lead, Uranium need to be handed over to the Mining Department of the State in case the life of the mine is less than 30 years. It would be obligatory for the State Mines Departments to make arrangements for the safe and secure storage of the records including X-Ray. Only conventional X-Ray will be accepted for record purposes and not the digital one). X-Ray must meet ILO criteria (17 x 14 inches and of good quality)	
(v)	The Proponent shall maintained a record of performance indicators for workers which includes (a) there should not be a significant decline in their Body Mass Index and it should stay between 18.5 - 24.9, (b) the Final Chest X-Ray compared with the base line X-Ray should not show any capacities, (c) At the end of their leaving job there should be no Diminution in their Lung Functions Forced Expiratory Volume in one second (FEV1), Forced Vital Capacity (FVC), and the ratio) unless they are smokers which has to be adjusted, and the effect of age, (d) their hearing should not be affected. As a proof an Audiogram (first and last need to be presented), (e) they should not have developed any Persistent Back Pain, Neck Pain, and the movement of	M/s Geetarani Mohanty is conducting occupational health examination regular interval and maintaining a record of performance indicators for workers through EZMA.

	their Hip, Knee and other joints should have normal range of movement, (f) they should not have suffered loss of any body part. The record of the same should be submitted to the Regional Office, MoEF&CC annually along with details of the relief and compensation paid to workers having above indications.	
(vi)	The Project Proponent shall ensure that Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	Personnel working in dust prone areas have been provided with dust mask for proper respiration and are being trained in Vocational Training Center about information on safety and health aspects. The company has earmarked Rs.4.5 lakhs per annum for expenditure against occupational health management under heads like Safety instruments, equipment's etc, Up-gradation of Dispensary and carrying out health monitoring.
(vii)	Project Proponent shall make provision for the housing for workers/labors or shall construct labor 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 wastewater should be treated with STP to avoid contamination of underground water.	The accommodation facilities for the employees have been provided with necessary basic infrastructure/ facilities like LPG for cooking, toilets, safe drinking water, dispensary for medical health care etc. The domestic effluents are being treated through STP of 60 KLD capacity.
(viii)	The activities proposed in Action plan prepared for addressing the issues raised during the Public Hearing shall be completed as per the budgetary provisions mentioned in the Action Plan and within the stipulated time frame. The Status Report on implementation of Action Plan shall be submitted to the concerned Regional Office of the Ministry along with District Administration.	Implementation of action plan for issues raised during the public hearing is enclosed as Annexure-XX

(ix)	Issues raised and recorded in proceedings of public hearing w.r.t environment/ pollution/ CER shall be complied by the Mining Authority as per OMF No. 22-65/2017-IA.III, dated 30.09.2020 of MoEF & CC, Govt. of India.	Compliance of Public hearing proceeding and CER is continuing, which is for a period for 3 Years 2022-23, 23-24 & 24-25. The budget for CER is Rs 100.00 Lakhs. & Rs 194 lakhs has been expensed in the period 2023-2024. Expenditure details as in Annexure XXI
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IX. Corporate Environment Responsibility (CER)

Sl. No.	CONDITIONS	COMPLIANCES
(i)	The activities and budget earmarked for Corporate Environmental Responsibility (CER) as per Ministry's O.M No 22-65/2017-IA. II (M) dated 01.05.2018 or as proposed by SEAC should be kept in a separate bank account. The activities proposed for CER shall be implemented in a time bound manner and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude & longitude of infrastructure developed & road constructed needs to be submitted to Regional Office MoEF&CC annually along with audited statement.	The activities and budget earmarked for Corporate Environmental Responsibility (CER) as per Ministry's O.M No 22-65/2017-IA. II (M) dated 01.05.2018 or as proposed by SEAC is kept in a separate bank account No. A/C NO-728705000112 ICICI Bank The activities proposed for CER is being implemented in a time bound manner and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, is being submitted to Regional Office MoEF & CC annually along with audited statement.

(ii)	Project Proponent shall keep the funds earmarked for environmental protection measures in a separate account and refrain from diverting the same for other purposes. The Year wise expenditure of such funds should be reported to the MoEF&CC and its concerned Regional Office / SEIAA, Odisha	The funds earmarked for environment protection is being utilized for the Environment protection measures. Year wise expenditure is being reported to the Ministry and its Regional Office located at Bhubaneswar after completion of financial year in six monthly report. Project Proponent shall keep the funds earmarked for environmental protection measures in a separate account and refrain from diverting the same for other purposes.
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X. Miscellaneous:

Sl. No.	CONDITIONS	COMPLIANCES
(i)	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.	Digital map showing existing land use & land cover of the lease area will be submitted in due course of time.
(ii)	The Project Authority should inform to Regional Office regarding date of financial closures and final approved of the project by the concerned authorities and the date of start of land development work.	Date of financial closures and final approved of the project is not applicable at present because it is an ongoing project.
(iii)	The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguard to the MOEF & CC & its concerned Regional Office, SEIAA, Odisha, Central Pollution Control Board and State Pollution Control Board.	The Project Proponent is submitting six monthly reports complying to the EC conditions. reports to the MOEF & CC & its concerned Regional Office, SEIAA, Odisha on 1 st June & 1 st respectively.
(iv)	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	An Environmental cell has been formed, headed by a senior Geologist cum Environmental engineer and supported by an Asst. Environmental Engineer & Mining Engineer. Copy of the

	qualified Environmental Scientists and Mining Engineers shall be appointed and submit a report to RO, MoEF & CC.	organizational chart is enclosed as Annexure-XXII .
(v)	The proponent shall comply all the specific conditions as recommended by CSIR-NEERI on carrying capacity study (as applicable) in time bound manner as proposed.	Complying to the NEERI recommendations proponent has already commissioned wheel wash system, 300M concrete road, within the lease area. Further, regular monitoring work is being carried out as per the conditions of CSIR-NEERI. Regarding online monitoring system, vacuum cleaner, the PP has already installed the same. The proponent has all the specific conditions as recommended by CSIR-NEERI on carrying capacity study as applicable for this project in time bound manner as proposed. Attached as Annexure XXIII
(vi)	The project proponent shall augment infrastructure on drinking water, health care and education in nearby villages as per time bound action plan submitted.	The project proponent has facilitated pipeline drinking water to the nearby villages and has set up a dispensary for both employees & public.
(vii)	The project proponent shall obtain permission from DGMS under 106(2b) to carry out blasting operation within the lease area.	The project proponent has obtained permission from DGMS under 106(2b) to carry out blasting operation within the lease area. Copy enclosed as Annexure XXIV
(viii)	It shall be mandatory for the project management to submit six monthly compliance reports on post of environmental monitoring in respect of the stipulated terms and condition in this Environmental Clearance to the State Environmental Impact Assessment Authority (SEIAA), Odisha ,SPCB & Regional Office of the Ministry of Environmental & Forest ,Odisha in hard and soft copies on 1 st June and 1 st December of each calendar year, The Proponent shall also upload the compliance report including results of monitored data, as applicable in the	The half yearly EC compliance report is being regularly submitted on 1 st June and 1 st December of every year. The half yearly EC compliance report for the period from October 2023 to March 2024 is already submitted in due time.

	website of the Ministry for monitoring of EC conditions.	
(ix)	The environmental statement for each financial year ending 31 st March in Form-V as is mandated to be submitted by the project proponent to the Odisha State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective to the MoEF & CC & its concerned Regional Office, Central Pollution Control Board and State Pollution Control Board.	The environmental statement for each financial year ending 31 st March in Form-V has been submitted by the project proponent to the Odisha State Pollution Control Board.
(x)	The proponent shall submit/upload six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF&CC, Govt. of India, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO ₂ , NO _x (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.	The proponent is submitting the six-monthly compliance reports on the status of compliance of the stipulated Environmental Clearance. The monitored data is being 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 MoEF&CC may also be referred in this regard.
(xi)	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.	The project authorities will extend their full cooperation to the MoEF&CC officer(s) and will furnish the requisite data / information / monitoring reports asked
(xii)	The above conditions will be enforced inter-alia, under the provisions of the	The Project proponent agrees to this condition

	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 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..	
(xiii)	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.	We will extend all our cooperation during any such inspections by the Authority.
(xiv)	Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	The Project Proponent will abide by all the Rules and Regulations framed under the provisions of the Water Act, 1974, the Air Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/High Court any other Court of Law relating to the subject matter.

M/S GEETARANI MOHANTY

MANAGING PARTNER
Project Proponent

Annexure - I

EMP EXPENDITURE

		EC Specific Condition		ACTUALS	
SL. NO.	PARTICULARS	CAPITAL COST (IN LAKHS)	RECURRING COST PER ANNUM (IN LAKHS)	EXPENSES IN ACTUAL	RECURRING COST PER ANNUM (IN LAKHS)
1	AIR POLLUTION CONTROL				
a)	Truck mounted water tankers -4 Nos			60.00	44.5
b)	Chemical dust binder.			1.40	
	RCC Road 300 m			178.00	1.3
c)	Maintenance of Vehicle Wheel wash system			30.85	6.5
d)	Installation of fixed Water Sprinklers at haul roads			15.81	16.5
e)	Dry fog system in Crushing & Screen plant			71.78	26
f)	Tractor mounted vacuum cleaner			15.33	10.5
g)	Dust Extraction System Rig			4.80	1.3
f)	Environmental Monitoring(In house Lab)			5.41	
	Environmental Monitoring 3rd Party				73.2
2	WATER POLLUTION CONTROL				
a)	Construction of garland drains with settling pits			1.50	1.2

	Retaining Wall			49.82	2.9
b)	Rain water harvesting pond			40.00	7.2
	Roof Top Rain water Recharge			2.10	1.7
c)	STP			35.43	4.5
	ETP			17.31	3.5
	Dump Rehabilitation Matting			23.73	2.3
	Check Dam			33.00	
3	NOISE POLLUTION CONTROL				
a)	Online Noise Monitoring			4.30	0.3
b)	PPE				4
4	INSTALLATION OF ON LINE MONITORING SYSTEM, ENVIRONMENT MONITORING AND MANAGEMENT, TRAINING ON ENVIRONMENT MANAGEMENT.			196.71	1.5
5	GREEN BELT DEVELOPMENT AND NURSERY DEVELOPMENT			19.71	7.5
6	OCCUPATIONAL HEALTH MANAGEMENT				0.75
	Healt Camp				4.9
TOTAL		807.74	133	806.99	222.05

F. No. 8-37/2007-FC
Government of India
Ministry of Environment, Forests and Climate Change
(Forest Conservation Division)

Indira Paryavaran Bhawan
Aliganj, Jorbagh Road
New Delhi -110 003
Dated: 22nd October, 2014

To,

The Principal Secretary (Forests)
Government of Odisha
Bhubaneswar.

Sub: Diversion of 64.148 hecatres of forest land for Iron Ore Mining in Village Raikela by Geetarani Mohanty of Bonai Forest Division in the district of Sundargarh, Odisha.

Sir,

I am directed to refer to the Government of Odisha's letter No 10F (Cons) 38/ 2013-7190/ F & E dated 22nd April 2014 on the above-mentioned subject, wherein prior approval of the Central Government for diversion of (i) 64.148 hecatres of forest land for Iron Ore Mining in village Raikela by M/s. Geetarani Mohanty of Bonai Forest Division in the district of Sundargarh, Odisha during the original Mining lease period which has already expired on 1.7.2011 and (ii) the entire forest land of 66.671 hectares including 2.523 hectares of forest land within the safety zone within the ML area of 67.586 hecatres during 1st RML for a period, co-terminus with lease period to be granted by the State Government, not exceeding twenty years *w.e.f.* 02.07.2011, was sought, in accordance with section-2 of the Forest (Conservation) Act, 1980. After careful consideration of the proposal by the Forest Advisory Committee constituted by the Central Government under section 3 of the said Act, in-principle approval for the said diversion was granted vide this Ministry's letter of even number dated 29th August 2014, subject to fulfillment of certain conditions. The State Government has furnished compliance report in respect of the conditions stipulated in the in-principle approval and has requested the Central Government to grant final approval.

2. In this connection, I am directed to say that on the basis of the compliance report furnished by the Government of Odisha vide letter No. 10F (Cons) -38/2013-18032/ F & E dated 29th September 2014, approval of the Central Government is hereby granted under section 2 of the Forest (Conservation) Act, 1980 for diversion of (i) 64.148 hecatres of forest land for Iron Ore Mining in village Raikela by M/s. Geetarani Mohanty of Bonai Forest Division in the district of Sundargarh, Odisha during the original Mining lease period which has already expired on 1.7.2011 and (ii) for entire forest land of 66.671 hectares including 2.523 hectares of forest land within the safety zone within the ML area of 67.586 hecatres during 1st RML for a period, co-terminus with lease period to be granted by the State Government, not exceeding twenty years *w.e.f.* 02.07.2011, subject to fulfillment of the following conditions:

22-10-14

- (i) Legal status of the diverted forest land shall remain unchanged;
- (ii) State Government shall create and maintain from funds already realised the user agency, compensatory afforestation over non-forest land equal in extent to 64.148 hectares of forest land diverted in favour of the user agency for mining and allied activities, transferred and mutated in favour of the State Forest Department;
- (iii) State Government shall undertake, from funds already realised from the user agency, fencing, protection and regeneration of the safety zone area (7.5 metre strip all along the outer boundary of the mining lease area). Besides this, State Government shall also undertake, from funds already realised from the user agency, afforestation on degraded forest land, to be selected elsewhere, measuring one and a half times the area under safety zone;
- (iv) User agency shall undertake appropriate measures as per the plan duly approved by the Divisional Forest Officer, Bonai Forest Division to prevent pollution of tanks, rivers and *nalas*, etc. and de-silting of adjoining villages located within 5 kilometers from the project site;
- (v) Following activities shall be undertaken by the State Forest Department from funds already realised from the user agency as per the Plan duly approved by the Regional Chief Conservator of Forests, Rourkela:
 - (a) Proper mitigative measures to minimize soil erosion and choking of stream;
 - (b) Planting of adequate drought hardy plant species and sowing of seeds to arrest soil erosion; and
 - (c) Construction of check dams, retention/toe walls to arrest sliding down of the excavated material along the contour.
- (vi) Wherever possible and technically feasible, the user agency shall undertake by involving local community, afforestation measures, as per the plan duly approved by the DFO, Bonai Forest Division, in the blanks within the lease area, as well as along the roads outside the lease area diverted under this approval;
- (vii) The State Government shall realise from the user agency additional NPV, if so determined as per the final decision of Hon'ble Supreme Court of India and transfer the same to the Ad-hoc CAMPA;
- (viii) State Government shall create and maintain from funds already realised from the user agency, penal compensatory afforestation over degraded forest land equal in extent to the 43.056 hectares of DLC forest land utilised for mining and allied activities without obtaining requisite approval under the Forest (Conservation) Act, 1980;

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- (ix) The lease will remain in the name of M/s Geeta Rani Mohanty. For transfer of the said lease to any other firm or person prior approval of Central Government under the Forest (Conservation) Act, 1980 shall be obtained;
- (x) User agency shall surrender from the mining lease, as per the schedule submitted to this Ministry, the fully (biologically) reclaimed mined out forest land. The summary of the said schedule is as below:

(in hectares)

Phase/ Financial year	Mined out area at the beginning	Addl. Area	Total Area	Area to be reclaimed and rehabilitated	Year of reclamation	Mined out land at the end of the phase	Schedule of surrender
1 st Phase 2011- 2016	29.893	7.00	36.893	Nil	—	36.893	—
2 nd Phase 2016- 2021	36.893	3.00	39.993	Nil	—	39.993	—
3 rd Phase 2021- 2026	39.993	3.00	42.893	10.000	0 th Year	32.893	10 th Year 2031-2036
4 th Phase 2026- 2031	32.893	3.00	35.893	10.000	5 th Year	25.893	10 th Year 2036-2041
5 th Phase 2031- 2036	25.893	3.00	28.893	10.000	10 th Year	18.893	10 th Year 2041-2046
6 th Phase 2036-2041	18.893	2.00	20.893	10.000	15 th Year	10.893	10 th Year 2046-2051
7 th Phase 2041- 2046	10.893	Nil	10.893	10.893	20 th Year	Nil	10 th Year 2051-2056

- (xi) Any other condition that the concerned Regional Office of this Ministry of the State Forest Department may impose from time to time for protection and improvement of flora and fauna in the forest area;

[Handwritten signature]

- (xii) User agency shall submit annual report on compliance to conditions stipulated in this approval to the State Forest Department and the concerned Regional office of this Ministry; and
- (xiii) User agency and the State Government shall comply with all other conditions, as applicable to this project, under different rules, regulations and regulations including environmental clearance.

Yours faithfully,

(H. C. Chaudhary)
Director

Copy to:

1. The Principal Chief Conservator of Forests, Government of Odisha, Bhubaneswar.
2. The Nodal Officer, the Forest (Conservation) Act, 1980, O/o the Principal Chief Conservator of Forests, Government of Odisha, Bhubaneswar.
3. The Addl. Principal Chief Conservator of Forests (Central), Regional Office (Eastern Zone), Bhubaneswar.
4. User agency.
5. Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard File.

(H. C. Chaudhary)
Director

ENVIRONMENTAL
CLEARANCE

Government of India
Ministry of Environment, Forest and Climate Change
(Issued by the State Environment Impact Assessment
Authority(SEIAA), Orissa)

To,

The Managing Partner
 MS GEETARANI MOHANTY
 House no-96, Station Road Barbil -758035

Subject: Grant of Environmental Clearance (EC) to the proposed Project Activity under the provision of EIA Notification 2006-regarding

Sir/Madam,

This is in reference to your application for Environmental Clearance (EC) in respect of project submitted to the SEIAA vide proposal number SIA/OR/MIN/64563/2021 dated 23 May 2022. The particulars of the environmental clearance granted to the project are as below.

- | | |
|--|--|
| 1. EC Identification No. | EC22B001OR152352 |
| 2. File No. | 64563/88-MINB1/05-2022 |
| 3. Project Type | Expansion |
| 4. Category | B1 |
| 5. Project/Activity including Schedule No. | 1(a) Mining of minerals |
| 6. Name of Project | Enhancement of production capacity of Iron Ore from 2.99 MTPA to 4.99 MTPA along with 1000 TPH fixed crushing Screening facility at Raileka village in Sundergarh District of Odisha |
| 7. Name of Company/Organization | MS GEETARANI MOHANTY |
| 8. Location of Project | Orissa |
| 9. TOR Date | 16 Aug 2021 |

The project details along with terms and conditions are appended herewith from page no 2 onwards.

Date: 27/12/2022

(e-signed)
Dr. K. Murugesan, IFS
Member Secretary
SEIAA - (Orissa)

Note: A valid environmental clearance shall be one that has EC identification number & E-Sign generated from PARIVESH. Please quote identification number in all future correspondence.

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**STATE ENVIRONMENT IMPACT ASSESSMENT AUTHORITY, ODISHA**

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statutory body constituted by Ministry of Environment, Forest & Climate Change under Environment (Protection) Act, 1986

SEIAA File No. 64563/88-MINB1/05-2022

Subject: Proposal for Enhancement in Production capacity of Iron Ore from 2.99 MTPA to 4.99 MTPA from Raikela Iron Ore Mines (ML area-67.586Ha) along with 1000 TPH fixed crushing & Screening facility at village- Raikela, Tahasil-Koira, District-Sundergarh by M/s. Geetarani Mohanty -Environmental Clearance reg.

Sir,

This has reference to your online proposal No. SIA/OR/MIN/64563/2021 dated 23.05.2022, submitted to SEIAA, Odisha for grant of Environmental Clearance(EC) Enhancement in Production capacity of Iron Ore from 2.99 MTPA to 4.99 MTPA from Raikela Iron Ore Mines (ML area-67.586 Ha) along with 1000 TPH fixed crushing & Screening facility at village- Raikela, Tahasil-Koira, District-Sundergarh by M/s. Geetarani Mohanty in terms of the provisions of the Environment Impact Assessment(EIA) Notification, 2006 under the Environment(Protection) Act, 1986.

2. Proposal in Brief:

Proposal No.	SIA/OR/MIN/64563/2021
File No.	64563/88-MINB1/05-2022
Project Type	EC(Expansion)
Category	B1
Project/Activity including Schedule No.	1(a) Mining of minerals
Name of the Project	Proposal for grant of EC for Enhancement of production capacity of Iron Ore from 2.99 MTPA to 4.99 MTPA from Raikela Iron Ore Mines along with 1000 TPH fixed crushing & Screening facility at village- Raikela, Tahasil-Koira, District-Sundergarh, Odisha
Name of the company/Organization	M/s. Geetarani Mohanty
Location of Project	Odisha
ToR Date	28.09.2021

3. The proposal is for Environmental Clearance for Enhancement in Production capacity of Iron Ore from 2.99 MTPA to 4.99 MTPA from Raikela Iron Ore Mines (ML area-67.586Ha) along with 1000 TPH fixed crushing & Screening facility at village- Raikela, Tahasil-Koira, District- Sundergarh by M/s. Geetarani Mohanty filed by Sri Srinibash Sahoo (Managing Partner).
4. Raikela iron ore mine over a mining lease area of 67.586 Ha was initially executed in favor of Smt. Geetarani Mohanty for a period of 20 years w.e.f. 02.07.1991. Subsequently, the



- lease was transferred in favour of M/s Geetarani Mohanty, a registered firm bearing Registration No 5/92 (Cuttack) on 13.01.1993 with prior approval of the State Govt.
5. The lease was executed on 02.07.1991. Now under section 8A(3) of the MMDR(Amendment) Act, 2015 the state government extended the validity period of the mining lease up to 01.07.2041 i.e. 50 years from the date of original mining lease from 02.07.1991 to 01.07.2041.
 6. After obtaining all the statutory clearances, a supplementary lease deed has been executed and registered in favor of lessee vide regd. No. 1721900263 on dated 27.05.2019 which is valid up to 01.07.2041. The state government has allowed to work within the ML area and accordingly, mining operation has been started since 22.08.2019.
 7. Earlier, EC was accorded by SEIAA vide SEIAA File No. 41890/08-MNB 1/09-2019 Ref No. 9672/SEIAA, Dated. 23.11.2020 for enhancement in production capacity of iron ore from 0.864 MTPA to 2.99 MTPA. Now, at present the mining operation is being carried out for 2.99 MTPA by open cast Fully Mechanized method, for which EC has already been accorded.
 8. The Certified EC Compliance Report for 2.99MTPA production, has been obtained from MOEF & CC, Eastern regional office, Bhubaneswar vide letter no 109-1019/21/EPE dated. 24.01.2022 has been submitted. The project proponent has complied most of the EC conditions and some stipulated conditions are partially complied which the PP has committed to comply at the earliest.
 9. Mining Plan with Progressive Mine Closure Plan has been approved by IBM vide letter No: MRMP/A/05-ORI/BHU/2021-22 dt 01.07.2021 for 4.99 MTPA Iron Ore production.
 10. Out of the 67.586ha of mining lease area, forest land under DLC category is 66.671ha and 0.915ha is non-forest land. Ministry of environment and forest, Govt. of India has accorded the stage-II (final stage) forest clearance over an area of 66.671ha vide letter no 8-37/2007-FC dated 22.10.2014.
 11. The lessee has obtained the consent to establish under section 25/26 of the water (PCP) act 1974 and under section 21 of air (PCP) act 1981 for the production capacity of 2.99 MTPA vide the letter no 9818/IND-II-CTE-6420 dated 18.09.2020.
 12. The lessee has obtained the consent to operate under section 25/26 of the water (PCP) act 1974 and under section 21 of air (PCP) act 1981 for the production capacity of 2.99MTPA vide the letter no 4063/IND-I-CON-2572 dated 16.03.2022 and is valid up to 31.03.2023.
 13. Authorization for hazardous waste management granted vide no IND-IV-HW-1360/7992 dated 07.05.2022 valid up to 31.03.2023.
 14. NOC for ground water withdrawal is obtained vide No CGWA/NOC/MIN/ORIG/2021/10588 dated 31.01.2021 valid upto 30.01.2023.
 15. Location and Connectivity: The ML area is featured under Toposheet F45N1 and bounded by geo coordinates Latitude: 21°51'54.47556"N to 21° 52' 35.39676" N Longitude:

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85°10'32.27952"E to 85°11'05.16660" E. The mining lease area is approachable from Koira town (8 km) by Bhadrasahi – Rourkela NH–215. And from Tensa town ship which is on NH – 215 at a distance of 2 km. Nearest Rail is Barsuan Railway station located at 17 km. District Headquarters is at Sundargarh – 110 km from lease area. The nearest water bodies are Sarkunda Nala- 4.2 km, Kuradhi Nadi- 8km and Karo Nala -3km respectively. There is no reserve forest in the core zone. However, the reserve forests found in the buffer zone are as follows - Sarkunda R.F - 2.5 Km (South), Tohra R.F - 3.3km (South), Karo R.F - 9.5km (North-east), Kathmal R.F - 8.2km (East).

16. Topography - The topography of mining lease area is hilly terrain with maximum elevation of the area is 840m AMSL at NW part of the area whereas the lowest elevation is 630m AMSL at eastern part.
17. The total geological and mineral reserve of iron ore is estimated to be 90.295 MT and 76.316 MT. Proposed production during the plan period is 22950000 MT. The life of mines is 16 years. Open cast fully mechanized method category 'A' (FM) will be used for mining.
18. Production Details: The year-wise in-situ tentative excavation for the first five years from the date of opening of the mine is given as follows: -

Year	Quarry Name	Total tentative Excavation (MT)	Top Soil (M T)	OB/SB/I B (MT) (SB+IB)	ROM (MT)		ROM (MT)	ROM Waste / Ratio (MT/MT)
					Ore * (MT)	Mineral Reject (MT)		
1	2	3	4	5	6	7	8=6+7	9
2021-22	Top Quarry	1746832	Nil	260660	1145934	340238	1486172	1:0.175
	Middle Quarry	1575628	Nil	71800	877118	626710	1503828	1:0.048
	Total	3322460	Nil	332460	2023052	966948	2990000	1:0.111
2022-23	Top Quarry	1295490	Nil	116200	1145189	34101	1179290	1:0.099
	Middle Quarry	3948010	Nil	137300	3266352	544358	3810710	1:0.036
	Total	5243500	Nil	253500	4411541	578459	4990000	1:0.051
2023-24	Top Quarry	2784768	Nil	241400	2198505	344863	2543368	1:0.095
	Middle Quarry	2508032	Nil	61400	2400342	46290	2446632	1:0.025
	Total	5292800	Nil	302800	4598847	391153	4990000	1:0.061
2024-25	Top Quarry	3818487	Nil	283800	3281527	253160	3534687	1:0.080
	Middle Quarry	1483293	Nil	27980	1398860	56453	1455313	1:0.019

Dy

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	Total	5301780	Nil	311780	4680387	309613	4990000	1:0.062
2025-26	Top Quarry	1408906	Nil	126200	1282706	Nil	1282706	1:0.098
	Middle Quarry	4444694	Nil	737400	3707294	Nil	3707294	1:0.199
	Total	5853600	Nil	863600	4990000	Nil	4990000	1:0.173
Grand Total		25014140	Nil	2064140	20703827	2246173	22950000	1:0.090

19. The proposal is to increase production capacity from existing 2.99 MTPA to 4.99 MTPA. During plan Period 2020-21, to 2025-26 total excavation will be 2,50,14,140 MT consisting 2,29,50,000 MT ROM and 10,32,070 waste generated will be used for internal road maintenance and be disposed at dumping site.
20. During Plan period it has been planned for plantation over an area of 1.60 Ha with 2560 nos. of saplings consisting Mango, Karanj, Chakunda, Neem etc.
21. Water Requirement - Total makeup water requirement for the project is 281.3 KLD out of which 180 KLD from ground source, NOC obtained from CGWA. 88 KLD will be from RWH and 13.3 KLD from recycled water from STP & ETP, during monsoons only 14 KLD will be drawn from ground source and Wheel wash & work shop will run from recycled water.
22. Power Requirement - Presently about 240 KW power is used. The Power Requirement is about 1400KW and the source is from WESCO. About 30KW will be sourced from solar power plant and balance 1370KW from State Power Grid.
23. Manpower - The existing manpower is 351 nos. Additionally 209 persons will get direct employment. The total direct employment after expansion will be 560 nos. Indirectly about 300 persons will be benefited due to opportunities in allied sectoral service, such as logistics, trading, ancillary units, contractual and casual needs, green belt, etc.
24. Project Cost - Estimated project cost for expansion project is Rs.100.00 Crore. A sum of Rs. 660.10 Lakh will be spent towards capital cost for EMP and a sum of Rs. 51.30 Lakh will be spent towards annual recurring cost of EMP. The PP has allocated Rs.100.00Lakhs towards compliance of issues raised during Public Hearing.
25. The baseline data on micro- meteorology, ambient air quality, water quality, noise level, soil and flora & fauna are collected during Summer Season (Mar 2021 – May 2021).
26. Public Hearing was conducted on 13.04.2022 at Geetarani Project Upper primary School. The major issues raised during public hearing were on provision of employment to local people, education, healthcare facilities, provision of street lights, supply of seed and fertilizer for agriculture, school bus facility, construction of check dams, water pollution, air pollution, peripheral development and welfare activities, road maintenance, tree plantation, skill development, etc. Action plan for fulfilling the PH commitments has been made.



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27. The Environment Consultant M/s Global Tech Enviro Experts Pvt. Ltd. Bhubaneswar along with the proponent made a detailed presentation on the proposal before the Committee on 08.07.2022.
28. The project proponent furnished additional information / documents on the project to SEAC on 25.08.2022.
29. The SEAC have appraised the proposal in its meeting dated 02.09.2022 and recommended for grant of Environmental Clearance for the project stipulating various conditions.
30. This proposal conforms to the item no. I(a) in the schedule of EIA Notification, 2006 as amended time to time, and the minor mineral extraction project falls under Category B1 and the EC will be considered by SEIAA as the mining lease area is less than 250ha.
31. The proposal was placed in the 100th meeting of SEIAA, Odisha held on 24.11.2022 and the Authority decided to deferred the proposal for next meeting and ask the PP to submit the revised budgetary provision for EMP and its expenditure timeline.
32. The project proponent furnished additional information / documents on the project to SEIAA on 06.12.2022.
33. The matter was further examined in the State Environment Impact Assessment Authority (SEIAA), Odisha in its 102th meeting held on 07.12.2022 in accordance with the EIA Notification, 2006 and further amendments thereto.
34. **Environmental Clearance (EC) is granted under the provisions of EIA Notification No. S.O. 1533 (E) dated the 14th September, 2006 of the Government of India in the erstwhile Ministry of Environment and Forests, as amended from time to time for Enhancement in Production capacity of Iron Ore from 2.99 MTPA to 4.99 MTPA from Raikela Iron Ore Mines (ML area-67.586Ha) along with 1000 TPH fixed crushing & Screening facility at village- Raikela, Tahasil-Koira, District- Sundergarh by M/s. Geetarani Mohanty" with the following stipulations, environmental conditions and safeguards.**

Stipulations:

A. Specific conditions:

- (i) The proponent shall implement the Pollution Control Measures and safeguards as proposed in the Environment Management Plan (EMP) or as committed to SEIAA/SEAC. As proposed, the PP has allocated a budgetary provision towards implementation of EMP (revised) as Rs.816.00 Lakhs as capital cost & Rs.145.98 Lakhs / annum as recurring cost.

B. Standard Conditions -

I. Statutory compliance:

- (i) 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.

Signature



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- (ii) 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.
- (iii) 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.
- (iv) This Environmental Clearance shall become operational only after receiving formal NBWL Clearance from MoEF & CC subsequent to the recommendations of the Standing Committee of National Board for Wildlife, if applicable to the Project.
- (v) This Environmental Clearance shall become operational only after receiving formal Forest Clearance (FC) under the provision of Forest Conservation Act, 1980, if applicable to the project.
- (vi) Project Proponent (PP) shall obtain Consent to Operate after grant of EC and effectively implement all the conditions stipulated therein. The mining activity shall not commence prior to obtaining Consent to Establish / Consent to Operate from the concerned State Pollution Control Board.
- (vii) The PP shall adhere to the provision of the Mines Act, 1952, Mines and Mineral (Development & Regulation), Act, 2015 and rules & regulations made there under. The PP shall adhere to various circulars issued by Directorate General Mines Safety (DGMS) and Indian Bureau of Mines from time to time.
- (viii) The Project Proponent shall obtain consents from all the concerned land owners, before start of mining operations, as per the provisions of MMDR Act, 1957 and rules made there under in respect of lands which are not owned by it.
- (ix) The Project Proponent shall follow the mitigation measures provided in MoEF&CC'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".
- (x) The Project Proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water and from CGWA for withdrawal of groundwater for the project.
- (xi) 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.
- (xii) State Pollution Control Board shall be responsible for display of this EC letter at its Regional office, District Industries Centre and Collector's office/ Tahasildar's Office for 30 days.
- (xiii) 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

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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 and web site of the Ministry of Environment, Forest and Climate Change (www.environmentclearance.nic.in). A copy of the advertisement may be forwarded to the concerned MoEF&CC Regional Office for compliance and record.

- (xiv) The Project Proponent shall inform the MoEF&CC/SEIAA, Odisha for any change in ownership of the mining lease. In case there is any change in ownership or mining lease is transferred than mining operation shall only be carried out after transfer of EC as per provisions of the para 11 of EIA Notification, 2006 as amended from time to time.

(I) Air quality monitoring and preservation

- (i) 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, PM_{2.5}, NO₂, CO and SO₂ etc. as per the methodology mentioned in NAAQS Notification No. B-29016/20/90/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.
- (ii) 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 PM_{2.5} 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 equipments / 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 MoEF&CC/ Central Pollution Control Board.

(II) Water quality monitoring and preservation

- (i) In case, immediate mining scheme envisages intersection of ground water table, then Environmental Clearance shall become operational only after receiving formal clearance from CGWA. In case, mining operation involves intersection of ground water table at a later stage, then PP shall ensure that prior approval from CGWA and MoEF&CC 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.
- (ii) Regular monitoring of the flow rate of the springs and perennial nallahs flowing in and around the mine lease shall be carried out and records maintain. The natural water bodies and or streams which are flowing in an around the village, should not be disturbed. The Water Table should be nurtured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the Project Proponent has to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug wall located in village should be incorporated to ascertain the impact of mining over ground

DH



- water table. The Report on changes in Ground water level and quality shall be submitted on six-monthly basis to the Regional Office of the Ministry, CGWA and State Groundwater Department / State Pollution Control Board.
- (iii) 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.
- (iv) 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-a-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 MoEF&CC/ SEIAA, Odisha. 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 (January) and the record of monitored data be sent regularly to Ministry of Environment, Forest and Climate Change and its Regional Office, SEIAA, Odisha, 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.
- (v) Quality of polluted water generated from mining operations which include Chemical Oxygen Demand (COD) in mines run-off; acid mine drainage and metal contamination in runoff shall be monitored along with Total Suspended Solids (TDS), Dissolved Oxygen (DO), pH and Total Suspended Solids (TSS). The monitored data shall be uploaded on the website of the company as well as displayed at the project site in public domain, on a display board, at a suitable location near the main gate of the Company. The circular No. J- 20012/1 /2006-IA.II (M) dated 27.05.2009 issued by Ministry of Environment, Forest and Climate Change may also be referred in this regard.
- (vi) The project proponent shall construct retaining wall and settling pond within the lease area. Further, check dams shall be constructed at strategic locations in which rain water passes in rainy season. Finally, the excess supernatant after sedimentation shall be allowed to spill away through stone pitch structure to the nearby valley.
- (vii) De-silting of agricultural lands in buffer zone and beyond including nearby Nalas/rivers perennially periodically and perpetually caused due to wash up of minerals/OB/dumps shall be done as per SOP submitted. A legal affidavit shall be submitted within 6 months from the date of issue of Environmental Clearance to this effect with periodicity of

Signature



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- de-silting.
- (viii) Detail design of the existing retaining wall and the proposed for the expansion from a chartered Civil Engineer shall be submitted within 6 months from the date of issue of Environmental Clearance to ensure that no silt after wash up is escaped from the core / buffer zone of the mines.
- (ix) 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, MoEF & CC annually.
- (x) Industrial waste water (workshop and waste water from the mine) should be properly collected and treated in an ETP as proposed 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.
- (xi) 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.
- (III) Noise and vibration monitoring and prevention**
- (i) The peak particle velocity at 500m distance or within the nearest habitation, whichever is closer shall be monitored periodically as per applicable DGMS guidelines.
- (ii) The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right for darkness and minimal noise levels at night. PPs must ensure that the biological clock of the villages is not disturbed; by orienting the floodlights/ masks away from the villagers and keeping the noise levels well within the prescribed limits for day /night hours.
- (iii) The Project Proponent shall take measures for control of noise levels below 85 dBA in the work environment. The worker engaged in operations of HEMM, etc. should be provided with ear plugs /muffs. All personnel including laborers 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/ laborers are working without personal protective equipment.
- (IV) Mining Plan**
- (i) The Project Proponent shall adhere to the working parameters of mining plan which was submitted at the time of EC appraisal wherein year-wise plan was mentioned for total excavation i.e. quantum of mineral, waste, over burden, inter burden and top soil etc. No change in basic mining proposal like mining technology, total excavation, mineral & waste production, lease area and scope of working (viz. method of mining, overburden & dump management, O.B & dump mining, mineral transportation mode, ultimate depth of mining etc.) shall not be carried out without prior approval of the Ministry of Environment, Forest and Climate Change, which entail adverse environmental impacts, even if it is a part of approved mining plan modified after grant of EC or granted by

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(Protection) Act, 1986)

- State Govt. in the form to Short Term Permit (STP), Query license or any other name.
- (ii) The Project Proponent shall get the Final Mine Closure Plan along with Financial Assurance approved from Indian Bureau of Mines/Department of Mining & Geology as required under the Provision of the MMDR Act, 1957 and Rules/ Guidelines made there under. A copy of approved final mine closure plan shall be submitted within 2 months of the approval of the same from the competent authority to the concerned Regional Office of the Ministry of Environment, Forest and Climate Change for record and verification.
 - (iii) 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-a-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 MoEF&CC and its concerned Regional Office / SEIAA, Odisha.
- (V) **Land reclamation**
- (i) 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.
 - (ii) The reject/waste generated during the mining operations shall be stacked at earmarked waste dump site(s) only. The physical parameters of the waste dumps like height, width and angle of slope shall be governed as per the approved Mining Plan as per the guidelines/circulars issued by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of waste dumps.
 - (iii) The reclamation of waste dump sites shall be done in scientific manner as per the Approved Mining Plan cum Progressive Mine Closure Plan.
 - (iv) 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 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/ leveling of dump mass. In critical areas, use of geo textiles/ geo-membranes / clay liners / Bentonite etc. shall be undertaken for stabilization of the dump.
 - (v) The Project Proponent shall carry out slope stability study In case the dump height is more than 30 meters. The slope stability report shall be submitted to concerned regional office of MoEF&CC, Govt. of India, Bhubaneswar as well as SEIAA, Odisha.
 - (vi) Catch drains, settling tanks and siltation ponds of appropriate size shall be constructed around the mine working, mineral yards and topsoil / OB / waste dumps to prevent runoff 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

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development, plantation etc. The drains/ sedimentation sumps etc. shall be de-silted regularly, particularly after monsoon season, and maintained properly.

- (vii) 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.
- (viii) The top soil, if any, shall temporarily be stored at earmarked site(s) within the mine lease only and should not be kept unutilized for long. The physical parameters of the top soil dumps like height, width and angle of slope shall be governed as per the approved Mining Plan and as per the guidelines framed by DGMS w.r.t. safety in mining operations shall be strictly adhered to maintain the stability of dumps. The topsoil shall be used for land reclamation and plantation purpose.
- (ix) The mining lease holders shall, after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.

(VI) Transportation

- (i) No Transportation of the minerals shall be allowed in case of roads passing through transportation of the minerals leaving an adequate gap (say at least 200 meters) so that the adverse impact of sound and dust along with chances of accidents could be mitigated. All costs resulting from widening and strengthening of existing public road network shall be borne by the PP in consultation with nodal State Govt. Department. Transportation of minerals through road movement in case of existing village/ rural roads shall be allowed in consultation with nodal State Govt. Department only after required strengthening such that the carrying capacity of roads is increased to handle the traffic load. The pollution due to transportation load on the environment will be effectively controlled and water sprinkling will also be done regularly. Vehicular emissions shall be kept under control and regularly monitored. Project should obtain Pollution Under Control (PUC) certificate for all the vehicles from authorized pollution testing centers.
- (ii) The Main haulage road within the mine lease should be provided with a permanent water 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 equipments 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.
- (iii) Traffic management shall be done as per recommendation of Traffic Management Study Report.

[Signature]



- (iv) The Project Proponent shall provide parking plaza for the heavy vehicles within the lease area in compliance to NEER1 condition.

(VII) Green Belt

- (i) 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.
- (ii) The Project Proponent shall carryout plantation/ afforestation in backfilled and reclaimed area of mining lease, around water body, along the roadsides, in community areas etc. by planting the native species in consultation with the State Forest Department/ Agriculture Department/ Rural development department/ Tribal Welfare Department/ Gram Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per Hectare. Adequate budgetary provision shall be made for protection and care of trees.
- (iii) 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.
- (iv) The Project Proponent shall undertake all precautionary measures for conservation and protection of endangered flora and fauna and Schedule-I species during mining operation. A Wildlife Conservation Plan shall be prepared for the same clearly delineating action to be taken for conservation of flora and fauna. The Plan shall be approved by Chief Wild Life Warden of the State Govt and implemented in consultation with the State Forest and Wildlife Department. A copy of Wildlife Conservation Plan and its implementation status (annual) shall be submitted to the Regional Office of the Ministry.

(VIII) Public hearing and human health issues

- (i) The Project Proponent shall appoint an Occupational Health Specialist for Regular as well as Periodical medical examination of the workers engaged in the mining activities, as per the DGMS guidelines. The records shall be maintained properly. PP shall also carryout Occupational health check-ups in respect of workers which are having ailments like BP, diabetes, habitual smoking, etc. The check-ups shall be undertaken once in six months and necessary remedial/ preventive measures be taken. A status report on the same may be sent to MoEF&CC Regional Office and DGMS on half-yearly basis.
- (ii) A commitment in form of an undertaking for periodical occupational health checkup of the employee and the local people shall be done through an occupational health expert as per the detailed action plan submitted with the proposal within 6 months from the date of issue of Environmental Clearance.

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- (iii) The Project Proponent must demonstrate commitment to work towards 'Zero Harm' from their mining activities and carry out Health Risk Assessment (HRA) for identification workplace hazards and assess their potential risks to health and determine appropriate control measures to protect the health and wellbeing of workers and nearby community. The proponent shall maintain accurate and systematic records of the HRA. The HRA for neighborhood has to focus on Public Health Problems like Malaria, Tuberculosis, HIV, Anaemia, Diarrhoea in children under five, respiratory infections due to bio mass cooking. The proponent shall also create awareness and educate the nearby community and workers for Sanitation, Personal Hygiene, Hand washing, not to defecate in open, Women Health and Hygiene (Providing Sanitary Napkins), hazard of tobacco and alcohol use. The Proponent shall carryout base line HRA for all the category of workers and thereafter every five years.
- (iv) The Proponent shall carry out Occupational health surveillance which be a part of HRA and include Biological Monitoring where practical and feasible, and the tests and investigations relevant to the exposure (e.g. for Dust a X-Ray chest; For Noise Audiometric; for Lead Exposure Blood Lead, For Welders Full Ophthalmologic Assessment; for Manganese Miners a complete Neurological Assessment by a Certified Neurologist, and Manganese (Mn) estimation in Blood; For Inorganic Chromium-Fortnightly skin inspection of hands and forearms by a responsible person. Except routine tests all tests would be carried out in a Lab accredited by NABH. Records of Health Surveillance must be kept for 30 years, including the results of and the records of Physical examination and tests. The record of exposure due to materials like Asbestos, Hard Rock Mining, Silica, Gold, Kaolin, Aluminium, Iron, Manganese, Chromium, Lead, Uranium need to be handed over to the Mining Department of the State in case the life of the mine is less than 30 years. It would be obligatory for the State Mines Departments to make arrangements for the safe and secure storage of the records including X-Ray. Only conventional X-Ray will be accepted for record purposes and not the digital one). X-Ray must meet ILO criteria (17 x14 inches and of good quality).
- (v) The Proponent shall maintained a record of performance indicators for workers which includes (a) there should not be a significant decline in their Body Mass Index and it should stay between 18.5 -24.9, (b) the Final Chest X-Ray compared with the base line X-Ray should not show any capacities,(c) At the end of their leaving job there should be no Diminution in their Lung Functions Forced Expiratory Volume in one second (FEV1), Forced Vital Capacity (FVC), and the ratio) unless they are smokers which has to be adjusted, and the effect of age, (d) their hearing should not be affected. As a proof an Audiogram (first and last need to be presented), (e) they should not have developed any Persistent Back Pain, Neck Pain, and the movement of their Hip, Knee and other joints should have normal range of movement, (f) they should not have suffered loss of any body part. The record of the same should be submitted to the Regional Office, MoEF&CC annually along with details of the relief and compensation paid to workers having above indications.
- (vi) The Project Proponent shall ensure that Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.

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- (vii) Project Proponent shall make provision for the housing for workers/labors or shall construct labor 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, creche 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.
- (viii) The activities proposed in Action plan prepared for addressing the issues raised during the Public Hearing shall be completed as per the budgetary provisions mentioned in the Action Plan and within the stipulated time frame. The Status Report on implementation of Action Plan shall be submitted to the concerned Regional Office of the Ministry along with District Administration.
- (ix) Issues raised and recorded in proceedings of public hearing w.r.t. environment / pollution / CER shall be complied by the Mining Authority as per OM F. No. 22-65/2017-IA.III, dated 30.09.2020 of MoEF&CC, Govt. of India.

(IX) Corporate Environment Responsibility (CER)

- (i) The activities and budget earmarked for Corporate Environmental Responsibility (CER) as per Ministry's O.M No 22-65/2017-IA. II (M) dated 01.05.2018 or as proposed by SEAC should be kept in a separate bank account. The activities proposed for CER shall be implemented in a time bound manner and annual report of implementation of the same along with documentary proof viz. photographs, purchase documents, latitude & longitude of infrastructure developed & road constructed needs to be submitted to Regional Office MoEF&CC annually along with audited statement.
- (ii) Project Proponent shall keep the funds earmarked for environmental protection measures in a separate account and refrain from diverting the same for other purposes. The Year wise expenditure of such funds should be reported to the MoEF&CC and its concerned Regional Office / SEIAA, Odisha.

(X) Miscellaneous

- (i) 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.
- (ii) 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.
- (iii) The Project Proponent shall submit six monthly compliance reports on the status of the implementation of the stipulated environmental safeguards to the MoEF&CC & its concerned Regional Office, SEIAA, Odisha, Central Pollution Control Board and State Pollution Control Board.
- (iv) 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.

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- (v) The proponent shall comply all the specific conditions recommended by CSIR-NEERI on carrying capacity study (as applicable) in time bound manner as proposed.
- (vi) The project proponent shall augment infrastructure on drinking water, health care and education in nearby villages as per time bound action plan submitted.
- (vii) The project proponent shall obtain permission from DGMS under 106(2b) to carry out blasting operation within the lease area.
- (viii) it shall be mandatory for the project management to submit six (06) monthly compliance reports on post environmental monitoring in respect of the stipulated terms and conditions in this Environmental Clearance to the State Environment Impact Assessment Authority (SEIAA), Odisha, SPCB & Regional Office of the Ministry of Environment & Forest, Odisha in hard and soft copies on 1st June and 1st December of each calendar year. The proponent shall also upload the compliance report including results of monitored data, as applicable in the website of the Ministry for monitoring of EC Conditions.
- (ix) The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the Odisha State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective to the MoEF&CC & its concerned Regional Office, Central Pollution Control Board and State Pollution Control Board.
- (x) The proponent shall submit/upload six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF&CC, Govt. of India, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM, SO₂, NO_x (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.
- (xi) 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.
- (xii) 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 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.
- (xiii) 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.

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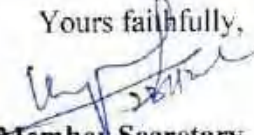
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- (xiv) Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

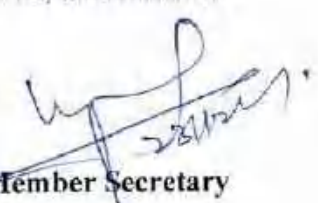
Yours faithfully,


Member Secretary

Copy to:

1. **Joint Secretary (Environment)**, Ministry of Environment, Forests and Climate Change Govt. of India, Indira Paryavaran Bhavan, Jor Bagh Road, Aliganj, New Delhi-110003 for information.
2. **Additional Chief Secretary**, Forests & Environment Dept., Government of Odisha for information.
3. **Member Secretary**, State Pollution Control Board, Odisha, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-8, Bhubaneswar for information.
4. **Additional Principal Conservator** of Forests, Regional Office (EZ), Ministry of Environment & Forests, A-31, Chandrasekharapur, Bhubaneswar for information.
5. **Member Secretary**, CGWA, 18/11, Jamnagar House, ManSingh Road, New Delhi-110011 for information.
6. **Collector, District Magistrate**, Sundargarh, for kind information and necessary action.
7. **Secretary**, SEAC, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar for kind information.
8. Guard file for record/Website/Parivesh Portal.

DH


Member Secretary



CONSENT ORDER
RAIKELA IRON ORE MINE OF M/S. GEETARANI MOHANTY.

Page 1 of 13

BY REGD. POST WITH AD

STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]

A/118, Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012

Phone-2561909, Fax: 2562822, 2560955 E-mail: paribesh1@ospcboard.org, Website: www.ospcboard.org

CONSENT ORDER

No. 4185 /

IND-I-CON- 2572

Dt. 22.03.2024 /

CONSENT ORDER NO. 1586

Sub: Consent for discharge of sewage and trade effluent under section 25/26 of Water (PCP) Act, 1974 and for existing / new operation of the plant under section 21 of Air (PCP) Act, 1981.

Ref: Your online application No. 4514059 Dated 28-12-2022.

Consent to operate is hereby granted under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 and under section 21 of Air (Prevention & Control of Pollution) Act, 1981 and rules framed thereunder to

Name of the Industry: RAIKELA IRON ORE MINE OF M/S. GEETARANI MOHANTY.

Name of the Occupier & Designation: SRI SRINIBASH SAHOO, MANAGING PARTNER

Address: AT: RAIKELA, PO: DENGULA, DIST: SUNDARGARH.

This consent order is valid for the period from 01.04.2024 to 31.03.2027.

Details of Products Manufactured:

Sl. No	Product	Quantity
01.	Iron Ore	4.99 MTPA

Details of Mineral Handling Plants /Units:

01.	Mobile Crushing Plant of capacity 2x400 TPH
02.	Mobile Screening Plant of capacity 2x300 TPH & 2x400 TPH
03.	Fixed Crushing and Screening Plant of capacity 1x1000 TPH

This consent order is valid for the specified outlets, discharge quantity and quality, specified chimney/stack, emission quantity and quality of emissions as specified below. This consent is granted subject to the general and special conditions stipulated therein.



A. Discharge permitted through the following outlet subject to the standard

Outlet No.	Description of outlet	Point of discharge	Quantity of discharge KLD or KL/hr	Prescribed Standard				
				pH	TSS (mg/l)	BOD (mg/l)	Oil & Grease (mg/l)	Fecal Coliform (MPN/100 ml)
01	Outlet of STP (Domestic effluent)	Used for plantation	60 KLD	6.5-9.0	<100	30	—	<1000
02	Outlet of ETP of workshop	Re-used in vehicle washing	0.25	6.5-8.5	50	—	10	—
03	Mine drainage water/ surface runoff/ other wastewater	On land /inland surface water body	7078	5.5-9.0	100 (Rainy days) 50 (Non-rainy days)	—	10	—

B. Fugitive Emission Standards

Particulate Matter	1200 µg/m ³
Note : Fugitive emission shall be monitored in the predominant downwind direction at a distance 25.0 ± 2.0 metres from the source of fugitive emission as per following :	
Area	Monitoring Location
Mine face / Benches	Drilling, excavation and loading applicable for operating benches above water table
Haul Roads/ Service Roads	Haul roads to ore processing plant, waste dumps and loading areas and service road.
Crushing plant	Run-off mine unloading at hopper, crushing areas, screens and transfer points.
Screening plant	Screens, conveying and transportation of ore discharge points.
Ore storage and loading	Intermediate stock bin / pile areas, ore stock bin / pile areas, wagon / truck loading areas.
Waste dump	Active waste / reject dumps

C. Disposal of solid waste permitted in the following manner

Sl. No.	Type of Solid waste	Quantity generated (TPD)	Quantity to be reused on site(TPD)	Quantity to be reused off site(TPD)	Quantity disposed off (TPD)	Description of disposal site.
01	Top soil/ over burden	As per approved mining plan	—	—	—	As per approved mining plan



D. GENERAL CONDITIONS FOR ALL UNITS

1. The consent is given by the Board in consideration of the particulars given in the application. Any change or alternation or deviation made in actual practice from the particulars furnished in the application will also be the ground for liable to review/variation/revocation of the consent order under section 27 of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 of Air (Prevention & Control of Pollution) Act, 1981 and to make such variations as deemed fit for the purpose of the Acts.
2. The occupier would immediately submit revised application for consent to operate to this Board in the event of any change in the quantity and quality of raw material / products / manufacturing process or quantity /quality of the effluent rate of emission / air pollution control equipment / system etc.
3. The applicant shall not change or alter either the quality or quantity or the rate of discharge or temperature or the route of discharge without the previous written permission of the Board.
4. The application shall comply with and carry out the directives/orders issued by the Board in this consent order without any negligence on his/her part. In case of non-compliance of any order/directives issued at any time and/or violation of the terms and conditions of this consent order, the applicant shall be liable for legal action as per the provisions of the Law.
5. The applicant shall make an application for grant of fresh consent at least 90 days before the date of expiry of this consent order.
6. The issuance of this consent does not convey any property right in either real or personal property or any exclusive privileges nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Central, State laws or regulation.
7. This consent does not authorize or approve the construction of any physical structure or facilities or the undertaking of any work in any natural water course.
8. The applicant shall display this consent granted to him in a prominent place for perusal of the public and inspecting officers of this Board.
9. An inspection book shall be opened and made available to Board's Officers during the visit to the factory.
10. The applicant shall furnish to the visiting officer of the Board any information regarding the construction, installation or operation of the plant or of effluent treatment system / air pollution control system / stack monitoring system any other particulars as may be pertinent to preventing and controlling pollution of Water / Air.
11. The applicant shall display suitable caution board at the place where the effluent is entering into any water-body or any other place to be indicated by the Board, indicating therein that the area into which the effluents are being discharged is not fit for the domestic use/bathing.
12. Storm water shall not be allowed to mix with the trade and/or domestic effluent on the upstream of the terminal manholes where the flow measuring devices will be installed.
13. The applicant shall maintain good house-keeping both within the factory and the premises. All pipes, valves, sewers and drains shall be leak-proof. Floor washing shall be admitted into the effluent collection system only and shall not be allowed to find their way in storm drains or open areas.
14. The applicant shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems install or used by him to achieve with the term(s) and conditions of the consent.
15. Care should be taken to keep the anaerobic lagoons, if any, biologically active and not utilized as mere stagnation ponds. The anaerobic lagoons should be fed with the required nutrients for effective digestion. Lagoons should be constructed impervious.
16. The utilization of treated effluent on factory's own land, if any, should be completed and there should be no possibility of the effluent gaining access into any drainage channel or other water courses either directly or by overflow.
17. The effluent disposal on land, if any, should be done without creating any nuisance to the surroundings or inundation of the lands at any time.
18. If at any time the disposal of treated effluent on land becomes incomplete or unsatisfactory or create any problem or becomes a matter of dispute, the occupier must adopt alternate satisfactory treatment and disposal measures.
19. The sludge from treatment units shall be dried in sludge drying beds and the drained liquid shall be taken to equalization tank.
20. The effluent treatment units and disposal measures shall become operative at the time of commencement of production.
21. The applicant shall provide port holes for sampling the emissions and access platform for carrying out stack sampling and provide electrical outlet points and other arrangements for chimneys/stacks and other sources of emissions so as to collect samples of emission by the Board or the applicant at any time in accordance with the provision of the Acts or Rules made therein.
22. The applicant shall provide all facilities and render required assistance to the Board staff for collection of samples / stack monitoring / inspection.



23. The applicant shall not change or alter either the quality or quantity or rate of emission or install, replace or alter the air pollution control equipment or change the raw material or manufacturing process resulting in any change in quality and/or quantity of emissions, without the previous written permission of the Board.
 24. No control equipments or chimney shall be altered or replaced or as the case may be erected or re-erected except with the previous approval of the Board.
 25. The liquid effluent arising out of the operation of the air pollution control equipment shall be treated in the manner so as to meet the standards prescribed by the Board in accordance with the provisions of Water (Prevention and Control of Pollution) Act, 1974 (as amended).
 26. The stack monitoring system employed by the applicant shall be opened for inspection to this Board at any time.
 27. There shall not be any fugitive or episodal discharge from the premises.
 28. In case of such episodal discharge/emissions the occupier shall take immediate action to bring down the emission within the limits prescribed by the Board and stop the operation of the plant if required. Report of such accidental discharge /emission shall be brought to the notice of the Board within 24 hours of occurrence.
 29. The applicant shall keep the premises and air pollution control equipments clean and make all hoods, pipes, valves, stacks/chimneys leak proof. The air pollution control equipments, location, inspection chambers, sampling port holes shall be made easily accessible at all times.
 30. Any upset condition in any of the plant/plants of the factory which is likely to result in increased effluent discharge/emission of air pollutants and / or result in violation of the standards mentioned shall be reported to the Headquarters and Regional Office of the Board by E-mail within 2 hours of its occurrence.
 31. The occupier has to ensure that minimum three varieties of trees are planted at the density of not less than 1000 trees per acre. The trees may be planted along boundaries of the premises. This plantation is stipulated over and above the bulk plantation of trees in that area.
 32. The solid waste such as sweeping, wastage packages, empty containers residues, sludge including that from air pollution control equipments collected within the premises of the shall be disposed off scientifically to the satisfaction of the Board.
 33. All solid wastes arising in the premises shall be properly classified and disposed off to the satisfaction of the Board by :
 - i) Land fill in case of inert material, care being taken to ensure that the material does not give rise to leachate which may percolate into ground water or carried away with storm run-off.
 - ii) Controlled incineration, wherever possible in case of combustible organic material.
 - iii) Composting, in case of bio-degradable material.
 34. Any toxic material shall be detoxicated if possible, otherwise be sealed in steel drums and buried in protected areas after obtaining approval of this Board in writing. The detoxication or sealing and burying shall be carried out in the presence of Board's authorized persons only. Letter of authorization shall be obtained for handling and disposal of hazardous wastes.
 35. If due to any technological improvement or otherwise this Board is of opinion that all or any of the conditions referred to above requires variation (including the change of any control equipment either in whole or in part) this Board shall after giving the applicant an opportunity of being heard, vary all or any of such condition and thereupon the applicant shall be bound to comply with the conditions so varied.
 36. The applicant, his/heirs/legal representatives or assignees shall have no claim whatsoever to the condition or renewal of this consent after the expiry period of this consent.
 37. The Board reserves the right to review, impose additional conditions or condition, revoke change or alter the terms and conditions of this consent.
 38. Notwithstanding anything contained in this conditional letter of consent, the Board hereby reserves to it the right and power under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 to review any and/or all the conditions imposed herein above and to make such variations as deemed fit for the purpose of the Act by the Board.
 39. The conditions imposed as above shall continue to be in force until revoked under section 27(2) of the Water (Prevention & Control of Pollution) Act, 1974 and section 21 A of Air (Prevention & Control of Pollution) Act, 1981.
 40. The occupier shall comply to the conditions stipulated in CTE order issued by Odisha State Pollution Control Board and conditions stipulated in Environmental Clearances issued by MoEF&CC, Govt. of India.
 41. The occupier shall abide by E(P) Act, 1986 and Rules framed there-under.
 42. In case the consent fee is revised upward during this period, the industry shall pay the differential fees to the Board (for the remaining years) to keep the consent order in force. If they fail to pay the amount within the period stipulated by the Board the consent order will be revoked without prior notice.
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CONSENT ORDER
RAIKELA IRON ORE MINE OF M/S. GEETARANI MOHANTY.

Page 5 of 13

**GENERAL CONDITIONS FOR UNITS WITH INVESTMENT OF MORE THAN Rs 50 CRORES, AND 17 CATEGORIES OF
HIGHLY POLLUTING INDUSTRIES (RED A).**

1. The applicant shall analyse the emissions every month for the parameters indicated in TABLE. B & C as mentioned in this order and shall furnish the report thereof to the Board by the 10th of the succeeding month.
2. The applicant shall provide and maintain at his own cost three ambient air quality monitoring stations for monitoring Suspended Particulate Matter, Sulphur Dioxide, Oxides of Nitrogen, Hydro-Carbon, Carbon-Monoxide and monitor the same once in a day/week/fortnight/month. The data collected shall be maintained in a register and a monthly extract be furnished to the Board.
3. The applicant shall provide and maintain at his own cost a meteorological station to collect the data on wind velocity, direction, temperature, humidity, rainfall, etc. and the daily reading shall be recorded and the extract sent to the Board once in a month.
4. The applicant shall forward the following information to the Member Secretary, State Pollution Control Board, Odisha, Bhubaneswar regularly.
 - a) Report of analysis of stack monitoring, ambient air quality monitoring meteorological data as required every month.
 - b) Progress on planting of trees quarterly.
5. The applicant shall install mechanical composite sampling equipment and continuous flow measuring / recording devices on the effluent drains of trade as well as domestic effluent. A record of daily discharge shall be maintained.
6. The following information shall be forwarded to the Member Secretary on or before 10th of every month.
 - a) Performance / progress of the treatment plant.
 - b) Monthly statement of daily discharge of domestic and/or trade effluent.
7. Non-compliance with effluent limitations
 - a) If for any reason the applicant does not comply with or is unable to comply with any effluent limitations specified in this consent, the applicant shall immediately notify the consent issuing authority by telephone and provide the consent issuing authority with the following information in writing within 6 days of such notification.
 - i) Causes of non-compliance
 - ii) A description of the non-compliance discharge including its impact on the receiving waters.
 - iii) Anticipated time of continuance of non-compliance if expected to continue or if such condition has been corrected the duration or period of non-compliance.
 - iv) Steps taken by the applicant to reduce and eliminate the non-complying discharge and
 - v) Steps to be taken by the applicant too prevent the condition of non-compliance.
 - b) The applicant shall take all reasonable steps to minimize any adverse impact to natural waters resulting from non-compliance with any effluent limitation specified in this consent including such accelerated or additional monitoring as necessary to determine the nature and impact of the non-complying discharge.
 - c) Nothing in this consent shall be construed to relieve the applicant from civil or criminal penalties for non-compliance whether or not such non-compliance is due to factors beyond his control, such as break-down, electric failure, accident or natural disaster.
8. The applicant shall at his own cost get the effluent samples collected both before and after treatment and get them analysed at an approval laboratory every month for the parameters indicated in Part-D and shall submit in duplicate the report thereof to the Board.
9. The addition of various treatment chemicals should be done only with mechanical dozers and proper equipment for regulation of correct dosages determined daily and for proper uniform feeding. Crude practices such as dumping of chemicals in drains or sumps or trickling of acids or alkalis arbitrarily and utilizing poles for stirring etc. should not be resorted to.
10. In the disposal of treated effluent on land for irrigation, the industry shall keep in view of the need for:
 - a) Rotation of crops
 - b) Change of point of application of effluent on land
 - c) A portion of land kept fallow.
11. The adoption of these would avoid soil becoming sick or stale, the industry may ensure this in consultation with the Agriculture Department.
12. It is the sole responsibility of the industry to ensure that there are no complaints at any time from the locals in the surrounding areas as a result of discharge of sewage or trade effluent if any.
13. Proper housekeeping shall be maintained by a dedicated team.
14. The industry must constitute a team of responsible and technically qualified personnel who will ensure continuous operation of all pollution control devices round the clock (including night hours) and should be in a position to explain the status of operation of the pollution control measures to the inspecting officers of the Board at any point of time. The name of these persons with their contact telephone numbers shall be intimated to the concerned Regional Officer and Head Office of the Board and in case of any change in the team it shall be intimated to the Board immediately.

E. SPECIAL CONDITIONS:

- 1) This consent order is subject to compliance of orders of the Hon'ble Supreme Court of India in the matter of W. P. (Civil) 114/2014.
 - 2) This consent order is subject to permission from Steel and Mines Department, Government of Odisha for continuing of mining operation.
 - 3) Mining operation is subject to availability of all other statutory clearances.
 - 4) Drills shall either be operated with dust extractors or equipped with water injection system to minimize dust generation in the work environment.
 - 5) Controlled blasting shall be practiced to minimize generation of dust and fly rocks.
 - 6) Regular water sprinkling shall be carried out in critical areas prone to air pollution such as around crushing and screening plant, haul roads, approach road, active OB dumps and mine benches at frequent interval so that it should always remain in wet condition.
 - 7) Effort shall be made to use chemical binders/wetting agents alongwith sprinkled water in order to reduce water consumption and to improve retention and re-absorption capacity of water.
 - 8) Haulage roads shall be devoid of ruts and potholes and shall be maintained properly to avoid generation of dust during movement of vehicles.
 - 9) The air pollution control measures shall be revisited or augmented to bring down the concentration of PM₁₀ within stipulated standard. The action taken report in this regard shall be submitted to the Board for verification.
 - 10) Fog canons shall be deployed at the haul roads and mineral handling area for strengthening of dust suppression measures.
 - 11) Dust suppression measures (preferably dry fog system) shall be provided at all appropriate places of mineral handling plants (crusher & screening plant). Loading and unloading areas including all the transfer points shall also have efficient dust suppression arrangements (dry fog system). These shall be properly maintained and operated.
 - 12) Mechanized wheel washing facility for the ore transport vehicles shall be provided at the exit point of the mine. The wheel washing facility shall be integrated with complete recirculation system.
 - 13) The vehicles carrying ore for transportation from the mine shall be covered with tarpaulin (both bottom & top).
-



- 14) Regular water sprinkling on mineral transportation roads passing through the habitation area as well as other strategic point on the National Highway shall be done jointly by the mining lessees in consultation with the Regional Officer.
- 15) Three continuous real time Ambient Air Quality Monitoring Stations shall be established in core zone and buffer zone with data transfer facility to SPCB server and location of these stations shall be decided based on the metrological data, topographical features and environmentally and ecologically sensitive targets in consultation with the Regional Officer, State Pollution Control Board.
- 16) The CAAQMS shall be properly maintained and calibrated from time to time to ensure that spurious data are not transformed to the SPCB server. The action taken report in this regard shall be submitted by 15.04.2024 to the Board for verification.
- 17) Fugitive Dust Emission Monitoring shall be carried out at the places as stated in Part-B of this order. The monitoring of fugitive dust shall be carried out twice in a week (24 hourly) at a particular site and consolidated data shall be submitted to the State Pollution Control Board, once in a year.
- 18) The top soil generated shall be stored at earmarked site (s) only and stabilized with plantation or shall be used for land reclamation and plantation.
- 19) The over burden generated during the course of mining shall be stacked at earmarked dump site (s) and stabilized with plantation or used for reclamation of excavated land followed by plantation.
- 20) The project proponent shall ensure that no natural watercourse and / or water resources are obstructed due to any mining operations. In case of diversion of natural watercourse, this shall be done with prior permission of the competent authority.
- 21) Check dams and check weirs shall be constructed at appropriate places of the mine lease area to prevent direct flow of runoff to nearby water bodies. The surface run off water from the existing runoff management system shall meet the prescribed standards as stated in Part A (Sl No. 3) of the consent order.
- 22) Retention wall shall be constructed at the toe of topsoil dump and OB dump. Garland drain shall be constructed around topsoil dumps, over burden dumps and mineral stack yards terminating at settling pit to prevent direct disposal of runoff to nearby water bodies.
- 23) Garland drain and sedimentation pit shall be de-silted after monsoon or as and when required. The runoff discharge quality from runoff management system



shall meet the prescribed standards as stated in Part A (Sl No. 3) of the consent order.

- 24) Domestic effluents shall be treated in a sewage treatment plant (STP) and or shall be discharged to soak pit via septic tank constructed as BIS specification. The treated wastewater quality of STP shall remain within the following standards and shall be used for plantation:

pH	-	6.5 -9.0
TSS	-	<100 mg/l
BOD	-	30 mg/l
Fecal Coliform	-	<1000 MPN/100 ml.

- 25) ETP comprising of oil and grease trap with sedimentation pit shall be provided for treatment of workshop effluent and treated effluent shall remain within the following prescribed standards and shall be re-used for washing of vehicles:

pH	-	6.5 -8.5
TSS	-	50 mg/l
Oil & grease	-	10 mg/l
COD	-	150 mg/l

- 26) Regular monitoring of water quality of upstream and downstream of surface water bodies existed if any within 5 Km shall be carried out once in every month and record shall be maintained and submitted to the State Pollution Control Board once in every year. Monitoring shall be carried out through MoEF & CC accredited laboratory.
- 27) Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells. The monitoring should be done four times a year in pre-monsoon (April/May), monsoon (August), post-monsoon (November) and winter (January) seasons. Data thus collected should be submitted to the Board quarterly.
- 28) The mine shall take necessary action for compliance with the air and water quality standards as stipulated in Part-A and Part-B of this order.
- 29) Adequate measures shall be taken for control of noise levels in the work environment of mine area so that noise levels at the boundary line of mining lease area shall not exceed 75 dB(A) during day time (6.00 AM to 9.00 PM) and 70 dB(A) during night time (9.00 PM to 6 AM).
- 30) Adequate noise barriers shall be provided surrounding the crushing and screening plants to control noise pollution and avoid impact on wildlife due to operation of crushing and screening plants during night hours.
- 31) Online noise monitoring system shall be installed to monitor noise level during night hours.



- 32) Protective barriers shall be provided for the lights to prevent illumination towards the forest area during night hours.
- 33) Ambient air quality monitoring data, noise monitoring data and water / wastewater quality monitoring data shall be electronically displayed at the entry point of the mine or at a suitable location of the mine.
- 34) Plantation of trees shall be undertaken in the colony/ township, over top soil dumps, OB dumps, along the side of haul road and in other areas of the mines not being utilized for mining activities. The mine shall take up avenue plantation and plantation in nearby village areas in consultation with DFO/Horticulture Department. The plantation details shall be submitted to the Board before end of April every year.
- 35) A copy of the annual return (annual return submitted to IBM, Govt. of India/ Directorate of Mines, Govt. of Odisha) shall be submitted to this Board every year.
- 36) The environmental statement report for the financial year ending 31st March shall be submitted to the Board in Form-V on or before 30th September every year.

MEMBER SECRETARY

STATE POLLUTION CONTROL BOARD, ODISHA

To,

**THE MANAGING PARTNER,
RAIKELA IRON ORE MINE OF M/S. GEETARANI MOHANTY,
STATION ROAD, BARBIL,
DIST: KEONJHAR, PIN-758035**

Memo No. _____/Dt. _____/

Copy forwarded to :

- i) Regional Officer, State Pollution Control Board, Rourkela.
- ii) District Collector, Sundargarh
- iii) Director of Mines, Govt. of Odisha, Bhubaneswar
- iv) Director, Environment-cum-Special Secretary, F. E & CC Deptt., Govt. of Odisha, Bhubaneswar.
- v) D.F.O, Bonai, Sundargarh
- vi) Deputy Director of Mines, Koira, Sundargarh.
- vii) Chief Env. Scientist, Central Lab. SPCB, Bhubaneswar
- viii) Addl. Chief Env. Engineer (Hazardous Waste Management Cell)
- ix) Consent Register

**CHIEF ENV. ENGINEER (M)
STATE POLLUTION CONTROL BOARD, ODISHA**



GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS



**GENERAL STANDARDS FOR DISCHARGE OF
ENVIRONMENTAL POLLUTANTS PART – A : EFFLUENTS**

Sl. No.	Parameters	Standards			
		Inland surface	Public sewers	Land for irrigation	Marine Coastal Areas
		(a)	(b)	(c)	(d)
1.	Colour & odour	Colourless/ Odourless as far as practicable	--	See 6 of Annex-1	See 6 of Annex-1
2.	Suspended Solids (mg/l)	100	600	200	a. For process wastewater – 100 b. For cooling water effluent 10% above total suspended matter of influent
3.	Particular size of SS	Shall pass 850	--	--	--
5.	pH value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	Shall not exceed 5°C above the receiving water temperature	--	--	Shall not exceed 5°C above the receiving water temperature
7.	Oil & Grease mg/l max.	10	20	10	20
8.	Total residual chlorine	1.0	--	--	1.0
9.	Ammonical nitrogen (as N) mg/l max.	50	50	--	50
10.	Total Kjeldahl nitrogen (as NH ₃) mg/l max.	100	--	--	100
11.	Free ammonia (as NH ₃) mg/l max.	5.0	--	--	5.0
12.	Biochemical Oxygen Demand (5 days at (20°C) mg/l max.	30	350	100	100
13.	Chemical Oxygen Demand, mg/l max.	250	--	--	250
14.	Arsenic (as As) mg/l max	0.2	0.2	0.2	0.2
15.	Mercury (as Hg) mg/l max	0.01	0.01	--	0.001

Sl. No.	Parameters	Standards			
		inland surface	Public sewers	Land for irrigation	Marine Coastal Areas
		(a)	(b)	(c)	(d)
16.	Lead (as pb) mg/l max.	01.	1.0	--	2.0
17.	Cadmium (as Cd) mg/l max.	2.0	1.0	--	2.0
18.	Hexavalent Chromium (as Cr + 6) mg/l max.	0.1	2.0	--	1.0
19.	Total Chromium (as Cr) mg/l max.	2.0	2.0	--	2.0
20.	Copper (as Cu) mg/l max.	3.0	3.0	--	3.0
21.	Zinc (as Zn) mg/l max.	5.0	15	--	15
22.	Selenium (as Se) mg/l max.	0.05	0.05	--	0.05
23.	Nickel (as Ni) mg/l max.	3.0	3.0	--	5.0
24.	Cyanide (as CN) mg/l max.	0.2	2.0	0.2	0.02
25.	Fluoride (as F) mg/l max.	2.0	15	--	15
26.	Dissolved Phosphates (as P) mg/l max.	5.0	--	--	--
27.	Sulphide (as S) mg/l max.	2.0	--	--	5.0
28.	Phenolic compounds as (C ₆ H ₅ OH) mg/l max.	1.0	5.0	--	5.0
29.	Radioactive materials				
	a. Alpha emitter micro curie/ml. b. Beta emitter micro curie/ml.	10 ⁷ 10 ⁶	10 ⁷ 10 ⁶	10 ⁸ 10 ⁷	10 ⁷ 10 ⁶
30.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
31.	Manganese (as Mn)	2 mg/l	2 mg/l	--	2 mg/l
32.	Iron (Fe)	3 mg/l	3 mg/l	--	3 mg/l
33.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	--	0.2 mg/l
34.	Nitrate Nitrogen	10 mg/l	--	--	20 mg/l



NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl. No.	Pollutants	Time Weighed Average	Concentrate of Ambient Air		
			Industrial Residential, Rural and other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
(1)	(2)	(3)	(4)	(5)	(6)
1.	Sulphur Dioxide (SO ₂), µg/m ³	Annual * 24 Hours **	50 80	20 80	-Improved west and Gaeke - Ultraviolet fluorescence
2.	Nitrogen Dioxide (NO ₂), µg/m ³	Annual * 24 Hours **	40 80	30 80	- Modified Jacob & Hochheiser (Na-Arsenite) - Chemiluminescence
3. ---	Particulate Matter (size less than 10µm) or PM ₁₀ µg/m ³	Annual * 24 Hours **	60 100	60 100	-Gravimetric - TOEM - Beta Attenuation
4.	Particulate Matter (size less than 2.5µm) or PM _{2.5} µg/m ³	Annual * 24 Hours **	40 60	40 60	-Gravimetric - TOEM - Beta Attenuation
5.	Ozone (O ₃) µg/m ³	8 Hours ** 1 Hours **	100 180	100 180	- UV Photometric - Chemiluminescence - Chemical Method
6.	Lead (Pb) µg/m ³	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP method after sampling on EMP 2000 or equivalent filter paper. - ED-XRF using Teflon filter
7.	Carbon Monoxide (CO) mg/m ³	8 Hours ** 1 Hours **	02 04	02 04	- Non Dispersive Infra Red (NDIR) Spectroscopy
8.	Ammonia (NH ₃) µg/m ³	Annual* 24 Hours**	100 400	100 400	-Chemiluminescence - Indophenol Blue Method
9.	Benzene (C ₆ H ₆) µg/m ³	Annul *	05	05	-Gas Chromatography based continuous analyzer - Adsorption and Desorption followed by GC analysis
10.	Benzo (a) Pyrene (BaP)-Particulate phase only, ng/m ³	Annual*	01	01	-Solvent extraction followed by HPLC/GC analysis
11.	Arsenic (As), ng/m ³	Annual*	06	06	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper
12.	Nickel (Ni), ng/m ³	Annual*	20	20	-AAS/ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 08 hourly or 01 hourly monitored values, as applicable, shall be complied with 98% of the time in a year, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.



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OFFICE OF THE STATE POLLUTION CONTROL BOARD, ODISHA

[DEPARTMENT OF FOREST & ENVIRONMENT, GOVERNMENT OF ODISHA]

Paribesh Bhawan, A/118, Nilakantha Nagar, Unit – VIII
Bhubaneswar – 751 012, INDIA

*By Speed Post /
Through online*

No. 14891 /

IND-II-CTE-6693

Date 19.08.2022 /

CONSENT TO ESTABLISH ORDER

In consideration of the online application no. 4104134 for obtaining Consent to Establish for **Raikela Iron Ore Mines of M/s Geetarani Mohanty**, the State Pollution Control Board is pleased to convey its Consent to Establish under Section 25 of Water (Prevention & Control of Pollution) Act, 1974 and under Section 21 of Air (Prevention & Control of Pollution) Act, 1981 for enhancement of production from 2.99 MTPA to 4.99 MTPA Iron Ore along with installation of following crushing and screening plants.

Sl. No.	Type of the mineral processing unit	Existing (Capacity in TPH)	Additional Proposed (Capacity in TPH)	Total Capacity (TPH) after expansion
1.	Central Processing unit (CPU) (Fixed Crushing and Screening Plant)	--	1x1000	1x1000 TPH
2.	Mobile Crushing Plant	2x400 TPH	-	2x400 TPH
3.	Mobile Screening Plant	2x300 TPH & 2x400 TPH	-	2x300 TPH & 2x400 TPH

Inside the mining lease area of 67.586 Ha. At-Raikela, PO. Dengula in the District of Sundargarh with the following conditions.

GENERAL CONDITIONS:

1. This Consent to Establish is valid for the product, method of mining and capacity mentioned in the application form. This order is valid for five years which means the proponent shall do substantial mining activities for the proposal within a period of five years from the date of issue of this order. If the proponent fails to do substantial mining activities for the proposal within five years then a renewal of this consent to establish shall be sought by the proponent.
2. The mine shall apply for grant of Consent to Operate under Section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of Air (Prevention & Control of Pollution) Act, 1981 at least 3 (three) months before the commencement of production and obtain Consent to Operate from this Board.

3. No change in mining technology and scope of working shall be made without prior approval of the Board.
4. This Consent to Establish is subject to statutory and other clearances from Govt. of Odisha and/or Govt. of India, as and when applicable.

SPECIAL CONDITIONS:

GENERAL:

1. The proponent shall obtain Environmental Clearance as per EIA Notification, 2006 and amendment thereafter for the proposal. The mining activity for the proposal shall be commenced after obtaining Environmental Clearance.
2. This Consent to Establish is granted for the capacity as mentioned above and any expansion in the capacity change or modification in the process, addition, alternation any nature has to be undertaken with prior approval of the Board. For any change in the site or area fresh Consent to Establish has to be obtained from the Board.
3. The mine shall implement the Pollution Control Measures and safeguards as proposed in the Environment Management Plan (EMP) of Environment Impact Assessment (EIA) report.
4. The proponent shall submit six monthly progress report every year (i.e. June and December) of mining activity of the project to the Board (at Head Office and Regional Office) for record and verification.
5. The unit shall obtain NOC from CGWA for using of ground water for getting Consent to Operate of State Pollution Control Board, Odisha.
6. The proponent shall obtain requisite permission from the Water Resources Department, Govt. of Odisha for drawal of water.
7. Model equipment / machineries along with advanced technology shall be followed.
8. The method of mining shall be Fully Mechanized open cast mining.
9. The proponent shall obtain forest clearance for the forest land involved in the project area. No project activity shall be undertaken in/under the forest land until prior Forest Clearance has been obtained under the provisions of FC Act 1980.
10. A green belt of adequate width and density preferably with local species along the periphery of the mine, inactive dumps, backfilled area, vacant area, colony and any other vacant area shall be raised so as to provide protection against particulates and noise to ameliorate the environment. A detailed plantation programme in this regard shall be prepared and submitted at the time of making application for Consent to Operate for assessment.
11. The project proponent shall develop greenbelt in 7.5 m 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 development of greenbelt shall be governed as per the EC granted by the MoEF&CC, Govt. of India/ SEIAA Odisha.
12. 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 plating the native species in consultation with the State Forest Department / Agriculture Department / Rural development department / Tribal Welfare Department / Gram

Panchayat such that only those species be selected which are of use to the local people. The CPCB guidelines in this respect shall also be adhered. The density of the trees should be around 2500 saplings per hectare. Adequate budgetary provision shall be made for protection and care of trees.

13. A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive; who will report directly to the Head of the organization.
14. The construction material which has potential to be air borne, shall be transported in covered trucks.
15. Good housekeeping practice shall be followed to improve the work environment as the project will handle lot of iron ore fines.
16. The construction shall be carried out with the fly ash bricks. If the fly ash bricks are not available locally the construction may be carried out with other bricks with prior intimation to the concerned Regional Office of SPC Board. A quarterly statement indicating the use of fly ash bricks during civil construction shall be submitted to the Board for record.
17. The construction and demolition wastes, if any, to be generated from the proposed project shall be disposed of in accordance with the provision under "Construction & Demolition Wastes Management Rules 2016".
18. The proponent shall comply to the provisions of E-Waste (Management) Rules, 2016 and amendment thereafter and shall handover e-waste to authorized collection centers/ register dismantlers/ recyclers for proper disposal of e-waste.
19. The mine shall take up adequate measure for routine health checkup of its employees / workers and the people residing in the neighborhood of the plant free of cost.
20. The mine shall install digital display board at mines main gate for display of environmental information for public view.
21. The proponent shall implement recommendations of CSIR-NEERI for sustainable mining.
22. The Board may impose further conditions or modify the conditions stipulated in this order during installation and/or at the time of obtaining consent to operate and may revoke this clearance in case the stipulated conditions are not implemented.
23. The above conditions will be enforced, inter-alia, under the provisions of the water (Prevention & Control of pollution) Act, 1974 and Air (Prevention & Control of Prevention) Act, 1981 and Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rule.

WATER POLLUTION:

24. The domestic wastewater generated from the industry shall be treated in sewage treatment plant to meet the following standards as notified by the MoEF&CC, Govt. of India vide G.S.R. 1265 (E), dated 13.10.2017. The treated water shall be reused for gardening and plantation. Under no circumstances there shall be any discharge of treated waste water to outside the factory premises.

Sl. No.	Parameters	Standards
1.	pH	6.5-9.0
2.	BOD(mg/l)	30

Sl. No.	Parameters	Standards
3.	TSS(mg/l)	<100
4.	Fecal Coliform (MPN/100ml)	< 1000

25. Garland drains along with settling pit shall be provided around the iron ore fines stock yard to control washout of fines from the stockyard along with surface runoff.
26. Surface run-off from OB dump area, mineral stock yard, top soil storage area and rain water to be pumped from quarry shall be routed through adequate settling pond (designed maximum hourly rain fall basis) to meet prescribed standard of SS - 100 mg/l and Oil & Grease-10 mg/l before discharge into natural stream/water courses during monsoon.
27. At stockpile and loading plant area, a network of drains shall be constructed at a depth of 1.5 meter below the lowest level on the sites parallel to the stockpile area with interconnected box culverts. The sloping of surface shall be given inward to the stockpiles so that surface water will only infiltrate in to the drain.
28. The unit shall provide storm water drain around raw material stock yard, product stock yard and surface run-off generated from this area shall be treated in settling tanks of adequate capacity and same shall be stored in rain water harvesting pond for reuse in dust suppression, green belt etc.
29. The unit shall provide high pressure water spraying nozzle at the iron ore fines and stock yards and feeding section.
30. All the permanent internal roads along the crusher and screening plant shall be concreted or black topped. Permanent high pressure water sprinkling system shall be installed for regular spraying of water on roads to minimize fugitive dust emission.
31. Rain water harvesting shall be followed by utilizing the rain water collected from the roof of the administrative buildings for recharging of ground water within the premises as per the concept and practices prescribed by CPCB.
32. The Mine shall provide mechanized wheel washing system along with effluent treatment and recycling facilities at the exit point of the mine.

AIR POLLUTION:

33. Ambient Air Quality shall be maintained as per National Ambient Air Quality standard prescribed for industrial and mixed used area under E (P) Act, 1986.
34. Fugitive and AAQ monitoring shall be carried out and report shall be submitted to the Board regularly.
35. Drift shall be wet operated or with dust extractors and controlled blasting shall be practices. Pre-wetting of blasting site shall be practiced.
36. The primary crusher, screen and secondary crusher shall be placed in covered shed. All the conveyor shall be covered with corrugated GI Sheets.
37. Both dust suppression (dry fog) and extraction (bag filter) system shall be provided at all dust generating source such as crushing, screening & material transfer points etc. such that, particulate matter concentration in ambient air shall not be more than 1200 µg/m³ at a distance of 25.0 ± 2.0 m from the source of fugitive emission in the predominant down

wind direction as per MoEF&CC, Govt. of India notification No. G.S.R. 809(E), dated 04.10.2010 (copy enclosed as **Annexure – I**).

38. The suction points of dust extraction system shall be provided at primary crusher discharge chute, screen, all transfer points, secondary crusher discharge chutes and any other dust generating sources. This system shall be connected to bag filters so that particulate matter emission from the stack shall not exceed 100 mg/Nm³ as per MoEF&CC, Govt. of India Notification no-GSR.-809(E) dated 4th October 2010 (copy enclosed as **Annexure-I**). Stack height for de-dusting unit shall be calculated as per above notification of MoEF&CC, Govt. of India i.e. $H = 74 Q^{0.27}$ where H and Q are stack height in meter and particulate matter (PM) emission in ton/hr respectively.
39. All the product conveyor of the screens shall discharge the product into a hopper and chute arrangement fitted with dust extraction and bag filter system. Chute shall be maximum 3 meter height from the ground level. Fixed auto sprinklers shall be provided in the stock yard of product.
40. The mine shall make provision to collect the fine products in hopper instead of heaping by free falling to avoid the dust nuisance. The ore fines shall be stacked properly and systematically with retaining wall at the toe to avoid washings during rain. Ore fine transportation shall be done in covered truck.
41. Dust suppression on mine haul roads, active OB dumps and mine working benches shall be done by spraying water through water sprinklers along with chemical binders/wetting agents at frequent interval in order to reduce water consumption and to improve retention and re-absorption capacity of water. Water sprinklers of fixed type shall also be provided at the mine HEMM maintenance shop, other service centers and approach roads from mines to raw material handling & product handling area to prevent the generation of dust to be air borne.
42. Adequate measures shall be taken for control of noise levels in the work environment of mine area so that noise levels at the boundary line of mining lease area shall not exceed 75 dB (A) during day time (06:00 AM to 10:00 PM) and 70 dB(A) during night time (10:00 PM to 06:00 AM).
43. Adequate noise barriers shall be provided surrounding the crushing and screening plants to control noise pollution and avoid impact on wildlife due to operation of crushing and screening plants during night hours.
44. Online noise monitoring system shall be installed to monitor noise level during night hours.
45. Protective barriers shall be provided for the lights to prevent illumination towards the forest area during night hours.
46. Fixed auto sprinklers on both sides of major haul road and approach roads of the mine shall be installed and frequency of water sprinkling through mobile water tankers shall be enhanced at the said areas till installation of fixed auto sprinklers.
47. Regular water sprinkling through mobile water tankers shall be carried out at mineral stockpile area, mines approach road and transportation road to avoid generation of dust during movement of vehicles.
48. Necessary preventive measures shall be taken during mining so that the ambient air quality including noise shall conform to National ambient air quality standards in industrial

area as per Annexure-II. Six monthly air quality monitoring report shall be submitted to the Board regularly.

49. Ambient Air Quality shall be monitored at three locations within core zone and three locations within buffer zone of ML area as per NAAQS standards. Fugitive emission shall also be monitored at relevant locations as specified in the Condition No. 14. The location of the monitoring stations shall be decided in consultation with Regional Officer, SPCB, Odisha,
50. The proponent shall install 03 nos. of Online Continuous Ambient Air Quality Monitoring Station (CAAQMS) inside the mining lease area order to monitor PM10, PM2.5, SO2, NOx, CO for online real time data transmission through GPRS system to SPCB RTDAS server and also upload data to CPCB.
51. IP Cameras shall be installed at major dust prone areas of mine such as mine quarry, mineral/fines stock yards, haul roads, transportation roads, mineral handling plants etc. and they shall be connected to SPCB Server.
52. Dry fog system shall be provided at the point of loading to the conveyor to minimize fugitive emission.
53. The trucks carrying fines shall be covered with tarpaulin and over loading shall be avoided to minimize fugitive emission.
54. The permanent internal roads used for transportation shall be made block topped/ Concreted. Fixed type water sprinklers shall be provided along these internal roads to minimize fugitive emission.
55. Regular collection of spilled over fines from haul roads shall be practiced to prevent the generation of dust to be air borne.

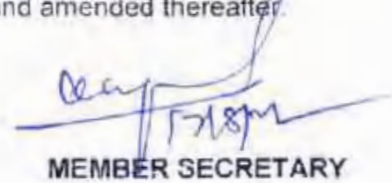
SOLID AND HAZARDOUS WASTE:

56. Solid waste to be generated during course of mining shall be dumped in the earmarked dump area as per approved mining plan.
57. The OB/waste dumps shall be properly dressed benched at low angle with terracing in the slopes. Vegetation should be carried out over dump slopes and hydro seedling technique or use of geo-tiles mat embedded with seed shall be adopted.
58. Hazardous waste storage area shall be earmarked before disposal of hazardous waste as per guidelines.
59. Top soil should be stacked separately with proper slope at earmarked site (s) with adequate measures and shall be used for reclamation and rehabilitation of mined out areas.
60. The OB/waste dumps shall be properly dressed benched stopped at low angle (30°) with terracing and coir matting in the slopes making retaining walls stone barriers at the toe of the dumps gully plugging etc. to prevent the soil erosion during monsoon, besides establishing vegetation on dump top as well as its slope surface. In difficult cases, hydro-seedling technique or use of geo-tiles mat embedded with seeds shall be adopted.



61. The proponent shall comply to the provisions of Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 and amended thereafter.

Encl: As above


MEMBER SECRETARY

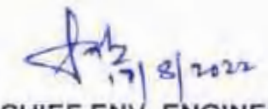
To,

The Managing Partner,
Raikela Iron Ore Mines of M/s Geetarani Mohanty,
At – Station Road, Barbil, Dist. – Keonjhar.

Memo No. 14892 /Date 19.08.2022

Copy forwarded to:

1. The Director, Directorate of Mines, Govt. of Odisha, Bhubaneswar
2. The Collector & District Magistrate, **Sundargarh**.
3. The Director, Directorate of Mines, Govt. of Odisha, Bhubaneswar
4. The Regional Officer, SPC Board, **Rourkela**.
5. The DFO, **Bonai**.
6. Copy to HSM Cell, SPC Board, Bhubaneswar
7. Consent to Operate Section, SPC Board, Bhubaneswar
8. Copy to Guard file


ADDL. CHIEF ENV. ENGINEER

MINISTRY OF ENVIRONMENT AND FORESTS

NOTIFICATION

New Delhi, the 4th October, 2010

G.S.R. 809(E).—In exercise of the powers conferred by Sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following Rules further to amend the Environment (Protection) Rules, 1986, namely:-

1. (1) These rules may be called the Environment (Protection) (Sixth Amendment) Rules, 2010.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in schedule I, after serial number 17 and the existing entries relating thereto, the following serial number and entries shall be inserted, namely :-

S. No	Industry	Parameter	Standard
(1)	(2)	(3)	(4)
18	Iron Ore Mining and Ore Processing	A. Emission Standards for Stack for De-dusting Unit	
		Particulate matter	100 mg/ Nm ³
		Stack height **	15.0 m
		** Stack height for De-dusting unit shall be calculated as $H=74 Q^{0.27}$, where H and Q are stack height in metre and particulate matter (PM) emission in tonne/hr respectively, i.e.	
		Q (kg/hr)	H (metre)
		up to 2.71	15
		2.72 - 7.86	20
		7.87 - 17.96	25
		17.97 - 35.29	30
		Note:- Stack attached to De-dusting unit shall have minimum height of 15.0 metres and would be atleast 2.50 metres above the top-most point of the nearby building/shed or plant in the mine.	
		B. Fugitive Emission Standards	
		Particulate matter	1200 µg/m ³
		Note:- Fugitive emission shall be monitored in the predominant downwind direction at a distance 25.0±2.0 metres from the source of fugitive emission as per following:	

1	2	3	4
		Area	Monitoring location
		Mine face/ Benches	Drilling, excavation and loading applicable for operating benches above watertable
		Haul Roads/ Service Roads	Haul roads to ore processing plant, waste dumps and loading areas and service road
		Crushing plant	Run-off mine unloading at hopper, crushing areas, screens and transfer points
		Screening Plant	Screens, conveying and transportation of ore discharge points
		Ore Storage & Loading	Intermediate stock bin/pile areas, ore stock bin/pile areas, wagon/truck loading areas
		Waste dump	Active waste/reject dumps
		C. Effluent Standards	
		pH	5.5-9.0
		Suspended solids (non-rainy day)	50 mg/l
		Suspended solids (rainy day)	100 mg/l
		Oil & grease	10 mg/l
		Note:-	
		(i) All efforts shall be made to reuse and re-circulate the treated effluent.	
		(ii) The aforesaid effluent standards shall be complied with for sewage, service water, beneficiation of ore washwater and surface run-off put together."	

(F No. Q-15017/21/2007-CPW)

RAJNEESH DUBE, Jt. Secy.

Note : The principal rules were published in the Gazette of India vide number S.O. 844 (E) 19th November, 1986; and subsequently amended vide S.O. 433 (E) dated 18th April 1987; S.O. 64 (E), dated the 18th January 1988 and recently amended vide G.S.R. 97(E), dated the 18th February, 2009; G.S.R. 149 (E), dated the 4th March, 2009; G.S.R. 512(E), dated the 9th July, 2009; G.S.R. 543 (E), dated the 22nd July, 2009; G.S.R. 595(E), dated the 21st August, 2009; G.S.R. 794 (E), dated the 4th November, 2009; G.S.R. 826 (E), dated the 16th November, 2009; G.S.R. 01 (E), dated the 01st January, 2010; G.S.R. 61 (E), dated the 5th February, 2010; GSR 485(E), dated the 9th June, 2010; GSR 608 (E), dated the 21st July, 2010 and GSR 739 (E), dated, the 9th September, 2010.

ANNEXURE-II

SCHEDULE (see rule 3(1) and 4(1))

Ambient Air Quality Standards in respect of Noise

Area Code	Category of Area/Zone	Limits in dB(A) Leq *	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note

1. Day time shall mean from 06:00 A.M. to 10:00 P.M.
2. Night time shall mean from 10:00 P.M. to 06:00 A.M.
3. Silence zone is defined as an area comprising not less than 100 meters around hospitals, educational institutions and courts. The silence zones are zones which are declared as such by the competent authority.
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

*dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A "decibel" is a unit in which noise is measured.

"A", in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq : It is an energy mean of the noise level, over a specified period.

[F. No. Q-14012/1/96-CPA]
VIJAI SHARMA, R. Secy.

By e-mail

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
OFFICE OF THE REGIONAL CONTROLLER OF MINES, BHUBANESHWAR**

No. IBM/5796/2011/ 30ORI13034

Dt : 12/07/2023

Shri/M/s. GEETARANI MOHANTY ,
380,BOMIKHAL CUTTACK PURI ROAD BHUBANESWAR

RAIKELA 30ORI13034 (38478603)

Sub Approval of the Modification of Review of Mining Plan alongwith Progressive Mine Closure Plan (PMCP) in respect of RAIKELA
: Mining Lease for Iron Ore over an area of 67.586 ha of M/s Geetarani Mohanty, situated in Raikela Village, Koira Taluka, Sundargarh District of Odisha State

Sirs,

In exercise of the powers conferred by clause (b) of sub-section (2) of section 5 of the Mines & Minerals (Development & Regulation) Act, 1957 and rule 16, clause (3) of Rule 17 of the Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 read with Government of India Order No. S.O. 1857(E) dated 18th May, 2016; I hereby **approve** the Modification of Review of Mining Plan along with Progressive Mine Closure Plan (PMCP) in respect of RAIKELA Mining Lease for Iron Ore over an area of 67.586 ha of M/s Geetarani Mohanty, situated in Raikela Village, Koira Taluka, Sundargarh District of Odisha State. This approval is subject to the following conditions:-

A--General Conditions:

- (1). The Modification of Review of Mining Plan is approved without prejudice to any other law applicable to the mine area from time to time whether made by the Central Government, State Government or any other authority and without prejudice to any order or direction from any court of competent jurisdiction.
- (2). That this approval of aforesaid Modification of Review of Mining Plan does not in any way imply the approval of the Government in terms of any other provision of Mines & Minerals (Development & Regulation) Act, 1957, or the Mineral Concession Rules, 2016 and any other laws including Forest (Conservation) Act, 1980, Environment (Protection) Act, 1986 or the rules made there under and other relevant statutes, order and guidelines as may be applicable to the lease area from time to time
- (3). The provisions of the Mines Act, 1952 and Rules and Regulations made thereunder including submission of notices of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with.
- (4). The execution of Modification of Review of Mining Plan shall be subjected to vacations of prohibitory orders / notices, if any.
- (5). If anything is found to be concealed as required by the Mines Act in the contents of the mining plan and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- (6). This approval for proposed mining operations and associated activities is restricted to the mining lease area only from this date. The mining lease area is as shown on the statutory plans by the Lessee/QP/Applicant and Indian Bureau of Mines has not undertaken any survey verification of mining lease boundary on the ground.
- (7). Your attention is invited to the Supreme Court interim order in W.P. (C) No. 202 dated 12.12.1996 for compliance. The approval of above said Mining Plan is therefore, issued without prejudice to and is subject to the said directions of the Supreme Court as applicable.
- (8). This department does not undertake any responsibility regarding correctness of the boundaries of the lease area shown on the ground.
- (9). At any stage, if it is observed that the information furnished in the document are incorrect or misrepresent facts, the approval of the document shall be revoked with immediate effect.
- (10). If this approval conflicts with any other law or court order/ Direction under any statute, it shall be revoked immediately.
- (11). It shall be mandatory for the project proponent, abstracting ground water, to obtain "No Objection Certificate" from Central Ground

Water Authority or, the concerned State/Union Territory Ground Water Authority, as the case may be.

(12). Lessee shall ensure grassing/re-grassing of worked out mining lease area in accordance with Hon'ble Supreme Court Order dated 8/1/2020.

(13). This approval has been given for mining proposal for the year 2023-24 to 2025-26 and are subject to the validity of lease period.

(14). The next Review of Mining Plan for the subsequent period of five years shall become due 180 days before expiry of this document proposal period.

(15) The validity period of the financial assurance shall be renewed before the expiry of the same and should be submitted to this office on or before 1/4/2026.

(16) Disposal of OB/Waste as minor mineral shall be carried out only after obtaining permission under Rule 12(1)(k) of Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016.

Yours Faithfully

(B.L.GURJAR)

RAIKELA 30ORI13034 (38478603)

Regional Controller Of Mines,

Indian Bureau of Mines, Bhubaneswar

Copy for information to :-

(1). The Controller of Mines (EZ), Indian Bureau of Mines, CP-13, Sector V, Salt Lake City, Kolkata- 700 091 by mail. zo.kol@ibm.gov.in

(2). The Director of Mines, Directorate of Mines, Government of Odisha, Heads of the Department Building, Bhubaneswar- 751001, Email- directorateofmines@orissaminerals.gov.in.

(3). The Director of Mines Safety , Chaibasa Region, Email- altafhussainaksa@gmail.com

(4). Qualified Person – Shri Pradeept Mohapatra, by mail. Pmohapatra_07@yahoo.com

(5). Concerned MCDR file.

Chapter 1 : General Information

1.1 : Lease Details

IBM Registration Number :	IBM/5796/2011
Lease Code :	38478603
Mine Code :	30ORI13034
Name of Lessee :	GEETARANI MOHANTY
Address of Lessee :	380,BOMIKHAL CUTTACK PURI ROAD BHUBANESWAR
Type of Lessee :	Private Entity Other Than Individual
Name of Mining Lease :	RAIKELA 30ORI13034
State :	ODISHA
District :	SUNDARGARH
Tehsil/ Taluk/ Mandal :	Koida
Village :	Raikela
Lease Area (Ha) :	67.586
Forest Area (Ha) :	66.6710
Name of Minerals :	IRON ORE
Name of associated minerals :	IRON ORE

Type :	Existing Lease
Period of the proposal (FY) from :	2023 - 24
Period of the proposal (FY) to :	2025 - 26
Type of working :	Opencast
Nature of Use :	Non Captive
Category of Mine :	Category A

1.1.1 : Initial/subsequent Lease grant details

Grant	From	To	Lease deed execution date	Lease registration date
Initial Grant	02/07/1991	01/07/2011	02/07/1991	02/07/1991
1st Extension	02/07/2011	01/07/2041	27/05/2019	30/05/2019

1.1.2 : Mining Plan Submission Criteria Details

Type of Document :	Modification Of Mining Plan Under Rule 17(3) Of MCR, 2016
Reason/s For Modification :	1. Common Boundary Working With PTA. 2. The Approved Mining Plan Was Prepared As Per The Authenticated Lease Map But In This Modification ML Boundary Is As Per DGPS Map. 3. In The Existing Top Pit The Production Of Lumpy Ore Generation Is Less. As The Market Value Of Lumpy Ore Is More From The Business Environment Point Of View, This Quarry Has Been Planned To Get The Lumpy Ore. As Far As The Mineral Conservation Point Of View This Has Been Proposed To Be Developed To Maintain The Require Grade As Per The Consumers Demand. The Location Of The Proposed New Quarry Is Between E-311660-312078 To 2419023-2419443.The Year Wise Dimension Of The Proposed New Quarry Is Given Below: Year Length In M Width In M 2023-24 284 195 2024-25 320 274 2025-26 383 277
Period for which modification is proposed :	2023-2024 to 2025-2026

1.2 : Land Ownership Details

View Land Ownership Details Excel	Land_Ownership_GRM.xlsx
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1.3 : Existing Lease

Date of Execution :	02/07/1991
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1.3.1 : Approval of earlier Mining Plan & Its Subsequent Review in Chronological Order

S.N.	Letter Number	Date	Period		Type Of Approved Document	Remark
			From	To		
1	RQP/CAL/006/87/A/M O-94	27/06/1990	01/04/1993	31/03/1999	Mining Plan	Mining Plan
2	BBS/SNG/Fe/MS-7	11/10/1999	01/04/1999	31/03/2004	Scheme Of Mining	1ST MINING SCHEME
3	BBS/SNG/Fe/MS-7	08/05/2003	01/04/2002	31/03/2004	Modification Of Mining Plan	MODIFICATION IN THE APPROVED SCHEME OF MINING
4	314(3)/2004/MCCM(c)/ MS-14	17/02/2005	01/04/2004	31/03/2009	Scheme Of Mining	2ND MINING SCHEME
5	314(3)/2009/MCCM/(C Z)/MS/36	22/03/2010	01/04/2009	01/07/2011	Scheme Of Mining	3RD SCHEME OF MINING
6	314(3)/2011/MCCM/(C Z)/MP/10	03/08/2011	01/07/2011	31/03/2016	Mining Plan	MINING PLAN
7	MPM/FM/07-ORI/BHU /2015-16	15/06/2016	01/04/2016	31/03/2021	Scheme Of Mining	1ST SCHEME OF MINING

8	MSM/FM/10-ORI/BHU /2019-20/1087	20/09/2019	01/04/2019	31/03/2021	Modification In RMP	MODIFICATION OF REVIEW OF MINING PLAN
9	RMP/A/30-ORI/BHU-2 020-21	18/11/2020	01/04/2021	31/03/2026	Review Of Mining Plan	REVIEW OF MINING PLAN
10	MRMP/A/05-ORI/BHU /2021-22	01/07/2021	01/04/2021	31/03/2026	Modification In RMP	MODIFICATION OF REVIEW OF THE MINING PLAN
11	MRMP/A/32-ORI/BHU /2021-22	06/01/2022	01/01/2022	31/03/2026	Modification In RMP	MODIFICATION OF REVIEW OF MINING PLAN

1.3.2 : Partial Surrenderd Area During Stages of Operations in Chronological Order

Not Applicable

1.3.3 : Transfer of Lease Area Subsequent to Grant

Sr.no	Transfer of lease deed letter number	Date of execution of Transfer lease deed	Name of Transferor	Nature of block transferred		
				Granted through auction	Other than through auction for captive use	Other than through auction for non captive use
1	344(O)&345(D)	13/01/1993	Smt Geetarani Mohanty	No	No	Yes

1.3.4 : Statutory Compliances

1.3.4.1 : Environment Clearance

Applicable :	Yes
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Letter No :	SEIAA FILE NO-64563/88-MINB1/05-2022
Date :	27/12/2022
Validity :	01/07/2041
ROM Mineral :	4990000.0000 (Tonnes)

1.3.4.2 : SPCB Approvals

Letter No :	14891/IND-II-CTE-6693
Approval of :	Consent To Established
Date :	19/08/2022
Validity :	01/07/2041
ROM Mineral :	4990000.0000 (Tonnes)

1.3.4.3 : Forest Clearance

Applicable :	Yes
Letter No :	8-37/2007-FC
Date :	22/10/2014
Validity :	01/07/2041
Area (Ha) :	66.6710

1.3.4.4 : Land Acquisition Details

Total Area Acquired in hectare:	0.0000
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Total Amount Paid (INR) :	0.0000
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1.3.5 : Mine Location Details

Toposheet Number :	F45N1(73G/1)
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1.3.5.1 : Location of Boundary Pillars

View Location of Boundary Pillars Excel	location_boundary_pillar_GRM.xlsx
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1.3.6 : Owner/Nominated Owner Details

Name	PAN of owner / Nominated Owner	Address of owner/ Nominated Owner	Mobile Number	Email	Please attach Minutes of Board Resolution in case of Nominated Owner
GEETARANI MOHANTY	QUFERkcxNjkyRA==	380,BOMIKHALCUTTACK PURI ROADBHUBANESWAR	0674-2580999	geetarani.mines@gmail.com	Board_resolution_Nominated_owner.pdf

1.3.7 : Qualified Person Details as per M(OAHCEM)CR, 2016

S.N.	Prefix	Name	PAN of QP	Address	Mobile no.	Qualification	Exp in years as prescribed under the rule	Email
1	Mr	Pradeept Mohapatra	AUGPM5286J	WORLD CONSULTANCY SERVICES,KONARK CONSTRUCTION AND ENGINEERING L TD,TELENGAPE NTHA,CUTTACK	9438149715	MSC GEOLOGY	19	pmohapatra_07@yahoo.com

				-754001				
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Approved

Chapter 2A : Geology & Exploration

2A.1 : Geology

2A.1.1 : Topography

Terrain :	Undulating
Highest Level (m) from MSL :	840.0000
Lowest Level (m) from MSL :	620.0000
Average Level (m) from MSL :	730.0000
Drainage Pattern :	Dendritic
Order of Stream :	Order 1
Min Dist of Stream from Lease Area(m) :	2.5000

2A.1.2 : Details of Physiographic features and Infrastructures available in and around the lease/ block area

Description	Location if existing Within the lease/block area	Distance from boundary periphery in kms, if existing outside the lease/block area. (within 5.00Kms)	Remark if any
River/Nallah/Reservoir	NOT APPLICABLE	2.5	KAKARPANI NALA
Public roads (Tar road, cart road)	KOIRA TENSA ROAD	0	Within the lease area
Railway track	NOT APPLICABLE	Nil	Nil
Human settlements	NOT APPLICABLE	1.2	RAIKELA-ADJACENT,TENTULIDIHI-1.2,D ENGULA-1.5 AND NUAGAON-3.5KM
Archaeological monuments/ places of worships/public utilities etc	NOT APPLICABLE	0	Nil

Wild life sanctuaries/ national parks	NOT APPLICABLE	Nil	NOT APPLICABLE
Coastal Regulation Zone (CRZ)	NOT APPLICABLE	Nil	NOT APPLICABLE
Powertransmision lines/telephone lines	HT LINE	Within the lease area	Nil
Firing range	NOT APPLICABLE	Nil	NOT APPLICABLE
Ordinance factory	NOT APPLICABLE	Nil	NOT APPLICABLE
grazing land/ burial ground or cremation ground	NOT APPLICABLE	Nil	NOT APPLICABLE
Any other specify	NOT APPLICABLE	Nil	NOT APPLICABLE

Particulars	Distance from lease boundary in kms
Near by village	Raikela village is adjacent to lease area.
Nearest Railway station	Barsuan railway station is 14km from the lease area.
Nearest Port	Paradeep port is located at a distance of 350.00km from lease area.
Distance of SH/NH from lease area	NH-520 is 9.00km far from the lease area.

2A.1.3 : Regional Geology

Regional Geology Regional Geology- The Pre-Cambrian iron ore formations of the iron ore series has been deciphered to be an asymmetrical synclinorium pitching towards north. The famous "Horse Shoe” shaped synclinorium as described by Jones and others open at the north and closes at the south of Malangtoli. The superimposed folding is noticed within the synclinorium and the general strike is NNE - SSW with westerly dip. The stratigraphic succession has undergone evolutionary changes as per the interpretation of various geologists hence the regional Stratigraphy as postulated by Prof. Sarkar and Saha in 1983 as mentioned in following Table wherein the geo-chronological data are also included. Lithology (Regional) The different lithological units present can be broadly categorized into three major groups, namely (a) Basic volcanic rocks - Lavas - Dolerites. (b) Iron Ore formations (BIF), stratiform such as BHJ/BHQ. (c) Argillaceous formations such as shale Alluvium Laterite (Iron bearing at places) Newer Dolerites Kolhan Group ----- Unconformity ----- Singbhum Granite (Intrusive in to Iron Ore Group-IOG) Epidiorite (Intrusive) Upper tuffs & Volcanics Iron bearing shale Iron Ore Group BIF with Iron Ores Lower tuffs and grey wacke Quartzite ----- Unconformity ----- Older metamorphic gneisses Older metamorphic supra crustal Group
--

2A.1.4 : Local Geology & Structure

2A.1.4.1 : Local Geological Set-up	
The available field studies conducted indicates that the local structural elements are compatible with the general regional trend of the western limb of the synclinorium. The main rock types found in this mines are BHQ, Hematite (Massive, Laminated), Lateritic Iron Ore and ferruginous laterite. In the ML area, iron ore found as mainly hard massive and laminated variety. The lithological succession established as observed within the leasehold area are compatible with other locations on the western limb of the synclinorium. The general lithological succession is as follows: Alluvium Laterite/lateritic ore Massive / Laminated in-situ ore Shale BHQ / BHJ	

2A.1.4.2 : Structure	
The strike varies from NE to SW. The dip is generally westerly but varying from 40degree to 45degree and in few isolated locations the dip amount is 50 degree. These normally conform to the regional trend of the rock i.e. BHQ/BHJ.	

2A.1.4.3 : Lithology, Petrographic & Mineralogical Description for Major, Associated & Indicator Minerals	
(i)Soil & Alluvium Soil and Alluvium occurs in the North-east of lease area having thickness of 0.5 m to 1.00m. (ii) Laterite/lateritic ore The Laterite is reddish, brown, porous, concretionary material. It is exposed in the eastern section of the Raikela Iron Ore Mines whereas Brecciated Laterite (conga) is found in the north eastern part. (iii) Massive / Laminated in-situ ore Hematite is a massive and steel gray colour ore ranging from 55% to 65% Fe. Porous laminated variety is also available ranging from low to medium grade of iron content. Iron ore found within the M.L area are of massive, hard and soft laminated variety. (iv) Shale Shale is a Major litho-unit in the lease area which continues after the termination of the ore body in most of the boreholes. Thickness of the Shale varies from section to section. (iv) Banded Hematite Quartzite (BHQ) BHQ is found in the east covers a small area. Banded hematite quartzite is found as big boulders. Alternate band of hematite and quartzite is the main characteristic of BHQ. The BHQ is very hard to disintegrate the hematite portion.	

2A.1.4.4 : Mode of Occurance & Controls of Mineralization	
Control of mineralization The possible parameters of control of mineralization may be attributed to (a) Regional and local tectonics, (b) Leaching and metasomatic replacement of BHQ and there by leading to iron ore formations, as evidenced by the presence of unleached portion of the ore and BHQ in the ore body	

2A.1.4.5 : Extent of Weathering/ Alteration	
The weathering has led to the formation or Laterite, which is highly erratic in nature, hence irregular/discontinuous pockets of Laterite is a common feature in the iron ore deposits.	

2A.1.4.6 : Nature/Form of Mineral	Lump
--	------

Specify If any other	Friable, powdery (Lumps :Fines - 30 : 70) .As per the last three year(2020-21,2021-22 and 2022-23) annual return submitted to IBM data the percentage of lumps fines has been given below: Year % of lumps % of fines 2020-21 37 63 2021-22 30 70 2022-23
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2A.1.4.7 : Extent of Mineralization

The lessee has drilled 64 nos of Core drill and accordingly the maximum depth attained is 112.50m (BH-16/19) and the minimum depth is 20.70m (BH-33/20). There exist two quarries namely Top quarry and middle quarry within the ML area and the floor of the quarry is 690.00m and 635.00m respectively. These quarries give detail information about the configuration of ore body. Considering the information of existing quarries, bore hole data, the shape and of the mineral deposit is 930m x 750m x 109.50m.

2A.1.4.8 : Deposit Type (as per MEMC Rule)

Type of Deposit: Bedded Stratiform deposits of regular habit Strike / Trend of the Ore Body: NNE to SSW Amount of dip of Orebody: 43 to 50 Dip Direction of the Ore Body: NW Plunge of Mineral Body (degree) (if any): Nil Direction of plunge: Not Applicable

Strike / Trend of the Ore Body						
N	30	E	to	S	30	W

Amount of Dip of the Ore Body (degree)	Amount of Dip of the Ore Body (degree)
43	50
(from)	(to)

Dip Direction of the Ore Body			Plunge of Mineral Body (degree) (if any)	Direction of Plunge		
N	45	W	Nil	W	Nil	W

2A.2: Exploration

2A.2.1: Summary of The Previous Exploration (for fresh grant) / During Last Plan Period (for existing leases)

Name of The Agency

MS NATURAL RESOURCES EXPLORATION AND MINING PVT. LTD & WORLD CONSULTANCY SERVICES PVT. LTD.

2A.2.1.1: Geological Mapping

SI.No.	Year		Scale	Area Covered (Ha)
	From	To		
1	01/04/2022	31/03/2023	1:2000	67.5860

2A.2.1.2: Airborne Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					Form	To	Form	To
1	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.1.3: Ground Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					Form	To	Form	To
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.1.4: Geochemical Survey

SI.No.	Type of Sample	No of Samples	Aanlysis report	Area Covered (Ha)
1	Nil	0	Nil	Nil

2A.2.1.5: Pitting

Number of Pits
0

Sl.No.	Year		Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av Grade(in %)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.1.6: Trenching

Number of Trenches															
0															

2A.2.1.6.1: Spacing

Min (m)						Max (m)						Avg (m)			
Nil						Nil						Nil			

Sl.No.	Year		Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench(m)	Depth (from)	Depth(to)	Running mtr	Litho units exposed	Name of the radical	Av. Grade	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
	From	To											From	To	From	To
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.1.7 Exploratory Drilling(Core/non Core)

Sl.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	
1	01/04/2019	31/03/2020	MS NATURAL RESOURCES EXPLORATIO N AND MINING	19	1336.85	0	0.00	19	1336.85	BH Logsheet GRM -1-19.xls x

			PVT.LTD							
2	01/04/2020	31/03/2021	MS NATURAL RESOURCES	27	1904.38	0	0.00	27	1904.38	BH Logsheet GRM - 20-47.xlsx
3	01/04/2021	31/03/2022	MY WORLD C CONSULTANCY PVT.LTD.	15	988.00	0	0.00	15	988.00	BH Logsheet 4 8-62.xlsx

2A.2.1.8: Exploratory Mining

SI.No.	Pit/Adit ID	Length in Mtr	Width in Mtr	Depth in mtrs	Volume (m³)
1	Not carried out	Nil	Nil	Nil	Nil

2A.2.1.9: Sampling

SI.No.	Type of sample	No of samples collected	Number of samples analyzed	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remark if any
				From	To	From	To	
1	Drill Core	64	64	21:52:01.38	21:52:01.38	85:10:46.06	85:10:46.06	BH-1/19
2	Drill Core	35	35	21:52:31.14	21:52:31.14	85:10:43.74	85:10:43.74	BH-2/19
3	Drill Core	49	49	21:51:58.76	21:51:58.76	85:10:44.01	85:10:44.01	BH-3/19
4	Drill Core	71	71	21:51:56.93	21:51:56.93	85:10:46.40	85:10:46.40	BH-4/19
5	Drill Core	75	75	21:52:18.28	21:52:18.28	85:10:39.20	85:10:39.20	BH-5/19
6	Drill Core	56	56	21:52:15.94	21:52:15.94	85:11:00.09	85:11:00.09	BH-6/19
7	Drill Core	85	85	21:52:04.98	21:52:04.98	85:10:45.32	85:10:45.32	BH-7/19
8	Drill Core	61	61	21:52:04.98	21:52:04.98	85:10:45.32	85:10:45.32	BH-8/19
9	Drill Core	87	87	21:52:14.11	21:52:14.11	85:10:56.35	85:10:56.35	BH-9/19
10	Drill Core	76	76	21:52:28.58	21:52:28.58	85:10:41.64	85:10:41.64	BH-10/19
11	Drill Core	49	49	21:51:59.72	21:51:59.72	85:10:48.59	85:10:48.59	BH-11/19
12	Drill Core	68	68	21:52:07.60	21:52:07.60	85:10:55.39	85:10:55.39	BH-13/19

13	Drill Core	75	75	21:52:03.78	21:52:03.78	85:10:47.98	85:10:47.98	BH-14/19
14	Drill Core	43	43	21:52:25.70	21:52:25.70	85:10:39.62	85:10:39.62	BH-15/19
15	Drill Core	115	115	21:52:10.28	21:52:10.28	85:10:56.64	85:10:56.64	BH-16/19
16	Drill Core	32	32	21:52:16.19	21:52:16.19	85:10:35.46	85:10:35.46	BH-17/19
17	Drill Core	84	84	21:52:12.35	21:52:12.35	85:10:58.95	85:10:58.95	BH-18/19
18	Drill Core	43	43	21:52:06.63	21:52:06.63	85:10:50.18	85:10:50.18	BH-19/19
19	Drill Core	56	56	21:52:16.42	21:52:16.42	85:10:53.54	85:10:53.54	BH-20/19
20	Drill Core	74	74	21:52:09.29	21:52:09.29	85:10:52.34	85:10:52.34	BH-21/20
21	Drill Core	88	88	21:52:18.60	21:52:18.60	85:10:56.37	85:10:56.37	BH-22/20
22	Drill Core	76	76	21:52:17.36	21:52:17.36	85:10:40.92	85:10:40.92	BH-23/20
23	Drill Core	73	73	21:52:12.30	21:52:12.30	85:10:54.18	85:10:54.18	BH-24/20
24	Drill Core	68	68	21:52:23.07	21:52:23.07	85:10:55.26	85:10:55.26	BH-25/20
25	Drill Core	94	94	21:52:21.64	21:52:21.64	85:10:40.48	85:10:40.48	BH-26/20
26	Drill Core	35	35	21:52:19.66	21:52:19.66	85:10:43.25	85:10:43.25	BH-27/20
27	Drill Core	60	60	21:52:24.23	21:52:24.23	85:10:41.91	85:10:41.91	BH-28/20
28	Drill Core	62	62	21:52:22.18	21:52:22.18	85:10:44.93	85:10:44.93	BH-29/20
29	Drill Core	39	39	21:52:25.10	21:52:25.10	85:10:47.19	85:10:47.19	BH-30/20
30	Drill Core	62	62	21:52:27.04	21:52:27.04	85:10:43.61	85:10:43.61	BH-31/20
31	Drill Core	70	70	21:52:27.59	21:52:27.59	85:10:49.08	85:10:49.08	BH-32/20
32	Drill Core	18	18	21:52:20.87	21:52:20.87	85:10:52.99	85:10:52.99	BH-33/20
33	Drill Core	61	61	21:52:29.05	21:52:29.05	85:10:46.10	85:10:46.10	BH-34/20
34	Drill Core	77	77	21:52:22.79	21:52:22.79	85:10:50.08	85:10:50.08	BH-35/20
35	Drill Core	63	63	21:52:14.15	21:52:14.15	85:10:39.42	85:10:39.42	BH-36/20
36	Drill Core	66	66	21:52:25.38	21:52:25.38	85:10:51.96	85:10:51.96	BH-37/20
37	Drill Core	75	75	21:52:09.13	21:52:09.13	85:10:34.75	85:10:34.75	BH-38/20
38	Drill Core	39	39	21:52:11.62	21:52:11.62	85:10:36.91	85:10:36.91	BH-39/20

39	Drill Core	104	104	21:52:13.16	21:52:13.16	85:10:46.68	85:10:46.68	BH-40/20
40	Drill Core	53	53	21:52:11.28	21:52:11.28	85:10:49.80	85:10:49.80	BH-41/20
41	Drill Core	59	59	21:52:13.51	21:52:13.51	85:10:51.90	85:10:51.90	BH-42/20
42	Drill Core	89	89	21:52:17.73	21:52:17.73	85:10:45.30	85:10:45.30	BH-43/20
43	Drill Core	111	111	21:52:03.34	21:52:03.34	85:10:43.29	85:10:43.29	BH-44/20
44	Drill Core	85	85	21:52:10.63	21:52:10.63	85:10:44.34	85:10:44.34	BH-45/20
45	Drill Core	92	92	21:52:18.34	21:52:18.34	85:10:50.93	85:10:50.93	BH-46/20
46	Drill Core	83	83	21:52:18.34	21:52:18.34	85:10:50.93	85:10:50.93	BH-47/20
47	Drill Core	76	76	21:52:00.45	21:52:00.45	85:10:41.34	85:10:41.34	BH-48/21
48	Drill Core	97	97	21:52:01.92	21:52:01.92	85:10:50.76	85:10:50.76	BH - 49/21
49	Drill Core	82	82	21:52:26.92	21:52:26.92	85:10:53.09	85:10:53.09	BH - 50/21
50	Drill Core	22	22	21:52:21.70	21:52:21.70	85:10:39.88	85:10:39.88	BH-51/21
51	Drill Core	66	66	21:52:19.43	21:52:19.43	85:10:37.34	85:10:37.34	BH-52/21
52	Drill Core	52	52	21:52:15.01	21:52:15.01	85:10:43.80	85:10:43.80	BH-53/21
53	Drill Core	52	52	21:52:29.54	21:52:29.54	85:10:40.20	85:10:40.20	BH-54/21
54	Drill Core	74	74	21:52:32.23	21:52:32.23	85:10:42.19	85:10:42.19	BH-55/21
55	Drill Core	118	118	21:52:12.39	21:52:12.39	85:10:41.74	85:10:41.74	BH-56/22
56	Drill Core	98	98	21:52:01.92	21:52:01.92	85:10:50.76	85:10:50.76	BH-57/22
57	Drill Core	122	122	21:52:06.92	21:52:06.92	85:10:47.21	85:10:47.21	BH-58/22
58	Drill Core	4	4	21:52:19.97	21:52:19.97	85:11:02.90	85:11:02.90	BH-59/22
59	Drill Core	58	58	21:52:27.72	21:52:27.72	85:10:39.88	85:10:39.88	BH-60/22
60	Drill Core	24	24	21:52:21.64	21:52:21.64	85:10:57.65	85:10:57.65	BH-61/22
61	Drill Core	4	4	21:52:19.18	21:52:19.18	85:11:00.46	85:11:00.46	BH-62/22

2A.2.1.10: Chemical Analysis

SI.No.	Sample ID	Minerals	Radical with garde in %	Name of Agency	Type of agency	Attachment
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1	BH-1/19 to BH-62/22	Fe	Fe, Sio2 &Al2O3	S.K LABORATORY & ASSOCIATES	NABL accredited	Chemical_analysis.xlsx
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* Chemical analysis of core /non vore samples may be uploaded in CSV file which shall normally include Five files namely collar file, survey file and Geology log file, Assay file & RQD File.

2A.2.1.11: Petrology & Mineralogical Studies

SI.No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
1	None	0	0	Nil

2A.2.1.12: Beneficiation Studies

SI.No.	Type of Beneficiation	Number of Samples	Attach
1	Nil	0	Nil

2A.2.1.13: Bulk Density Study as per M(EMC) Rules, 2015 and SOP of CGPB

Method adopted for calculating bulk density of ore and waste
The bulk density of ore and waste has been calculated by NABL accredited agency. Report is attached as annexure.

SI.No.	Nature of Ore/OB	Mineral	Number of samples	Bulk Density Established (t/m ³)
1	Iron ore	Hematite (+55 %Fe)	3	3.00
2	Iron ore	Hematite (45 to 55 %Fe)	3	2.50
3	Waste	-45%Fe	3	2.00

2A.2.1.14: Area Covered under Exploration

Level of exploration	Area in Ha.		Total Area in Ha.
	Forest	Non Forest	
G-1	62.040000	0.915000	62.955000

G-2	4.631000	0.000000	4.631000
G-3	0.000000	0.000000	0.000000
G-4	0.000000	0.000000	0.000000
Area proved as Non-mineralized	3.054000	0.000000	3.054000
Area to be explored	0.000000	0.000000	0.000000
Total	66.671000	0.915000	67.586000

2A.2.2: Summary of The Previous Exploration (Before Last Plan Period)

Name of The Agency
M/s Geo Associate Pvt Ltd & M/s Natural Resources Exploration and Mining Pvt. Ltd

2A.2.2.1: Geological Mapping

SI.No.	Year		Scale	Area Covered (Ha)
	From	To		
1	01/04/2010	31/03/2011	1:2000	67.59

2A.2.2.2: Airborne Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.2.3: Ground Geophysical Survey

SI.No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.2.4: Geochemical Survey

SI.No.	Type of Sample	No of Samples
1	Nil	0

2A.2.2.5: Pitting

SI.No.	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Litho units exposed	Litho Unit From (m)	Litho Unit To (m)	Average Grade(%)	Running Metres (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
										Form	To	Form	To
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.2.6: Trenching

Number of Trenches
0

Spacing

Min (m)	Max (m)	Avg (m)
0.00	0.00	0.00

Area Covered Under Trenching

Co-ordinates

Latitude

North	Nil
North	Nil
North	Nil
North	Nil

Longitude

East						Nil					
East						Nil					
East						Nil					
East						Nil					
SI.No.	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)	Litho Units Exposed	Average Grade	Running mtr	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
								From	To	From	To
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.2.7: Exploratory Drilling

2A.2.2.7.1:Core/Non-core Drilling

SI.No.	Year		Exploration agency	Core holes		Non-core (RC/DTH)		Grand total		Attach log sheet of each borehole in csv/excel format
	From	To		Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Total boreholes	Total mtrs	
1	01/04/2010	31/03/2011	M/s Geo associate pvt. ltd	3	116.85	0	0.00	3	116.85	Borehole(2010-11).xlsx

2A.2.2.8: Exploratory Mining

SI.No.	Pit / Adit ID	Volume (m³)
1	Not applicable	0.00

2A.2.2.9: Sampling

SI.No.	Type of sample	Number of Samples	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
				From	To	From	To
1	Drill Core	46	2.00	21:52:27.30	21:52:27.30	85:10:38.08	85:10:38.08
2	Drill Core	23	2.00	21:52:03.42	21:52:03.42	85:10:50.81	85:10:50.81
3	Drill Core	50	2.00	21:52:03.31	21:52:03.31	85:10:40.44	85:10:40.44

2A.2.2.10: Chemical Analysis

SI.No.	Sample ID	Minerals	Radical Analysis	Attachment
1	BH-41,BH-61,BH-66	Fe	Fe	Chemical_analysis41,61,66.pdf

2A.2.2.11:Petrology & Mineralogical Studies

SI.No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
1	None	0	0	Nil

2A.2.2.12: Beneficiation Test

SI.No.	Type of Beneficiation	Number of Samples	Attachment
1	Nil	0	Nil

2A.2.2.13: Bulk Density

SI.No.	Rock Type	Number of Samples	Minerals	Bulk Density Established (t/m ³)
1	Hematite	Nil	Iron ore(+55% Fe)	3.00
2	Hematite	Nil	Iron ore(45-55% Fe)	2.50

2A.2.2.14: Area Covered under Exploration

Level of exploration	Area in Ha.		Total Area in Ha.
	Forest	Non Forest	
G-1	62.0400	0.9150	62.9550
G-2	1.5770	0.0000	1.5770
G-3	0.0000	0.0000	0.0000
G-4	0.0000	0.0000	0.0000
Area proved as Non-mineralized	3.0540	0.0000	3.0540
Area to be explored	0.0000	0.0000	0.0000
Total	66.6710	0.9150	67.5860

SI.No.	Year		Area converted to G1 from G2, G3 & G4	% increase in G-1 Area	Remaining Area % in G2	Remaining Area % in G3	Remaining Area % in G4	Remaining Area in G2	Remaining Area in G3	Remaining Area in G4
	From	To								
1	01/04/2020	31/03/2021	49.50	73.24	26.76	0.00	0.00	18.09	0.00	0.00
2	01/04/2021	31/03/2022	54.40	80.00	20.00	0.00	0.00	13.09	0.00	0.00
3	01/04/2022	31/03/2023	62.96	93.00	7.00	0.00	0.00	4.63	0.00	0.00
4	01/04/2023	31/03/2024	67.86	100.00	0.00	0.00	0.00	0.00	0.00	0.00
Potentially Mineralised area (Ha)										64.53

2A.2.3 Ore Body Geometry & Grade

SI.No.	Name of the ore band	General Strike / Trend	Dip Of Mineral Body	Average Strike Length (m)	Average Width (m)	Chemical parameters				
						Average Depth (m)	Name of the radical	Min Grade (%)	Max Grade (%)	Avg Grade (%)
1	Iron ore	NW-SE	NW	930.00	750.00	109.50	Fe	45.23	69.84	57.67

2A.2.4: Reserve / Resource Estimation Method

2A.2.4.2: Resource Calculation

[illegible]

4	NN	29979	100.00	570.00	2997900.00	3.00	8993700.0000 00	331	FOREST	Fe	+55(Avg.Grade 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
5	NN	387	100.00	570.00	38700.00	3.00	116100.0000 0	331	NF	Fe	+55(Avg.Grade 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
6	NN	1497	100.00	570.00	149700.00	2.50	374250.0000 0	331	FOREST	Fe	45-55(Avg.Grade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
7	OO	24507	100.00	570.00	2450700.00	3.00	7352100.0000 00	331	FOREST	Fe	+55(Avg.Grade 61.72%fe)	SECTIONAL AREA METHOD Sectional area method. Recovery percentage considered as 100%.
8	OO	2028	100.00	570.00	202800.00	3.00	608400.0000 0	331	NF	Fe	+55(Avg.Grade 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
9	OO	2584	100.00	570.00	258400.00	2.50	646000.0000 0	331	FOREST	Fe	45-55(Avg.Grade 53.62%fe)	Sectional area method. Recovery percentage considered as

												100%.
10	OO	139	100.00	570.00	13900.00	2.50	34750.00000	331	NF	Fe	45-55(Avg.G rade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
11	PP	40866	100.00	570.00	4086600.00	3.00	12259800.00 000	331	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
12	PP	4152	100.00	570.00	415200.00	2.50	1038000.000 00	332	FOREST	Fe	45-55(Avg.G rade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
13	QQ	43663	100.00	580.00	4366300.00	3.00	13098900.00 000	331	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
14	QQ	1004	100.00	580.00	100400.00	2.50	251000.0000 0	332	FOREST	Fe	45-55(Avg.G rade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
15	RR	53999	100.00	570.00	5399900.00	3.00	16199700.00 000	331	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.

16	RR	3145	100.00	570.00	314500.00	2.50	786250.0000 0	331	FOREST	Fe	45-55(Avg.G rade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
17	SS	47264	100.00	580.00	4726400.00	3.00	14179200.00 000	331	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
18	SS	1193	100.00	580.00	119300.00	3.00	357900.0000 0	332	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
19	SS	6164	100.00	580.00	616400.00	2.50	1541000.000 00	331	FOREST	Fe	45-55(Avg.G rade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
20	TT	24304	100.00	590.00	2430400.00	3.00	7291200.000 00	331	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
21	TT	6897	100.00	590.00	689700.00	3.00	2069100.000 00	332	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
22	TT	1428	100.00	590.00	142800.00	2.50	357000.0000	331	FOREST	Fe	45-55(Avg.G	Sectional

							0				rade 53.62%fe)	area method. Recovery percentage considered as 100%.
23	UU	17288	80.00	620.00	1383040.00	3.00	4149120.000 00	331	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
24	UU	2154	80.00	620.00	172320.00	3.00	516960.0000 0	332	FOREST	Fe	+55(Avg.Gra de 61.72%fe)	Sectional area method. Recovery percentage considered as 100%.
25	UU	998	80.00	620.00	79840.00	2.50	199600.0000 0	331	FOREST	Fe	45-55(Avg.G rade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
26	UU	303	80.00	620.00	24240.00	2.50	60600.00000	332	FOREST	Fe	45-55(Avg.G rade 53.62%fe)	Sectional area method. Recovery percentage considered as 100%.
Total					34281590.00		101769080.0 0000					

2A.2.4.3: Mineral Resource Estimate for Conversion to Mineral Reserve

During mining operation certain resources have been blocked under UPL, lease boundary safety zone and blocked area within bench slope. The ore in these blocked areas are non-mineable. Although feasibility study has been carried out and the quantity is established, because of the above-mentioned blockages the quantity falls under F-1 & F-2 category. By considering these blockages, due to above mention various factors, the mineable resource has been estimated

2A.2.4.4: Threshold value & Cut off Parameters

Threshold 45% Fe Cut-off grade 55%Fe Average Bulk Density has been assumed as 2.96 ton/cum.

2A.2.4.5: Mining Factors or Assumptions

Sl.No Salient features Description 1) Method of Mining Opencast mechanized method (A-FM). 2) Existing production 4.99 Million Tones 3) Type of ore Laminated hard and soft ore, massive boulder type 4) Means of raising Drilling, Blasting, excavation, screening, crushing, loading etc. 5) Bench height and width 10m height with 15m width. 6) Stripping ratio (t/m3) (Ore: OB) 1:0.00906 7) Over all slope 28 8) Transportation ore to the stacking yard By dumper through haulage road to the Crusher at 1:16 gradient. 9) Nature of overburden/ interburden Generally, consists of BHJ/BHQ, shale, and Laterites. 10 Drilling 104mm dia drill hole by Sandwick DP1100 11) Blasting Drilling of 11.0m drill holes with wagon drills and blasting by using Class 3 explosives. Since the formations are mostly soft, drilling & blasting is done only for 75% of the volume. One hydraulic rockbreaker is used for reducing the size of the large boulders instead of secondary blasting.

2A.2.4.6: Metallurgical Factors or Assumptions

The metallurgical characterization of any ore is critical in terms of describing or identifying any factors that may have a negative impact on product quality and recovery. Frequently, metallurgical recoveries are based on historical data or test work based on limited sample sites that do not always reflect the natural variability in most ore bodies. If the metallurgical inputs are not properly considered, inaccurate recoveries may be used resulting in either lower or higher plant recoveries, thus potentially impacting on the accuracy of the reporting of Mineral Reserves. Metallurgical considerations include the metallurgical process or method, equipment, plant capacity, efficiencies, and personnel requirements. In this regard the nature, scope, and representativeness of metallurgical test work undertaken and the recovery factors used. A detailed flow sheet and a mass balance exist, according to different chemical and physical characteristics

2A.2.4.7: Cost & Revenue Factors

The financial viability of a project is a critical factor – in order for a Mineral Reserve to be declared, the project must be economically feasible, proving the deposit is mineable. The commodity prices have been declared and are relevant to the product quality and volume to be sold/ usable and related to the market. The use of ore has been furnished. During use a detail market condition has been taken into consideration. Detail capital and operating costs,, revenue inputs, royalties, and cut-off grades has been furnished. The method used to estimate the commodity price profiles used for cut-off grade calculation, economic analysis and project valuation, including applicable taxes, inflation indices, and exchange rates have been taken into consideration. The product price assumptions are reasonable. A detail cost on transportation, treatment, penalties, marketing, and other costs have been taken into consideration during the evaluation of project. The cost of production and average sale price for last three(3) years i.e. 2019-20, 2020-21 and 2021-22 is as below; Year Cost of Production ASP Year Cost of Production ASP Year Cost of Production ASP 2019-20 1445.57 1737 2020-21 2104.65 1689 2021-22 3166.69 4399 A detailed cash flow analysis, including a summary of taxes, royalties, and other government levies has been furnished in the feasibility report. However, all the data/ figures of cash-flow statement are tentative.

2A.2.4.8: Market Assessment

There will not be any marketing issue of iron and Manganese ore. However, the consideration of the supply, demand, and stock situation for iron and manganese ore and its consumption trends, and factors likely to affect supply and demand have been studied during the financial analysis.

2A.2.4.9: Other Modifying Factors

Legal factor There are no legal issues exist that could negatively affect the project. The lease has been in operation since long by previous lessee. Environmental factor Potential environmental impacts of the mining and processing operation, as well as all the approvals already exist. Environment compliances have been submitted on six monthly bases to MoEF& CC. During grant of environment clearance, all the factors were taken into consideration. There are no environmental liabilities for the project. Social Factor Local environmental laws and processes have been considered. Information that materially increases or decreases the risk that the necessary legal rights has been obtained and are publicly disclosed. As on date there are no social issues. However, it is recognized that the legal environment may change over time and that such changes may have an impact on the Mineral Reserve estimate. If obstacles arise or are eliminated, the Mineral Reserve estimates must be adjusted accordingly. Government Factor All the necessary permission obtained from the competent authorities to run the mine. There are no such issues from Government.

2A.2.4.10: Classification

Under UNFC, the reserves have been categorized by attributing 3-digit codes of {E} economic axis, (F) feasibility axis and (G) geological axis. The key parameter considered for mineral reserve/resource estimation under the axes of UNFC are ia) Exptoration already done (drilling & analysis of ore sarnples), (b) Reserves updated as on date, (c) Processing technique adopted to be adopted for saleable ore, id) Approval of rining plan/scherne of mining with PMCP, {e} Forest Clearance, (f) Environmental Clearance and (g) Prevailing cost of mining/tonne of ore and sale value.Total 65 boreholes along with existing quarries within the lease area were taken into consideration for estimation of resources under G1 categories. The depth of the bore hole where the mineralization ends; was considered as the depth of measured ore zone (G1). However, the thickness of the ore body is variable from section to section. The geological map has been prepared on a scale of 1:2000. Based on the borehole data, existing quarries and surface geology, measured resource was estimated. The depth of the bore hole where the mineralization ends has been considered as the depth of measured ore zone (G1).Geological information has been detailed. Part of the ML area has been explored in detail through bore hole and by exposures in the existing quarry. The level of exploration in this part is high and hence falls under G1 category. Pre-Feasibility study has been undertaken based on the following factors Geological mapping has been done on 1:2000 scales. Geological plan has been prepared showing the detailed topographical -cum-geological details including surface features, extent of deposit, location of borehole etc. Geological sections have been prepared based on the borehole data and mine development. Samples collected from the boreholes have been analyzed by NABL Accredited Lab.

2A.2.4.11: Calculation of blocked resources

SI.No.	Reserves blocked due to	Cross section/Block	Sectional area/ block area (in Sq mtr)	Influence (m)	Depth (m)	Volume (m³)	Bulk Density (t/m³)	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	Ultimate Pit Limit	MM	2985.00	150.00	740.00	447750.00	3.00	1343250.00000	211	FOREST	Fe	+55(Avg. Grade	Sectional area

												61.72%fe)	method. Recovery has been considered as 100%.
2	Ultimate Pit Limit	MM	240.00	150.00	740.00	36000.00	2.50	90000.0000 0	211	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
3	Ultimate Pit Limit	NN	4944.00	100.00	570.00	494400.00	3.00	1483200.00 000	211	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
4	Ultimate Pit Limit	NN	1169.00	100.00	570.00	116900.00	2.50	292250.000 00	211	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
5	Ultimate Pit Limit	OO	1141.00	100.00	600.00	114100.00	3.00	342300.000 00	211	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
6	Ultimate Pit Limit	OO	97.00	100.00	600.00	9700.00	2.50	24250.0000 0	211	NF	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been

													considered as 100%.
7	Ultimate Pit Limit	PP	7855.00	100.00	588.00	785500.00	3.00	2356500.00 000	211	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
8	Ultimate Pit Limit	QQ	5640.00	100.00	590.00	564000.00	3.00	1692000.00 000	211	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
9	Ultimate Pit Limit	RR	7798.00	100.00	573.00	779800.00	3.00	2339400.00 000	211	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
10	Ultimate Pit Limit	SS	4168.00	100.00	590.00	416800.00	3.00	1250400.00 000	211	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
11	Ultimate Pit Limit	SS	2017.00	100.00	590.00	201700.00	2.50	504250.000 00	211	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
12	Ultimate Pit	TT	5245.00	100.00	590.00	524500.00	3.00	1573500.00	211	FOREST	Fe	+55(Avg.	Sectional

	620.00	172640.00	3.00	517920.0000
	620.00	3200.00	2.50	8000.00000

2A.2.4.12: Calculation of Reserves - I

[illegible]

1	MM	15917	150.00	610.00	2387550.00	3.00	7162650.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
2	MM	1539	150.00	610.00	230850.00	3.00	692550.00	111	NF	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
3	NN	25035	100.00	570.00	2503500.00	3.00	7510500.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
4	NN	387	100.00	570.00	38700.00	3.00	116100.00	111	NF	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
5	NN	328	100.00	570.00	32800.00	2.50	82000.00	111	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
6	OO	23366	100.00	570.00	2336600.00	3.00	7009800.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
7	OO	2028	100.00	570.00	202800.00	3.00	608400.00	111	NF	Fe	+55(Avg. Grade	Sectional area method.

											61.72%fe)	Recovery has been considered as 100%.
8	OO	2584	100.00	570.00	258400.00	2.50	646000.00	111	FOREST	Fe	45-55(Avg. Grade 53.62%fe	Sectional area method. Recovery has been considered as 100%.
9	OO	42	100.00	570.00	4200.00	2.50	10500.00	111	NF	Fe	45-55(Avg. Grade 53.62%fe	Sectional area method. Recovery has been considered as 100%.
10	PP	33011	100.00	570.00	3301100.00	3.00	9903300.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
11	PP	4152	100.00	570.00	415200.00	2.50	1038000.00	122	FOREST	Fe	45-55(Avg. Grade 53.62%fe	Sectional area method. Recovery has been considered as 100%.
12	QQ	38023	100.00	580.00	3802300.00	3.00	11406900.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
13	QQ	1004	100.00	580.00	100400.00	2.50	251000.00	122	FOREST	Fe	45-55(Avg. Grade 53.62%fe	Sectional area method. Recovery has been

												considered as 100%.
14	RR	46201	100.00	570.00	4620100.00	3.00	13860300.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
15	RR	3145	100.00	570.00	314500.00	2.50	786250.00	111	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
16	SS	43096	100.00	580.00	4309600.00	3.00	12928800.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
17	SS	1193	100.00	580.00	119300.00	3.00	357900.00	122	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
18	SS	4147	100.00	580.00	414700.00	2.50	1036750.00	111	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
19	TT	19059	100.00	590.00	1905900.00	3.00	5717700.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.

20	TT	6897	100.00	590.00	689700.00	3.00	2069100.00	122	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
21	TT	1230	100.00	590.00	123000.00	2.50	307500.00	111	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
22	UU	15130	80.00	620.00	1210400.00	3.00	3631200.00	111	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
23	UU	2154	80.00	620.00	172320.00	3.00	516960.00	122	FOREST	Fe	+55(Avg. Grade 61.72%fe)	Sectional area method. Recovery has been considered as 100%.
24	UU	958	80.00	620.00	76640.00	2.50	191600.00	111	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
25	UU	303	80.00	620.00	24240.00	2.50	60600.00	122	FOREST	Fe	45-55(Avg. Grade 53.62%fe)	Sectional area method. Recovery has been considered as 100%.
Total					29594800.00		87902360.00					

2A.2.4.13: Calculation of Reserves -II

Mineral	IRON ORE
Reserves/ Resources estimated as on	01/04/2023
UNIT of estimation	tonnes

A. Mineral Reserve

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Proved Mineral Reserve (A)	111	82181250.00	1427550.00	83608800.00	3050100(45-55),79131150(+55)	10500(45-55),1417050(+55)	3060600(45-55),80548200(+55)
2. Probable Mineral Reserve (A)	121	0.00	0.00	0.00	0	0	0
3. Probable Mineral Reserve (A)	122	4293560.00	0.00	4293560.00	1349600(45-55),2943960(+55)	0	1349600(45-55),2943960(+55)

B. Remaining Resources

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Feasibility Mineral Resource (B)	211	13842470.00	24250.00	13866720.00	944000(45-55),2898470(+55)	24250(45-55)	968250(45-55),12898470(+55)
2. Prefeasibility Mineral Resource (B)	221	0.00	0.00	0.00	0	0	0
3. Prefeasibility Mineral Resource (B)	222	0.00	0.00	0.00	0	0	0
4. Measured Mineral Resource (B)	331	0.00	0.00	0.00	0	00	0
5. Indicated Mineral Resource (B)	332	0.00	0.00	0.00	0	0	0

6. Inferred Mineral Resource (B)	333	0.00	0.00	0.00	0	0	0
7. Reconnaissance Mineral Resource (B)	334	0.00	0.00	0.00	0	0	0
Total Mineral Resources (A+B) :				101769080.00			

2A.2.4.13: Calculation of Reserves -III

Associated Mineral (IRON ORE)

Mineral	IRON ORE
Reserves/ Resources estimated as on	Nil
UNIT of estimation	2

A. Mineral Reserve

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Proved Mineral Reserve (A)	111	Nil	Nil	Nil	Nil	Nil	Nil
2. Probable Mineral Reserve (A)	121	Nil	Nil	Nil	Nil	Nil	Nil
3. Probable Mineral Reserve (A)	122	Nil	Nil	Nil	Nil	Nil	Nil

B. Remaining Resources

Classification	Code	Quantity			Grade		Remark
		Forest	Non Forest	Total	Forest	Non Forest	
1. Feasibility Mineral Resource (B)	211	Nil	Nil	Nil	Nil	Nil	Nil
2. Prefeasibility	221	Nil	Nil	Nil	Nil	Nil	Nil

Mineral Resource (B)							
3. Prefeasibility Mineral Resource (B)	222	Nil	Nil	Nil	Nil	Nil	Nil
4. Measured Mineral Resource (B)	331	Nil	Nil	Nil	Nil	Nil	Nil
5. Indicated Mineral Resource (B)	332	Nil	Nil	Nil	Nil	Nil	Nil
6. Inferred Mineral Resource (B)	333	Nil	Nil	Nil	Nil	Nil	Nil
7. Reconnaissance Mineral Resource (B)	334	Nil	Nil	Nil	Nil	Nil	Nil
Total Mineral Resources (A+B) :				0.00			

2A.2.5: Future Exploration Proposal

2A.2.5.1: Geological Mapping

SI.N.	Year	Scale	Area Covered (Ha)
1	2023-2024	1:2000	67.59

2A.2.5.2: Ground Geophysical Survey

SI.No.	Year	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To
1	Nil	NIL	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.5.3: Pitting

Number of Pits
0

SI.No.	Year	Land Type	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.5.4: Trenching

Number of Trenches										
0										

2A.2.5.4.1: SPACING

Min (m)			Max (m)			Avg (m)		
Nil			Nil			Nil		

2A.2.5.4.2: Area Covered Under Trenching

Co-ordinates

SI.No.	Year	Land Type	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

2A.2.5.5: Exploratory Drilling

2A.2.5.5.1: Core Drilling & Non-Core Drilling

SI.No.	Year	In Forest Area				In Non Forest Area				Total Borehole	Total Meter
		No. of Borehole	Total Mtr	Type Borehole	Grid Interval	No. of Borehole	Total Mtr	Type Borehole	Grid Interval		

1	2023-2024	8	800.00	Core	100.00	0	0.00	Nil	Nil	8	800.00
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2A.2.5.6: Exploratory Mining

SI.No.	Year	Pit ID	Length in meter	Width in meter	Depth in meter	Volume (m³)
1	Nil	Not Applicable	Nil	Nil	Nil	Nil

2A.2.5.7: Sampling

SI.No.	Year	Type of Sample	Number of Samples Proposed	Area Covered(Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
					From	To	From	To
1	2023-2024	Drill Core	100	0.70	21:52:07.65	21:52:07.65	85:10:42.71	85:10:42.71
2	2023-2024	Drill Core	100	0.70	21:52:07.21	21:52:07.21	85:10:37.49	85:10:37.49
3	2023-2024	Drill Core	100	0.70	21:52:05.29	21:52:05.29	85:10:40.30	85:10:40.30
4	2023-2024	Drill Core	100	0.70	21:52:04.36	21:52:04.36	85:10:35.79	85:10:35.79
5	2023-2024	Drill Core	100	0.70	21:52:02.44	21:52:02.44	85:10:38.60	85:10:38.60
6	2023-2024	Drill Core	100	0.70	21:52:21.96	21:52:21.96	85:11:00.16	85:11:00.16
7	2023-2024	Drill Core	100	0.70	21:52:17.17	21:52:17.17	85:11:01.58	85:11:01.58
8	2023-2024	Drill Core	100	0.70	21:52:20.06	21:52:20.06	85:11:00.03	85:11:00.03

2A.2.5.8 Petrographic & Mineralgraphic Studies

SI.No.	Year	Type of Sample	Number of Samples Proposed
1	2024-2025	Waste	2
2	2024-2025	Mineral	2

Chapter 2B : Geology & Exploration UG : NA

Approved

Chapter 3: Mineral Beneficiation / Processing

Name of The Ore/Mineral	Iron Ore
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3.1: Mineralogy of the ROM ore/ Mineral

SI.No	Valuable Mineral Name	Approx. Mineral %	Gangue Mineral/s name	Approx. Mineral Gangue %
1	Fe	93.0000	BHJ Shale Laterite	7.0000

3.2: Complete Chemical Analysis of the ROM Ore/Mineral

SI.No	Radical	Wt%
1	Fe	62.0000
2	Phosphorus	0.0700
3	sulphur	0.0300
4	silica	1.2600
5	Alumina	2.3400
6	loI	4.1100
7	cao	0.4200
8	Mgo	0.0900
9	Tio2	0.1400
10	V2O5	0.0200
11	Cuo	0.0150
12	Zno	0.0080

3.3: Crushing Section

3.3.1: Primary Crushing

SI.No	Type of Crusher	Make	Capacity of Crusher(tph)	Feed Size(mm)	Product Size(mm)
1	Jaw Crusher	Sandvick	83	400.0000	80.0000

3.3.2: Secondary Crushing

SI.No	Type of Crusher	Make	Capacity of Crusher(tph)	Feed Size(mm)	Product Size(mm)
1	Gyratory Crusher	Sandvick	263	80.0000	40.0000
2	Gyratory Crusher	Sandvick	263	40.0000	18.0000
3	Gyratory Crusher	Sandvick	263	18.0000	10.0000

3.3.3: Tertiary Crushing

Not Applicable

3.4: Grinding Section

3.4.1: Dry Grinding

Not Applicable

3.4.2: Wet Grinding

Not Applicable

3.5: Dry Processing

3.5.1: Screening and Classification

SI.No	Type of Screen/Classifier	Stages	Make	Capacity(tph)	Aperture Size of Screen/Classifier (mm), if applicable	Feed Size(mm)	Product (mm)	Product Quality(if applicable)
1	Dry Screen	Multiple	Sandvick	500.0000	40.0000	400.0000	40.0000	45-62%Fe
2	Dry Screen	Multiple	Sandvick	500.0000	18.0000	40.0000	18.0000	45-62%fe
3	Dry Screen	Multiple	Sandvick	500.0000	10.0000	18.0000	10.0000	45-62%fe

3.5.2: Other Operations

Not Applicable

3.5.3: Product Quality

Not Applicable

3.6: Wet Processing

3.6.1: Scrubbing / Washing

SI.No	Type of Scrubbers /	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product Size (mm)	Product Quality, if	Water Requirement(l/h)	Fresh Water Requirement	Recirculated Water (l/h)
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	washers						available		(l/h)	
1	Not apllicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.2: Screening and Classification

SI.No	Type of screen / classifiers	Stages, if applicable	Make	Capacity(tph)	Aperture Size of Screen/Classifier (mm), if applicable	Feed Size(mm)	Product Size (mm)	Product Quality, if available	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	Not apllicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.3: Gravity Separation

SI.No	Type of separators (jig, table, spiral, etc.)	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product (Conc) (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.4: Magnetic Separation

SI.No	Type of magnetic separators (magnetic intensity)	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Mag (tph)	Product-Mid (tph), if available	Product non-Mag (tph)	Water Requirement(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.5: Flotation

SI.No	Type of flotation	Stages (rougher/	Make	Capacity(tph)	Feed Size(mm)	Product-Float (tph)	Product non-Float (tph)	Water Requirement(l/h)	Fresh Water Requirement	Recirculated Water (l/h)
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	equipment (froth/ column)	cleaner, etc), if applicable							(l/h)	
1	Not Applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.6: Other Operations

SI.No	Type of equipment / operation	Stages, if applicable	Make	Capacity(tph)	Feed Size(mm)	Product-Conc (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Require ment(l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)
1	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.6.7: Product Quality (wet processing)

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis
Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

3.7: Overall Product Quality (Dry cum Wet Processing)

Products	Wt%	In Tonnes	Size (Range) mm	Complete chemical analysis
Concentrate	0.0000	0.0000	0	0
Sub-grade	0.0000	0.0000	0	0
Rejects	0.0000	0.0000	0	0

3.8: Disposal Method for tailing/ rejects

a) Explain the disposal method for tailing or reject from processing plant with detail chemical / mineral analysis of tailing	Nil
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b) Size and capacity of tailing pond, toxic effect of such tailings, process adopted to neutralise its effect (if any)	Nil
c) Any other data (if available)	Nil

3.9: Overall water requirement of mining and mineral processing

Indicate quantity, source of supply, disposal of water and extent of recycling and chemical analysis of water	WATER_BALANCE.pdf
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3.10: Flow sheets and charts

Material balance chart of mineral processing plant(s) (each stage of process)	material_balance.pdf
Attach flow sheet of beneficiation of plant(s)	Nil
Any other data (if applicable)	Nil

Chapter 4A: Mining Operations

4A.1.1: Existing Method of Mining			Mechanized	
Choose one or more	HEMM with deephole drilling	Combination of loaders and tippers	HEMM with deephole drilling	Combination of loaders and tippers
4A.1.2: Proposed Method of Mining			Mechanized	
Choose one or more	HEMM with deephole drilling	Combination of loaders and tippers	HEMM with deephole drilling	Combination of loaders and tippers
Reasons for Proposed Changes			There is no change in existing method of mining Opencast fully mechanized method has been adopted to achieve the targeted production in 3 shift basis Drilling of 11m drill holes with DTH drills and blasting by using Class 3 explosives Since the formations are mostly soft drilling blasting is done only for 75 of the volume One hydraulic rock breaker is used for reducing the size of the large boulders instead of secondary blasting The ROM produced is fed to the Screening unit for the producti	

4A.2: Operational Parameters

4A.2.1: Inventory of Existing Pits & Dumps

4A.2.1.1: Pits

Sl.No.	Pit ID	Pit Status	Area Covered by Pit(Ha)	Pit Dimensions(L*W*D)
1	Top pit	Active	33.90	630 X 503 X109.50

4A.2.1.2: Dumps and Stacks

4A.2.1.2.1: Dump Details

SI.No.	Dump ID	Dump Status	Type of Dump	Total of Dump Quantity(t)	Area Covered by Dump(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
							From	To	From	To
1	waste dump	Active	Waste	1283364.00	2.00	25.00	21:52:16.14	21:52:16.14	85:10:58.69	85:10:58.69

4A.2.1.2.2: Stack Details

SI.No.	Stack ID	Type of Stack	Total Stack of Quantity(t)	Area Covered by Stack(Ha)	Height(m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
						From	To	From	To
1	stack-1	Stack for mineral	4368	0.052	2.8	21:52:31.79	21:52:31.79	85:10:46.31	85:10:46.31
2	Stack-2	Stack for mineral	4536	0.056	2.7	21:52:30.26	21:52:30.26	85:10:46.81	85:10:46.81
3	stack-3	Stack for mineral	3888	0.048	2.7	21:52:24.09	21:52:24.09	85:10:49.92	85:10:49.92
4	stack-4	Stack for mineral	4620	0.055	2.8	21:52:22.05	21:52:22.05	85:10:56.36	85:10:56.36
5	stack-5	Stack for mineral	4131	0.051	2.7	21:52:21.92	21:52:21.92	85:10:57.23	85:10:57.23
6	stack-6	Stack for mineral	4620	0.055	2.8	21:52:22.71	21:52:22.71	85:10:43.29	85:10:43.29
7	stack7	Stack for mineral	4212	0.052	2.7	21:52:20.97	21:52:20.97	85:10:44.74	85:10:44.74
8	stack-8	Stack for mineral	4452	0.053	2.8	21:52:19.45	21:52:19.45	85:10:54.06	85:10:54.06
9	stack-9	Stack for mineral	4000	0.042	2.8	21:52:18.63	21:52:18.63	85:10:53.33	85:10:53.33
10	stack-10	Stack for mineral	4000	0.048	2.7	21:52:17.57	21:52:17.57	85:10:54.01	85:10:54.01
11	stack-11	Stack for mineral	4000	0.042	2.8	21:52:17.57	21:52:17.57	85:10:54.01	85:10:54.01
12	stack-12	Stack for mineral	4000	0.048	2.7	21:52:17.26	21:52:17.26	85:10:52.86	85:10:52.86
13	stack-13	Stack for mineral	4000	0.042	2.8	21:52:16.27	21:52:16.27	85:10:54.34	85:10:54.34
14	stack-14	Stack for mineral	4000	0.048	2.7	21:52:15.96	21:52:15.96	85:10:52.78	85:10:52.78
15	stack-15	Stack for mineral	4000	0.048	2.7	21:52:15.43	21:52:15.43	85:10:54.63	85:10:54.63
16	stack-16	Stack for mineral	4000	0.042	2.8	21:52:00.91	21:52:00.91	85:10:46.91	85:10:46.91
17	stack-17	Stack for mineral	4000	0.048	2.7	21:52:10.70	21:52:10.70	21:52:10.70	21:52:10.70

18	stack-18	Stack for mineral	4000	0.048	2.7	21:52:11.95	21:52:11.95	85:10:40.22	85:10:40.22
19	stack-19	Stack for mineral	4000	0.042	2.9	21:52:13.58	21:52:13.58	85:10:37.90	85:10:37.90
20	stack-20	Stack for mineral	4000	0.048	2.7	21:52:14.62	21:52:14.62	85:10:40.18	85:10:40.18
21	stack-21	Stack for mineral	4000	0.049	2.9	21:52:15.34	21:52:15.34	85:10:38.12	85:10:38.12
22	stack-22	Stack for mineral	4000	0.051	2.9	21:52:16.05	21:52:16.05	85:10:37.10	85:10:37.10
23	stack-23	Stack for mineral	4000	0.049	2.8	21:52:16.42	21:52:16.42	85:10:41.76	85:10:41.76
24	stack-24	Stack for mineral	4000	0.048	2.8	21:52:17.53	21:52:17.53	85:10:35.93	85:10:35.93
25	stack-25	Stack for mineral	4000	0.042	2.9	21:52:18.67	21:52:18.67	85:10:36.51	85:10:36.51
26	stack-26	Stack for mineral	4000	0.048	2.8	21:52:18.30	21:52:18.30	85:10:41.22	85:10:41.22
27	stack-27	Stack for mineral	4611	0.053	2.9	21:52:19.40	21:52:19.40	85:10:40.23	85:10:40.23
28	stack-28	Stack for mineral	4368	0.052	2.8	21:52:20.86	21:52:20.86	85:10:40.38	85:10:40.38
29	stack-29	Stack for mineral	3969	0.051	2.7	21:52:20.49	21:52:20.49	85:10:42.16	85:10:42.16
30	stack-30	Stack for mineral	4263	0.049	2.9	21:52:19.64	21:52:19.64	85:10:41.62	85:10:41.62
31	MR stack-1	Stack for mineral reject	80000	1	8	21:52:14.14	21:52:14.14	85:10:55.40	85:10:55.40
32	MR stack-2	Stack for mineral reject	40000	0.52	8	21:52:15.17	21:52:15.17	85:10:35.69	85:10:35.69
33	MR stack-3	Stack for mineral reject	545200	2.726	20	21:52:09.72	21:52:09.72	85:10:32.53	85:10:32.53
34	MR stack-4	Stack for mineral reject	55770	0.577	10	21:51:56.93	21:51:56.93	85:10:45.21	85:10:45.21

4A.2.1.3: Details of stabilised dumps

SI.No.	Dump ID	Number of Terraces	Average Height of Terraces(m)	Lenght of Toe Wall(m)	Lenght of Garland Drain(m)	Area Stablized(Ha)	Method of Stablization
1	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil

4A.2.2: Opencast Mining

4A.2.2.1: Bench Parameters

Pit ID	Year	Max Height of the Benches in Over Burden (m)	Min Width of the Benches in Over Burden (m)	Slope of the Bench in Over Burden (degree)	Max Height of the Benches in Mineral (m)	Minimum Width of the Benches in Mineral (m)	Slope of the Bench in Mineral (degree)	Overall Slope of Pit (degree)	Number of Benches in Top Soil	Number of Benches in Over Burden	Number of Benches in Mineral	Max Depth of Workings (m)	Depth of Water Table (mRL)	Max Slope Angle of Haul Roads (1xx in)
Top pit	2023-2024	10.00	10.00	23.00	10.00	10.00	85.00	30.00	0	7	12	130.00	613.00	16
South pit	2023-2024	0.00	0.00	0.00	10.00	10.00	85.00	30.00	0	0	6	60.00	613.00	16
Top pit	2024-2025	10.00	10.00	23.00	10.00	10.00	85.00	30.00	0	3	9	100.00	613.00	16
South pit	2024-2025	0.00	0.00	0.00	10.00	10.00	85.00	30.00	0	0	8	90.00	613.00	16
Top pit	2025-2026	10.00	10.00	23.00	10.00	10.00	85.00	30.00	0	4	18	190.00	613.00	16
South pit	2025-2026	0.00	0.00	0.00	10.00	10.00	85.00	30.00	0	0	6	70.00	613.00	16

4A.2.2.2: Yearwise Opencast Development - I Continue

Sl.No.	Year	Pit ID	Bench	Direction	Bulk Density of Overburden (BD1) (ton/m³)	Bulk Density of Mineral (BD2) (tonn/m³)	Top Soil Volume (Length x Width x Height) (m³)	Over Burden Volume (Length x Width x Height) (m³)	Over Burden Quantity (t)	ROM Volume (Length x Width x Height) (m³)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	OB Ratio to Ore (m³/ton)
1	2023-2024	Top pit	650-800	NW	2.00	2.75	0.00	179000.0	358000.0	1450876.36	3989909.99	0.76	944870.0	3045040.00	Nil	0.0449
2	2023-2024	south pit	660-710	W	2.00	2.75	0.00	0.00	0.00	363669.09	1000090.00	0.88	121075.0	879015.0	0.00	Nil
3	2024-2025	Top pit	730-650	NW	2.00	2.75	0.00	123220.0	246440.0	1452061.82	3993170.00	0.96	145250.0	3847920.00	0.00	0.0309

4	2024-2025	south pit	720-650	W	2.00	2.75	0.00	0.00	0.00	362483.59	996829.87	0.92	78899.87	917930.00	0.00	Nil
5	2025-2026	Top pit	820-680	NW	2.00	2.75	0.00	133430.00	266860.00	1438582.73	3956102.51	0.98	70374.51	3885728.00	0.00	0.0337
6	2025-2026	south pit	680-630	W	2.00	2.75	0.00	31365.00	62730.00	375962.73	1033897.51	0.81	193987.51	839910.00	0.00	0.0303
Total									934030.00		1496999.88		1554456.89	13415543.00	0.00	

4A.2.2.2 Yearwise Opencast Development - I End

SI.No.	Year	Pit ID	Total Topsoil Volume (m³)	Total Over Burden Volume (m³)	Total Over Burden Quantity (t)	Total ROM Volume (m³)	Total ROM Quantity (t)
1	2023-2024	Top pit	0.00	179000.00	358000.00	1450876.36	3989909.99
2	2023-2024	south pit	0.00	0.00	0.00	363669.09	1000090.00
3	2024-2025	Top pit	0.00	123220.00	246440.00	1452061.82	3993170.00
4	2024-2025	south pit	0.00	0.00	0.00	362483.59	996829.87
5	2025-2026	Top pit	0.00	133430.00	266860.00	1438582.73	3956102.51
6	2025-2026	south pit	0.00	31365.00	62730.00	375962.73	1033897.51
Total			0.00	467015.00	934030.00	5443636.32	14969999.88

4A.2.2.3: Transportation & Hauling Equipment

SI.No.	Type	Make	Capacity (m³)	No. of Equipments
1	Dumper	Volvo	14.00	14

4A.3: Material Handling Summary

4A.3.1: Studies Undertaken

Title	Study Undertaken	Attachment (only pdf allowed)
Blast Vibration Study Report	Yes	Blast vibration study report.pdf
Slope Stability Study Report	No	Nil
Recovery Study Report	Yes	Bulk density & recovery study report.pdf
Hydrological Study Report	No	Nil
Mineral Beneficiation Study Report	No	Nil
Subsidence Study Report	No	Nil
Geotechnical Study Report	No	Nil
Any Other Study Report	No	Nil
Bulk Density Study Report	Yes	Bulk density & recovery study report.pdf

4A.3.2: Insitu Mining

Sl.No.	Year	Waste Quantity(t)	ROM Quantity(t)	Total Handling (t)	ROM Quantity Saleable Mineral (t)	ROM Quantity Mineral Reject (t)	OB Ratio to Ore (Waste Quantity / ROM Quantity)	Grade Range (%)
1	2023-2024	358000.00	4990000.00	5348000.00	3924055.00	1065945.00	0.07	59.98
2	2024-2025	246440.00	4990000.00	5236440.00	4765850.00	224150.00	0.05	61.35
3	2025-2026	329590.00	4990000.00	5319590.00	4725638.00	264362.00	0.07	61.72
4	2023-2024	Nil	Nil	Nil	Nil	Nil	Nil	Nil
5	2023-2024	Nil	Nil	Nil	Nil	Nil	Nil	Nil
	Total	934030.00	14970000.00	15904030.00	13415543.00	1554457.00		

4A.3.3: Dump workings

Sl.No.	Year	Dump ID	Latitude (dd:mm:ss.ss)	Longitude (dd:mm:ss.ss)	Area (m2)	Avg Height of Dump (m)	Volume (m³)	Total Dump Quantity (t)	Proposed Dump Handling Quantity (t) (A)	Proposed Recovery of Saleable Mineral	Proposed Waste Quantity (t) (A-B)	Grade Range (%)	Justificati on
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			From	To	From	To						(t)(B)			
1	Nil	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

4A.3.4: Calculation Summary

Year	2023-2024	2024-2025	2025-2026	Total
(A) Total ROM quantity (t)	4990000.00	4990000.00	4990000.00	14970000.00
(B) Saleable ore from ROM (t)	3924055.00	4765850.00	4725638.00	13415543.00
(C) Proposed Dump Handling Quantity (t)	0.00	0.00	0.00	0.00
(D) Saleable Ore recovered from dump workings (t)	0.00	0.00	0.00	0.00
(E) Total Saleable Ore (t)(=B+D)	3924055.00	4765850.00	4725638.00	13415543.00
(F) Total Quantity Handled (t)(=A+C)	4990000.00	4990000.00	4990000.00	14970000.00

4A.4: Machine Calculation

4A.4.1: Machine Requirement Summary

Number of Average Working Days in One Year (A)	300
Number of Shifts per Day (B)	3
Material Handling Required per Day (t) ((D)=Largest of (Q1,Q5)/(A))	17827
Material to be Handled per Shift (t) ((E)=(D)/(B))	5942.33
Handling Required per Hour (t) ((F)=(E)/8 hours)	742.79
Effective Shift Time	6 hrs 00 mins

4A.4.3: Dumper Requirement

Effective Shift Time					6 hrs					00 mins				
Sl.No.	Total Hour s=Number of working days (W)x Number of shifts/day x Effective shift hours (Machine Requireme nt	Capacity of Dumpers (t) (B)	Speed of the dumper (KMPH) (i)	Lead Distance (KM) (ii)	Time taken to cover distance in minutes(iii) =(ii/i) x 60	Queuing, Loading Time at Shovel (min) (iv)	Queuing, Unloading Time during unloading (min) (v)	Total Time to complete one trip(vi) = (iii + iv + v)	No. of Trips / hr = (60 / vi)	Total trans portation per hour =(B X vii)	Yearly handling by one dumper (ix) = A x TPH	Maximum handling of the material by this machine during the block period (t) (x)	Number of dumpers will be (xi) =(x / ix)	Plus Standby dumper (xii)

	Summary) (A)													
1	5400	30.00	17.00	2.00	7.06	5.00	9.00	21.06	2	85	461700.00	5348000.00	12	2

4A.4.4: Drill Machine Requirement

Effective Shift Time	6 hrs	00 mins
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SI.No.	Type of Drill	Depth of Hole(including Sub-grade Drilling (m)	Spacing (m)	Burden (m)	Bulk Density of Waste (t/m³)	Bulk Density of Mineral (t/m³)	Yield per Hole (t)	Yield per Meter (t/m) = Yield per Hole (t)/Depth of Hole(including Sub-grade Drilling (m))	Annual Target Known (t)	Drilling Requirement per Day (m) = (Annual Target Known (t) / Yield per Meter (t/m))/Number of Average Working Days in One Year (A)	Drilling Requirement per Shift(m)	Rate of Drilling per Hours (m/hr) = Drilling Requirement per Shift (m)/Effective Shift Time	Required No. of drills (m/c) = Required rate of drilling in meters per hr./ Actual rate of drilling in meters per hr of the machine deployed	Stand by Drill
1	Hydraulic	11.00	3.75	3.25	2.00	3.00	402.18	36.56	4990000.00	454.95	151.65	25.27	1.00	1
2	Hydraulic	11.00	3.75	3.25	2.00	3.00	268.12	24.37	358000.00	48.96	16.32	2.72	1.00	1

4A.4.5: Machine Deployment Details

4A.4.5.1: Excavator & Loading Equipment

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Sl.No.	Type	Make	Capacity (m ³)	No. of Equipments
1	Excavator	Hitachi Zaxix 470(Existing)	3.20	3
2	Excavator	Volvo(Proposed)	3.00	4
3	Hyd.Excavator-PC200 (for Plant Feeding)	Komatsu(Existing)	0.90	5
4	Hyd.Excavator-PC200 (for Plant Feeding)	Komatsu(Proposed)	0.90	5
5	Wheel Loader	SDLG & Liugung(Existing)	3.00	4
6	Wheel Loader	SDLG & Liugung(Proposed))	2.50	5
7	Wheel Loader	Cat(Proposed)	4.50	3
8	Dumper	Volvo(Existing)	30.00	17
9	Water Tanker	Volvo (20000 Litre, Existing))	20000.00	1
10	Water Tanker	Volvo (20000 Litre, Proosed)	20000.00	3
11	Water Tanker	Tata 8000 Litre(Existing)	8000.00	1
12	Mobile Crushing Unit	Terex 200TPH(Existing)	200.00	2
13	Mobile Crushing Unit	Metso 400 TPH (Proposed)	400.00	2
14	Mobile Screen Plant	Terex Power Screen 400TPH(Existing)	400.00	2
15	Mobile Screen Plant	Kleemann 350 MT/Hr(Existing)	350.00	1
16	Mobile Screen Plant	Terex Power Screen 200MT/Hr (Existing)	200.00	1
17	Central Processing Unit	Sandvick 500TPH(Proposed)	500.00	2
18	Grader	Komatsu 260 HP (Existing)	260.00	1
19	Grader	Komatsu 120 HP (Proposed)	120.00	1
20	Rock Breaker	Hitachi 30Mt (Existing)	30.00	1
21	Rock Breaker	Hyundai 30Mt (Proposed)	30.00	1

4A.4.5.2: Dozers Details

Sl.No.	Type	Make	Capacity (hp)	No. of Equipments
1	Dozer	Beml (Existing)	264.00	1
2	Dozer	Cat(proposed)	264.00	3

4A.4.5.3: Drilling Details

Sl.No.	Type	Make	Capacity (t)	Diameter of Hole(mm)
1	DP 1100	Sandvick 100mm Dia (Existing)	25.00	110.00
2	D1500	Sandvick	25.00	110.00

4A.5 Blasting Requirement

4A.5.1: Blasting & Explosive Requirement in Waste/Development

Sl.No.	Drill Pattern / Spacing of Holes (m)	Burden of Holes (m)	Number of Rows / Rings	Yield per Holes in Waste (m³)	Frequency of Blasting in a Week	Maximum Number of Holes Blasted in a Round	Charge per Hole (kg)	Charge per Round (kg)	Explosive Requirement Per Month in Development (kg)	Powder Factor in Development / Waste (t/kg)	Depth Of Hole
1	3.75	3.25	1	121.875	1	50	32	1600	6400	7.617	10

4A.5.2: Blasting & Explosive Requirement in Mineral / Ore

Type of Explosive										Type of Explosives used / to be Used									
Slurry Explosives										Permitted Slurry Explosives (Large Diameter)									
Sl.No.	Total ROM p roposed to be handled in CU	Total ROM p roposed to be handled in	Spacing of Holes (m)	Burden of Holes (m)	Numbe r of Rows	Yield per Holes in ROM Zone	Freque ncy of Blasting in a Week	Maxim um Numbe r of Holes Blasted	No of Holes R equired to be Blasted per	Charge per Hole (kg)	Charge per Round (kg)	Explosi ve Req uireme nt Per Month for	Powder Factor in Ore (t/kg)	Pop Shootin g (no of Boulder s)	Plaster Shootin g (no of Boulder s)	Use of Rockbr eaker	Capacit y	Second ary Blasting Require ments	Depth Of Hole

	M/annu m	CUM/ day				(m³)		in a Round	Round			ROM Zone Blasting (kg)							
1	181454 6	6048	3.75	3.25	2	121.87 5	2	100	155	50	1750	14000	7.31	0	0	1	30	0	11

4A.6: Man Power Deployment

4A.6.1: Managerial

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	1st Class	0	0	0	2	2
2	Mining Engineer	0	0	0	1	1
3	2nd Class Manager	1	1	1	1	4
4	Geologist	0	0	0	2	2
5	other	0	0	0	1	1
6	Mechanical Engineer	1	1	1	2	5
7	Electrical Engineer	1	1	1	2	5

4A.6.2: Supervisory

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	Foreman	3	3	3	1	10
2	Mine-mate	4	4	3	1	12

4A.6.3: Skilled Workers / Operators

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SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	Operator	70	70	55	50	245

4A.6.4: Semi-skilled Workers

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	15	15	10	20	60

4A.6.5: Unskilled Workers

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	5	5	0	25	35

4A.6.6: Others Specify

SI.No.	Particular	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	other	0	0	0	0	0

4A.6.7: No of Persons Engaged Per Day

SI.No.	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	100	100	74	108	382
No of Shifts per Day ((A) = Machine Requirement Summary (B))			3		
Average Daily Employment per Shift ((B) = (Total Number of Person per Day) / (A))			127		

Material to be Handled per Shift ((C) = Machine Requirement Summary (E))	5942
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4A.6.8: Supervision

SI.No.	Particular	Qualification	Requirement / Proposed	In Position / Existing Strength	(Requirement / Proposed) - (In Position / Existing Strength) = (-) Shortage / (+) Excess	Remarks
1	Mine Foreman	Foreman Competency Certificate	11	7	4	NA
2	Mining Mate	Mate/blaster Competency Certificate	12	9	3	NA

4A.7: Waste Management

4A.7.1: Existing Dump

SI.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m³)	Existing Dump Location
						From	To	From	To		
1	Nil	waste dump	Waste	2.00	25.00	21:52:16.14	21:52:23.66	85:10:58.69	85:11:02.58	641682.00	Near MLB 19

4A.7.2: New Dump

SI.No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Dump Quantity (m³)	New Dump Location
						From	To	From	To		
1	2023-2024	waste dump	Waste	1.30	10.00	21:52:16.14	21:52:23.66	85:10:58.69	85:11:02.58	179000.00	Near MLB 19
2	2024-2025	waste dump	Waste	1.25	10.00	21:52:13.99	21:52:18.18	85:10:55.55	85:11:01.05	123220.00	Near MLB 19
3	2025-2026	waste dump	Waste	1.16	10.00	21:52:13.99	21:52:18.18	85:10:55.55	85:11:01.05	164795.00	Near MLB 19
4	2023-2024	MR stack-1	Mineral Reject	2.50	12.00	21:52:08.92	21:52:16.70	85:10:32.84	85:10:39.24	300000.00	Top quarry

5	2023-2024	MR stack-2	Mineral Reject	0.35	6.00	21:52:13.95	21:52:16.17	85:10:55.55	85:10:58.84	21000.00	Top quarry
6	2023-2024	MR stack-3	Mineral Reject	0.45	11.00	21:52:10.95	21:52:13.80	85:10:54.24	85:10:57.25	50178.00	Top quarry
7	2023-2024	MR stack-4	Mineral Reject	0.46	12.00	21:52:58.55	21:52:00.84	85:10:47.43	85:10:49.58	55200.00	South quarry
8	2024-2025	MR stack-2	Mineral Reject	1.30	5.00	21:52:08.55	21:52:13.47	85:10:36.99	85:10:42.07	65000.00	Top quarry
9	2024-2025	MR stack-3	Mineral Reject	0.70	2.50	21:52:09.92	21:52:13.74	85:10:53.75	85:10:57.27	17500.00	Top quarry
10	2024-2025	MR stack-4	Mineral Reject	0.20	3.58	21:52:09.92	21:52:09.92	85:10:53.75	85:10:53.75	7160.00	South quarry
11	2025-2026	MR stack-2	Mineral Reject	1.50	5.00	21:52:07.74	21:52:13.71	85:10:36.00	85:10:42.50	75000.00	Top quarry
12	2025-2026	MR stack-3	Mineral Reject	1.00	3.00	21:52:08.70	21:52:55.59	85:10:57.34	85:10:57.39	30745.00	Top quarry

4A.7.3: Existing Stack

SI.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m³)	Existing Stack Location
						From	To	From	To		
1	Nil	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

4A.7.4: New Stack

SI.No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Total Stack Quantity (m³)	New Stack Location
						From	To	From	To		
1	2023-2024	stack-1	Stack for mineral	0.70	2.90	21:52:15.17	21:52:16.09	85:10:37.28	85:10:38.53	20300.00	Top quarry
2	2023-2024	stack-2	Stack for mineral	1.90	2.90	21:52:20.35	21:52:29.70	85:10:41.90	85:10:46.91	55100.00	Top quarry

3	2023-2024	stack-3	Stack for mineral	2.00	3.00	21:52:14.96	21:52:17.47	85:10:53.43	85:10:53.94	60000.00	Top quarry
4	2023-2024	stack-4	Stack for mineral	1.40	2.90	21:51:56.41	21:52:03.70	85:10:42.83	85:10:45.89	40600.00	south quarry
5	2024-2025	stack-1	Stack for mineral	0.70	2.90	21:52:15.17	21:52:16.09	85:10:37.28	85:10:38.53	20300.00	Top quarry
6	2024-2025	stack-2	Stack for mineral	1.90	2.90	21:52:20.35	21:52:29.70	85:10:53.43	85:10:53.94	55100.00	Top quarry
7	2024-2025	stack-3	Stack for mineral	2.00	3.00	21:52:10.73	21:52:24.55	85:10:46.13	85:10:50.26	60000.00	Top quarry
8	2024-2025	stack-4	Stack for mineral	2.00	2.80	21:52:14.96	21:52:17.47	85:10:53.43	85:10:53.94	56000.00	Top quarry
9	2024-2025	stack-5	Stack for mineral	1.40	2.90	21:51:56.41	21:52:03.70	85:10:42.83	85:10:45.89	40600.00	south quarry
10	2025-2026	stack-1	Stack for mineral	0.50	2.80	21:52:14.53	21:52:18.09	85:10:36.09	85:10:38.63	14000.00	Top quarry
11	2025-2026	stack-2	Stack for mineral	1.50	2.80	21:52:23.75	21:52:31.79	85:10:40.13	85:10:48.33	42000.00	Top quarry
12	2025-2026	stack-3	Stack for mineral	1.90	2.90	21:52:10.73	21:52:24.55	85:10:46.13	85:10:50.26	55100.00	Top quarry
13	2025-2026	stack-4	Stack for mineral	1.00	2.80	21:52:11.26	21:52:23.32	85:10:48.87	85:10:52.70	28000.00	Top quarry
14	2025-2026	stack-5	Stack for mineral	2.00	2.80	21:52:14.96	21:52:17.47	85:10:53.43	85:10:53.94	56000.00	Top quarry
15	2025-2026	stack-6	Stack for mineral	1.50	2.90	21:52:01.28	21:52:05.08	85:10:43.42	85:10:50.08	43500.00	south quarry
16	2025-2026	stack-7	Stack for mineral	1.00	2.90	21:51:56.22	21:52:00.47	85:10:43.19	85:10:49.79	29000.00	south quarry
17	2023-2024	MR stack-1	Stack for mineral reject	2.50	4.00	21:52:08.92	21:52:16.70	85:10:32.84	85:10:39.24	100000.00	Top quarry
18	2023-2024	MR stack-2	Stack for mineral reject	0.35	2.00	21:52:13.95	21:52:16.17	85:10:55.55	85:10:58.84	7000.00	top quarry

19	2023-2024	MR stack-3	Stack for mineral reject	0.45	3.00	21:52:10.95	21:52:13.80	85:10:54.24	85:10:57.25	13500.00	top quarry
20	2023-2024	MR stack-4	Stack for mineral reject	0.46	1.60	21:51:58.55	21:52:00.84	85:10:47.43	85:10:49.58	7500.00	South quarry
21	2024-2025	MR stack-2	Stack for mineral reject	1.30	1.50	21:52:08.55	21:52:13.47	85:10:36.99	85:10:42.07	18898.00	Top quarry
22	2024-2025	MR stack-3	Stack for mineral reject	0.70	1.00	21:52:09.92	21:52:13.74	85:10:53.75	85:10:57.27	7000.00	Top quarry
23	2024-2025	MR stack-4	Stack for mineral reject	0.20	0.50	21:51:58.64	21:52:00.83	85:10:47.41	85:10:49.68	1000.00	south quarry
24	2025-2026	MR stack-2	Stack for mineral reject	1.50	1.50	21:52:07.74	21:52:13.71	85:10:36.00	85:10:42.50	22500.00	Top quarry
25	2025-2026	MR stack-3	Stack for mineral reject	1.00	0.90	21:52:08.70	21:52:55.59	85:10:57.34	85:10:57.39	9224.00	Top quarry

4A.8: Mineral Waste Handling To Utilize As Minor Mineral

SI.No.	Year	Dump ID	Type of Dump	Proposed Area (ha)	Quantity Handled (t)	Quantity Recovered (t)	Name Of Minor Mineral	Alternative Waste Utilization (m ³)
1	2023-2024	Waste dump	Waste	1.30	358000.00	0.00	BHJ SHALE LATERITE	179000.00
2	2024-2025	Waste dump	Waste	1.25	246440.00	0.00	BHJ SHALE LATERITE	123220.00
3	2025-2026	Waste dump	Waste	1.16	329590.00	0.00	BHJ SHALE LATERITE	164795.00

4A.9: Use of Minerals

SI.No.	Proposed Use Of Mineral	Name Of Mineral	Relevant Use Of Mineral	Physical Specifications	Chemical Specifications
1	Direct Selling	IRON ORE	DRI	5-20mm	55 -63.5
2	Direct Selling	IRON ORE	pellet plant/export/Beneficiation	0-10mm	55 -63.5

			plant		
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* Choose among these:

1. Captive use in own industry

2. Direct Selling

3. Selling Post-Beneficiation /Up-gradation

*Select more than one, if applicable

Approved

Chapter 4 B : Mining Operations UG : NA

Approved

Chapter 5: Sustainable Mining

5.1: Sustainable Mining and SDF Implementations in Compliance of Rule 35 of MCDR’2017

A sustainable development frame work has been constitution of SDU (Sustainable Development U nit) at Mine level - team of Mine management comprising of Technical, Financial, CSR, HRD, and Environment heads for ensuring implementation of SDF principles. To mitigate the adverse effect of air, water & noise pollution Proponent has complied to the Environment Clearance conditions of SEAC by establishing online ambient air monitoring along with manual ambient monitoring for 5 & 7 parameters following to NAAQ 2009 standards. Star rating template is being submitted for 2022-23. As per the assessment the mine has got 4 star rating. CSR activities have been carried out and a total 10 crore rupees has been spent till date.

(Total 200 characters)

Compliance of Vishakha Committee Guidelines for prevention of women harassment at workplace	Implemented
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5.2: CSR INITIATIVES

5.2.1: 2023-2024

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.1.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.01	0.01
5.2.1.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.50	0.50
5.2.1.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses

0	0
5.2.1.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
20	20
5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
1500	1500
5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
500	500
5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
150	150
5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives	
Number of Beneficiaries	Number of Beneficiaries
50	50
5.2.1.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
30	30
5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities	
Number of Beneficiaries	Number of Beneficiaries
0	0
5.2.1.11: Adoption of ODF	

Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
3	5	70

5.2.1.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	6

5.2.1.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
1500.00	5.00

5.2.1.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
180.00	10.00

5.2.2: 2024-2025

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.2.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.01

5.2.2.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.50

5.2.2.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses
0	0

5.2.2.4: Efforts Made towards Providing Transport to Local Communities	
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Number of Beneficiaries		Number of Beneficiaries	
20		40	
5.2.2.5: Efforts Made towards Providing Healthcare to Local Communities			
Number of Beneficiaries		Number of Beneficiaries	
1500		1500	
5.2.2.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities			
Number of Beneficiaries		Number of Beneficiaries	
100		600	
5.2.2.7: Efforts Made towards Skill Development Programs to Local Communities			
Number of Beneficiaries		Number of Beneficiaries	
50		200	
5.2.2.8: Efforts Made to Promote Education & Knowledge Based Initiatives			
Number of Beneficiaries		Number of Beneficiaries	
50		100	
5.2.2.9: Communication Facilities Provided to Local Communities			
Number of Beneficiaries		Number of Beneficiaries	
30		60	
5.2.2.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities			
Number of Beneficiaries		Number of Beneficiaries	
0		0	
5.2.2.11: Adoption of ODF			
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:		Number of Beneficiaries
0	3		85

5.2.2.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes Proposed	Number of Swatchata Programmes Held
2	8
5.2.2.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
1500.00	5.00
5.2.2.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
180.00	10.00

5.2.3: 2025-2026

Details of Work Proposed during the Year / Measures Planned for the Affected Segment	Cumulative Work done / Measures Taken
5.2.3.1: Area to be Developed for Recreation	
Area (Ha)	Area (Ha)
0.00	0.01
5.2.3.2: Area for Water Storage & Recharge Facility	
Area (Ha)	Area (Ha)
0.00	0.50
5.2.3.3: Efforts Made towards Housing for Local Communities	
Number of Houses	Number of Houses
0	0
5.2.3.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries	Number of Beneficiaries
60	140

5.2.3.5: Efforts Made towards Providing Healthcare to Local Communities		
Number of Beneficiaries		Number of Beneficiaries
1500		1500
5.2.3.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities		
Number of Beneficiaries		Number of Beneficiaries
200		800
5.2.3.7: Efforts Made towards Skill Development Programs to Local Communities		
Number of Beneficiaries		Number of Beneficiaries
50		250
5.2.3.8: Efforts Made to Promote Education & Knowledge Based Initiatives		
Number of Beneficiaries		Number of Beneficiaries
50		150
5.2.3.9: Communication Facilities Provided to Local Communities		
Number of Beneficiaries		Number of Beneficiaries
60		120
5.2.3.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities		
Number of Beneficiaries		Number of Beneficiaries
0		0
5.2.3.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area	Number of Toilets Built outside the Lease Area:	Number of Beneficiaries
0	5	120
5.2.3.12: Awareness Program among Mine Workers for Swatchata		
Number of Swatchata Programmes Proposed		Number of Swatchata Programmes Held
2		8

5.2.3.13: Efforts for green energy	
Total energy consumption (KWh)	Green energy consumption (% of total)
1500.00	5.00

5.2.3.14: Water & recycled use	
Total water consumption (KLD)	Water recycled (% of total)
180.00	10.00

5.3: Rehabilitation & Resettlement of Affected Persons

Particular	2023-2024	2024-2025	2025-2026
Proposed Number of Project Affected Persons(PAP)	0	0	0
Proposed Number of Person for Alternate Arrangement for Sustainable Livelihood	0	0	0
Proposed Number of Person for Skill Training	0	0	0
Proposed Number of Person Likely to get Direct Employment	0	0	0
Proposed Number of Person Likely to get Indirect Employment	0	0	0
Proposed Project Affected Families Skilled and Absorbed	0	0	0
Proposed Number of Project Affected Families	0	0	0

Chapter 6: Progressive Mine Closure Plan

6.1: Status of Land

Total Area Degraded					Total mined out area Reclaimed and Rehabilitated			Other Areas Reclaimed and Rehabilitated	
Total area under excavation in the lease		Area under Dumps(in hect)	Area under utility services(in hect)	Area under Stack yards(in hect)	Mined out Area Reclaimed but not rehabilitated(in hect)	Mined outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabililized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)
Area under mining operation	Mined Out area in the lease								
33.90	0.00	2.00	2.50	4.82	0.00	0.00	0.00	0.00	0.00

6.2: Progressive Reclamation and Rehabilitation Plan

6.2.1: Backfilling

Quantity of Waste / Fill Material Available at Site (m³)	1283364.00
Availability of Top Soil for Spreading (m³)	0.00
Proposed Spread Area (m²)	0.00

6.2.1.1: Year Wise Proposal

Sl.No	Year	Pit ID	Area (m²)	Top RL	Bottom RL	Estimated Expenditure (₹ INR)
1	Nil	Not applicable	Nil	Nil	Nil	Nil

6.2.2: Water Reservoir

Average Rainfall of The Area (mm)	1530.00
Proposed Area under Water Storage	0

6.2.2.1: Preparations For Ground Water Recharging

6.2.2.1.1: Drilling Holes	
Year	Proposed no of Holes to be Drilled
2023-2024	0.00
2024-2025	0.00
2025-2026	0.00
6.2.2.1.2:Preparation of Course Gravel Bed	
Year	Proposed Area of Bed (LxW)
2023-2024	0.00
2024-2025	0.00
2025-2026	0.00
Please specify, if others	
Existing 1 well(RWH)	

6.2.2.2: Protective measures (Please specify running meter)

6.2.2.2.1: Fencing					
Year	Proposed Fencing Length (m)	Latitude(dd:mm:ss.ss)		Longitude(dd:mm:ss.ss)	
		From	To	From	To
2023-2024	0	Nil	Nil	Nil	Nil
2024-2025	0	Nil	Nil	Nil	Nil
2025-2026	0	Nil	Nil	Nil	Nil

6.2.2.2.2: Retaining Wall					
Year	Proposed Wall Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
2023-2024	185	21:52:08.59	21:52:13.47	85:10:53.95	85:10:56.67
2024-2025	250	21:52:07.96	21:52:12.82	85:10:36.44	85:10:42.85
2025-2026	0	Nil	Nil	Nil	Nil

6.2.2.2.3: Garland Drains					
Year	Proposed Bund Length (m)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)	
		From	To	From	To
2023-2024	450	21:52:14.05	21:52:21.96	85:10:55.97	85:11:01.49
2024-2025	258	21:52:07.96	21:52:12.82	85:10:36.44	85:10:42.85
2025-2026	0	Nil	Nil	Nil	Nil

6.2.3: Green Belt Development

6.2.3.1: Cumulative work done (upto end of previous block of five years)

SI.No	Total Expenditure Incurred up to Last Year (INR)	Area Covered (Ha)	Number of Plants	Survival Rate (%)
1	500000.00	2.48	15000	70.00

6.2.3.2: Year Wise Proposal

SI.No	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (₹ INR)
1	2023-2024	Safety zone	0.257	643	85	96450

2	2024-2025	Safety zone	0.703	1757	85	263550
3	2025-2026	Safety zone	0.591	1477	85	221550

6.2.4: Use of Shallow Pits

6.2.4.1: Cumulative Work Done (upto end of previous block of five years)

SI.No	Pit ID	Work Done	Area covered (m ²)	Total Expenditure Incurred (up to last five year block) (₹ INR)
1	Not applicable	Nil	Nil	Nil

6.2.4.2: Year Wise Proposal

SI.No	Year	Pit ID	Total Area(Ha)	Area Proposed for Crops (Ha)	Suitable Crops	Area Proposed for Grass (Ha)	Total Proposed Expenditure (₹ INR)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Remarks
								From	To	From	To	
1	2023-2024	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2	2024-2025	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
3	2025-2026	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

6.2.5: Pisciculture

6.2.5.1: Total Expenditure incurred as on Date (INR)	0
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6.2.5.2: Cumulative work done as on Date

SI.No	Pit ID	Area (m ²)	Expenditure (₹ INR)

1	Nil	0.00	0.00
---	-----	------	------

6.2.5.3: Year Wise Proposal

SI.No	Year	Pit ID	Area (m ²)	Estimated Expenditure (₹ INR)
1	2023-2024	0	0.00	0.00
2	2024-2025	0	0.00	0.00
3	2025-2026	0	0.00	0.00

6.2.5.4: Source of Water for Pisciculture	Nil
---	-----

6.2.5.5: Whether the quality of water has been assessed & found to be suitable for Pisciculture	No
---	----

6.2.6: Recreational Facility

6.2.6.1: Total Expenditure Incurred (up to last five year block) (INR)	0.00
--	------

6.2.6.2: Cumulative work done as on Date

SI.No	Pit ID	Area (m ²)	Expenditure (₹ INR)
1	Nil	Nil	Nil

6.2.6.3: Year Wise Proposal

SI.No	Year	Type of Recreational Facility	Area Covered (Ha)	Latitude (dd:mm:ss.ss)		Longitude (dd:mm:ss.ss)		Estimated Expenditure (INR)
				From	To	From	To	
1	2023-2024	Gardening	0.06	21:52:07.74	21:52:07.74	85:10:52.82	85:10:52.82	50000.00
2	2024-2025	Gardening	0.04	21:52:07.74	21:52:07.74	85:10:52.82	85:10:52.82	50000.00
3	2025-2026	Gardening	0.10	21:52:07.74	21:52:07.74	85:10:52.82	85:10:52.82	50000.00

6.2.7: Dump Area Stabilization & Development

SI.No	Year	Dump ID	No of Terraces	Average Height of Terraces (m)	Length of Toe Wall (m)	Length of Garland Drain (m)	Area Stabilized (Ha)	Method of Stabilization	Estimated Expenditure (₹ INR)	No of Check Dams
1	Nil	Not applicable	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

6.2.8: Other Form of Reclaiming the Area

6.2.8.1: Cumulative work done as on Date

SI.No	Total Expenditure incurred as on Date (INR)	Work Done
1	0.00	0

6.2.8.2: Year Wise Proposal

SI.No	Year	Work Proposals	Estimated Expenditure (INR)
1	2023-2024	0	0.00
2	2024-2025	0	0.00
3	2025-2026	0	0.00

6.2.9: TopSoil Management

6.2.9.1: Cummulative Work Done as on Date

SI.No	Top Soil Generated (m³)	Top Soil Utilized (m³)	Topsoil Stored (m³)	Total expenditure incurred as on date (₹)
1	0.00	0.00	0.00	Nil

6.2.9.2: Year Wise Proposal

SI.No	Year	Topsoil Generated (m³) (A)	Topsoil Utilized (m³) (B)	Topsoil Stored (m³) (A-B)	Estimated Expenditure (INR)
1	2023-2024	0.00	0.00	0.00	0.00
2	2024-2025	0.00	0.00	0.00	0.00
3	2025-2026	0.00	0.00	0.00	0.00

6.2.10: Tailings Dam Management

SI.No	Year	Yearly generation of Tailing (m³) (A)	Total capacity of Tailing Pond (m³)	Measures Proposed for Periodic Desilting	Yearly Utilization of Tailing (m³) (B)	Disposal of Tailing to Tailing Pond (m³) (A-B)	Tailing Dam Design	Structural Stability Studies
1	2023-2024	0.00	0.00	0	0.00	0.00	Nil	Nil
2	2024-2025	0.00	0.00	0	0.00	0.00	Nil	Nil
3	2025-2026	0.00	0.00	0	0.00	0.00	Nil	Nil

6.2.11: Land Use of Lease Area at the Expiry of Lease Period

Total Area Degraded				Non Degraded area	Total mined out area Reclaimed and Rehabilitated			Other Areas Reclaimed and Rehabilitated			
Mined Out area in the lease	Area under Dumps(in hect)	Area under the Tailing Dam	Area under utility services(in hect)	Area undisturbed/virgin	Mined out Area Reclaimed but not rehabilitated(in n hect)	Mined outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabililized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)	Rehabilitated Area under utility services(in hect)	Rehabilitated Area under Tailing dam (in hect)
63.276	2.23	0.00	0.00	2.08	14.68	46.37	2.23	2.21	2.08	0.00	0.00

Chapter 7: Financial Assurance/ Performance Surety (AREA PUT TO USE)

2023-2024

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	33.90	3.92	37.82
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	2.00	0.00	2.00
4	Mineral Storage	5.61	0.27	5.88
5	Infrastructure (Workshop, Administrative Building etc.)	0.60	0.96	1.56
6	Roads	1.90	0.60	2.50
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	2.51	0.00	2.51
	Total	46.52	5.75	52.27

2024-2025

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	37.82	1.87	39.69
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	2.00	1.25	3.25
4	Mineral Storage	5.88	1.92	7.80
5	Infrastructure (Workshop, Administrative Building etc.)	1.56	0.00	1.56
6	Roads	2.50	0.00	2.50
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	2.51	0.00	2.51
	Total	52.27	5.04	57.31

2025-2026

Consolidated View of Financial Assurance

SI.No	Particular	Area put to use at Start of Year (ha) (A)	Additional Requirement (ha) (B)	Total (ha) (C = A + B)
1	Area under Mining	39.69	6.52	46.21
2	Topsoil stacking	0.00	0.00	0.00
3	Overburden/Waste Dumping	3.25	0.47	3.72
4	Mineral Storage	7.80	0.59	8.39
5	Infrastructure (Workshop, Administrative Building etc.)	1.56	0.00	1.56

6	Roads	2.50	0.00	2.50
7	Railway	0.00	0.00	0.00
8	Tailing Pond	0.00	0.00	0.00
9	Effluent Treatment Plant	0.00	0.00	0.00
10	Mineral Separation Plant	0.00	0.00	0.00
11	Township Area	0.00	0.00	0.00
12	Others to specify	2.51	-0.04	2.47
	Total	57.31	7.54	64.85
Financial Assurance				

Financial Assurance

Category A Mining Lease

Total Area Proposed to be put to use in hect(Year 1 to 5)	Amount of Bank Gurantee (Lac INR)	Valid till (dd/mm/yyyy)	Upload copy of Bank Gurantee as attachment
64.85	324.25	31/03/2026	BG_DETAILS1_compressed.pdf

Category B Mining Lease

SI.No	Total Area Proposed to be put to use in hect(Year 1 to 5)	Amount of Bank Gurantee (Lac INR)	Valid till (dd/mm/yyyy)	Upload copy of Bank Gurantee as attachment
1	Nil	Nil	Nil	Nil

Chapter 8: Review of Previous Proposals (Not applicable for fresh grant)

8.1: General

8.1.1: Lease Area Utilization

Sl. No.	Type of land use (in ha)	Area at the beginning of the proposal period	Area proposed under activity	Actual Area utilized in the proposal period	Deviation	Reasons for deviation
1	Mining	33.59	36.14	33.90	-2.24	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
2	Mineral storage	3.80	10.22	5.43	-4.79	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
3	Mineral Beneficiation plant	0.00	0.00	0.00	0	NA
4	Township	0.00	0.00	0.00	0	NA
5	Tailing Pond	0.00	0.00	0.00	0	NA
6	Railways	0.00	0.00	0.00	0	NA
7	Roads	1.90	2.23	1.90	-0.33	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
8	Infrastructure (Workshop, administrative building)	0.60	2.63	0.60	-2.03	The proposal was for 4.99MTPA, however due

	etc.)					to delay in grant of EC production has been carried out @ 2.99MTPA.
9	OB/waste dump	2.00	4.27	2.00	-2.27	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
10	Top soil preservation	0.00	0.00	0.00	0	NA
11	Others	2.48	2.98	2.48	-0.5	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
12	Total area put to use	44.37	58.47	46.31	-12.16	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
13	Excavated area reclaimed	0.00	0.00	0.00	0	NA
14	Waste dump area reclaimed	0.00	0.00	0.00	0	NA
15	Undisturbed Area	23.22	9.12	21.28	12.16	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
	Total	67.59	67.59	67.59	0	

8.1.2: SDF and CSR Expenditures

Activity	Proposals		Achievement	Deviation	Reasons for deviation
Total expenditure incurred for implementation of SDF at mine level including	10% of Royalty (a)	Total Expenditure for SDF implementation (b)			

- Environment Protection - CSR & other welfare activities in peripheral area (Explanation: Expenditure is not over and above the statutory levies imposed by the Government; However, THIS EXCLUDES CONTRIBUTION TO DMF & NMET and is over and above the statutory levies imposed by the Government.)					
CSR (Corporate Social Responsibility) spending at the mine level in Proposal Period (as per Companies Act, 2013 or otherwise)	132759866.30	54485745.00	54485745.00	0.00	No Deviation

8.2: Technical Details

8.2.1: Exploration

Particulars	Proposals			Achievement			Deviation			Reasons for deviation
	Boreholes	Pits	Trenchs	Boreholes	Pits	Trenchs	Boreholes	Pits	Trenchs	
Number of Boreholes/ Pits/ Trenches	25	0	0	15	Nil	Nil	-10	Nil	Nil	Due to inaccessiblity for steep gradient and felling of tree have not been completed.
Boreholes Meterage (If Boreholes selected in first row) (m)	2040			988			-1052			Due to inaccessiblity for steep gradient and felling of tree

				have not been completed.
Grid	100	100	0	NA
G Axis upgradation during Proposal Period as per guidelines of MEMC Rule 2015)	67.59	62.04	-5.55	Due to inaccessibility for steep gradient and felling of tree have not been completed.
Area converted under G1 from G2/G3	67.59	62.04	-5.55	Due to inaccessibility for steep gradient and felling of tree have not been completed.

8.2.2: Mine Development (Opencast/ Underground/ Both/ Dump Mining)

Particulars	Proposals	Actual	Deviation	Reasons for deviation
8.2.2.1: Generation of Ore/Waste While Development				
Ore	7980000	6124500	-1855500	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
Waste	585960	444700	-141260	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
Generated Waste while ROM recovery	0	0	0	NA
Dumping Site (For Surface)	Near MLB 19	Near MLB 19	0	NA
Removal of waste/ over burden in cubic meters	292980	222350	-70630	The proposal was for 4.99MTPA, however due to delay in grant of EC

				production has been carried out @ 2.99MTPA.
8.2.2.2: Excavation				
Lateral extent	300	300	0	NA
Vertical extent	160	160	0	NA

8.2.3: Mining operation: Dump Mining

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Handling of Material	0	0	0	NA
Waste Generated post recovery	0	0	0	NA
Dumping site for waste	0	0	0	0

8.2.4: Zero Waste Mining

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Alternative use / Disposal of Waste Generated (excluding top soil)	0.00	0.00	0.00	NA

8.2.5: Backfilling

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Site (Co-ordinates)	0	0	0	0
Area	0	0	0	0
Depth	0	0	0	0
Volume Backfilled (CuM)	0	0	0	0
Backfilled Area available for Reclamation and Rehabilitation	0	0	0	0
Backfilled Area Reclaimed and Rehabilitated	0	0	0	0

Balance Backfilled Area	0	0	0	0
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8.2.6: Production of Mineral(s)

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
8.2.6.1: ROM				
Opencast	7980000.0000	6124500.0000	-1855500.0000	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
8.2.6.2: Cleaned Ore				
Opencast	6434593.0000	5399080.0000	-1035513.0000	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
Dump Mining	0.0000	0.0000	0.0000	0
Recovery from Mineral Rejects or Tailings	0.0000	0.0000	0.0000	0
Total	6434593.0000	5399080.0000	-1035513.0000	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.

8.2.7: Handling of Mineral Rejects/ Sub-Grade

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Generation of mineral rejects				
Opencast	1545407	1168220	-377187	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
Dump Mining	0	0	0	NA

Other recovery	0	0	0	NA
Stacking of mineral rejects/ sub-grade mineral (Dump Id)	1081784.9	817754	-264030.9	The proposal was for 4.99MTPA, however due to delay in grant of EC production has been carried out @ 2.99MTPA.
Blending of mineral reject / sub-grade	463622.1	350466	Nil	Nil

8.2.8: Environment Compliances

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
8.2.8.1: Top soil				
Generation	0	0	0	0
Utilization	0	0	0	0
Stacking (Dump Id)	0	0	0	0
Reclamation	0	0	0	0
Rehabilitation	0	0	0	0
8.2.8.2: Afforestation (Dumps/Benches/Backfilled Area etc.)				
2021 - 2022	0	0	0	NA
2022 - 2023	0	0	0	NA
Nil	Nil	Nil	Nil	Nil
Nil	Nil	Nil	Nil	Nil
Nil	Nil	Nil	Nil	Nil
8.2.8.3: Afforestation (Green Belt)				
2021 - 2022	0.231	0.231	0	NA
2022 - 2023	0.253	0.253	0	NA

Nil	Nil	Nil	Nil	Nil
Nil	Nil	Nil	Nil	Nil
Nil	Nil	Nil	Nil	Nil
Construction of check dams	0	0	0	0
Construction of Garland Drain (in meter)	450	450	0	NA
Construction of Retaining Walls (in meter)	0	0	0	NA
8.2.8.4: Tailings				
Generation	0	0	0	0
Utilization	0	0	0	0
Disposal	0	0	0	0

8.3: Socio-Economic Review

8.3.1: Rehabilitation & Resettlement for Project Affected People

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
No. of Project Affected People (PAP)	0.0000	0.0000	0.0000	0
%age of PAP for whom alternate arrangements made for sustained livelihood	0.0000	0.0000	0.0000	0
% of project affected families given employment	0.0000	0.0000	0.0000	0
% of project affected families who have been skilled by the lessee and absorbed (% of total employment given to affected families)	0.0000	0.0000	0.0000	0

8.3.2 : Grievance Redressal

Grievances Received	Nil	Nil	Nil	Nil	Nil
	0	0	0	0	0
Grievances Redressed	0	0	0	0	0

8.3.3: Welfare and socio-economic development programs for local communities

Particulars	2021 - 2022	2022 - 2023	Nil	Nil	Nil
8.3.3.1 Support for Drinking Water & Agriculture					
No. of Water Storage Tanks constructed	3	4	Nil	Nil	Nil
Drinking Water Facilities provided (Bore wells/ Pumps etc.)	2	3	Nil	Nil	Nil
Irrigation Support provided (Canals/ Pumps etc.)	0	0	Nil	Nil	Nil
No. of Water tanks De-silted	4	5	Nil	Nil	Nil
Water Treatment facilities provided (A/NA)	NA	NA	Nil	Nil	Nil
Amount of Water treated (in kL) (if selected A in above)	NA	NA	Nil	Nil	Nil
8.3.3.2 Support to Health & Medical Services					
No. of persons identified from Occupational health diseases	0	0	Nil	Nil	Nil
No. of Health Camps/ Medicine Camps Organized	1	1	Nil	Nil	Nil
8.3.3.3 Support to Skill development & Education					
Vocational Training Provided/ Support Provided					
No. of employees undergone Vocational training	5	10	Nil	Nil	Nil

No. of other persons undergone Vocational training	10	15	Nil	Nil	Nil
Number of Literacy & Education Camps held/ Supported	1	1	Nil	Nil	Nil
8.3.3.4 Support to Transportation Services & Infrastructure					
Expenditure on Transportation Services & Infrastructure	1469959	8607911	Nil	Nil	Nil
Road development (m) in the peripheral area (not lease area)	Nil	Nil	Nil	Nil	Nil
No. of Public transport support provided (Ambulance/Buses/ School Vans etc)	1	1	Nil	Nil	Nil
8.3.3.5 Swatchata Programs: Creating/providing sanitation and healthy condition in and around the mine area					
Adoption of ODF within mining lease area					
No. of Toilets built in the Lease Area	Nil	Nil	Nil	Nil	Nil
Adoption of ODF in nearby villages					
No. Of Toilets built in the villages	Nil	Nil	Nil	Nil	Nil
Provision for greenage recreational facility (Within Lease Area/ Outside)					
Recreational Area Type (Picnic Spot/ tracks/Park Etc)	Nil	Nil	Nil	Nil	Nil
Area covered (For within Lease Area only)	Nil	Nil	Nil	Nil	Nil
Awareness program among Mine workers for Swatchata					
No. of Swatchchta Programmes held	1	1	Nil	Nil	Nil

Chapter 9 : Impact Assessment (NA)

Approved

Chapter 10: Annexures

1. Upload Document

1.1 Upload Document

SI.No.	Title	Is Upload	Document (only pdf allowed)
1	Letter of Intent /Letter of lease grant	Nil	Lease deed.pdf
2	Copy of lease deed executed	Nil	TRANSFER_LEASE_DEED.pdf
3	Copy of Declaration of Owner/Nominated Owner in case of Company/partnership firm	Nil	Board_resolution_Nominated_owner.pdf
4	ID & Address Proof of Owner/ Nominated Owner	Nil	ID_Address_Proof_of_lessee.pdf
5	Copy of Environment and Forest Clearence, Consent to Establish, Consent to Operate	Nil	EC,FC,CTE&CTO.pdf
6	Copy of Registration of Company (RoC)/Partnership firm (Registration) & Deed	Nil	Company_registration.pdf
7	Consent letter for Qualified Person	Nil	CONSENT_LETTER_FROM_LESSEEPM.pdf
8	Experience & Qualification Details of Qualified Person	Nil	QP_CERTIFICATE_EXP.pdf
9	Certificate from QP	Nil	CERTIFICATE_FROM_QUALIFIED_PERSON.pdf
10	Copy of Bank Guarantee	Nil	BG_DETAILS1.pdf
11	Copy of Performance Surety	Nil	Nil
12	Copy of MDPA (as applicable)	Nil	Nil
13	Exploration details	Nil	Borehole_details.pdf
14	Copy of feasibility Report	Nil	Feasibility_Report_GRM.pdf

15	Copy of Study reports conducted as per Para 4.3.1	Nil	BD_ & Recovery_factor.pdf
16	Chemical and Mineralogical analysis report	Nil	BH_SAMPLE_ANALYSIS_AND_RADICAL_ANALYSIS.pdf
17	Any other Report or Certification as required in the submitted Document.	Nil	RADICALS_ANALISYS.pdf
18	Copy of Scale relaxation approval granted(if applicable)	No	Nil
19	Mineral processing flowsheet with stage wise recovery	Nil	material_balance.pdf
20	Any Other	Yes	Introduction_with_mining_plan_at_a_glance.pdf

Chapter 11: Plates (OC)

1. Upload Document

1.1 Upload Document

S.N.	Title	Is Upload	Document
1	Lease sketch plan;	Nil	Lease sketch plan.pdf
2	Surface Plan (.KMZ format)(Georeferenced); A statutory plan as per MCDR, 2017. The Plan should be submitted showing different color codes for:(1) Active Pits & Excavation area(2) Excavated area reclaimed & rehabilitated (3)Active dumps (4) Stabilized & rehabilitated dump area , (5) Green belt (6) Mineral Stacks (7) Utilities such as plant, buildings etc (8) Lease boundary along with other details.)	Nil	SURFACE_PLAN.kmz
3	Surface Geological Plan of the lease (.KMZ format)(Georeferenced); The Plan should be submitted showing different color codes for : (1) Lithological/Geological Occurance (2) Area under G1,G2,G3 & G4 (3) Active pits & Excavation area (4) Dump Area (5) Mineral Stacks (6) Lease boundary along with other details.)	Nil	GEOLOGICAL_PLAN.kmz
4	Surface Geological sections (in Pdf format); Geological sections with different color coding depicting all the features shown in Surface Geological Plan.)	Nil	FINAL_GEOLOGICAL_SECTION.pdf
5	Five year Production and Development plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for: (1) Active Pit and Excavation area ,	Nil	3YEARS_DEVELOPMENT.kmz

	(2) Year wise excavation proposal for year I to V (3) Active dump and yearwise dump proposal for year I to V (4) Year wise Dump working proposal for year I to V (6) Lease boundary (with reference to chapter 4) along with other details.)		
6	Five year Production and Development sections (in pdf fromat); Year wise excavation and dumping proposals with different color coding depicting all the features as shown in the Five year Production and development plan.)	Nil	3YEAR DEVELOPMENT_SECTION.pdf
7	Progressive Mine Closure Plan (.KMZ format)(Georeferenced); The Plan should be submitted showing different color coding for : (1) Yearwise excavated area Reclaimed & rehabilitated for year I to V (2) Year wise dump area to be stabilized and dump area to be rehabilitatd for year I to V (3) Year wise Green area proposed from year I to V.(4) Any other reclamation and rehabilitation measures proposed.(5) Lease boundary (with reference to chapter 6) along with other details.)	Nil	PROGRESSIVE_MINE_CLOSURE_PLAN.kmz
8	Progressive mine Closure sections (in pdf format); Year wise Progressive mine clouser sections showing all the yearwise reclamation, rehabilitaion proposals as depicted in the Progessive mine clouser plan.)	Nil	CONCEPTUAL_SECTION.pdf
9	Conceptual Plan (.KMZ format)(Georeferenced); The Plan should depict the staus of lease area as envisaged at the end of life of Mine showing all the details. Status of land use shall be depicted by different color coding.)	Nil	CONCEPTUAL_PLAN.kmz
10	Conceptual Sections (pdf) format;	Nil	CONCEPTUAL_SECTION.pdf
11	Geo referenced Cadastral Plan; Duly certified by the State Government)	Nil	DGPS_MAP.pdf
12	Financial Assurance Plan (KMZ);	Nil	FINANCIAL_ASSURANCE_PLAN.kmz

13	Environmental Plan (.KMZ format)(Georeferenced); As per MCDR, 2017 indicating all the details.)	Nil	ENVIRONMENT_PLAN.kmz
14	Any other plan/section as deemed necessary by approving authority;	Yes	3YEAR DEVELOPMENT SLICE PLAN AND ORTHO.pdf
15	Five Year Production and Development sections (in pdf format);	Yes	COMMON BOUNDARY WORKING PLAN.pdf
16	LEVEL WISE SLICE PLAN; LEVEL WISE SLICE PLAN (PDF FORMAT IN VISIBLE SCALE))	Yes	6slice.pdf

Approved

Chapter 11 : Plates(UG) : NA

Approved

OFFICE OF THE DEPUTY DIRECTOR OF MINES, KOIRA CIRCLE

No. 5054 / Mines, Dt. 02/09/2017DEMAND NOTICE

To

M/s Geetarani Mohanty

Raikela Iron Mines

Station Road, Barbil, Distt.- Keonjhar

Whereas, it has been observed that M/s Geetarani Mohanty, the mining lease holder of Raikela Iron Mines over an area of 67.586 ha has undertaken production of Iron Ore from the above referred mining lease hold area without or in excess of the approved limit of production under Environmental Clearance during 2000-01 to 2010-11.

2. And Whereas pursuant to the interim order dt. 16.05.2014 of Hon'ble Supreme Court in the matter of W.P.(C) No. 114 of 2014 Common Cause Vrs. Union of India and others, the CEC has dealt among others, the issue of production without or in excess of EC and has submitted its final report on dt. 16.10.2014 before the Hon'ble Supreme Court. In the said report the CEC under Para 34 has calculated the notional value of the total quantities of iron and manganese produced without EC / beyond EC by all the lessees in the State of Odisha during the years 2000-01 to 2010-2011. The details of year wise production of Iron Ore in the Raikela mining leasehold area along with the approved limit of production under EC, the excess production, price of mineral and the notional value (price of minerals) of total quantities of 2774964.040 MT of Iron Ore produced without E.C/beyond the EC by you during the years 2000-01 to 2010-11 as have been indicated in the said report is annexed herewith.

3. Whereas the Hon'ble Supreme Court in its Judgment dated 2.8.2017 in the W.P.(C) No. 114 of 2014 has observed under para 128 that

"..... the holder of a mining lease is required to adhere to the terms of the mining scheme, the mining plan and the mining lease as well as the statutes such as the ERPA, the FCA, the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. If any mining operation is conducted in violation of any of these requirements, then that mining operation is illegal or unlawful. Any extraction of a mineral through an illegal or unlawful mining operation would become illegally or unlawfully extracted mineral".

4. Whereas, the Hon'ble Supreme Court in the said Judgment has further observed under Para 150 that

"In our opinion, Section 21(5) of the MMDR Act is applicable when any person raises, without any lawful authority, any mineral from any land. In the event, the State Government is entitled to recover from such person the mineral so raised or where the mineral has already been disposed of, the price thereof as compensation. The words 'any land' are not confined to the mining lease area. As far as the mining lease area is

etc

concerned, extraction of a mineral over and above what is permissible under the mining plan or under the EC undoubtedly attracts the provisions of Section 21(5) of the MMDR Act being extraction without lawful authority....."

5. Whereas, the Hon'ble Supreme Court in the said Judgement has further held in Para 156 that

"Since the recommendation made by the CEC in this regard is not totally unreasonable, we accept that the compensation should be payable from 2000-2001 onwards at 100% of the price of the mineral, as rationalized by the CEC."

6. Whereas considering the above excess production as production without lawful authority, you are liable to pay a sum of Rs.185,94,55,009.88 (Rupees One hundred eighty five crores Ninety four lakh Fifty five thousand Nine & Eighty eight paise) only, being the price thereof towards compensation under Section 21(5) of MMDR Act, 1957 for production without/in excess of the environmental clearance as rationalized the CEC, in pursuance to the Judgement dt.02.08.2017 of Hon'ble Supreme Court in the matter of W.P. (C) No.114/14 Common Cause Vrs Union of India and Others.

Now therefore, you are hereby directed that you shall pay the compensation of Rs.185,94,55,009.88 (Rupees One hundred eighty five crores Ninety four lakh Fifty five thousand Nine & Eighty eight paise) only as detailed in Annexure-I on or before 31.12.2017 in pursuance to the Para 225 of the Order dt.02.08.2017 of Hon'ble Supreme Court, following the mode of payment as detailed out under Annexure II.

It is also made clear that the aforesaid demand is relatable to recovery of price of minerals produced without/beyond the EC alone under Section 21(5) of MMDR Act, 1957 as adjudicated vide Para 156 of the Judgement as referred above and does not include recoveries under Section 21(5) of the said act for violation of mining plan, consent requirements under Air/Water Act and Forest violations, for which the demands, if any would be raised separately.

Memo No. 575/DM, dt. 21/9/2017

Copy forwarded Director of Mines, Odisha, Bhubaneswar for favour of kind information and necessary action.

S. Beha
21/9/2017
DEPUTY DIRECTOR OF MINES

Deputy Director of Mines
Koraput, Dist. Sundargarh

S. Beha
21/9/2017
DEPUTY DIRECTOR OF MINES

Deputy Director of Mines
Koraput, Dist. Sundargarh

Name of the Lease :M/s. G.R. Mohanty (Ralkela & Tantra Iron & Mn Mines)

Sl. No.	Mineral	Year of Production	Production in MT	Approved limit of production in MT under EC as considered by CEC	Excess Production in MT as assessed by CEC	Price of Minerals as considered by CEC (in Rs/Tonne)	Cost of excess minerals produced in Rs. to be recovered towards compensation
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
1	Iron	2000-01	96500	5117.37	91382.63	230.43	21057299.43
2	Iron	2001-02	112910	5117.37	107792.63	241.05	25983413.46
3	Iron	2002-03	40717	5117.37	35599.63	300.33	10691636.88
4	Iron	2003-04	131700	5117.37	126582.63	487.81	61748272.74
5	Iron	2004-05	445906	5117.37	440788.63	562.41	247903933.4
6	Iron	2005-06	678100	5117.37	672982.63	690.93	464983888.5
7	Iron	2006-07	1144700	5117.37	1139582.63	749	853547389.9
8	Iron	2007-08	165370	5117.37	160252.63	1082.91	173539175.6
9	Iron	2008-09	174410	648000		1317.21	0
10	Iron	2009-10	444990	864000		1184.33	0
11	Iron	2010-11	863364	864000		1982.29	0
Total			4298667.00	2416938.96	2774964.04	8828.70	1859455009.88

R. K. Mohanty
2/9/2017
Deputy Director of Mines
Koraput, Dist Sundergarh

Mode of Payment of compensation under section 21(5) of MMDR Act, 1957

1. The payment is to made through the online portal of Directorate of Steel & Mines (I3MS) and the Treasury Application (IFMS, Odisha) into the designated banking account in the Public Account of the State Government under the Account Head "8443 Civil Deposits -00- 106-Personal Deposits- 3275- Banking Account of Odisha Mineral Bearing Areas Development Corporation(OMBADC) – 91328- Compensation under Section-21(5) of MMDR Act and other provisions of MMDR Act as per orders of Hon'ble Supreme Court".
2. The Lessee will log into the portal of Directorate of Mines i.e. www.orissaminerals.gov.in and access the link to I3MS. The lessee may register him / herself to make the online payment of Compensation under Section-21(5) of MMDR Act, if not registered earlier.
3. The Lessee will access the "compensation" payment link in the login page and click the make payment option. The personal details of the lessee will be auto populated in the payment screen of I3MS. Along with the amount due to be paid in pursuance to the demand notice. She/he will provide the details about the amount of payment to be made by him/her in the current transaction.
4. The Lessee will then be redirected to IFMS, Odisha (www.odishatreasury.gov.in) where she/he will choose the Bank through which he/she wants to make the payment and the mode of payment.
5. The payment can be made through the following modes: Net Banking, Debit Card or Over the Counter. In case of Net Banking and Debit Card, the system will be redirect to the portal of the concerned Bank, wherein he/she will authenticate the payment request using the credentials of the Bank. Response of successful payment will be received from the Bank in the Treasury Portal and I3MS instantaneously. In case the payment is made using Over the Counter mode, a pre-populated challan will be generated in the online portal of IFMS, Odisha. The payer will take the printout of the challan and visit the designated Bank branch to make the remittance.
6. The authorised Banks will report the receipt of the remittances to the Reserve Bank of India on T+1 or T+2 working day, as the case may be. The RBI, PAD, Bhubaneswar will report the receipt of the remittances to the Cyber Treasury electronically using the e-Kuber platform.
7. The Cyber Treasury will import the credit information from the RBI and account for the receipt in their books. The challan no. generated will be made available in the login page of the lessee in I3MS.
8. In case of any difficulty in making the online payment, the lessee may contact the Project Management Unit of Directorate of Mines through mail ID: itpmu@orissaminerals.gov.in or the Help Desk of IFMS, Odisha Tollfree No. 18003456739 or email ID: helpdesk@orissatreasury.gov.in.

M/s. Geetarani Mohanty

SI No	Date	Name of Bank	Challan Amount	Challan No.	Internet Transaction No.
1	29.12.17	SBI Corporate Banking	5000000.00	27DE0E0FB2	CKE5429792
2	29.12.17	SBI Corporate Banking	5000000.00	27DE0E0FD5	CKE5430846
3	29.12.17	SBI Corporate Banking	5000000.00	27DE0E1046	CKE5434825
4	29.12.17	SBI Corporate Banking	5000000.00	27DE0E030B	CKE5436468
5	29.12.17	SBI Corporate Banking	5000000.00	27DE0E0300	CKE5436048
6	30.12.17	SBI Corporate Banking	5000000.00	27DE1D4BDE	CKE5482184
7	30.12.17	SBI Corporate Banking	5000000.00	27DE1D4BFB	CKE5483426
8	30.12.17	SBI Corporate Banking	5000000.00	27DE1D4C23	CKE5485227
9	30.12.17	SBI Corporate Banking	5000000.00	27DE1D583A	CKE5484403
10	28.06.18	SBI Corporate Banking	10000000.00	2A0E536955	CKG3227126
11	02.08.18	SBI Corporate Banking	100000000.00	2A18A5949D	CKG6805644
12	02.08.18	SBI Corporate Banking	50000000.00	2A18A5A097	CKG6810940
13	02.08.18	SBI Corporate Banking	50000000.00	2A18A59548	CKG6811496
14	03.08.18	SBI Corporate Banking	100000000.00	2A18B4E559	CKG6855132
15	03.08.18	SBI Corporate Banking	10000000.00	2A18B4F2F0	CKG6873708
16	03.08.18	SBI Corporate Banking	90000000.00	2A18B4E6E5	CKG6879076
17	03.08.18	SBI Corporate Banking	80000000.00	2A18B4E733	CKG6886087
18	03.08.18	SBI Corporate Banking	80000000.00	2A18B4E741	CKG6887428
19	03.08.18	SBI Corporate Banking	80000000.00	2A18B4F3E!	CKG6888281
20	03.08.18	SBI Corporate Banking	100000000.00	2A18B4F2AA	CKG6870201
21	03.08.18	SBI Corporate Banking	60000000.00	2A18B4E75D	CKG6889914
22	03.08.18	SBI Corporate Banking	90000000.00	2A18B4F40A	CKG6891086
23	03.08.18	SBI Corporate Banking	70000000.00	2A18B4F417	CKG6892725
24	03.08.18	SBI Corporate Banking	490000000.00	2A18B4E849	CKG6910225
25	04.08.18	SBI Corporate Banking	90000000.00	2A18C43AD5	CKG6945617
26	04.08.18	SBI Corporate Banking	484442000.00	2A18C43DFD	CKG6960092
		Total Paid	2079442000.00		

M/s. Geetarani Mohanty

SI No	Date	Name of Bank	Challan Amount	Challan No.	Internet Transaction No.
1	29.12.17	SBI Corporate Banking	5000000.00	27DE0E0FB2	CKE5429792
2	29.12.17	SBI Corporate Banking	5000000.00	27DE0E0FD5	CKE5430846
3	29.12.17	SBI Corporate Banking	5000000.00	27DE0E1046	CKE5434825
4	29.12.17	SBI Corporate Banking	5000000.00	27DE0E030B	CKE5436468
5	29.12.17	SBI Corporate Banking	5000000.00	27DE0E0300	CKE5436048
6	30.12.17	SBI Corporate Banking	5000000.00	27DE1D4BDE	CKE5482184
7	30.12.17	SBI Corporate Banking	5000000.00	27DE1D4BFB	CKE5483426
8	30.12.17	SBI Corporate Banking	5000000.00	27DE1D4C23	CKE5485227
9	30.12.17	SBI Corporate Banking	5000000.00	27DE1D583A	CKE5484403
10	28.06.18	SBI Corporate Banking	10000000.00	2A0E536955	CKG3227126
11	02.08.18	SBI Corporate Banking	100000000.00	2A18A5949D	CKG6805644
12	02.08.18	SBI Corporate Banking	50000000.00	2A18A5A097	CKG6810940
13	02.08.18	SBI Corporate Banking	50000000.00	2A18A59548	CKG6811496
14	03.08.18	SBI Corporate Banking	100000000.00	2A18B4E559	CKG6855132
15	03.08.18	SBI Corporate Banking	10000000.00	2A18B4F2F0	CKG6873708
16	03.08.18	SBI Corporate Banking	90000000.00	2A18B4E6E5	CKG6879076
17	03.08.18	SBI Corporate Banking	80000000.00	2A18B4E733	CKG6886087
18	03.08.18	SBI Corporate Banking	80000000.00	2A18B4E741	CKG6887428
19	03.08.18	SBI Corporate Banking	80000000.00	2A18B4F3E!	CKG6888281
20	03.08.18	SBI Corporate Banking	100000000.00	2A18B4F2AA	CKG6870201
21	03.08.18	SBI Corporate Banking	60000000.00	2A18B4E75D	CKG6889914
22	03.08.18	SBI Corporate Banking	90000000.00	2A18B4F40A	CKG6891086
23	03.08.18	SBI Corporate Banking	70000000.00	2A18B4F417	CKG6892725
24	03.08.18	SBI Corporate Banking	490000000.00	2A18B4E849	CKG6910225
25	04.08.18	SBI Corporate Banking	90000000.00	2A18C43AD5	CKG6945617
26	04.08.18	SBI Corporate Banking	484442000.00	2A18C43DFD	CKG6960092
		Total Paid	2079442000.00		



भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग
केन्द्रीय भूमि जल प्राधिकरण
Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation
Central Ground Water Authority

(भूजल निकासी हेतु अनापत्ति प्रमाण पत्र)

NO OBJECTION CERTIFICATE (NOC) FOR GROUND WATER ABSTRACTION

Project Name:	Raikela Iron Ore Mine		
Project Address:	Village-raikela		
Village:	Raikela	Block:	Koida
District:	Sundargarh	State:	Odisha
Pin Code:			
Communication Address:	Bomikhal, Plot No 380, Rasulgarh, Bhubaneswar, Bhubaneswar, Khordha, Odisha - 751010		
Address of CGWB Regional Office :	Central Ground Water Board South Eastern Region, Bhujal Bhawan, Khandagiri Square, Nh-5, Bhubaneshwar, Khordha, Odisha - 750001		

1.	NOC No.:	CGWA/NOC/MIN/REN/1/2023/8368					2.	Date of Issuance	11/10/2023					
3.	Application No.:	21-4/2466/OR/MIN/2020					4.	Category: (GWRE 2022)	Safe					
5.	Project Status:	Existing Ground Water					6.	NOC Type:	Renewal					
7.	Valid from:	31/01/2023					8.	Valid up to:	30/01/2025					
9.	Ground Water Abstraction Permitted:													
Fresh Water			Saline Water				Dewatering			Total				
m³/day		m³/year	m³/day		m³/year		m³/day		m³/year		m³/day	m³/year		
170.00		56100.00												
10.	Details of ground water abstraction /Dewatering structures													
Total Existing No.:2							Total Proposed No.:0							
			DW	DCB	BW	TW	MP	MPu	DW	DCB	BW	TW	MP	MPu
Abstraction Structure*			0	0	2	0	0	0	0	0	0	0	0	0
*DW- Dug Well; DCB-Dug-cum-Bore Well; BW-Bore Well; TW-Tube Well; MP-Mine Pit;MPu-Mine Pumps														
11.	Ground Water Abstraction/Restoration Charges paid (Rs.):							131846.00						
12.	Environment Compensation (if applicable) paid (Rs.):							0.00						
13.	Number of Piezometers(Observation wells) to be constructed/ monitored & Monitoring mechanism.					No. of Piezometers		Monitoring Mechanism						
Manual								DWLR**		DWLR With Telemetry				
**DWLR - Digital Water Level Recorder						1		0		1		0		

(Compliance Conditions given overleaf)

This is an auto generated document & need not to be signed.

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

पानी बचाये - जीवन बचाये
SAVE WATER - SAVE LIFE

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

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पानी बचाये – जीवन बचाये
SAVE WATER - SAVE LIFE

Validity of this NOC shall be subject to compliance of the following conditions:

Mandatory conditions:

- 1) Installation of tamper proof digital water flow meter with telemetry on all the abstraction structure(s) shall be mandatory for all users seeking No Objection Certificate and intimation regarding their installation shall be communicated to the CGWA within 30 days of grant of No Objection Certificate.
- 2) Proponents shall mandatorily get water flow meter calibrated from an authorized agency once in a year.
- 3) Construction of purpose-built observation wells (piezometers) for ground water level monitoring shall be mandatory as per Section 14 of Guidelines. Water level data shall be made available to CGWA through web portal. Detailed guidelines for construction of piezometers are given in Annexure-II of the guidelines.
- 4) Proponents shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells/ tube wells / dug wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. Water quality data shall be made available to CGWA through the web portal.
- 5) In case of mining projects, additional key wells shall be established in consultation with the Regional Director, CGWB for ground water level monitoring four (4) times a year (January, May, August and November) in core as well as buffer zones of the mine.
- 6) In case of mining project the firm shall submit water quality report of mine discharge/ seepage from Govt. approved/ NABL accredited lab.
- 7) The firm shall report compliance of the NOC conditions online in the website (www.cgwa-noc.gov.in) within one year from the date of issue of this NOC.
- 8) Industries abstracting ground water in excess of 100 m³/d shall undertake annual water audit through certified auditors and submit audit reports within three months of completion of the same to CGWA. All such industries shall be required to reduce their ground water use by at least 20% over the next three years through appropriate means.
- 9) Application for renewal can be submitted online from 90 days before the expiry of NOC. Ground water withdrawal, if any, after expiry of NOC shall be illegal & liable for legal action as per provisions of Environment (Protection) Act, 1986.
- 10) This NOC is subject to prevailing Central/State Government rules/laws/norms or Court orders related to construction of tube well/ground water abstraction structure / recharge or conservation structure/discharge of effluents or any such matter as applicable.

General conditions:

- 11) No additional ground water abstraction and/or de-watering structures shall be constructed for this purpose without prior approval of the Central Ground Water Authority (CGWA).
- 12) The proponent shall seek prior permission from CGWA for any increase in quantum of groundwater abstraction (more than that permitted in NOC for specific period).
- 13) Proponents shall install roof top rain water harvesting in the premise as per the existing building bye laws in the premise.
- 14) The project proponent shall take all necessary measures to prevent contamination of ground water in the premises failing which the firm shall be responsible for any consequences arising thereupon.
- 15) In case of industries that are likely to contaminate the ground water, no recharge measures shall be taken up by the firm inside the plant premises. The runoff generated from the rooftop shall be stored and put to beneficial use by the firm.
- 16) Wherever feasible, requirement of water for greenbelt (horticulture) shall be met from recycled / treated waste water.
- 17) Wherever the NOC is for abstraction of saline water and the existing wells (s) is /are yielding fresh water, the same shall be sealed and new tubewell(s) tapping saline water zone shall be constructed within 3 months of the issuance of NOC. The firm shall also ensure safe disposal of saline residue, if any.
- 18) Unexpected variations in inflow of ground water into the mine pit, if any, shall be reported to the concerned Regional Director, Central Ground Water Board.
- 19) In case of violation of any NOC conditions, the applicant shall be liable to pay the penalties as per Section 16 of Guidelines.
- 20) This NOC does not absolve the proponents of their obligation / requirement to obtain other statutory and administrative clearances from appropriate authorities.
- 21) The issue of this NOC does not imply that other statutory / administrative clearances shall be granted to the project by the concerned authorities. Such authorities would consider the project on merits and take decisions independently of the NOC.
- 22) In case of change of ownership, new owner of the industry will have to apply for incorporation of necessary changes in the No Objection Certificate with documentary proof within 60 days of taking over possession of the premises.
- 23) This NOC is being issued without any prejudice to the directions of the Hon'ble NGT/court orders in cases related to ground water or any other related matters.
- 24) Proponents, who have installed/constructed artificial recharge structures in compliance of the NOC granted to them previously and have availed rebate of upto 50% (fifty percent) in the ground water abstraction charges/ground water restoration charges, shall continue to regularly maintain artificial recharge structures.
- 25) Industries which are likely to cause ground water pollution e.g. Tanning, Slaughter Houses, Dye, Chemical/ Petrochemical, Coal washeries, pharmaceutical, other hazardous units etc. (as per CPCB list) need to undertake necessary well head protection measures to ensure prevention of ground water pollution as per Annexure III of the guidelines.
- 26) In case of new infrastructure projects having ground water abstraction of more than 20 m³/day, the firm/entity shall ensure implementation of dual water supply system in the projects.
- 27) In case of infrastructure projects, paved/parking area must be covered with interlocking/perforated tiles or other suitable measures to ensure groundwater infiltration/harvesting.
- 28) In case of coal and other base metal mining projects, the project proponent shall use the advance dewatering technology (by construction of series of dewatering abstraction structures) to avoid contamination of surface water.
- 29) The NOC issued is conditional subject to the conditions mentioned in the Public notice dated 27.01.2021 failing which penalty/EC/cancellation of NOC shall be imposed as the case may be.
- 30) This NOC is issued subject to the clearance of Expert Appraisal Committee (EAC) (if applicable).
- 31) In the self-compliance report, the PP shall submit details of Drilling Agency/ Agencies, which has/ have constructed BW(s)/ TW(s) along with undertaking to the effect that all necessary measures have been taken as per directions of Hon'ble Supreme Court provided in Annexure-VII of guidelines dated 24.09.2020 in respect of abandoned/ failed BW(s)/ TW(s)/Piezometer(s), if any. The PP is advised to engage registered drilling agency/ agencies. In the event of any mishap/ unfortunate incident due to negligence in taking measures for prevention of accident due to falling in Bore Well, both PP and concerned drilling agency shall jointly be held responsible and penal action as per extant Government rules shall be taken.

(Non-compliance of the conditions mentioned above is likely to result in the cancellation of NOC and legal action against the proponent.)

CENTRAL GROUND WATER AUTHORITY

Department of Water Resources, River Development and Ganga Rejuvenation
Ministry of Jal Shakti, Govt. of India

18/11, जामनगर हाउस, मानसिंह रोड, नई दिल्ली - 110011 / 18/11, Jamnagar House, Mansingh Road, New Delhi-110011

Phone: (011) 23383561 Fax: 23382051, 23386743

Website: cgwa-noc.gov.in

पानी बचाये – जीवन बचाये
SAVE WATER - SAVE LIFE

Receipt

(As per the guideline Gazette Notification S.O. 3281(E) regarding the New Guidelines dated 24.09.2020 of CGWA, MoJS, Govt. of India)
<https://cgwa-noc.gov.in>

Application No.:	21-4/2466/OR/MIN/2020	Date of Issuance:	11/10/2023
Name of Firm:	RAIKELA IRON ORE MINE		
AppType Category:	Iron ore		
Application Type:	Mining		
PAN/GSTIN No. of Firm/Individual:	/		

S N	Description	Amount (Rs.)
1.	Application Processing Fee	1000.00
2.	Ground Water Abstraction /Restoration charges	131846.00
3.	Environmental Compensation Charges (ECRGW) (Date From to) Days-	
4.	Penalty for non-Compliance of NOC conditions Condition to be mentioned	200000.00
Rs. Rupees Three Lakh Thirty Two Thousand Eight Hundred Forty Six Only		332846.00

This is an system generated invoice, hence, does not require ink signed.

ଯୋଗ୍ୟ ବିବେଚିତ ହେଲେ ୧୪ ଜାତୀୟ

ମୁଖ୍ୟ ଏଜେଣ୍ଟ ୧୪ ଜଣ ଛାତ୍ରଛାତ୍ରୀ ସଫଳତା
ପୂର୍ବ ତଥ୍ୟ ଶେଷ ନ୍ୟାସ୍‌ସ୍ଥାନ ପ୍ରାପ୍ତବେଳେ
ଯୋଗ୍ୟ ବିଷୟରେ ସୂଚନା ଦିଅନ୍ତି।

[illegible]

ରଣ ସଂପର୍କିତ ଭୂଲ
ତଥ୍ୟ ପ୍ରଦାନ

ସମ୍ବଲପୁର, ୬/୧(କନିଷ୍ଠ):
 ଚନ୍ଦ୍ରା ଚକ୍ରା ଓ ଚନ୍ଦ୍ରା
 ଅବଦାନ କରନ୍ତୁ ସମ୍ବଲପୁ
 ଶାନ୍ତି ବିହାର ଓ ସମାଧାନ
 ପଞ୍ଚାବ ନ୍ୟାୟାଳୟ ବ୍ୟାଞ୍ଜନ
 ରାଜା କରାଯାଇ କରନ୍ତୁ।

ବିଜ୍ଞାନୀ ବଳରାମ ମିଶ୍ର
ମସିହାରେ ଏହି କବିତା
ଅବସ୍ୟାକତା ପାଇଁ ବିଚିତ୍ର ବ୍ୟା
ସ୍ଥାପନା କରାଯାଇଛି। ବି
ଜ୍ଞାନୀ ବଳରାମ ମିଶ୍ର
ମସିହାରେ ଏହି କବିତା
ଅବସ୍ୟାକତା ପାଇଁ ବିଚିତ୍ର ବ୍ୟା
ସ୍ଥାପନା କରାଯାଇଛି। ବି

[illegible]

ଏହାକୁ ଶୁଣି କବିରାଜ, ଚଉତିଶ ୪, ୧୧ ନିୟୁତ ଘୋର ପ୍ରହାରରେ ଭବନନି
କରିପାରିବେ । ଏହାପାଇଁ ଶ୍ରୀ କବିରାଜ, ଶ୍ରୀମଦ୍ଭଗବତ୍ ପରିବେଷ ପ୍ରକାଶ ପୁସ୍ତକାଳୟ
ପ୍ରାପ୍ତକରଣ, ଫୁଲବାଣୀ ରଥା ଚାନ୍ଦୀ ପ୍ରଦର୍ଶନ ନିର୍ଦ୍ଦେଶ ଦେଇ, ଶେଷା ଓ ବନମା
ନିର୍ଦ୍ଦେଶ ଆବଶ୍ୟକ ଧ୍ୟାନରେ ରଖାଉଅଛି ।

ସ୍ୱ/- ଶ୍ରୀନିବାସ ସାହୁ, ଏମ୍.ଏସ୍. ଶାନ୍ତିନଗରୀ ମହାବି, ପଟ୍ଟଚାଳନା ଭାଗାପାଳ



ଡ. ପ୍ର. ରେଳପଥ-ଟେଣ୍ଡର

[illegible]



MY WORLD CONSULTANCY SERVICES PRIVATE LIMITED
(TESTING LABORATORY)
GST NO: 21AADCT4043NIZE
CIN: U72501OR2010PTC011651



WCS/LQR/57

TEST REPORT

Report No. : WCSL240403A Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Nuagaon** Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	37.0	18.7	4.1	11.6
2	04.03.2024	41.8	21.1	4.7	13.1
3	07.03.2024	36.7	18.5	4.1	11.5
4	11.03.2024	42.8	21.6	4.8	13.4
5	14.03.2024	46.8	23.7	5.2	14.7
6	19.03.2024	45.3	22.9	5.1	14.2
7	23.03.2024	42.9	21.7	4.8	13.4
8	26.03.2024	46.9	23.7	5.3	14.7
9	29.03.2024	51.2	25.8	5.7	16.0
AAQ Standard 2009		43.5	22.0	4.9	13.6
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory
(Mr. Pradeept Mohapatra)

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WCS/LQR/57

TEST REPORT

Report No. : WCSL240403A Issue Date : 02.04.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Nuagaon** Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.156
2	04.03.2024	0.176
3	07.03.2024	0.154
4	11.03.2024	0.180
5	14.03.2024	0.197
6	19.03.2024	0.190
7	23.03.2024	0.180
8	26.03.2024	0.197
9	29.03.2024	0.215
AAQ Standard 2009		0.183
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCSL240403B Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Tentulidihi** Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	38.0	19.2	4.3	11.9
2	04.03.2024	42.9	21.7	4.8	13.4
3	07.03.2024	37.6	19.0	4.2	11.8
4	11.03.2024	43.9	22.2	4.9	13.8
5	14.03.2024	48.0	24.3	5.4	15.1
6	19.03.2024	46.5	23.5	5.2	14.6
7	23.03.2024	44.0	22.2	4.9	13.8
8	26.03.2024	48.1	24.3	5.4	15.1
9	29.03.2024	52.5	26.5	5.9	16.4
AAQ Standard 2009		44.6	20.2	5.0	14.0
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


Reviewed by
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TEST REPORT

Report No. : WCSL240403B Issue Date : 02.04.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Tentulidihi** Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.160
2	04.03.2024	0.180
3	07.03.2024	0.158
4	11.03.2024	0.184
5	14.03.2024	0.202
6	19.03.2024	0.195
7	23.03.2024	0.185
8	26.03.2024	0.202
9	29.03.2024	0.220
AAQ Standard 2009		0.187
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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(Mr. Pradeept Mohapatra)

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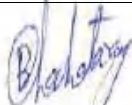


WCS/LQR/57

TEST REPORT

Report No. : WCSL240403C Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Dengula** Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	36.4	18.4	4.1	11.4
2	04.03.2024	41.1	20.8	4.6	12.9
3	07.03.2024	36.1	18.2	4.0	11.3
4	11.03.2024	42.1	21.3	4.7	13.2
5	14.03.2024	46.1	23.3	5.2	14.4
6	19.03.2024	44.6	22.5	5.0	14.0
7	23.03.2024	42.2	21.3	4.7	13.2
8	26.03.2024	46.1	23.3	5.2	14.5
9	29.03.2024	50.3	25.4	5.6	15.8
AAQ Standard 2009		42.8	19.3	4.8	13.4
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


Reviewed by
(Mr. Bijaya Kumar Chahataray)


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(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCSL240403C Issue Date : 02.04.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Dengula** Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.153
2	04.03.2024	0.173
3	07.03.2024	0.152
4	11.03.2024	0.177
5	14.03.2024	0.194
6	19.03.2024	0.187
7	23.03.2024	0.177
8	26.03.2024	0.194
9	29.03.2024	0.211
AAQ Standard 2009		0.180
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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(Mr. Pradeept Mohapatra)

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TEST REPORT

Report No. : WCSL240403D Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Office** Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	41.2	20.8	4.6	12.9
2	04.03.2024	46.5	23.5	5.2	14.6
3	07.03.2024	40.8	20.6	4.6	12.8
4	11.03.2024	47.6	24.0	5.3	14.9
5	14.03.2024	52.1	26.3	5.8	16.3
6	19.03.2024	50.4	25.5	5.6	15.8
7	23.03.2024	47.7	24.1	5.3	14.9
8	26.03.2024	52.2	26.4	5.8	16.4
9	29.03.2024	56.9	28.7	6.4	17.8
AAQ Standard 2009		48.4	21.9	5.4	15.2
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017

Reviewed by
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TEST REPORT

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Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Office** Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.173
2	04.03.2024	0.195
3	07.03.2024	0.171
4	11.03.2024	0.200
5	14.03.2024	0.219
6	19.03.2024	0.212
7	23.03.2024	0.200
8	26.03.2024	0.219
9	29.03.2024	0.239
AAQ Standard 2009		0.203
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

Reviewed by
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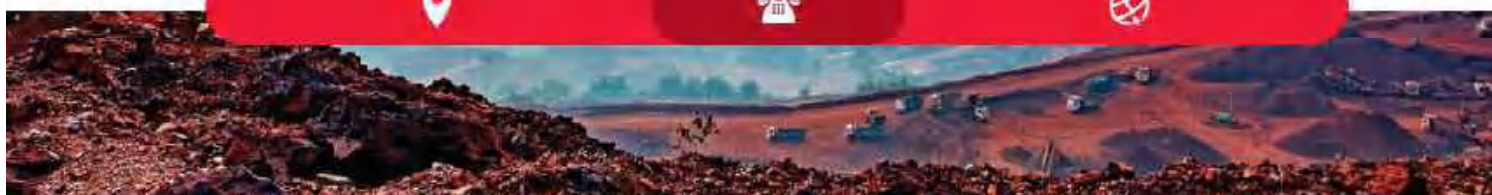


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GST NO: 21AADCT4043N1ZE
CIN: U72501OR2010PTC011651



TC-11225

TEST REPORT

Report No. : WCSL240404A Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Mines Face
Month of Sampling : March-2024
Sample Description : Fugitive Emission
Sampling Plan & Method : WCS/QSP/SAMP (AIR)

Quantity of Sample : 31
Sample Condition : Good
Sample Collected by : WCS Laboratory

Sl. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	421
2	02-03-2024	449
3	03-03-2024	490
4	04-03-2024	519
5	05-03-2024	545
6	06-03-2024	561
7	07-03-2024	513
8	08-03-2024	524
9	09-03-2024	558
10	10-03-2024	586
11	11-03-2024	597
12	12-03-2024	612
13	13-03-2024	639
14	14-03-2024	641
15	15-03-2024	649
16	16-03-2024	619
17	17-03-2024	523
18	18-03-2024	481
19	19-03-2024	470
20	20-03-2024	454
21	21-03-2024	407
22	22-03-2024	419
23	23-03-2024	398
24	24-03-2024	411
25	25-03-2024	374
26	26-03-2024	398
27	27-03-2024	451
28	28-03-2024	524
29	29-03-2024	588
30	30-03-2024	606
31	31-03-2024	622
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

Bhahatary
Reviewed by

(Mr. Bijaya Kumar Chahatary)

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TC-11225

TEST REPORT

Report No. : WCSL240104B Issue Date : 02.04.2024
NABL ULR No. : TC112252400000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensu, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Haul Road
Month of Sampling : March-2024
Sample Description : Fugitive Emission
Sampling Plan & Method : WCS/QSP/SAMP (AIR)

Quantity of Sample : 31
Sample Condition : Good
Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	451
2	02-03-2024	481
3	03-03-2024	525
4	04-03-2024	555
5	05-03-2024	584
6	06-03-2024	601
7	07-03-2024	549
8	08-03-2024	561
9	09-03-2024	598
10	10-03-2024	628
11	11-03-2024	639
12	12-03-2024	655
13	13-03-2024	684
14	14-03-2024	686
15	15-03-2024	695
16	16-03-2024	663
17	17-03-2024	560
18	18-03-2024	515
19	19-03-2024	504
20	20-03-2024	487
21	21-03-2024	436
22	22-03-2024	448
23	23-03-2024	426
24	24-03-2024	440
25	25-03-2024	401
26	26-03-2024	426
27	27-03-2024	483
28	28-03-2024	561
29	29-03-2024	630
30	30-03-2024	649
31	31-03-2024	666
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11225

TEST REPORT

Report No. : WCSL240404C Issue Date : 02.04.2024
NABL ULR No. : TC112252400(KK00081F)
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Crushing & Screening Plant**
Month of Sampling : March-2024
Sample Description : Fugitive Emission
Sampling Plan & Method : WCS/QSP/SAMP (AIR)

Quantity of Sample : 31
Sample Condition : Good
Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	391
2	02-03-2024	418
3	03-03-2024	455
4	04-03-2024	482
5	05-03-2024	507
6	06-03-2024	522
7	07-03-2024	477
8	08-03-2024	487
9	09-03-2024	519
10	10-03-2024	545
11	11-03-2024	555
12	12-03-2024	569
13	13-03-2024	593
14	14-03-2024	595
15	15-03-2024	604
16	16-03-2024	575
17	17-03-2024	486
18	18-03-2024	447
19	19-03-2024	437
20	20-03-2024	422
21	21-03-2024	378
22	22-03-2024	389
23	23-03-2024	370
24	24-03-2024	382
25	25-03-2024	348
26	26-03-2024	370
27	27-03-2024	420
28	28-03-2024	487
29	29-03-2024	546
30	30-03-2024	563
31	31-03-2024	578
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11228

TEST REPORT

Report No. : WCSL240404D Issue Date : 02.04.2024
NABL ULR No. : TC112252400000008117
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohnnty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Mines Gate
Month of Sampling : March-2024 Quantity of Sample : 31
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	378
2	02-03-2024	404
3	03-03-2024	441
4	04-03-2024	466
5	05-03-2024	490
6	06-03-2024	505
7	07-03-2024	461
8	08-03-2024	471
9	09-03-2024	502
10	10-03-2024	527
11	11-03-2024	537
12	12-03-2024	550
13	13-03-2024	574
14	14-03-2024	576
15	15-03-2024	584
16	16-03-2024	556
17	17-03-2024	470
18	18-03-2024	433
19	19-03-2024	423
20	20-03-2024	409
21	21-03-2024	366
22	22-03-2024	376
23	23-03-2024	358
24	24-03-2024	369
25	25-03-2024	336
26	26-03-2024	358
27	27-03-2024	406
28	28-03-2024	471
29	29-03-2024	529
30	30-03-2024	545
31	31-03-2024	559
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-15225

TEST REPORT

Report No. : WCSL240404E Issue Date : 02.04.2024
NABL OLR No. : TC1122524000000081F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Ore storage & Loading**
Month of Sampling : **March-2024** Quantity of Sample : 31
Sample Description : **Fugitive Emission** Sample Condition : Good
Sampling Plan & Method : **WCS/QSP/SAMP (AIR)** Sample Collected by : **WCS Laboratory**

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	404
2	02-03-2024	431
3	03-03-2024	470
4	04-03-2024	498
5	05-03-2024	523
6	06-03-2024	539
7	07-03-2024	492
8	08-03-2024	503
9	09-03-2024	536
10	10-03-2024	562
11	11-03-2024	573
12	12-03-2024	587
13	13-03-2024	613
14	14-03-2024	615
15	15-03-2024	623
16	16-03-2024	594
17	17-03-2024	502
18	18-03-2024	462
19	19-03-2024	451
20	20-03-2024	436
21	21-03-2024	390
22	22-03-2024	402
23	23-03-2024	382
24	24-03-2024	394
25	25-03-2024	359
26	26-03-2024	382
27	27-03-2024	433
28	28-03-2024	503
29	29-03-2024	564
30	30-03-2024	581
31	31-03-2024	597
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019


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TC-11225

TEST REPORT

Report No. : WCSL240404F Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Waste Dump
Month of Sampling : March-2024
Sample Description : Fugitive Emission
Sampling Plan & Method : WCS/QSP/SAMP (AIR)

Quantity of Sample : 31
Sample Condition : Good
Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in (µg/m ³)
1	01-03-2024	412
2	02-03-2024	440
3	03-03-2024	480
4	04-03-2024	508
5	05-03-2024	534
6	06-03-2024	550
7	07-03-2024	502
8	08-03-2024	513
9	09-03-2024	547
10	10-03-2024	574
11	11-03-2024	585
12	12-03-2024	599
13	13-03-2024	626
14	14-03-2024	628
15	15-03-2024	636
16	16-03-2024	606
17	17-03-2024	512
18	18-03-2024	471
19	19-03-2024	461
20	20-03-2024	445
21	21-03-2024	399
22	22-03-2024	410
23	23-03-2024	390
24	24-03-2024	403
25	25-03-2024	367
26	26-03-2024	390
27	27-03-2024	442
28	28-03-2024	513
29	29-03-2024	576
30	30-03-2024	594
31	31-03-2024	609
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TEST REPORT

Report No. : WCSL240403A Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Nuagaon** Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	37.0	18.7	4.1	11.6
2	04.03.2024	41.8	21.1	4.7	13.1
3	07.03.2024	36.7	18.5	4.1	11.5
4	11.03.2024	42.8	21.6	4.8	13.4
5	14.03.2024	46.8	23.7	5.2	14.7
6	19.03.2024	45.3	22.9	5.1	14.2
7	23.03.2024	42.9	21.7	4.8	13.4
8	26.03.2024	46.9	23.7	5.3	14.7
9	29.03.2024	51.2	25.8	5.7	16.0
AAQ Standard 2009		43.5	22.0	4.9	13.6
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017

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TEST REPORT

Report No. : WCSL240403A Issue Date : 02.04.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Nuagaon** Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.156
2	04.03.2024	0.176
3	07.03.2024	0.154
4	11.03.2024	0.180
5	14.03.2024	0.197
6	19.03.2024	0.190
7	23.03.2024	0.180
8	26.03.2024	0.197
9	29.03.2024	0.215
AAQ Standard 2009		0.183
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

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TEST REPORT

Report No. : WCSL240403B Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Tentulidihi** Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	38.0	19.2	4.3	11.9
2	04.03.2024	42.9	21.7	4.8	13.4
3	07.03.2024	37.6	19.0	4.2	11.8
4	11.03.2024	43.9	22.2	4.9	13.8
5	14.03.2024	48.0	24.3	5.4	15.1
6	19.03.2024	46.5	23.5	5.2	14.6
7	23.03.2024	44.0	22.2	4.9	13.8
8	26.03.2024	48.1	24.3	5.4	15.1
9	29.03.2024	52.5	26.5	5.9	16.4
AAQ Standard 2009		44.6	20.2	5.0	14.0
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


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TEST REPORT

Report No. : WCSL240403B Issue Date : 02.04.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Tentulidihi** Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.160
2	04.03.2024	0.180
3	07.03.2024	0.158
4	11.03.2024	0.184
5	14.03.2024	0.202
6	19.03.2024	0.195
7	23.03.2024	0.185
8	26.03.2024	0.202
9	29.03.2024	0.220
AAQ Standard 2009		0.187
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

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WCS/LQR/57

TEST REPORT

Report No. : WCSL240403C Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Dengula** Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	36.4	18.4	4.1	11.4
2	04.03.2024	41.1	20.8	4.6	12.9
3	07.03.2024	36.1	18.2	4.0	11.3
4	11.03.2024	42.1	21.3	4.7	13.2
5	14.03.2024	46.1	23.3	5.2	14.4
6	19.03.2024	44.6	22.5	5.0	14.0
7	23.03.2024	42.2	21.3	4.7	13.2
8	26.03.2024	46.1	23.3	5.2	14.5
9	29.03.2024	50.3	25.4	5.6	15.8
AAQ Standard 2009		42.8	19.3	4.8	13.4
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


Reviewed by
(Mr. Bijaya Kumar Chahataray)


Authorized Signatory
(Mr. Pradeep Mohapatra)

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WCS/LQR/57

TEST REPORT

Report No. : WCSL240403C Issue Date : 02.04.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Dengula** Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.153
2	04.03.2024	0.173
3	07.03.2024	0.152
4	11.03.2024	0.177
5	14.03.2024	0.194
6	19.03.2024	0.187
7	23.03.2024	0.177
8	26.03.2024	0.194
9	29.03.2024	0.211
AAQ Standard 2009		0.180
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

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WCS/LQR/57

TEST REPORT

Report No. : WCSL240403D Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Office** Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.03.2024	41.2	20.8	4.6	12.9
2	04.03.2024	46.5	23.5	5.2	14.6
3	07.03.2024	40.8	20.6	4.6	12.8
4	11.03.2024	47.6	24.0	5.3	14.9
5	14.03.2024	52.1	26.3	5.8	16.3
6	19.03.2024	50.4	25.5	5.6	15.8
7	23.03.2024	47.7	24.1	5.3	14.9
8	26.03.2024	52.2	26.4	5.8	16.4
9	29.03.2024	56.9	28.7	6.4	17.8
AAQ Standard 2009		48.4	21.9	5.4	15.2
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017

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TEST REPORT

Report No. : WCSL240403D Issue Date : 02.04.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Office** Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : March-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.03.2024	0.173
2	04.03.2024	0.195
3	07.03.2024	0.171
4	11.03.2024	0.200
5	14.03.2024	0.219
6	19.03.2024	0.212
7	23.03.2024	0.200
8	26.03.2024	0.219
9	29.03.2024	0.239
AAQ Standard 2009		0.203
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

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TC-11225

TEST REPORT

Report No. : WCSL240404A Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Mines Face**
Month of Sampling : March-2024 Quantity of Sample : 31
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

Sl. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	421
2	02-03-2024	449
3	03-03-2024	490
4	04-03-2024	519
5	05-03-2024	545
6	06-03-2024	561
7	07-03-2024	513
8	08-03-2024	524
9	09-03-2024	558
10	10-03-2024	586
11	11-03-2024	597
12	12-03-2024	612
13	13-03-2024	639
14	14-03-2024	641
15	15-03-2024	649
16	16-03-2024	619
17	17-03-2024	523
18	18-03-2024	481
19	19-03-2024	470
20	20-03-2024	454
21	21-03-2024	407
22	22-03-2024	419
23	23-03-2024	398
24	24-03-2024	411
25	25-03-2024	374
26	26-03-2024	398
27	27-03-2024	451
28	28-03-2024	524
29	29-03-2024	588
30	30-03-2024	606
31	31-03-2024	622
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11225

TEST REPORT

Report No.
NABL ULR No.
Name of the Client
Address
Sampling Location
Month of Sampling
Sample Description
Sampling Plan & Method

: WCSL240404B
: TC1122524000000081F
: **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
: Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
: **Haul Road**
: March-2024
: Fugitive Emission
: WCS/QSP/SAMP (AIR)
Issue Date : 02.04.2024
Quantity of Sample : 31
Sample Condition : Good
Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	451
2	02-03-2024	481
3	03-03-2024	525
4	04-03-2024	555
5	05-03-2024	584
6	06-03-2024	601
7	07-03-2024	549
8	08-03-2024	561
9	09-03-2024	598
10	10-03-2024	628
11	11-03-2024	639
12	12-03-2024	655
13	13-03-2024	684
14	14-03-2024	686
15	15-03-2024	695
16	16-03-2024	663
17	17-03-2024	560
18	18-03-2024	515
19	19-03-2024	504
20	20-03-2024	487
21	21-03-2024	436
22	22-03-2024	448
23	23-03-2024	426
24	24-03-2024	440
25	25-03-2024	401
26	26-03-2024	426
27	27-03-2024	483
28	28-03-2024	561
29	29-03-2024	630
30	30-03-2024	649
31	31-03-2024	666
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11225

TEST REPORT

Report No. : WCSL240404C Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Crushing & Screening Plant**
Month of Sampling : March-2024 Quantity of Sample : 31
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	391
2	02-03-2024	418
3	03-03-2024	455
4	04-03-2024	482
5	05-03-2024	507
6	06-03-2024	522
7	07-03-2024	477
8	08-03-2024	487
9	09-03-2024	519
10	10-03-2024	545
11	11-03-2024	555
12	12-03-2024	569
13	13-03-2024	593
14	14-03-2024	595
15	15-03-2024	604
16	16-03-2024	575
17	17-03-2024	486
18	18-03-2024	447
19	19-03-2024	437
20	20-03-2024	422
21	21-03-2024	378
22	22-03-2024	389
23	23-03-2024	370
24	24-03-2024	382
25	25-03-2024	348
26	26-03-2024	370
27	27-03-2024	420
28	28-03-2024	487
29	29-03-2024	546
30	30-03-2024	563
31	31-03-2024	578
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11225

TEST REPORT

Report No.
NABL ULR No.
Name of the Client
Address
Sampling Location
Month of Sampling
Sample Description
Sampling Plan & Method

WCSL240404D
TC11225240000000811F
Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Mines Gate
March-2024
Fugitive Emission
WCS/QSP/SAMP (AIR)

Issue Date : 02.04.2024
Quantity of Sample : 31
Sample Condition : Good
Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	378
2	02-03-2024	404
3	03-03-2024	441
4	04-03-2024	466
5	05-03-2024	490
6	06-03-2024	505
7	07-03-2024	461
8	08-03-2024	471
9	09-03-2024	502
10	10-03-2024	527
11	11-03-2024	537
12	12-03-2024	550
13	13-03-2024	574
14	14-03-2024	576
15	15-03-2024	584
16	16-03-2024	556
17	17-03-2024	470
18	18-03-2024	433
19	19-03-2024	423
20	20-03-2024	409
21	21-03-2024	366
22	22-03-2024	376
23	23-03-2024	358
24	24-03-2024	369
25	25-03-2024	336
26	26-03-2024	358
27	27-03-2024	406
28	28-03-2024	471
29	29-03-2024	529
30	30-03-2024	545
31	31-03-2024	559
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11225

TEST REPORT

Report No. : WCSL240404E Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Ore storage & Loading**
Month of Sampling : March-2024 Quantity of Sample : 31
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	01-03-2024	404
2	02-03-2024	431
3	03-03-2024	470
4	04-03-2024	498
5	05-03-2024	523
6	06-03-2024	539
7	07-03-2024	492
8	08-03-2024	503
9	09-03-2024	536
10	10-03-2024	562
11	11-03-2024	573
12	12-03-2024	587
13	13-03-2024	613
14	14-03-2024	615
15	15-03-2024	623
16	16-03-2024	594
17	17-03-2024	502
18	18-03-2024	462
19	19-03-2024	451
20	20-03-2024	436
21	21-03-2024	390
22	22-03-2024	402
23	23-03-2024	382
24	24-03-2024	394
25	25-03-2024	359
26	26-03-2024	382
27	27-03-2024	433
28	28-03-2024	503
29	29-03-2024	564
30	30-03-2024	581
31	31-03-2024	597
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019


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TC-11225

TEST REPORT

Report No. : WCSL240404F Issue Date : 02.04.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Waste Dump**
Month of Sampling : March-2024 Quantity of Sample : 31
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in (µg/m3)
1	01-03-2024	412
2	02-03-2024	440
3	03-03-2024	480
4	04-03-2024	508
5	05-03-2024	534
6	06-03-2024	550
7	07-03-2024	502
8	08-03-2024	513
9	09-03-2024	547
10	10-03-2024	574
11	11-03-2024	585
12	12-03-2024	599
13	13-03-2024	626
14	14-03-2024	628
15	15-03-2024	636
16	16-03-2024	606
17	17-03-2024	512
18	18-03-2024	471
19	19-03-2024	461
20	20-03-2024	445
21	21-03-2024	399
22	22-03-2024	410
23	23-03-2024	390
24	24-03-2024	403
25	25-03-2024	367
26	26-03-2024	390
27	27-03-2024	442
28	28-03-2024	513
29	29-03-2024	576
30	30-03-2024	594
31	31-03-2024	609
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TEST REPORT

Report No. : WCS240422A Issue Date : 02.05.2024
NABL ULR No. : TC112252400000062F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Nuagaon Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ In (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ In (µg/m ³)	NO _x in (µg/m ³)
1	01.04.2024	52.5	26.5	5.9	16.5
2	04.04.2024	53.6	27.1	6.0	16.8
3	08.04.2024	55.3	27.9	6.2	17.3
4	11.04.2024	52.0	26.2	5.8	16.3
5	15.04.2024	55.2	27.9	6.2	17.3
6	18.04.2024	56.9	28.7	6.4	17.8
7	22.04.2024	54.7	27.7	6.1	17.2
8	25.04.2024	56.8	28.7	6.4	17.8
9	29.04.2024	58.1	29.3	6.5	18.2
Average		55.0	27.8	6.2	17.2
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017

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Reviewed by
(Mr. Bijaya Kumar Chahataray)

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(Mr. Pradeep Kumar)



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WCS/LQR/57

TEST REPORT

Report No. : WCS240422A Issue Date : 02.05.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Nuagaon** Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	01.04.2024	0.221
2	04.04.2024	0.225
3	08.04.2024	0.232
4	11.04.2024	0.218
5	15.04.2024	0.232
6	18.04.2024	0.239
7	22.04.2024	0.230
8	25.04.2024	0.239
9	29.04.2024	0.244
AAQ Standard 2009		0.231
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

Bijaya Kumar Chahataray

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Pradeep Mohapatra

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TEST REPORT

Report No. : WCS240422B Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000062F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tentulidili Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	01.04.2024	53.8	27.2	6.0	16.9
2	04.04.2024	55.0	27.8	6.2	17.2
3	08.04.2024	56.7	28.6	6.3	17.8
4	11.04.2024	53.3	26.9	6.0	16.7
5	15.04.2024	56.6	28.6	6.3	17.7
6	18.04.2024	58.4	29.5	6.5	18.3
7	22.04.2024	56.1	28.4	6.3	17.6
8	25.04.2024	58.3	29.4	6.5	18.3
9	29.04.2024	59.6	30.1	6.7	18.7
Average		56.4	25.5	6.3	17.7
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017

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Pradeep
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TEST REPORT

Report No. : WCS240422B Issue Date : 02.05.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Tentulidihi** Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	01.04.2024	0.226
2	04.04.2024	0.231
3	08.04.2024	0.238
4	11.04.2024	0.224
5	15.04.2024	0.238
6	18.04.2024	0.245
7	22.04.2024	0.236
8	25.04.2024	0.245
9	29.04.2024	0.250
AAQ Standard 2009		0.237
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II



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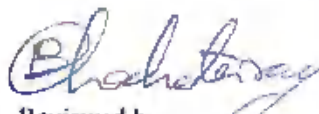


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TEST REPORT

Report No. : WCS240422C Issue Date : 02.05.2024
NABL ULR No. : TC112252400000062F
Name of the Client : Raikela Iron Ore Mines (M/S Cectarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Dengula Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	01.04.2024	51.6	26.1	5.8	16.2
2	04.04.2024	52.7	26.6	5.9	16.5
3	08.04.2024	54.4	27.5	6.1	17.0
4	11.04.2024	51.1	25.8	5.7	16.0
5	15.04.2024	54.3	27.4	6.1	17.0
6	18.04.2024	56.0	28.3	6.3	17.5
7	22.04.2024	53.8	27.2	6.0	16.9
8	25.04.2024	55.9	28.2	6.3	17.5
9	29.04.2024	57.1	28.8	6.4	17.9
Average		54.1	24.4	6.1	17.0
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


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TEST REPORT

Report No. : WCS240422C Issue Date : 02.05.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Dengula** Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	01.04.2024	0.217
2	04.04.2024	0.221
3	08.04.2024	0.228
4	11.04.2024	0.215
5	15.04.2024	0.228
6	18.04.2024	0.235
7	22.04.2024	0.226
8	25.04.2024	0.235
9	29.04.2024	0.240
AAQ Standard 2009		0.227
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

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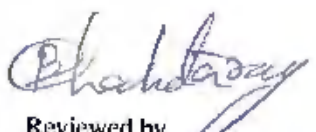


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TEST REPORT

Report No. : WCS240422D Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000062F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Office Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	01.04.2024	58.4	29.5	6.5	18.3
2	04.04.2024	59.6	30.1	6.7	18.7
3	08.04.2024	61.5	31.1	6.9	19.3
4	11.04.2024	57.8	29.2	6.5	18.1
5	15.04.2024	61.4	31.0	6.9	19.2
6	18.04.2024	63.3	32.0	7.1	19.8
7	22.04.2024	60.9	30.8	6.8	19.1
8	25.04.2024	63.2	31.9	7.1	19.8
9	29.04.2024	64.6	32.6	7.2	20.2
Average		61.2	27.6	6.9	19.2
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


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TEST REPORT

Report No. : WCS240422D Issue Date : 02.05.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Office** Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : April-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	01.04.2024	0.245
2	04.04.2024	0.250
3	08.04.2024	0.258
4	11.04.2024	0.243
5	15.04.2024	0.258
6	18.04.2024	0.266
7	22.04.2024	0.256
8	25.04.2024	0.266
9	29.04.2024	0.271
AAQ Standard 2009		0.257
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II


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GST NO: 21AADCT4043N1ZE
CIN: U72501OR2010PTC011651



TC-11225

TEST REPORT

Report No. : WCS240423A Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000063T
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Denguta, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Mines Face**
Month of Sampling : April-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	02.04.2024	628
2	05.04.2024	651
3	09.04.2024	687
4	12.04.2024	573
5	16.04.2024	632
6	19.04.2024	657
7	23.04.2024	652
8	26.04.2024	633
9	30.04.2024	654
Average		641
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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(Mr. Pradeep Chahataray)



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TC-11225

TEST REPORT

Report No. : WCS240423B Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000063F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Haul Road
Month of Sampling : April-2024
Sample Description : Fugitive Emission
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Quantity of Sample : 9
Sample Condition : Good
Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	02.04.2024	672
2	05.04.2024	697
3	09.04.2024	736
4	12.04.2024	614
5	16.04.2024	676
6	19.04.2024	704
7	23.04.2024	699
8	26.04.2024	677
9	30.04.2024	701
Average		686
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11225

TEST REPORT

Report No. : WCS240423C Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000063F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Crushing & Screening Plant**
Month of Sampling : April-2024
Sample Description : Fugitive Emission
Sampling Plan & Method : WCS/QSD/SAMP (AIR)

Quantity of Sample : 9
Sample Condition : Good
Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	02.04.2024	583
2	05.04.2024	605
3	09.04.2024	638
4	12.04.2024	533
5	16.04.2024	587
6	19.04.2024	611
7	23.04.2024	606
8	26.04.2024	588
9	30.04.2024	608
Average		596
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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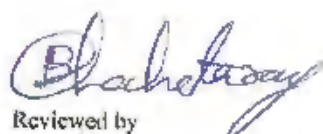


TC-11225

TEST REPORT

Report No. : WCS240423D Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000063F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Mines Gate
Month of Sampling : April-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	02.04.2024	564
2	05.04.2024	586
3	09.04.2024	618
4	12.04.2024	515
5	16.04.2024	568
6	19.04.2024	591
7	23.04.2024	587
8	26.04.2024	569
9	30.04.2024	588
Average		576
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019



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TC-11225

TEST REPORT

Report No. : WCS240423E Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000063F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Ore storage & Loading**
Month of Sampling : April-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	02.04.2024	602
2	05.04.2024	625
3	09.04.2024	659
4	12.04.2024	550
5	16.04.2024	606
6	19.04.2024	631
7	23.04.2024	626
8	26.04.2024	607
9	30.04.2024	628
Average		615
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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(Mr. Bijaya Kumar Chahaturay)

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(Mr. Pradyumn Chahaturay)



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CIN: U72501OR2010PTC011651



TC-11228

TEST REPORT

Report No. : WCS240423F Issue Date : 02.05.2024
NABL ULR No. : TC112252400000006317
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengulu, Dist- Sundargarh- 770048, Odisha
Sampling Location : Waste Dump
Month of Sampling : April-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	02.04.2024	615
2	05.04.2024	638
3	09.04.2024	673
4	12.04.2024	562
5	16.04.2024	619
6	19.04.2024	644
7	23.04.2024	639
8	26.04.2024	620
9	30.04.2024	641
Average		628
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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(Mr. Bijay Kumar Chahataray)

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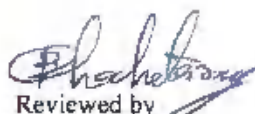


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TEST REPORT

Report No. : WCS240601A Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000086F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Nuagaon Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : May-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.05.2024	60.9	30.7	6.8	19.1
2	06.05.2024	61.3	31.0	6.9	19.2
3	10.05.2024	59.7	30.1	6.7	18.7
4	13.05.2024	58.6	29.6	6.6	18.4
5	16.05.2024	54.3	27.4	6.1	17.0
6	20.05.2024	53.3	26.9	6.0	16.7
7	23.05.2024	55.5	28.0	6.2	17.4
8	27.05.2024	59.2	29.9	6.6	18.5
9	30.05.2024	61.9	31.2	6.9	19.4
Average		58.3	29.4	6.5	18.3
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


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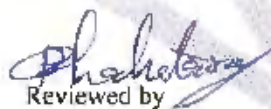


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TEST REPORT

Report No. : WCS240601A Issue Date : 04.06.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Nuagaon Co-Ordinate: 21°53'52.24"N 85°11'57.31"E
Month of Sampling : May-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO In (mg/m ³)
1	02.05.2024	0.256
2	06.05.2024	0.258
3	10.05.2024	0.251
4	13.05.2024	0.246
5	16.05.2024	0.228
6	20.05.2024	0.224
7	23.05.2024	0.233
8	27.05.2024	0.249
9	30.05.2024	0.260
Average		0.245
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II


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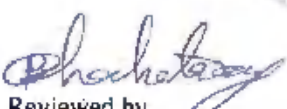
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TEST REPORT

TC-11225

Report No. : WCS240601B Issue Date : 04.06.2024
NABL ULR No. : TC11225240000000861
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tentulidihi Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : May-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x In (µg/m ³)
1	02.05.2024	62.4	31.5	7.0	19.6
2	06.05.2024	62.9	31.8	7.0	19.7
3	10.05.2024	61.2	30.9	6.9	19.2
4	13.05.2024	60.1	30.4	6.7	18.8
5	16.05.2024	55.7	28.1	6.2	17.5
6	20.05.2024	54.7	27.6	6.1	17.1
7	23.05.2024	56.9	28.7	6.4	17.8
8	27.05.2024	60.7	30.6	6.8	19.0
9	30.05.2024	63.4	32.0	7.1	19.9
Average		59.8	30.2	6.7	18.7
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


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TEST REPORT

Report No. : WCS240601B Issue Date : 04.06.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tentulidihi Co-Ordinate: 21°52'03.37"N 85°12'08.49"E
Month of Sampling : May-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.05.2024	0.262
2	06.05.2024	0.264
3	10.05.2024	0.257
4	13.05.2024	0.253
5	16.05.2024	0.234
6	20.05.2024	0.230
7	23.05.2024	0.239
8	27.05.2024	0.255
9	30.05.2024	0.267
Average		0.251
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

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(Mr. Bijaya Kumar Chahataray)

Pradeep

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(Mr. Pradeep Mohapatra)



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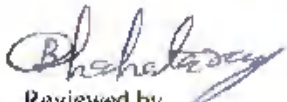


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TEST REPORT

Report No. : WCS240601C Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000086F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Dengula Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : May-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.05.2024	59.8	30.2	6.7	18.8
2	06.05.2024	60.3	30.4	6.8	18.9
3	10.05.2024	58.7	29.6	6.6	18.4
4	13.05.2024	57.6	29.1	6.5	18.1
5	16.05.2024	53.4	27.0	6.0	16.7
6	20.05.2024	52.4	26.5	5.9	16.4
7	23.05.2024	54.5	27.5	6.1	17.1
8	27.05.2024	58.2	29.4	6.5	18.2
9	30.05.2024	60.8	30.7	6.8	19.1
Average		57.3	28.9	6.4	18.0
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017


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TEST REPORT

Report No. : WCS240601C Issue Date : 04.06.2024
Name of the Client : **Rnikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Dengula** Co-Ordinate: 21°52'21.22"N 85°12'12.03"E
Month of Sampling : **May-2024** Quantity of Sample : 09
Sample Description : **Ambient Air Quality Monitoring** Sample Condition : Good
Sampling Plan & Method : **WCS/QSP/SAMP (AIR)** Sample Collected by : **WCS Laboratory**

SL. No.	Date of Sampling	CO in (mg/m ³)
1	02.05.2024	0.251
2	06.05.2024	0.253
3	10.05.2024	0.247
4	13.05.2024	0.242
5	16.05.2024	0.224
6	20.05.2024	0.220
7	23.05.2024	0.229
8	27.05.2024	0.244
9	30.05.2024	0.256
Average		0.241
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II



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TEST REPORT

Report No. : WCS240601D Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000086F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Office Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : May-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

Sl. No.	Date of Sampling	PM ₁₀ in (µg/m ³)	PM _{2.5} in (µg/m ³)	SO ₂ in (µg/m ³)	NO _x in (µg/m ³)
1	02.05.2024	67.7	34.2	7.6	21.2
2	06.05.2024	68.2	34.4	7.6	21.4
3	10.05.2024	66.4	33.5	7.4	20.8
4	13.05.2024	65.2	32.9	7.3	20.4
5	16.05.2024	60.4	30.5	6.8	18.9
6	20.05.2024	59.3	29.9	6.6	18.6
7	23.05.2024	61.7	31.2	6.9	19.3
8	27.05.2024	65.8	33.2	7.4	20.6
9	30.05.2024	68.8	34.7	7.7	21.6
Average		64.8	32.7	7.3	20.3
AAQ Standard 2009		100	60	80	80
Testing Method		IS-5182 (Part-23) 2006 RA 2017	IS-5182 (Part-24) 2019	IS-5182 (Part-2) 2001 RA 2017	IS-5182 (Part-6) 2006 RA 2017

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TEST REPORT

Report No. : WCS240601D Issue Date : 04.06.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Office Co-Ordinate: 21°52'15.44"N 85°11'04.36"E
Month of Sampling : May-2024 Quantity of Sample : 09
Sample Description : Ambient Air Quality Monitoring Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	CO In (mg/m ³)
1	02.05.2024	0.284
2	06.05.2024	0.287
3	10.05.2024	0.279
4	13.05.2024	0.274
5	16.05.2024	0.254
6	20.05.2024	0.249
7	23.05.2024	0.259
8	27.05.2024	0.276
9	30.05.2024	0.289
Average		0.272
Testing Method		CPCB Guidelines of Ambient Air Pollutants Volume-I&II

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Pradeep Mohapatra

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TC-11228

TEST REPORT

Report No. : WCS240602A Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000087F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist.-Sundargarh- 770048, Odisha
Sampling Location : **Mines Face**
Month of Sampling : May-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	03.05.2024	661
2	07.05.2024	665
3	10.05.2024	694
4	14.05.2024	715
5	17.05.2024	676
6	21.05.2024	741
7	24.05.2024	689
8	28.05.2024	696
9	31.05.2024	686
Average		691
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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TC-11226

TEST REPORT

Report No. : WCS240602B Issue Date : 04.06.2024
NABL ULR No. : TC11225240000000870
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Hnui Road
Month of Sampling : May-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	03.05.2024	708
2	07.05.2024	712
3	10.05.2024	743
4	14.05.2024	765
5	17.05.2024	724
6	21.05.2024	793
7	24.05.2024	738
8	28.05.2024	743
9	31.05.2024	735
Average		740
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

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GST NO: 21AADCT4043N1ZE
CIN: U72501OR2010PTC011651



TC-11225

TEST REPORT

Report No. : WCS240602C Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000087F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Crushing & Screening Plant**
Month of Sampling : May-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	03.05.2024	615
2	07.05.2024	618
3	10.05.2024	645
4	14.05.2024	664
5	17.05.2024	628
6	21.05.2024	688
7	24.05.2024	640
8	28.05.2024	647
9	31.05.2024	638
Average		643
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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(Mr. Pradeept Mohapatra)



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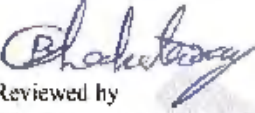


TC-11228

TEST REPORT

Report No. : WCS240602D Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000087F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dungula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Mines Gate
Month of Sampling : May-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

Sl. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	03.05.2024	595
2	07.05.2024	598
3	10.05.2024	624
4	14.05.2024	643
5	17.05.2024	608
6	21.05.2024	666
7	24.05.2024	619
8	28.05.2024	626
9	31.05.2024	617
Average		622
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA, 2019


Reviewed by
(Mr. Bijaya Kumar Chahataray)


Authorized Signatory
(Mr. Pradeep Mohapatra)

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TC-11225

TEST REPORT

Report No. : WCS240602E Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000087F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist.- Sundargarh- 770048, Odisha
Sampling Location : **Ore storage & Loading**
Month of Sampling : May-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	03.05.2024	635
2	07.05.2024	638
3	10.05.2024	666
4	14.05.2024	686
5	17.05.2024	649
6	21.05.2024	711
7	24.05.2024	661
8	28.05.2024	668
9	31.05.2024	658
Average		664
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

Chahatray

Reviewed by
(Mr. Bijaya Kumar Chahatray)

Pradept Mohapatra

Authorized Signatory
(Mr. Pradept Mohapatra)

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CIN: U72501OR2010PTC011651



TC-11225

TEST REPORT

Report No. : WCS240602F Issue Date : 04.06.2024
NABL ULR No. : TC1122524000000087F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Waste Dump
Month of Sampling : May-2024 Quantity of Sample : 9
Sample Description : Fugitive Emission Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (AIR) Sample Collected by : WCS Laboratory

SL. No.	Date of Sampling	SPM in ($\mu\text{g}/\text{m}^3$)
1	03.05.2024	648
2	07.05.2024	652
3	10.05.2024	680
4	14.05.2024	700
5	17.05.2024	663
6	21.05.2024	726
7	24.05.2024	675
8	28.05.2024	682
9	31.05.2024	672
Average		677
Standard		1200
Testing Method		IS-5182 (Part-4) 1999 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chhataray)

Authorized Signatory
(Mr. Pradeep Mohapatra)



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TC-11225

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TEST REPORT

Report No. : WCSL240317A Issue Date : 15.03.2024
NABL ULR No. : TC1122524000000074F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetaran Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Karo nala Down stream**
Sample Description : Surface Water Date of Sampling : 04.03.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 06.03.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0324W09A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 06.03.2024 to 11.03.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	--	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	4	IS 3025 (Part-4): 2021
3	pH Value	--	6.65	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	168	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	5.9	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	4.3	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.1	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	21	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 23 rd Ed. (5520-B): 2017
10	Total Hardness as CaCO ₃	mg/l	38	APHA 23 rd Ed. (2340-C): 2017
11	Chloride as Cl	mg/l	15.2	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	18.36	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	2.56	APHA 23 rd Ed. (4500-NO ₃ -B): 2017
14	Fluoride as F	mg/l	0.03	APHA 23 rd Ed. (4500-F-1): 2017
15	Calcium as Ca	mg/l	12.83	APHA 23 rd Ed. (3500-Ca-B): 2017
16	Magnesium as Mg	mg/l	1.46	APHA 23 rd Ed. (3500-Mg-B): 2017
17	Iron as Fe	mg/l	0.36	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	128	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	>161	IS 1622 : 1981

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCSL240317B Issue Date : 15.03.2024
NABL ULR No. : TC112252400000074F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tantara Pond
Sample Description : Surface Water Date of Sampling : 04.03.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 06.03.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0324W09B
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 06.03.2024 to 11.03.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	—	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	5	IS 3025 (Part-4): 2021
3	pH Value	—	7.25	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	125.1	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.3	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	2.8	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.2	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	23.4	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 23 rd Ed. (5520-B): 2017
10	Total Hardness as CaCO ₃	mg/l	64	APHA 23 rd Ed. (2340-C): 2017
11	Chloride as Cl ⁻	mg/l	14.3	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	2.65	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	1.13	APHA 23 rd Ed. (4500-NO ₃ -B): 2017
14	Fluoride as F ⁻	mg/l	0.06	APHA 23 rd Ed. (4500-F-D): 2017
15	Calcium as Ca	mg/l	22.44	APHA 23 rd Ed. (3500-Ca-B): 2017
16	Magnesium as Mg	mg/l	1.94	APHA 23 rd Ed. (3500-Mg-B): 2017
17	Iron as Fe	mg/l	0.23	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	93	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	>161	IS 1622: 1981

Chahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Pradeep

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCSL240317C Issue Date : 15.03.2024
NABL ULR No. : TC112252400000074F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Kuradhi Nala Down-Stream
Sample Description : Surface Water Date of Sampling : 04.03.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 06.03.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0324W09C
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 06.03.2024 to 11.03.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	--	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	5	IS 3025 (Part-4): 2021
3	pH Value	--	7.26	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	123.3	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.8	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	3.4	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.4	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	22.7	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 23 rd Ed. (5520-B): 2017
10	Total Hardness as CaCO ₃	mg/l	48	APHA 23 rd Ed. (2340-C): 2017
11	Chloride as Cl	mg/l	18.8	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	12.6	IS 3025 (Part-24, Sec-L): 2022
13	Nitrate as NO ₃	mg/l	10.89	APHA 23 rd Ed. (4500-NO ₃ -B): 2017
14	Fluoride as F	mg/l	0.16	APHA 23 rd Ed. (4500-F-D): 2017
15	Calcium as Ca	mg/l	16.03	APHA 23 rd Ed. (3500-Ca-B): 2017
16	Magnesium as Mg	mg/l	1.94	APHA 23 rd Ed. (3500-Mg-B): 2017
17	Iron as Fe	mg/l	0.69	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	115	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	>161	IS 1622 : 1981

Chahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Pradeep

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)



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TEST REPORT

Report No. : WCS240414A Issue Date : 12.04.2024
NABL ULR No. : TC1122524000000053F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Karo nala Down stream
Sample Description : Surface Water Date of Sampling : 02.04.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 04.04.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0424W02A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 04.04.2024 to 10.04.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	—	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	4	IS 3025 (Part-4): 2021
3	pH Value	--	6.74	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	167	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	5.8	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	4	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.1	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	17	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B): 2023
10	Total Hardness as CaCO ₃	mg/l	36	APHA 24 th Ed. (2340-C): 2023
11	Chloride as Cl	mg/l	15	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	18.46	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	2.52	APHA 24 th Ed. (4500-NO ₃ -B): 2023
14	Fluoride as F	mg/l	0.06	APHA 24 th Ed. (4500-F-D): 2023
15	Calcium as Ca	mg/l	12.83	APHA 24 th Ed. (3500-Ca-B): 2023
16	Magnesium as Mg	mg/l	0.97	APHA 24 th Ed. (3500-Mg-B): 2023
17	Iron as Fe	mg/l	0.52	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	132	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	<161	IS 1622 : 1981

Reviewed by
(Mr. Bijaya Kumar Chahatary)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeep Mondal)



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TEST REPORT

Report No. : WCS240414B Issue Date : 12.04.2024
NABL ULR No. : TC112252400000053F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tantara Pond
Sample Description : Surface Water
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Sampling : 02.04.2024
Environmental Condition : Temperature 29°C, Clear Weather Date of Receiving : 04.04.2024
Sample Collected by : WCS Laboratory Sample ID No : WCS0424W02B
Date of Testing : 04.04.2024 to 10.04.2024 Quantity of Sample : 1 Ltr
Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	--	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	5	IS 3025 (Part-4): 2021
3	pH Value	--	7.29	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	124.6	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.5	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	2.4	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	24	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B): 2023
10	Total Hardness as CaCO ₃	mg/l	64	APHA 24 th Ed. (2340-C): 2023
11	Chloride as Cl	mg/l	14.2	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	2.63	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	1.12	APHA 24 th Ed. (4500-NO ₃ -B): 2023
14	Fluoride as F	mg/l	0.05	APHA 24 th Ed. (4500-F-D): 2023
15	Calcium as Ca	mg/l	23.25	APHA 24 th Ed. (3500-Ca-B): 2023
16	Magnesium as Mg	mg/l	1.46	APHA 24 th Ed. (3500-Mg-B): 2023
17	Iron as Fe	mg/l	0.26	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	96	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	<161	IS 1622 : 1981

Chahataray
Reviewed by
(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

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TEST REPORT

Report No. : WCS240414C Issue Date : 12.04.2024
NABL ULR No. : TC1122524000000053F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Kuradhi Nala Down-Stream
Sample Description : Surface Water Date of Sampling : 02.04.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 04.04.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0424W02C
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 04.04.2024 to 10.04.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	--	Agreeable	IS 3025 (Part-5); 2018
2	Colour	Hazen	5	IS 3025 (Part-4); 2021
3	pH Value	--	7.41	IS 3025 (Part-11); 2022
4	Specific Conductivity	µs/cm	123.8 at 27.6	IS 3025 (Part-14); 2013
5	Dissolve Oxygen as DO	mg/l	6.5	IS 3025 (Part-38); 1989
6	Chemical Oxygen Demand as COD	mg/l	3.2	IS 3025 (Part-58); 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.1	IS 3025 (Part-44); 1993
8	Total Suspended Solid as TSS	mg/l	24	IS 3025 (Part-17); 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B); 2023
10	Total Hardness as CaCO ₃	mg/l	44	APHA 24 th Ed. (2340-C); 2023
11	Chloride as Cl	mg/l	15	IS 3025 (Part-32); 1988
12	Sulphate as SO ₄	mg/l	13.26	IS 3025 (Part-24, Sec-1); 2022
13	Nitrate as NO ₃	mg/l	10.54	APHA 24 th Ed. (4500-NO ₃ -B); 2023
14	Fluoride as F	mg/l	0.13	APHA 24 th Ed. (4500-F-D); 2023
15	Calcium as Ca	mg/l	16.83	APHA 24 th Ed. (3500-Ca-B); 2023
16	Magnesium as Mg	mg/l	0.49	APHA 24 th Ed. (3500-Mg-B); 2023
17	Iron as Fe	mg/l	0.67	IS 3025 (Part-53); 2003
18	Total Dissolved Solid as TDS	mg/l	117	IS 3025 (Part-16); 1984
19	Total Coliform	MPN/100 ml	<161	IS 1622 : 1981

Chahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

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(Mr. Pradeep Mohapatra)



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WCS/LQR/60

TEST REPORT

Report No. : WCS240528A Issue Date : 20.05.2024
NABL ULR No. : TC112252400000082F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Karo nala Down stream**
Sample Description : Surface Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W14A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	—	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	4.0	IS 3025 (Part-4): 2021
3	pH Value	—	6.86	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	166.0	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.4	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	4.8	IS 3025 (Part-38): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.5	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	19.0	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B): 2023
10	Total Hardness as CaCO ₃	mg/l	34.0	APHA 24 th Ed. (2310-C): 2023
11	Chloride as Cl	mg/l	15.5	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	18.56	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	2.53	APHA 24 th Ed. (4500-NO ₃ -B): 2023
14	Fluoride as F	mg/l	0.05	APHA 24 th Ed. (4500-F-D): 2023
15	Calcium as Ca	mg/l	12.83	APHA 24 th Ed. (3500-Ca-B): 2023
16	Magnesium as Mg	mg/l	0.49	APHA 24 th Ed. (3500-Mg-B): 2023
17	Iron as Fe	mg/l	0.49	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	140.0	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	>161	IS 1622 : 1981

Phahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Pradeep

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)



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TEST REPORT

Report No. : WCS240528B Issue Date : 20.05.2024
NABL LTR No. : TC1122524000000082F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tantara Pond
Sample Description : Surface Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W14B
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	—	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	3.0	IS 3025 (Part-4): 2021
3	pH Value	—	7.58	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	125.8	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.3	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	2.5	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.1	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	25.0	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B): 2023
10	Total Hardness as CaCO ₃	mg/l	62.0	APHA 24 th Ed. (2340-C): 2023
11	Chloride as Cl ⁻	mg/l	12.5	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	2.9	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	1.6	APHA 24 th Ed. (4500-NO ₃ -B): 2023
14	Fluoride as F ⁻	mg/l	0.06	APHA 24 th Ed. (4500-F-D): 2023
15	Calcium as Ca	mg/l	22.44	APHA 24 th Ed. (3500-Ca-B): 2023
16	Magnesium as Mg	mg/l	1.46	APHA 24 th Ed. (3500-Mg-B): 2023
17	Iron as Fe	mg/l	0.25	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	89.0	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	<161	IS 1622 : 1981

Chahataray
Reviewed by
(Mr. Bijaya Kumar Chahataray)

hs
Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Pradeep
Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCS240528C Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000082F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Kuradhi Nala Down-Stream
Sample Description : Surface Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W14C
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	--	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	5.0	IS 3025 (Part-4): 2021
3	pH Value	--	7.58	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	132.8	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.2	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	3.6	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.4	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	26.0	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B): 2023
10	Total Hardness as CaCO ₃	mg/l	46.0	APHA 24 th Ed. (2340-C): 2023
11	Chloride as Cl	mg/l	17.49	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	13.25	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	10.59	APHA 24 th Ed. (4500-NO ₃ -B): 2023
14	Fluoride as F	mg/l	0.15	APHA 24 th Ed. (4500-F-D): 2023
15	Calcium as Ca	mg/l	16.03	APHA 24 th Ed. (3500-Ca-B): 2023
16	Magnesium as Mg	mg/l	1.46	APHA 24 th Ed. (3500-Mg-B): 2023
17	Iron as Fe	mg/l	0.59	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	116.0	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	<161	IS 1622 : 1981

Chakhatary

Reviewed by
(Mr. Bijaya Kumar Chakhatary)

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Authorized Signatory for Microbiological
(Miss. Laxini Sahoo)

Pradept Mohanty

Authorized Signatory for Chemical
(Mr. Pradept Mohanty)



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TC-11225

WCS/LQR/60

TEST REPORT

Report No. : WCS240413 Issue Date : 12.04.2024
NABL ULR No. : TC1122524000000052F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Canteen Tap Water**
Sample Description : Drinking Water Date of Sampling : 02.04.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 04.04.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0424W01
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 04.04.2024 to 10.04.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max, 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.56	6.5-8.5	IS 3025 (Part-11): 2022
4	Taste Threshold	--	Agreeable	Agreeable	IS 3025 (Part-7): 2017
5	Turbidity	NTU	0.3	1	IS 3025 (Part-10): 1984 RA 2017
6	Total Dissolved Solid as TDS	mg/l	169	500	IS 3025 (Part-16): 1984 RA 2017
7	Ammonia as Total ammonia-N	mg/l	0.03	0.5	IS 3025 (Part-34): 1988 RA 2019
8	Chloride as Cl	mg/l	18.25	250	IS 3025 (Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.02	1.0	APHA 24 th Ed. (4500-F-D): 2023
10	Free Residual Chlorine	mg/l	<0.04	0.2	IS 3025 (Part-26): 2021
11	Iron as Fe	mg/l	0.23	1.0	IS 3025 (Part -53): 2003 RA 2019
12	Total Hardness as CaCO ₃	mg/l	23	200	IS 3025 (Part-21): 2009 RA 2019
13	Calcium as Ca	mg/l	6.4	75	IS 3025 (Part-40): 1991 RA 2019
14	Magnesium as Mg	mg/l	1.49	30	APHA 24 th Ed. (3500-Mg-H): 2023
15	Nitrate as NO ₃	mg/l	3.2	45	APHA 24 th Ed. (4500-NO ₃ -B): 2023
16	Sulphate as SO ₄	mg/l	0.95	200	IS 3025 (Part-24 Sec I):2022
17	Total Alkalinity as CaCO ₃	mg/l	30	200	IS 3025 (Part-23): 1986 RA 2019
18	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
19	Potassium as K	mg/l	26.3	--	IS 3025 (Part-45): 1993 RA 2019
20	Sodium as Na	mg/l	22.9	--	IS 3025 (Part-45): 1993 RA 2019
21	Total Suspended Solid as TSS	mg/l	<5.0	--	IS 3025 (Part-17): 2022

Chahataray
Reviewed by

(Mr. Bijaya Kumar Chahataray)

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TEST REPORT

Report No. : WCS240413 Issue Date : 12.04.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Canteen Tap Water
Sample Description : Drinking Water
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Sampling : 02.04.2024
Environmental Condition : Temperature 29°C, Clear Weather Date of Receiving : 04.04.2024
Sample Collected by : WCS Laboratory Sample ID No : WCS0424W01
Date of Testing : 04.04.2024 to 10.04.2024 Quantity of Sample : 1 Ltr
Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
22	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55)
23	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57)
24	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or APHA 4500-Cl ₂
25	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42)
26	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59)
27	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39)
28	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43)
29	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29)
30	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49)
31	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41)
32	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27)
33	Lead as Pb	mg/l	<0.01	0.01	IS 3025 (Part 47)
34	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48)
35	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54)
36	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37)
37	E.Coli	CFU/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 15185: 2016
38	Total Coliform	CFU/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 15185: 2016

Chahataray

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Pradeep

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiology
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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TC-11226

WCS/LQR/60

TEST REPORT

Report No. : WCS240526 Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Canteen Tap Water
Sample Description : Drinking Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W12
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max. 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.48	6.5-8.5	IS 3025 (Part-11): 2022
4	Taste Threshold	--	Agreeable	Agreeable	IS 3025 (Part-7): 2017
5	Turbidity	NTU	0.2	1	IS 3025 (Part-10): 1984 RA 2017
6	Total Dissolved Solid as TDS	mg/l	171	500	IS 3025 (Part-16): 1984 RA 2017
7	Ammonia as Total ammonia-N	mg/l	0.04	0.5	IS 3025 (Part-34): 1988 RA 2019
8	Chloride as Cl	mg/l	17.49	250	IS 3025 (Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.03	1.0	APHA 24 th Ed. (4500-F-12): 2023
10	Free Residual Chlorine	mg/l	<0.04	0.2	IS 3025 (Part-26): 2021
11	Iron as Fe	mg/l	0.26	1.0	IS 3025 (Part -33): 2003 RA 2019
12	Total Hardness as CaCO ₃	mg/l	26	200	IS 3025 (Part-21): 2009 RA 2019
13	Calcium as Ca	mg/l	7.21	75	IS 3025 (Part-40): 1991 RA 2019
14	Magnesium as Mg	mg/l	1.94	30	APHA 24 th Ed. (3500-Mg-B): 2023
15	Nitrate as NO ₃	mg/l	3.42	45	APHA 24 th Ed. (4500-NO ₃ -B): 2023
16	Sulphate as SO ₄	mg/l	0.86	200	IS 3025 (Part-24 Sec 1): 2022
17	Total Alkalinity as CaCO ₃	mg/l	25	200	IS 3025 (Part-23): 1986 RA 2019
18	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
19	Potassium as K	mg/l	23.6	--	IS 3025 (Part-45): 1993 RA 2019
20	Sodium as Na	mg/l	25.3	--	IS 3025 (Part-45): 1993 RA 2019
21	Total Suspended Solid as TSS	mg/l	<5.0	--	IS 3025 (Part-17): 2022

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Reviewed by

(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory
(Mr. Pradeept Mohapatra)

Bhubaneswar

WCS/LQR/60

TEST REPORT

Report No. : WCS240526 Issue Date : 20.05.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Canteen Tap Water
Sample Description : Drinking Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W12
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
22	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55)
23	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57)
24	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or APHA 4500-Cl G
25	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42)
26	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59)
27	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39)
28	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43)
29	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29)
30	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49)
31	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41)
32	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27)
33	Lead as Pb	mg/l	<0.01	0.01	IS 3025 (Part 47)
34	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48)
35	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54)
36	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37)
37	E.Coli	CFU/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 15185: 2016
38	Total Coliform	CFU/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 15185: 2016

Chahataray

Reviewed by

(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory for Microbiology

(Miss. Laxmi Sahoo)

Shubaneswar

Authorized Signatory for Chemical

(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCS240527A Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Office Bore Well (Inside Mines Office)
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max. 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.548	6.5-8.5	IS 3025 (Part-11): 2022
4	Turbidity	NTU	0.3	1	IS 3025 (Part-10): 1984 RA 2017
5	Total Dissolved Solid as TDS	mg/l	93	500	IS 3025 (Part-16): 1984 RA 2017
6	Ammonia as Total ammonia-N	mg/l	0.46	0.5	IS 3025 (Part-34): 1988 RA 2019
7	Calcium as Ca	mg/l	12.83	75	IS 3025 (Part-40): 1991 RA 2019
8	Chloride as Cl	mg/l	12.5	250	IS 3025 (Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.16	1.0	APHA 24 th Ed. (4500-F-E): 2023
10	Iron as Fe	mg/l	0.49	1.0	IS 3025 (Part -53): 2003 RA 2019
11	Magnesium as Mg	mg/l	3.4	30	APHA 24 th Ed. (3500-Mg-03): 2023
12	Nitrate as NO3	mg/l	1.92	45	APHA 24 th Ed. (4500-NO3-B): 2023
13	Sulphate as SO4	mg/l	1.53	200	IS 3025 (Part-24 See 1): 2022
14	Total Alkalinity as CaCO3	mg/l	35	200	IS 3025 (Part-23): 1986 RA 2019
15	Total Hardness as CaCO3	mg/l	46	200	IS 3025 (Part-21): 2009 RA 2019
16	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
17	Potassium as K	mg/l	22.3	--	IS 3025 (Part-45): 1993 RA 2019
18	Sodium as Na	mg/l	11.6	--	IS 3025 (Part-45): 1993 RA 2019
19	Total Suspended Solid as TSS	mg/l	<5	--	IS 3025 (Part-17): 2022
20	Total Coliform	MPN/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 1622 : 1981 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)



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TEST REPORT

Report No. : WCS240527A Issue Date : 20.05.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Office Bore Well (Inside Mines Office)
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
21	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55): 2003 RA 2019
22	Anionic detergents as MBAS	mg/l	<0.02	0.2	Annex K of IS 13428
23	Barium as Ba	mg/l	<0.1	0.7	Annex F of IS 13428* or IS 15302
24	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57): 2021
25	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or APHA 4500-Cl G
26	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42): 1992 RA 2019
27	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59): 2006 RA 2017
28	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39): 2021
29	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43): 1992 RA 2019
30	Selenium as Se	mg/l	<0.001	0.01	IS 3025 (Part 56): 2003 RA 2019 or IS 15303*
31	Silver as Ag	mg/l	<0.02	0.1	Annex J of IS 13428
32	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29): 1986 RA 2019
33	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49): 1994 RA 2019
34	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41): 1992 RA 2019
35	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27): 1986 RA 2019
36	Lead as Pb	mg/l	<0.001	0.01	IS 3025 (Part 47): 1994 RA 2019
37	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48): 1994 RA 2019
38	Molybdenum as Mo	mg/l	<0.02	0.07	IS 3025 (Part 2)
39	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54): 2003 RA 2019
40	Polynuclear aromatic hydrocarbons as PAH	mg/l	0.0001	0.0001	APHA 6440
41	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37): 2022

Pradeep Kumar

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Pradeep Kumar
Authorized Signatory
(Mr. Pradeep Mohantara)

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TEST REPORT

Report No. : WCS240527B Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Gectarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tensa Tube Well
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13B
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max, 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.45	6.5-8.5	IS 3025 (Part-11): 2022
4	Turbidity	NTU	0.2	1	IS 3025 (Part-10): 1981 RA 2017
5	Total Dissolved Solid as TDS	mg/l	125	500	IS 3025 (Part-16): 1984 RA 2017
6	Ammonia as Total ammonia-N	mg/l	0.23	0.5	IS 3025 (Part-34): 1988 RA 2019
7	Calcium as Ca	mg/l	20.04	75	IS 3025 (Part-40): 1991 RA 2019
8	Chloride as Cl	mg/l	16	250	IS 3025 (Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.25	1.0	APHA 24 th Ed. (4500-F-D): 2023
10	Iron as Fe	mg/l	0.45	1.0	IS 3025 (Part-53): 2003 RA 2019
11	Magnesium as Mg	mg/l	6.32	30	APHA 24 th Ed. (3500-Mg-B): 2023
12	Nitrate as NO ₃	mg/l	0.85	45	APHA 24 th Ed. (4500-NO ₃ -B): 2023
13	Sulphate as SO ₄	mg/l	2.59	200	IS 3025 (Part-24 Sec 1): 2022
14	Total Alkalinity as CaCO ₃	mg/l	45	200	IS 3025 (Part-23): 1986 RA 2019
15	Total Hardness as CaCO ₃	mg/l	76	200	IS 3025 (Part-21): 2009 RA 2019
16	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
17	Potassium as K	mg/l	25.3	--	IS 3025 (Part-45): 1993 RA 2019
18	Sodium as Na	mg/l	8.6	--	IS 3025 (Part-45): 1993 RA 2019
19	Total Suspended Solid as TSS	mg/l	<5	--	IS 3025 (Part-17): 2022
20	Total Coliform	MPN/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 1622: 1981 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeept Mohapatra)

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TEST REPORT

Report No. : WCS240527B Issue Date : 20.05.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tensa Tube Well
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13B
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
21	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55) : 2003 RA 2019
22	Anionic detergents as MBAS	mg/l	<0.02	0.2	Annex K of IS 13428
23	Barium as Ba	mg/l	<0.1	0.7	Annex F of IS 13428* or IS 15302
24	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57) : 2021
25	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or APHA 4500-Cl G
26	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42) : 1992 RA 2019
27	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59) : 2006 RA 2017
28	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39) : 2021
29	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43) : 1992 RA 2019
30	Selenium as Se	mg/l	<0.001	0.01	IS 3025 (Part 56):2003 RA 2019 or IS 15303*
31	Silver as Ag	mg/l	<0.02	0.1	Annex J of IS 13428
32	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29) : 1986 RA 2019
33	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49) : 1994 RA 2019
34	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41) : 1992 RA 2019
35	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27) : 1986 RA 2019
36	Lead as Pb	mg/l	<0.001	0.01	IS 3025 (Part 47) : 1994 RA 2019
37	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48) : 1994 RA 2019
38	Molybdenum as Mo	mg/l	<0.02	0.07	IS 3025 (Part 2)
39	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54) : 2003 RA 2019
40	Polynuclear aromatic hydrocarbons as PAH	mg/l	0.0001	0.0001	APHA 6440
41	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37) : 2022

Chahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Pradeep Mohapatra
Authorized Signatory
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCS240527C Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tentulidihi Dug Well
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13C
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max, 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.5	6.5-8.5	IS 3025 (Part-11): 2022
4	Turbidity	NTU	0.4	1	IS 3025 (Part-10): 1984 RA 2017
5	Total Dissolved Solid as TDS	mg/l	125	500	IS 3025 (Part-16): 1984 RA 2017
6	Ammonia as Total ammonia-N	mg/l	0.26	0.5	IS 3025 (Part-34): 1988 RA 2019
7	Calcium as Ca	mg/l	14.43	75	IS 3025 (Part-40): 1991 RA 2019
8	Chloride as Cl	mg/l	12.5	250	IS 3025 (Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.26	1.0	APHA 24 th Ed. (4500-F-D): 2023
10	Iron as Fe	mg/l	0.46	1.0	IS 3025 (Part-53): 2003 RA 2019
11	Magnesium as Mg	mg/l	3.89	30	APHA 24 th Ed. (3500-Mg-B): 2023
12	Nitrate as NO ₃	mg/l	2.43	45	APHA 24 th Ed. (4500-NO ₃ -B): 2023
13	Sulphate as SO ₄	mg/l	3.52	200	IS 3025 (Part-24 Sec 1): 2022
14	Total Alkalinity as CaCO ₃	mg/l	35	200	IS 3025 (Part-23): 1986 RA 2019
15	Total Hardness as CaCO ₃	mg/l	52	200	IS 3025 (Part-21): 2009 RA 2019
16	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
17	Potassium as K	mg/l	11.6	--	IS 3025 (Part-45): 1993 RA 2019
18	Sodium as Na	mg/l	22.3	--	IS 3025 (Part-45): 1993 RA 2019
19	Total Suspended Solid as TSS	mg/l	<5	--	IS 3025 (Part-17): 2022
20	Total Coliform	MPN/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 1622: 1981 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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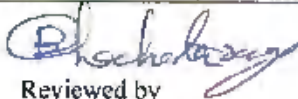


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TEST REPORT

Report No. : WCS240527C Issue Date : 20.05.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tentulidihi Dug Well
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13C
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
21	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55) : 2003 RA 2019
22	Anionic detergents as MBAS	mg/l	<0.02	0.2	Annex K of IS 13428
23	Barium as Ba	mg/l	<0.1	0.7	Annex F of IS 13428* or IS 15302
24	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57) : 2021
25	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or ALPHA 4500-Cl G
26	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42) : 1992 RA 2019
27	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59) : 2006 RA 2017
28	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39) : 2021
29	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43) : 1992 RA 2019
30	Selenium as Se	mg/l	<0.001	0.01	IS 3025 (Part 56):2003 RA 2019 or IS 15303*
31	Silver as Ag	mg/l	<0.02	0.1	Annex J of IS 13428
32	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29) : 1986 RA 2019
33	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49) : 1994 RA 2019
34	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41) : 1992 RA 2019
35	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27) : 1986 RA 2019
36	Lead as Pb	mg/l	<0.001	0.01	IS 3025 (Part 47) : 1994 RA 2019
37	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48) : 1994 RA 2019
38	Molybdenum as Mo	mg/l	<0.02	0.07	IS 3025 (Part 2)
39	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54) : 2003 RA 2019
40	Polynuclear aromatic hydrocarbons as PAH	mg/l	0.0001	0.0001	APHA 6440
41	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37) : 2022


Reviewed by
(Mr. Bijaya Kumar Chahataray)


Authorized Signatory
(Mr. Pradeep Mohapatra)



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TEST REPORT

Report No. : WCS240528A Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000082F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Karo nala Down stream
Sample Description : Surface Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W14A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	--	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	4.0	IS 3025 (Part-4): 2021
3	pH Value	--	6.86	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	166.0	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.4	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	4.8	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.5	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	19.0	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B): 2023
10	Total Hardness as CaCO ₃	mg/l	34.0	APHA 24 th Ed. (2340-C): 2023
11	Chloride as Cl	mg/l	15.5	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	18.56	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	2.53	APHA 24 th Ed. (4500-NO ₃ -B): 2023
14	Fluoride as F	mg/l	0.05	APHA 24 th Ed. (4500-F-D): 2023
15	Calcium as Ca	mg/l	12.83	APHA 24 th Ed. (3500-Ca-B): 2023
16	Magnesium as Mg	mg/l	0.49	APHA 24 th Ed. (3500-Mg-B): 2023
17	Iron as Fe	mg/l	0.49	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	140.0	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	>161	IS 1622 : 1981

Phahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Pradeep

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)



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TEST REPORT

Report No. : WCS240526 Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000080F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Canteen Tap Water
Sample Description : Drinking Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W12
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max, 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.48	6.5-8.5	IS 3025 (Part-11): 2022
4	Taste Threshold	--	Agreeable	Agreeable	IS 3025 (Part-7): 2017
5	Turbidity	NTU	0.2	1	IS 3025 (Part-10): 1984 RA 2017
6	Total Dissolved Solid as TDS	mg/l	171	500	IS 3025 (Part-16): 1984 RA 2017
7	Ammonia as Total ammonia-N	mg/l	0.04	0.5	IS 3025 (Part-34): 1988 RA 2019
8	Chloride as Cl	mg/l	17.49	250	IS 3025(Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.03	1.0	APHA 24 th Ed. (4500-F-ID): 2023
10	Free Residual Chlorine	mg/l	<0.04	0.2	IS 3025 (Part-26): 2021
11	Iron as Fe	mg/l	0.26	1.0	IS 3025 (Part -53): 2003 RA 2019
12	Total Hardness as CaCO ₃	mg/l	26	200	IS 3025 (Part-21): 2009 RA 2019
13	Calcium as Ca	mg/l	7.21	75	IS 3025 (Part-40): 1991 RA 2019
14	Magnesium as Mg	mg/l	1.94	30	APHA 24 th Ed. (3500-Mg-B): 2023
15	Nitrate as NO ₃	mg/l	3.42	45	APHA 24 th Ed. (4500-NO ₃ -B): 2023
16	Sulphate as SO ₄	mg/l	0.86	200	IS 3025 (Part-24 Sec 1): 2022
17	Total Alkalinity as CaCO ₃	mg/l	25	200	IS 3025 (Part-23): 1986 RA 2019
18	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
19	Potassium as K	mg/l	23.6	--	IS 3025 (Part-45): 1993 RA 2019
20	Sodium as Na	mg/l	25.3	--	IS 3025 (Part-45): 1993 RA 2019
21	Total Suspended Solid as TSS	mg/l	<5.0	--	IS 3025 (Part-17): 2022

Chahataray
Reviewed by

(Mr. Bijaya Kumar Chahataray)

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Authorized Signatory
(Mr. Pradeept Mohapatra)



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TEST REPORT

Report No. : WCS240526 Issue Date : 20.05.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Canteen Tap Water
Sample Description : Drinking Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W12
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
22	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55)
23	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57)
24	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or APHA 4500-Cl G
25	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42)
26	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59)
27	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39)
28	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43)
29	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29)
30	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49)
31	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41)
32	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27)
33	Lead as Pb	mg/l	<0.01	0.01	IS 3025 (Part 47)
34	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48)
35	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54)
36	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37)
37	E.Coli	CFU/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 15185: 2016
38	Total Coliform	CFU/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 15185: 2016

Chahataray
Reviewed by

(Mr. Bijaya Kumar Chahataray)

he
Authorized Signatory for Microbiology

(Miss. Laxmi Sahoo)

Pradeep
Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCS240527A Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Office Bore Well (Inside Mines Office)
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

SL No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max, 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.548	6.5-8.5	IS 3025 (Part-11): 2022
4	Turbidity	NTU	0.3	1	IS 3025 (Part-10): 1984 RA 2017
5	Total Dissolved Solid as TDS	mg/l	93	500	IS 3025 (Part-16): 1984 RA 2017
6	Ammonia as Total ammonia-N	mg/l	0.46	0.5	IS 3025 (Part-34): 1988 RA 2019
7	Calcium as Ca	mg/l	12.83	75	IS 3025 (Part-40): 1991 RA 2019
8	Chloride as Cl	mg/l	12.5	250	IS 3025(Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.16	1.0	APHA 24 th Ed. (4500-F-D): 2023
10	Iron as Fe	mg/l	0.49	1.0	IS 3025 (Part -53): 2003 RA 2019
11	Magnesium as Mg	mg/l	3.4	30	APHA 24 th Ed. (3500-Mg-B): 2023
12	Nitrate as NO3	mg/l	1.92	45	APHA 24 th Ed. (4500-NO3-B): 2023
13	Sulphate as SO4	mg/l	1.53	200	IS 3025 (Part-24 Sec 1):2022
14	Total Alkalinity as CaCO3	mg/l	35	200	IS 3025 (Part-23): 1986 RA 2019
15	Total Hardness as CaCO3	mg/l	46	200	IS 3025 (Part-21): 2009 RA 2019
16	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
17	Potassium as K	mg/l	22.3	--	IS 3025 (Part-45): 1993 RA 2019
18	Sodium as Na	mg/l	11.6	--	IS 3025 (Part-45): 1993 RA 2019
19	Total Suspended Solid as TSS	mg/l	<5	--	IS 3025 (Part-17): 2022
20	Total Coliform	MPN/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 1622 : 1981 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCS240527A Issue Date : 20.05.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Office Bore Well (Inside Mines Office)
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
21	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55): 2003 RA 2019
22	Anionic detergents as MBAS	mg/l	<0.02	0.2	Annex K of IS 13428
23	Barium as Ba	mg/l	<0.1	0.7	Annex F of IS 13428* or IS 15302
24	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57): 2021
25	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26) * or APHA 4500-Cl G
26	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42): 1992 RA 2019
27	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59): 2006 RA 2017
28	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39): 2021
29	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43): 1992 RA 2019
30	Selenium as Se	mg/l	<0.001	0.01	IS 3025 (Part 56): 2003 RA 2019 or IS 15303*
31	Silver as Ag	mg/l	<0.02	0.1	Annex J of IS 13428
32	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29): 1986 RA 2019
33	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49): 1994 RA 2019
34	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41): 1992 RA 2019
35	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27): 1986 RA 2019
36	Lead as Pb	mg/l	<0.001	0.01	IS 3025 (Part 47): 1994 RA 2019
37	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48): 1994 RA 2019
38	Molybdenum as Mo	mg/l	<0.02	0.07	IS 3025 (Part 2)
39	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54): 2003 RA 2019
40	Polynuclear aromatic hydrocarbons as PAH	mg/l	0.0001	0.0001	APHA 6440
41	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37): 2022

Reviewed by

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory
Authorized Signatory
(Mr. Pradeep Mohapatra)



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TEST REPORT

Report No. : WCS240527B Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tensa Tube Well
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13B
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max, 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.45	6.5-8.5	IS 3025 (Part-11): 2022
4	Turbidity	NTU	0.2	1	IS 3025 (Part-10): 1984 RA 2017
5	Total Dissolved Solid as TDS	mg/l	125	500	IS 3025 (Part-16): 1984 RA 2017
6	Ammonia as Total ammonia-N	mg/l	0.23	0.5	IS 3025 (Part-34): 1988 RA 2019
7	Calcium as Ca	mg/l	20.04	75	IS 3025 (Part-40): 1991 RA 2019
8	Chloride as Cl	mg/l	16	250	IS 3025 (Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.25	1.0	APHA 24 th Ed. (4500-F-D): 2023
10	Iron as Fe	mg/l	0.45	1.0	IS 3025 (Part-53): 2003 RA 2019
11	Magnesium as Mg	mg/l	6.32	30	APHA 24 th Ed. (3500-Mg-B): 2023
12	Nitrate as NO ₃	mg/l	0.85	45	APHA 24 th Ed. (4500-NO ₃ -B): 2023
13	Sulphate as SO ₄	mg/l	2.59	200	IS 3025 (Part-24 Sec 1): 2022
14	Total Alkalinity as CaCO ₃	mg/l	45	200	IS 3025 (Part-23): 1986 RA 2019
15	Total Hardness as CaCO ₃	mg/l	76	200	IS 3025 (Part-21): 2009 RA 2019
16	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
17	Potassium as K	mg/l	25.3	--	IS 3025 (Part-45): 1993 RA 2019
18	Sodium as Na	mg/l	8.6	--	IS 3025 (Part-45): 1993 RA 2019
19	Total Suspended Solid as TSS	mg/l	<5	--	IS 3025 (Part-17): 2022
20	Total Coliform	MPN/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 1622: 1981 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeept Mohapatra)



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TEST REPORT

Report No. : WCS240527B Issue Date : 20.05.2024
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tensa Tube Well
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13B
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
21	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55) : 2003 RA 2019
22	Anionic detergents as MBAS	mg/l	<0.02	0.2	Annex K of IS 13428
23	Barium as Ba	mg/l	<0.1	0.7	Annex F of IS 13428* or IS 15302
24	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57) : 2021
25	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or APHA 4500-Cl G
26	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42) : 1992 RA 2019
27	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59) : 2006 RA 2017
28	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39) : 2021
29	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43) : 1992 RA 2019
30	Selenium as Se	mg/l	<0.001	0.01	IS 3025 (Part 56):2003 RA 2019 or IS 15303*
31	Silver as Ag	mg/l	<0.02	0.1	Annex J of IS 13428
32	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29) : 1986 RA 2019
33	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49) : 1994 RA 2019
34	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41) : 1992 RA 2019
35	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27) : 1986 RA 2019
36	Lead as Pb	mg/l	<0.001	0.01	IS 3025 (Part 47) : 1994 RA 2019
37	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48) : 1994 RA 2019
38	Molybdenum as Mo	mg/l	<0.02	0.07	IS 3025 (Part 2)
39	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54) : 2003 RA 2019
40	Polynuclear aromatic hydrocarbons as PAH	mg/l	0.0001	0.0001	APHA 6440
41	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37) : 2022

Bhahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Pradept Mohapatra
Authorized Signatory
(Mr. Pradept Mohapatra)

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TEST REPORT

Report No. : WCS240527C Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000081F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : Tentulidihi Dug Well
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13C
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
1	Colour	Hazen	1	Max, 5	IS 3025 (Part-4): 2021
2	Odour	--	Agreeable	Agreeable	IS 3025 (Part-5): 2018
3	pH Value	--	6.5	6.5-8.5	IS 3025 (Part-11): 2022
4	Turbidity	NTU	0.4	1	IS 3025 (Part-10): 1984 RA 2017
5	Total Dissolved Solid as TDS	mg/l	125	500	IS 3025 (Part-16): 1984 RA 2017
6	Ammonia as Total ammonia-N	mg/l	0.26	0.5	IS 3025 (Part-34): 1988 RA 2019
7	Calcium as Ca	mg/l	14.43	75	IS 3025 (Part-40): 1991 RA 2019
8	Chloride as Cl	mg/l	12.5	250	IS 3025 (Part-32): 1988 RA 2019
9	Fluoride as F	mg/l	0.26	1.0	APHA 24 th Ed. (4500-F-D): 2023
10	Iron as Fe	mg/l	0.46	1.0	IS 3025 (Part -53): 2003 RA 2019
11	Magnesium as Mg	mg/l	3.89	30	APHA 24 th Ed. (3500-Mg-B): 2023
12	Nitrate as NO3	mg/l	2.43	45	APHA 24 th Ed. (4500-NO3-B): 2023
13	Sulphate as SO4	mg/l	3.52	200	IS 3025 (Part-24 Sec 1):2022
14	Total Alkalinity as CaCO3	mg/l	35	200	IS 3025 (Part-23): 1986 RA 2019
15	Total Hardness as CaCO3	mg/l	52	200	IS 3025 (Part-21): 2009 RA 2019
16	Total Chromium as Cr	mg/l	<0.02	0.05	IS 3025 (Part-52): 2003 RA 2019
17	Potassium as K	mg/l	11.6	--	IS 3025 (Part-45): 1993 RA 2019
18	Sodium as Na	mg/l	22.3	--	IS 3025 (Part-45): 1993 RA 2019
19	Total Suspended Solid as TSS	mg/l	<5	--	IS 3025 (Part-17): 2022
20	Total Coliform	MPN/100 ml	<2	Shall not be detectable in any 100 ml sample	IS 1622: 1981 RA 2019

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeept Mohapatra)

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TEST REPORT

Report No. : WCS240527C Issue Date : 20.05.2024
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Tentulidihi Dug Well**
Sample Description : Ground Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W13C
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per IS 10500:2012 Reaffirmed 2018	Test Methods
21	Aluminium as Al	mg/l	<0.02	0.03	IS 3025 (Part 55) : 2003 RA 2019
22	Anionic detergents as MBAS	mg/l	<0.02	0.2	Annex K of IS 13428
23	Barium as Ba	mg/l	<0.1	0.7	Annex F of IS 13428* or IS 15302
24	Boron as B	mg/l	<0.1	0.5	IS 3025 (Part 57) : 2021
25	Chloramines as Cl ₂	mg/l	<0.02	4.0	IS 3025 (Part 26)* or APHA 4500-Cl G
26	Copper as Cu	mg/l	<0.01	0.05	IS 3025 (Part 42) : 1992 RA 2019
27	Manganese as Mn	mg/l	<0.05	0.1	IS 3025 (Part 59) : 2006 RA 2017
28	Mineral oil	mg/l	<0.5	1.0	Clause 6 of IS 3025 (Part 39) : 2021
29	Phenolic compounds as C ₆ H ₅ OH	mg/l	<0.001	0.001	IS 3025 (Part 43) : 1992 RA 2019
30	Selenium as Se	mg/l	<0.001	0.01	IS 3025 (Part 56):2003 RA 2019 or IS 15303*
31	Silver as Ag	mg/l	<0.02	0.1	Annex J of IS 13428
32	Sulphide as H ₂ S	mg/l	<0.05	0.05	IS 3025 (Part 29) : 1986 RA 2019
33	Zinc as Zn	mg/l	<0.05	5	IS 3025 (Part 49) : 1994 RA 2019
34	Cadmium as Cd	mg/l	<0.001	0.003	IS 3025 (Part 41) : 1992 RA 2019
35	Cyanide as CN	mg/l	<0.01	0.05	IS 3025 (Part 27) : 1986 RA 2019
36	Lead as Pb	mg/l	<0.001	0.01	IS 3025 (Part 47) : 1994 RA 2019
37	Mercury as Hg	mg/l	<0.001	0.001	IS 3025 (Part 48) : 1994 RA 2019
38	Molybdenum as Mo	mg/l	<0.02	0.07	IS 3025 (Part 2)
39	Nickel as Ni	mg/l	<0.01	0.02	IS 3025 (Part 54) : 2003 RA 2019
40	Polynuclear aromatic hydrocarbons as PAH	mg/l	0.0001	0.0001	APHA 6440
41	Total arsenic as As	mg/l	<0.01	0.01	IS 3025 (Part 37) : 2022

Bhachataray
Reviewed by
(Mr. Bijaya Kumar Chahataray)

Pradeep Mohapatra
Authorized Signatory
(Mr. Pradeep Mohapatra)


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TEST REPORT

Report No. : WCS240528A Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000082F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : **Karo nala Down stream**
Sample Description : Surface Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W14A
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Test Methods
1	Odour	--	Agreeable	IS 3025 (Part-5): 2018
2	Colour	Hazen	4.0	IS 3025 (Part-4): 2021
3	pH Value	--	6.86	IS 3025 (Part-11): 2022
4	Specific Conductivity	µs/cm	166.0	IS 3025 (Part-14): 2013
5	Dissolve Oxygen as DO	mg/l	6.4	IS 3025 (Part-38): 1989
6	Chemical Oxygen Demand as COD	mg/l	4.8	IS 3025 (Part-58): 2006
7	Biochemical Oxygen Demand as BOD	mg/l	2.5	IS 3025 (Part-44): 1993
8	Total Suspended Solid as TSS	mg/l	19.0	IS 3025 (Part-17): 2022
9	Oil & Grease	mg/l	<4	APHA 24 th Ed. (5520-B): 2023
10	Total Hardness as CaCO ₃	mg/l	34.0	APHA 24 th Ed. (2340-C): 2023
11	Chloride as Cl	mg/l	15.5	IS 3025 (Part-32): 1988
12	Sulphate as SO ₄	mg/l	18.56	IS 3025 (Part-24, Sec-1): 2022
13	Nitrate as NO ₃	mg/l	2.53	APHA 24 th Ed. (4500-NO ₃ -B): 2023
14	Fluoride as F	mg/l	0.05	APHA 24 th Ed. (4500-F-D): 2023
15	Calcium as Ca	mg/l	12.83	APHA 24 th Ed. (3500-Ca-B): 2023
16	Magnesium as Mg	mg/l	0.49	APHA 24 th Ed. (3500-Mg-B): 2023
17	Iron as Fe	mg/l	0.49	IS 3025 (Part-53): 2003
18	Total Dissolved Solid as TDS	mg/l	140.0	IS 3025 (Part-16): 1984
19	Total Coliform	MPN/100 ml	>161	IS 1622 : 1981

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)

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11 SEP 2020

भारतीय गैर न्यायिक

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RUPEES

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Rs.10

INDIA NON JUDICIAL

Jagynosh Chharya
Notary, Govt. Of India
Odisha, BESR, Dist-Khurd
Regd. No.-7791/2009
Mob:- 9881006174

50AA 503244

ଓଡ଼ିଶା ओडिशा ODISHA

AFFIDAVIT

I, Srinibash Sahoo, S/o Sri Duhsahsan Sahoo, aged about 60 years, presently the Managing Partner of M/s. Geetarani Mohanty, Raikela Iron Ore Mines, a partnership firm duly registered under the Indian Partnership Act, 1932 having its registered office at Station Road Barbil, do hereby solemnly affirm and state as under:

1. That M/s. Geetarani Mohanty is the Lessee of the Mining Lease bearing ML No. 666 for Iron Ore over an area of 67.586 Ha. in the Village Raikela, Taluka - Koira in the district of Sundergarh, Orissa with a production capacity of 2.99 Million Tonnes per Annum [in short MTPA] .
2. That M/s. Geetarani Mohanty has submitted a proposal before the competent authority for grant of Environment Clearance for enhancement of iron ore production capacity from 2.99 MTPA to 4.99 MTPA along with crushing and screening facility over the mining lease hold area [Hereinafter the Project Proponent].



20803
11.9.20

M/S Geetarani Mahur

System Row

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J. BARAL
STAMP VENDOR
S.R. Khandagin, BBSR

Chaturbhuja Palei

Jagyneshwar Acharya
Notary, Govt. Of India
Odisha, BBSR, Dist-Khorda
Regd. No.-7791/2009
Mob-9861006174

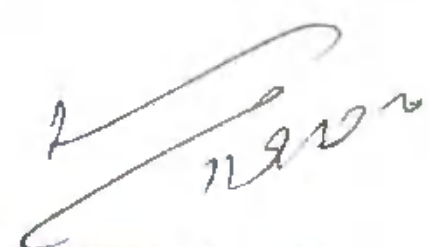
3. That as per the recommendation of the State Expert Appraisal Committee, Odisha, the Project Proponent has to submit a standard operating procedure [in short 'SOP'] for de-silting at buffer zone and beyond including nearby nala/river perennially periodically and perpetually caused to wash up off mineral/OB/Dumps through an Affidavit.
4. That the SOP as drawn by the Project Proponent is Annexed herewith and the same to be read as part and parcel of this Affidavit.
5. That all the facts, figures and informations as stated in the said SOP is true to the best of my knowledge and belief and are based on records.


DEPONENT

Identified By:
IDENTIFIED BY ME

ADVOCATE BBSR
ADVOCATE




Jagyneshwar Acharya
Notary, Govt. Of India
Odisha, BBSR, Dist-Khorda
Regd. No.-7791/2009
Mob-9861006174

11-9-01
Jagyneshwar Acharya
Notary, Govt. Of India
Opans, BSR, Dist-Khanda

STANDARD OPERATING PROCEDURE FOR DE-SILTING WORK AT BUFFER ZONE AND BEYOND INCLUDING NEARBY NALA/RIVER PERENNIALY PERIODICALLY AND PERPETUALLY CAUSED TO WASH UP OFF MINERALS/OB/DUMPS THROUGH A LEGAL AFFIDAVIT.

Introduction

In Raikela hill ranges 6nos of mines existing and out of which four mines are in operation.

The details of Leases in this region are furnished below:

1. Raikela Iron ore Mine, M/s Geetarani Mohanty
2. Raikela Iron ore Mine, M/s Penguin Trading Agency.
3. Raikela and Tantra Iron ore Mine, M/s Jindal Steel and Power Ltd.
4. Raikela Iron ore Mine, M/s National Enterprises.
5. Raikela Iron ore Mine, C.P.Sharma.
6. Raikela Iron ore Mines, S.N.Mohanty.

Out of which, 1st four mines are operating. Topographically, the mines are at higher elevation and in the North eastern part of the leases there is existence of Agricultural field of local villagers.

The location of the Agricultural field from the ML boundary is furnished below:

Most of the agricultural fields are located in the north eastern part of the lease area. These fields are located in the buffer zone at a distance of 2.5 km from the lease area.

There is no perennial nala within the core zone. In the Buffer zone Sarkunada Nala, Kuradhi Nala and Karo Nala are flowing. **The location of Nalas with respect to the ML boundary area as follows:**

- | | | |
|---------------|---|----------------------|
| Sarkunda Nala | - | 4.2 km in South |
| Kuradhi Nadi | - | 8.0 km in North West |
| Karo Nala | - | 6.8 km in the North |

Precautionary Measures

During flow of rain water, it may carry silts, clay or lateritic soil towards downhill side. Therefore, it's very much necessary to prevent these wash offs from these mines from spreading over the agricultural field. Wash off / runoff of mine workings, waste dumps, ore stock piles, during monsoon may carry the silt / ore residues and pollute the nearby nallah / streams, lands if it is let-out as such. To prevent such siltation effect, effective surfaces runoff management scheme are being devised and implemented.

Responsibility for effective run off Management

As explained above, it is the prime responsibility of the all the mine owners to make effective run off management to control the wash offs from each mines. Along with



other mine owner, M/s Geetarani Mohanty is also doing all the precautionary measures to prevent wash offs from the mines to buffer zone. Further, M/s Geetarani Mohanty, is committed to make necessary arrangement to prevent the wash offs by creating retaining wall followed by garland drain with settling ponds at strategic location. Garland drains & retaining walls have been constructed all around the dumps and plantation of native species has been carried out on the dump slopes to minimize erosion. A settling pond has been constructed to arrest silt and sediment flows from mining operations and the water so collected is being utilized for the mine area, roads, green belt development etc. The drains are regularly de-silted and maintained. M/s Geetarani Mohanty is and will be committed to do the de-silting work at regular interval.

Details of existing surface runoff management structures within core zone

Location	Retaining wall			Garland drain			Nos	Settling pond		
	L(m)	W(m)	H(m)	L(m)	W(m)	H(m)		L(m)	W(m)	H(m)
Waste dump	300	1.0	2.0	435	1.0	1.5	1	10	8	2
Existing Stack	130	1.0	2.0	362	1.0	1.5	-	-	-	-
Proposed Stack-I	465	1.0	2.0	464	1.0	1.5	1	10	8	2
Proposed Stack-II	285	1.0	2.0	284	1.0	1.5	1	10	8	2
Proposed Stack-III	-	-	-	525	1.0	1.5	1	10	8	2
Total	1180	1.0	2.0	2070	1.0	1.5	4	10	8	2

The following mitigative measures are and will be implemented to prevent run-off of water & flow of sediments directly into the nearby water bodies, land and control water environment in the area.

- Dozing and levelling of inactive waste dumps.
- Providing dump tops with inner slopes and through a system of drains and channels, allowing rain water to descent into surrounding drains, so as to minimize the effects of erosion arising out of uncontrolled descent of water.
- Proper terracing of the OB dumps and covering with Geo textile mat.
- Planting native tree species on the dump tops and slopes with grasses and shrubs to arrest and prevent erosion.
- Construction of garland drains of suitable size around mine area and dump with proper gradients to prevent rain water descent into active mine area.
- Settling ponds are & will be made to prevent flow of fine particles from OB / Waste dumps, check dams, parapet/retaining walls & garlanded drains.
- The garland drains connected to settling tank to collect surface runoff, mine water and arrest siltation.
- Usage of stored water in the settling ponds for watering of haul roads, vehicle washing and green belt development etc.



- De-silting of the garland drains & settling ponds are being & will be carried out at regular intervals.
- Maintenance of all the runoff management structures

Procedure for Desilting in agricultural field and Nala

M/s Geetarani Mohanty will adopt a Standard Procedure to make de-silting work both in core zone and buffer zone (agricultural field) as well as nala within the buffer zone by using environmentally sound practices that are cost effective and safe for desilting and dredging the fields. The details of standard operating procedure for the de-silting work at buffer zone especially at Agricultural field will be as follows:

(1) Objective/purpose

The main objective of the desilting work in the agricultural field is that to remove the silts, clay other non-fertile material came from the mines, waste dump, mineral stack so that the productivity of agricultural land will be more which will help directly to the surrounding local farmers. In the similar way, de-silting of nala will be undertaken once in a year.

(2) Scope

Engagement of machine/excavator and manpower for dredging the spread silts, clay and other non-fertile material over the agricultural field. The dredged material will be transported to the Waste dump through Tractor. De-silting of nala within buffer zone will be undertaken by engaging high capacity excavator. The material from nala will be sent for making bund both side of nala. Grass patching will be done both side of nala.

(3) Responsibility

Overall responsibility lies on owner. But in the field the Mines Manager will take care the job by out sourcing the agency for dredging the wash offs.

4) Procedure to be adopted for removal of silts in the buffer zone from agricultural field and nala:

- (a) Measurement of thickness of material (silt/clay/lateritic soil) spread over the agricultural field and nala.
- (b) If the thickness is more then, small size excavator will be utilised for digging.
- (c) After digging of the deleterious material from the field and nala the said material will be transported through tractors/tippers and disposed of at a purchased valley area or can be utilised for road construction or making bund.
- (d) The project proponent will purchase compost, cow dung and farmyard manures to the cleaned up agricultural land with an aim to enhance the organic content thereby facilitating better agricultural production. The same will be provided to the farmers for spreading over the agricultural field. The project proponent will help the farmers for spreading the same.



Costing

Sl No	Particulars	Cost(in Rs) per annum
1	Deployment of Excavator	1,00,000
2	Deployment of Tractors/tippers	50,000
3	Purchase of manures	50,000
4	Engagement of Labour	30,000
5	Miscellaneous Expenditure	20,000
Total		2,50,000

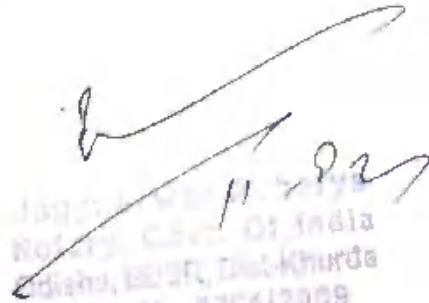
Conclusion

M/s Geetarani Mohanty do the de-silting of nala and agricultural field along with other Mine owner for the benefit of surrounding villagers. Necessary arrangement for development of agriculture will be done continually within the surrounding villagers as a part of CSR activity.

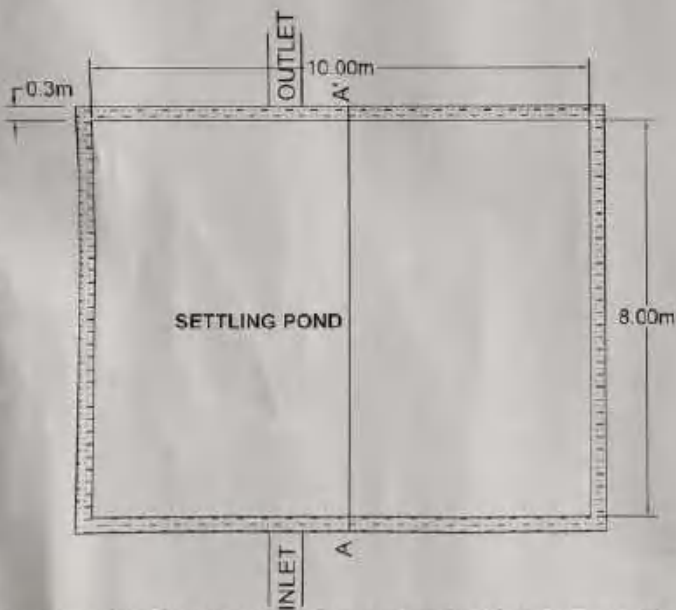
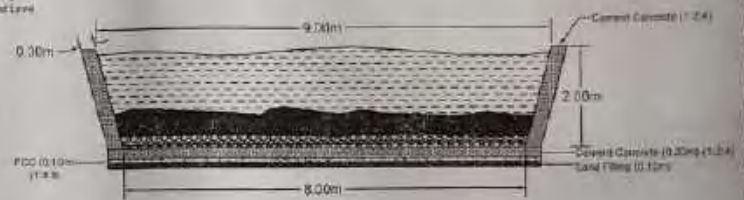
M/s Geetarani Mohanty

Managing Partner.




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RAIKELA IRON ORE MINES OF M/S GEETARANI MOHANTY
DETAIL DESIGN OF RETAINING WALL, GARLAND DRAIN AND SETTLING POND
SCALE:- 1:100



INDEX

- Boulder Wall
- Cement Concrete
- PCC
- Sand filling
- Boulder
- Silt
- Water



STRUCTURAL ENGINEER
 N.K. PARIDA

SIGNATURE



TC-11225

WCS/LQR/60

TEST REPORT

Report No. : WCSL240318 Issue Date : 15.03.2024
 NABL ULR No. : TC1122524000000075F
 Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
 Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
 Sampling Location : ETP Out-Let
 Sample Description : Waste Water Date of Sampling : 04.03.2024
 Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 06.03.2024
 Environmental Condition : Temperature 280C, Clear Weather Sample ID No : WCS0324W10
 Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
 Date of Testing : 06.03.2024 to 11.03.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per The Environment (Protection) Amendment Rules, 2015, Into inland surface water	Test Methods
1	pH Value	—	7.42	6.0 to 9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	8.6	30 (Max)	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	27.6	250 (Max)	APIIA 23rd Ed. (5220-10): 2017
4	Total Suspended Solid	mg/l	24.3	100 (Max)	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	246	2100 (Max)	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	5.6	10 (Max)	APIIA 23rd Ed. (5520-18): 2017

Reviewed by
(Mr. Bijaya Kumar Chahataray)

Authorized Signatory
(Mr. Pradeep Mohapatra)

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TEST REPORT

Report No. : WCSL240319 Issue Date : 15.03.2024
NABL ULR No. : TC112252400000076F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : STP Out-Let
Sample Description : Waste Water Date of Sampling : 04.03.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 06.03.2024
Environmental Condition : Temperature 280C, Clear Weather Sample ID No : WCS0324W11
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 06.03.2024 to 11.03.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per MoEF&CC, Govt. of India Vide G.S.R. 1265 (E), dated 13.10.2017	Test Methods
1	pH Value	--	7.5	6.5-9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ 27°C	mg/l	14.6	30	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	45.3	<100	APHA 23rd Ed. (5220-D): 2017
4	Total Suspended Solid	mg/l	24	--	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	226	--	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	<4	--	APHA 23rd Ed. (5520-B): 2017
7	Faecal Coliform	MPN/ 100 ml	500	<1000	IS 1622 : 1981 RA 2019

Chahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

he

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

R

Authorized Signatory for Chemical
(Mr. Prudeept Mohapatra)

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TEST REPORT

TC-91225

Report No. : WCSL240401 Issue Date : 02.04.2024
NABL ULR No. : TC112252400000078F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : ETP Out-Let
Sample Description : Waste Water Date of Sampling : 23.03.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 25.03.2024
Environmental Condition : Temperature 290C, Clear Weather Sample ID No : WCS0324W12
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Lit
Date of Testing : 25.03.2024 to 30.03.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per The Environment (Protection) Amendment Rules, 2015, Into inland surface water	Test Methods
1	pH Value	—	7.36	6.0 to 9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	7.6	30 (Max)	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	26.3	250 (Max)	APHA 23rd Ed. (5220-D): 2017
4	Total Suspended Solid	mg/l	26.5	100 (Max)	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	256	2100 (Max)	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	4.9	10 (Max)	APHA 23rd Ed. (5520-B): 2017

Bhahataray
Reviewed by

(Mr. Bijaya Kumar Chahataray)

Pradeep Mohapatra
Authorized Signatory

(Mr. Pradeep Mohapatra)

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TEST REPORT

TC-11225

Report No. : WCSL240402 Issue Date : 02.04.2024
NABL ULR No. : TC112252400000079F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : STP Out-Let
Sample Description : Waste Water Date of Sampling : 23.03.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 25.03.2024
Environmental Condition : Temperature 290C, Clear Weather Sample ID No : WCS0324W13
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 25.03.2024 to 30.03.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per MoEF&CC, Govt. of India Vide G.S.R. 1265 (E), dated 13.10.2017	Test Methods
1	pH Value	--	7.85	6.5-9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	16.3	30	IS 3025 (Part-14): 1993
3	Chemical Oxygen Demand as COD	mg/l	42.6	<100	APHA 23rd Ed. (5520-D): 2017
4	Total Suspended Solid	mg/l	26	--	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	223	--	IS 3025 (Part-16): 1984
7	Oil & Grease	mg/l	<4	--	APHA 23rd Ed. (5520-B): 2017
8	Faecal Coliform	MPN/ 100 ml	500	<1000	IS 1622 : 1981 RA 2019

Reviewed by *Phadhataray* Authorized Signatory for Microbiological (Mr. Bijaya Kumar Chahataray)
Authorized Signatory for Chemical (Miss. Laxmi Sahoo)
Authorized Signatory for Chemical (Mr. Pradeept Mohapatra)

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TEST REPORT

Report No. : WCS240416 Issue Date : 12.04.2024
NABL ULR No. : TC1122524000000055F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : STP Out-Let
Sample Description : Waste Water
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Sampling : 02.04.2024
Environmental Condition : Temperature 28th, Clear Weather Date of Receiving : 04.04.2024
Sample Collected by : WCS Laboratory Sample ID No : WCS0424W04
Date of Testing : 04.04.2024 to 10.04.2024 Quantity of Sample : 1 Ltr
Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per MoEF&CC, Govt. of India Vide G.S.R. 1265 (E), dated 13.10.2017	Test Methods
1	pH Value	--	7.5	6.5-9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	16.7	30	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	48.8	<100	APHA 24 th Ed. (5220-D): 2023
4	Total Suspended Solid	mg/l	26	--	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	229	--	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	<1	--	APHA 24 th Ed. (5520-B): 2023
7	Faecal Coliform	MPN/ 100 ml	500	<1000	IS 1622 : 1981 RA 2019

Chahataray

Reviewed by
(Mr. Bijaya Kumar Chahataray)

he

Authorized Signatory for Microbiological
(Miss. Laxmi Sahoo)

Pradeep

Authorized Signatory for Chemical
(Mr. Pradeep Mohapatra)



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TEST REPORT

Report No. : WCS240420 Issue Date : 24.04.2024
NABL ULR No. : TC1122524000000060F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : ETP Out-Let
Sample Description : Waste Water
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Sampling : 15.04.2024
Environmental Condition : Temperature 29°C, Clear Weather Date of Receiving : 17.04.2024
Sample Collected by : WCS Laboratory Sample ID No : WCS0424W08
Date of Testing : 17.04.2024 to 22.04.2024 Quantity of Sample : 1 Ltr
Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per The Environment (Protection) Amendment Rules, 2015, Into inland surface water	Test Methods
1	pH Value	--	7.6	6.0 to 9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	9.3	30 (Max)	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	26.4	250 (Max)	APHA 24 th Ed. (5220-10): 2023
4	Total Suspended Solid	mg/l	26.3	100 (Max)	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	236	2100 (Max)	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	4.2	10 (Max)	APHA 24 th Ed. (5520-B): 2023

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TEST REPORT

Report No. : WCS240421 Issue Date : 24.04.2024
NABL ULR No. : TC1122524000000061F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : STP Out-Let
Sample Description : Waste Water Date of Sampling : 15.04.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 17.04.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0424W09
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 17.04.2024 to 22.04.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per MoEF&CC, Govt. of India Vide G.S.R. 1266 (E), dated 13.10.2017	Test Methods
1	pH Value	--	7.85	6.5-9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 270C	mg/l	15.5	30	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	42.4	<100	APHA 24th Ed. (5220-D): 2023
4	Total Suspended Solid	mg/l	30	--	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	235	--	IS 3025 (Part-16): 1984
7	Oil & Grease	mg/l	<4	--	APHA 24th Ed. (5520-B): 2023
8	Faecal Coliform	MPN/ 100 ml	500	<1000	IS 1622 : 1981 RA 2019



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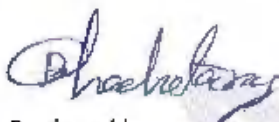


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TEST REPORT

Report No. : WCS240529 Issue Date : 20.05.2024
NABL LIR No. : TC1122524000000083F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : ETP Out-Let
Sample Description : Waste Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W15
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per The Environment (Protection) Amendment Rules, 2015, into inland surface water	Test Methods
1	pH Value	--	7.60	6.0 to 9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	7.9	30 (Max)	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	29.6	250 (Max)	APHA 24 th Ed. (5220-D): 2023
4	Total Suspended Solid	mg/l	26.8	100 (Max)	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	242.0	2100 (Max)	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	5.3	10 (Max)	APHA 24 th Ed. (5520-B): 2023


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TEST REPORT

Report No. : WCS240537 Issue Date : 25.05.2024
NABL ULR No. : TC112252400000088F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : ETP Out-Let
Sample Description : Waste Water Date of Sampling : 18.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 20.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W24
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 20.05.2024 to 24.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per The Environment (Protection) Amendment Rules, 2015, Into inland surface water	Test Methods
1	pH Value	-	7.3	6.0 to 9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	8.7	30 (Max)	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	24.8	250 (Max)	APHA 24 th Ed. (5220-10): 2023
4	Total Suspended Solid	mg/l	27.9	100 (Max)	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	232.0	2100 (Max)	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	4.5	10 (Max)	APHA 24 th Ed. (5520-B): 2023

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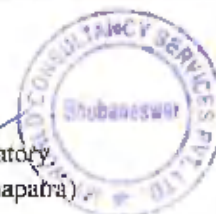
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TEST REPORT

Report No. : WCS240530 Issue Date : 20.05.2024
NABL ULR No. : TC1122524000000084F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : STP Out-Let
Sample Description : Waste Water Date of Sampling : 09.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 11.05.2024
Environmental Condition : Temperature 28°C, Clear Weather Sample ID No : WCS0524W16
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 13.05.2024 to 18.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per MoEF&CC, Govt. of India Vide G.S.R. 1265 (E), dated 13.10.2017	Test Methods
1	pH Value	—	7.59	6.5-9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	15.6	30	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	45.6	<100	APHA 24 th Ed. (5220-F): 2023
4	Total Suspended Solid	mg/l	24	—	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	227	—	IS 3025 (Part-16): 1984
6	Oil & Grease	mg/l	<4	—	APHA 24 th Ed. (5520-B): 2023
7	Faecal Coliform	MPN/ 100 ml	500	<1000	IS 1622 : 1981 RA 2019

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TEST REPORT

Report No. : WCS240538 Issue Date : 25.05.2024
NABL ULR No. : TC1122524000000089F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Sampling Location : STP Out-Let
Sample Description : Waste Water Date of Sampling : 18.05.2024
Sampling Plan & Method : WCS/QSP/SAMP (WATER) Date of Receiving : 20.05.2024
Environmental Condition : Temperature 29°C, Clear Weather Sample ID No : WCS0524W25
Sample Collected by : WCS Laboratory Quantity of Sample : 1 Ltr
Date of Testing : 20.05.2024 to 24.05.2024 Sample Condition : Good

Sl. No.	Parameter	Unit	Result	Requirement as per MoEF&CC, Govt. of India Vide G.S.R. 1265 (E), dated 13.10.2017	Test Methods
1	pH Value	--	7.56	6.5-9.0	IS 3025 (Part-11): 2022
2	Biochemical Oxygen Demand as BOD ₅ , 27°C	mg/l	15.2	30	IS 3025 (Part-44): 1993
3	Chemical Oxygen Demand as COD	mg/l	41.6	<100	APHA 24th Ed. (5220-10): 2023
4	Total Suspended Solid	mg/l	29.0	--	IS 3025 (Part-17): 2022
5	Total Dissolved Solid as TDS	mg/l	240	--	IS 3025 (Part-16): 1984
7	Oil & Grease	mg/l	<4	--	APHA 24th Ed. (5520-B): 2023
8	Faecal Coliform	MPN/ 100 ml	500	<1000	IS 1622 : 1983 RA 2019

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REPORT

On

Water Audit Study

At

**M/S GEETARANI MOHANTY RAIKELA
MINES**

Odisha

by



Resource Conservation & Management Division
Federation of Indian Chambers of Commerce and Industry
Federation House, Tansen Marg, New Delhi – 110 001

(December 2021)



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ACKNOWLEDGEMENT

Federation of Indian Chambers of Commerce & Industry (FICCI) places on record its sincere thanks to **M/S GEETARANI MOHANTY RAIKELA MINES**, ODISHA for entrusting the task of conducting Resource Audit for “Water Audit Study” as per CGWA guidelines at M/S GEETARANI MOHANTY RAIKELA MINES Odisha during October 2021.

‘We hereby express our sincere thanks to **Mr Srinibash Sahoo , Mr Ajit Ratha., Miss Sonal Sahoo, Mr Sunit Patel. Mr B.B Sahoo and Mr Pradeept Mohapatra**, of **M/S GEETARANI MOHANTY RAIKELA MINES Odisha** , for their proactive support and courtesy extended to the FICCI team during field study. We also thank other officials from **M/S GEETARANI MOHANTY RAIKELA MINES Odisha** for their cooperation and support provided during data collection. We are also grateful to all those we interacted with during the audit who gave us some operational insights.

MA Patil

Sr. Director

RCM Group, FICCI

New Delhi

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- ❖ **Karishma Bist, Additional Director**
- ❖ **Pushpendra Nayak, Joint Director**
- ❖ **Pankaj Dhote, Sr. Associate**
- ❖ **Mandar Agnihotri, Sr. Associate**

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ABBREVIATIONS

ETP	:	Effluent Treatment Plant
kW	:	Kilo Watt
kWh	:	Kilo Watt hour
lpcd	:	litres per capita per day
lpm	:	litres per minute
OHT	:	Overhead Tank
RWH	:	Rainwater Harvesting
RO	:	Reverse Osmosis
SWC	:	Specific Water Consumption

EXECUTIVE SUMMARY

FICCI has conducted a detailed Water Audit Study of the M/S GEETARANI MOHANTY RAIKELA MINES Odisha during October 2021. The study estimated that the total Water use by the mines is about 288 m³/day out of which about 48 % is fresh water and 11 % is recycled water. The main source of freshwater is supplied from groundwater by bore well. The plant consumes about 185m³ of groundwater as per 2020-21. The main water sources and their uses are given in Table below.

Table A: Details of Water Sourcing

S.No.	Source of Water	m ³ /day
1	Bore well Water	180.0
2	Rain water harvesting pond	88.0
2	STP Treated water	13.7
3	ETP Water	6.1
		288.0

The water is mainly used for Road Sprinkling for dust separation, Canteen domestic, Horticulture, Vehicle washing etc. The main water uses area are given in

The total wastewater generation in the plant is about 19.8m³/day, out of which about 11% (7.2m³/day) wastewater generated from Domestic and 4% (19m³/day) wastewater generated from vehicle wash. The breakup of wastewater generation from different sections is provided in below table. The detailed Water balance is discussed in the subsequent chapter.

Table C: Major Wastewater generating areas

S. No.	Major Sections	Wastewater discharged (m ³ /day)	Recycled/Discharge	(m ³ /day)
1	Domestic Use	19.5	Reused in Green Belt	8.2
2	Vehicle Wash	7.2	Reuse in dust suppression	11.5
	Total	26.7		19.7

Water Management Summary

Table 1 : Fact File of Raikela Iron ore mines of M/S GEETARANI MOHANTY

Plant Name and Location	Raikela Iron ore mines of M/S GEETARANI MOHANTY
Plant zone	Safe Zone
Depth of ground water table	91 meter
Type of products	Ore Extraction/Mining
No. of working days/year	300
Annual Production (2020 - Feb 2021)	-
Major Water Usage Area in the Plant	Road Sprinkling for dust separation, Canteen domestic, Horticulture, Vehicle washing etc.
Main Source of Freshwater and sourcing cost (Rs/m3)	Bore well- 180 m3/day & water cost rate Rs 1.00 /m3
Total annual Fresh Water consumption (2020-Feb21)	Bore well: 64010 m3/year
Total Water Use (Fresh water, Recycled RO Reject Water, CETP Treated Water) for Plant	❖ Fresh Bore well water – 120 m3/day ❖ Recycled use of treated water STP – 24 m3/day
Cost of Water at various water use areas	❖ Average Rate of abstraction of bore well water- Rs 1/ m3 ❖ Cost of water used for domestic use – Rs1/ m3 ❖ Cost of STP Treated water- Rs 3.55/ m3 ❖ Cost of ETP treated water- Rs 1.03/ m3
Annual water & wastewater management cost	Rs. 2.16 Lakhs/year
Average Effluent Generation in the STP and ETP generated and Reuse (m3/day)	15 m3/day in the STP & 19 m3/day in the ETP is treated
Power Supply Cost (2020-Jan21)	Rs. 6.50 kWh
Average Specific Water Consumption in M/S of Fresh water Use (2020-Jan 21)	

The water audit study of the plant has identified various water & cost saving opportunities which are discussed in the report. The summary of recommendations is given in table below. **It is estimated that by implementing FICCI suggested low & medium cost schemes; the plant can reduce its freshwater consumption.**

SUMMARY OF RECOMMENDATIONS

Sr. No	Section/Area	Recommendations
1.	Regularly calibrate & maintain existing water flow meters	It was observed that the existing bore well meter are installed and calibrated
2	Maintain logbook of daily ground water abstraction	It was observed that the plant is maintaining data of daily groundwater abstraction
3	Regular ground water quality monitoring and submission of data to CGWA:	The plant regularly checks the water quality of the Groundwater and submitting the reports to CGWA
4	Training and Awareness of the Employees at all Levels and Placing 'Water Saving' Posters/Slogans at various Locations	Mines is regularly conducting Training and Awareness of the Employees, events to promote water conservation like celebration of world water day, world environment day" and Placing 'Water Saving' Posters/Slogans at various Locations
5	Periodically conduct 'Water & Wastewater Audit'	Plant has formed a cell for assessment of potential for water & wastewater management in the plant for water saving & wastewater management.
6	Regular payment of applicable groundwater abstraction charges	The mines need to pay applicable ground water abstraction charges as per CGWA notification.
7	Ensure to comply with the NOC conditions to avoid any penalty	It is suggested that the mines should comply with the applicable NOC conditions to avoid any penalty.
8	Water Savings in the Buildings for Domestic Use	It is suggested to install following water efficient fixtures in the buildings to save domestic water consumption. Overall, 15-20% domestic water consumption
9	Install Drip Irrigation in the garden/horticulture area for efficient water use in landscaping/gardening	It is suggested that the plant should install Drip Irrigation system which is water efficient for gardening/ horticulture. The drip irrigation system will save 30-50% of water.

CHAPTER -1: INTRODUCTION

1. About the Plant: General Plant Details

Raikela iron ore mine over an area of 67.586Ha in village Raikela under Bonai Sub-Division of Sundargarh district was initially executed for a period of 20 years w.e.f. 02.07.1991 in favour of Smt. Geetarani Mohanty. The copy of the lease deed is attached as Annexure-I. On 03.02.1992 Smt. Geetarani Mohanty applied to the Government of Orissa for transfer of the mining lease in favour of the registered partnership firm i.e. M/s. Geetarani Mohanty. Government of Orissa, vide its proceeding dated 17/10/1992 accorded permission for transfer of the mining lease in favour of the partnership firm namely M/s. Geetarani Mohanty with previous approval of Govt. of India in terms of Rule 37 of the MC Rules, 1960. Transfer of Mining Lease Deed was executed on 13/01/1993 in statutory form 'O' under Rule 37 (A) of the MC Rules, 1960 by Smt. Geetarani Mohanty (individual Lessee) as Transferor with the State Govt, represented by Collector, Sundargarh, and the transferee M/s. Geetarani Mohanty, the Partnership Firm, represented by its Managing Partner Sri Srinibash Sahoo. As per the covenants of the transfer deed, after the transfer of the mining lease to the transferee, i.e., the partnership firm, the transferee became the lessee as if the lease had been granted to the transferee as the lessee there under and he had originally executed it such. (It is worth mentioning here that Smt. Geetarani Mohanty resigned from the partnership firm by tendering her resignation letter, acknowledging settlement of her books of accounts and executing a deed of retirement, thereby severing herself from all the activities of the partnership firm M/s. Geetarani Mohanty (hereinafter the lessee). The partnership firm, M/s. Geetarani Mohanty was reconstituted by induction of two new partners with the consent of Smt. Geetarani Mohanty. Since then the reconstituted partnership firm as lessee is carrying out mining operation over the lease hold area w.e.f. 01.04.1993.

The original term of mining lease was expired on 01.07.2011. Therefore, the lessee firm has filed the application on dated 20.05.2010 under Rule 24(A) (6) of M.C. Rules, 1960 before the State Government for its 1st Renewal of the Mining Lease for a period of 20 years w.e.f. 02.07.2011. (The copy of the RML application in form-J along with the Form-D is attached as Annexure-II. However, the 1st Renewal of mining lease application was pending before the State Government. In the meantime, the Mines and Minerals (Development and Regulation) Act, 1957 (in short MMDR Act, 1957) was amended by MMDR Amendment Act, 2015. It is pertinent to mention here that under section 8A(3) of the Amendment Act, 2015 the State Government in department of Steel & Mines has been pleased to extend the validity period of the mining lease up to 01.07.2041 being 50 years from the date of original mining lease i.e. from 02.07.1991 to 01.07.2041. A Copy of the said extension order dated 17.08.2015 is enclosed herewith for your kind perusal and reference as Annexure- III. It may be mentioned here that as per the order of Hon'ble Supreme Court of India in W.P (C) No. 114/2014 dated 16.05.2014 this mines was coming among the 102 non-working mining leases as Annexure R-2. As per the para 3 of the order of the Hon'ble Court. However, Hon'ble Supreme Court of India in I.A no. 110418 of 2018 filed by the lessee firm in W.P (c) No. 114 of 2014 allowed to resume the mining operation subject to compliance of all mandatory requirements vide its order dated 16.01.2019. (A copy of the order dated 16.01.2019 is enclosed herewith for your kind perusal and reference as Annexure-IV). In pursuant to the order from Hon'ble Supreme Court of State Government in department of Steel & Mines, allowed the lessee firm for resumption of mining operation subject to execution of

Supplementary Lease Deed vide no. 1763/SM, dated 08.03.2019 (A copy of the order dated 08.03.2109 is enclosed herewith for your kind perusal and reference as Annexure-V). Collector sundargarh given demand notice to lessee for stamp duty vide letter no. 112/XII-B-118/18, Dt.20.03.2019 and refer as Annexure-VI. Subsequent to the order from State Government, the Supplementary Lease Deed was executed and registered in favor of lessee vide regd. No1721900263 on dated 27.05.2019. (A copy of the Registered Supplementary Lease Deed is enclosed herewith for your kind perusal and reference as Annexure-VII). As per the Supplementary lease deed, the validity of the lease period is now extended up to 01.07.2041. Subsequently, the lessee has got the working permission from the state govt to run the Mines and the lessee has re-open the mines on 19.06.2019.

Statutory clearances

The lessee has obtained all the statutory clearances like Mining Plan approval from IBM, Forest and Environment Clearance from MoEF, Consent to Operate from SPCB. The details of statutory clearances are furnished below:

❖ Surface right obtained

Land details:

Area (hectares)	:	67.586 Ha
Details of forest land	:	66.671 Ha area is under forest as per the DLC record. 0.915 Ha is non-forest.
Ownership occupancy	:	Govt. of Odisha. Mining Lessee – M/s Geetarani Mohanty, Barbil

Out of the total ML area over 67.586Ha, surface Right over an area of 57.50Ha has been granted by the District Magistrate, Sundargarh.

❖ Forest clearance:

Out of the 67.586Ha of Mining Lease area, forest land under DLC category is 66.671Ha and 0.915Ha is non-forest land. Out of the 66.671Ha, DLC Forest land, 43.033Ha had been broken prior to 12.12.1996 and mining operation in this area was being continued. Ministry of Environment and Forest, Govt of India has accorded the Stage-II Forest Clearance over an area of 66.671Ha vide letter No. F No.8-37/2007-FC dated 22.10.2014.

❖ Environmental clearance

The State Level Environment Impact Assessment Authority, Odisha, Bhubaneswar has granted the Environmental Clearance for the production capacity of 2.99MTPA capacity vides SEIAA File No. 41890/08-MINB1/09-2019 dated 23.11.2020. The copy of the Environmental Clearance is enclosed as Annexure-XI. Further the lessee will obtain the Environmental Clearance @ of 4.99MTPA to operate the mines in the said capacity.

❖ Consent to Established form SPCB

The lessee has obtained the consent to established order under section 25 of the water (PCP) Act 1974 and under section 21 of Air (PCP) Act 1981 for the Production of 2.99MTPA (ROM) along with installation crushing and screening plant vide letter No. 8918/IND-II-CTE-6420 Dated 18.09.2020.

❖ Consent to operate from SPCB

The lessee has obtained the consent to operate under section 25/26 of the water (PCP) Act 1974 and under section 21 of Air (PCP) Act 1981 for the production capacity of 2.99MTPA vide the letter No. 875/IND-I-CON-2572 Dated 19.01.2021 and were valid up to 31.03.2022.

1. Water Conservation Initiatives taken by Plant

FICCI took up a detailed Water Audit Study at M/S GEETARANI MOHANTY RAIKELA MINES Odisha,

Table 2: Water Conservation Initiatives taken up by plant

Sr. No.	Water Conservation/Saving Measure Undertaken
❖	Installed Sewage Treatment plant for domestic water recycling
❖	Installed Effluent Treatment plant for Vehicle washing water Recycling
❖	Constructed Rain water harvesting system and reuse of water
❖	Wheel washing system
❖	Water Sprinkling System for roads

During the field study conducted by FICCI, many other water saving options were identified for Raikela Iron ore mines of M/S GEETARANI MOHANTY, Odisha which, if implemented, can lead to substantial water savings. FICCI is pleased to offer its services for conducting Water Audit Study Raikela Iron ore mines of M/S GEETARANI MOHANTY as per CGPA guidelines. FICCI's expertise in Water audit & conservation will complement the in-house efforts of Mines in conserving water, reducing wastewater generation as well as reducing operational costs.

CHAPTER -2: SCOPE OF WORK

1. Scope of Water Audit Study

The main objective of the study is to identify the water uses & water saving opportunities. Scope of work of the study includes the following:

- ❖ On-site training and discussion with facility manager and personnel
- ❖ Water system analysis and Quantification of baseline water map
- ❖ Water use Monitoring and measurements using pressure and flow meters and various other devices
- ❖ Quantification of inefficiencies and leaks in the water system
- ❖ Quantification of water quality loads and discharges
- ❖ Quantification of variability in flows and quality parameters
- ❖ Strategies for water treatment and reuse or direct use
- ❖ Development of detailed water circuit diagram and water balance of the facility
- ❖ Mapping of water quality requirement to develop 'recycle' and 'reuse' opportunities
- ❖ Developing Water consumption and wastewater generation pattern
- ❖ Estimating Specific water use and conservation potential
- ❖ Develop & Maintain monthly MIS on water extracted from borewells, water level, water quality etc.
- ❖ Calculation of Rainwater Harvesting Potential for the site and assessment of the existing structures
- ❖ Evolving Water saving opportunities with method of implementing the proposal with
- ❖ Description and figures related to water management schemes
- ❖ Investment required for water saving schemes/Cost Benefit Analysis
- ❖ Submission of water audit report & its presentation at site (if required)
- ❖ Following opportunities would also be assessed for Industries for water conservation:
 - ❖ Setting up of for water budgeting
 - ❖ Modernization of industrial process to reduce water consumption
 - ❖ Recycling water with a re-circulating cooling system
 - ❖ Ozonation cooling water approach which can result in fivefold reduction in blow down when compared to traditional chemical treatment
 - ❖ Reduction in reuse of de-ionized water by eliminating some plenum flushes, converting from a continuous flow to an intermittent flow system and improving control on the use
 - ❖ Use of wastewater for gardening
 - ❖ Proper processing of effluents to adhere to the nor M/S of disposal

CHAPTER -3: METHODOLOGY OF THE WATER AUDIT STUDY

1. Methodology followed for conducting water audit study

Step 1: Reconnaissance or Walk-through survey

- ❖ Understanding of existing water sourcing, storage and distribution facility.
- ❖ Assessing the water demand and water consumption areas/processes.
- ❖ Preparation of detailed water circuit diagram.

Step 2: Secondary Data Collection through the Discussion with mines executives, past records, Available technical literature/specifications

- ❖ Analyse historic water use and wastewater generation
- ❖ Field measurements for estimating current water use
- ❖ Metered & unmetered supplies.
- ❖ understanding of “base” flow and usage trend at site
- ❖ Past Water Bills
- ❖ Wastewater Treatment scheme & costs etc.

Step 3: Site Water Audit Planning (based on site operations and practices)

- ❖ Preparation of water flow measurement plan to quantify water use at various locations
- ❖ Wastewater flow measurement and sampling plan
- ❖ Instruments availability like Ultrasonic Water Flow Meter, Doppler type Flow meter, Stop Watch, measuring cylinders, Power Analyser etc.

Step 4: Conduction of Detailed Water Audit & Measurements

- ❖ Conduction of field measurements to Quantify water/wastewater stream/S
- ❖ Power Measurement of Pumps/Motors
- ❖ Measurement of suction & discharge pressure at various pumps
- ❖ Wastewater sampling & analysis
- ❖ Preparation of Water Balance Diagram
- ❖ Establishing Water Consumption Pattern
- ❖ Evolving value added “cost of water” at various locations
- ❖ Detection of potential leaks & water losses in the system
- ❖ Assessment of productive and unproductive usage of water
- ❖ Determine key opportunities for water consumption reduction, reuse & recycle with paybacks

Step 5: Preparation of Water Audit Report with Sustainable Water Management Plan

- ❖ Documentation of collected & analysed Water Balancing and Measurement details
- ❖ Projects and procedures to maximize water savings and minimize/eliminate water losses
- ❖ Water Metering and Accounting System
- ❖ Opportunities for Water Conservation based on Reduce/ Recycle/ Reuse/ Regeneration/ Recharge options with Cost Benefit Analysis

Step 6: Water Audit Report Finalization and Submission

- ❖ Incorporation of required changes based on discussions with plant executives
- ❖ Preparation & submission of final report.

❖ Methodology Adopted for Performance Evaluation of Pumps

The Plant has installed number of pumps in various sections to transfer/ circulate the water for different applications. During the audit, flow measurements were conducted at various pumps and performance evaluation of all the major pumps were conducted to estimate their present operating efficiency & cost of pumping. The estimated efficiency is based on operating head, measured flow rate & power consumption of the pumps.

❖ Water Flow Measurement

The water flow measurement was conducted using transit time ultrasonic flow meter at the discharge side of the pumps or any suitable location. The step wise methodology is given below,

- ❖ A suitable location for measurement of flow rate was identified on discharge pipeline of the pump and initial pipe preparation was done by cleaning and filing of pipe at measurement location
- ❖ The circumference of pipe for calculating the external diameter was measured by inch tape and the pipe thickness was measured by digital thickness gauge or by measurement of spare pipe.
- ❖ The parameter like pipe diameter, type of pipe, water temperature, pipe thickness, roughness etc are input in the ultrasonic flow meter
- ❖ Based on above input values, the flow meter reflects the distance between the traducers to be positioned on the pipe while measuring the flow
- ❖ The traducers are placed on the surface of the pipe (filed surface) at the same distance given by flow meter
- ❖ The ultrasonic flow meter displays instantaneous values of water flow rate in m^3/hr . The average of these values may be considered as flow rate of water.

❖ Electrical Power Measurement

The instantaneous electrical power consumption of pumps was measured from the corresponding electrical panel by portable Fluke Make Power analyser by measurement of electrical parameters like voltage, current, power factor, power etc.

❖ Head Measurement

The discharge head of the pump was determined by noting installed pressure gauges at the pump discharge while the suction head was estimated by physical measurement of horizontal and vertical length of suction pipeline. The total operating head was calculated by addition of suction and discharge head.

❖ Efficiency Calculation

The operating efficiency of the pumps was based on measured flow, head & power drawn by pumps is calculated with the help of following formula:

$$\text{Efficiency, \%} = \frac{Q \text{ (m}^3\text{/Hr.)} \times H \text{ (m)} \times 9.81 \times \rho \text{ (kg/m}^3\text{)}}{1000 \times 3600 \times \text{Motor Input Power (kW)}}$$

Where,

Efficiency % = Efficiency of pump set i.e. (Combined efficiency of pump & motor)

Q = Measured Water Flow rate in m³/hr

P = density of water i.e., 1000 kg/m³

H = Total Head developed (m of water column), Discharge + Suction

kW = Actual power measured at motor input.

CHAPTER -4: ASSESSMENT OF PRESENT WATER USAGE

1. Water sourcing and major water use areas

Details of Source of Water: The main source of freshwater for the plant is 2 no. of bore well. The plant sources about 120 m³/day of freshwater from bore wells. The freshwater is mainly used for. Another source is recycled water from STP plant of about 15 m³/day & ETP plant of about 19 m³/day

No. of Borewells and location: The bore well is located near Truck Entry Gate and Wheel washing system the plant. The rated yield is 8 & 20 m³/hr. which concurred with the measurements done by FICCI team using ultrasonic flow meter. The water abstraction limit for bore well is 180 m³/day. The bore well have mechanical meter installed from which reading were taken manual and maintained in logbook.

Table 3: Details of bore well

Bore wells	Location of Bore-wells	Depth of Bore-well	Type of Pump (mono-block/ Submersible etc.)	Pump Rated Capacity (HP)	Rated yield (m ³ /hr)
Bore well 1	21°52'14.35" 85°11'02.85"	91mtr	submersible	2.0	8.0
Bore well 2	21°52'02.68" 85°10'51.88"	New Borewell			

The BGL of pre-monsoon and post-monsoon peizometric reading taken is given in the table given below:

Pre-monsoon readin in the month of May 2020

DATA	TIME	Ground Water Level (m)
01/05/2021	06.00 AM	28.59
	12.00 PM	28.92
	06.00 PM	27.35
	00.00 AM	28.89
02/05/2021	06.00 AM	27.88
	12.00 PM	28.79

	06.00 PM	28.35
	00.00 AM	28.86
03/05/2021	06.00 AM	28.89
	12.00 PM	28.96
	06.00 PM	27.98
	00.00 AM	27.45
04/05/2021	06.00 AM	27.83
	12.00 PM	28.41
	06.00 PM	28.61
	00.00 AM	27.50
05/05/2021	06.00 AM	27.99
	12.00 PM	27.2
	06.00 PM	28.17
	00.00 AM	27.12
06/05/2021	06.00 AM	27.40
	12.00 PM	28.05
	06.00 PM	27.10
	00.00 AM	28.35
07/05/2021	06.00 AM	27.88
	12.00 PM	28.72
	06.00 PM	28.37
	00.00 AM	27.84
08/05/2021	06.00 AM	28.37
	12.00 PM	27.13
	06.00 PM	27.45
	00.00 AM	28.11
09/05/2021	06.00 AM	28.25
	12.00 PM	28.40
	06.00 PM	28.14
	00.00 AM	28.82
10/05/2021	06.00 AM	28.16
	12.00 PM	27.63
	06.00 PM	27.84
	00.00 AM	28.92
11/05/2021	06.00 AM	28.01
	12.00 PM	27.19
	06.00 PM	28.17

	00.00 AM	27.92
12/05/2021	06.00 AM	27.65
	12.00 PM	28.98
	06.00 PM	27.32
	00.00 AM	28.86
13/05/2021	06.00 AM	28.12
	12.00 PM	28.33
	06.00 PM	27.43
	00.00 AM	28.65
14/05/2021	06.00 AM	27.78
	12.00 PM	28.43
	06.00 PM	28.92
	00.00 AM	28.54
15/05/2021	06.00 AM	28.65
	12.00 PM	28.45
	06.00 PM	28.76
	00.00 AM	28.34
16/05/2021	06.00 AM	27.88
	12.00 PM	28.72
	06.00 PM	28.37
	00.00 AM	28.84
17/05/2021	06.00 AM	27.55
	12.00 PM	27.79
	06.00 PM	27.82
	00.00 AM	28.72
18/05/2021	06.00 AM	27.88
	12.00 PM	27.73
	06.00 PM	27.52
	00.00 AM	28.15
19/05/2021	06.00 AM	28.29
	12.00 PM	28.17
	06.00 PM	28.33
	00.00 AM	27.48
20/05/2021	06.00 AM	27.66
	12.00 PM	28.23
	06.00 PM	28.99
	00.00 AM	27.65

21/05/2021	06.00 AM	27.61
	12.00 PM	28.20
	06.00 PM	28.76
	00.00 AM	27.58
22/05/2021	06.00 AM	27.53
	12.00 PM	28.97
	06.00 PM	28.79
	00.00 AM	27.59
23/05/2021	06.00 AM	27.01
	12.00 PM	28.30
	06.00 PM	27.21
	00.00 AM	28.01
24/05/2021	06.00 AM	27.10
	12.00 PM	28.20
	06.00 PM	28.95
	00.00 AM	27.75
25/05/2021	06.00 AM	28.29
	12.00 PM	28.17
	06.00 PM	28.33
	00.00 AM	28.48
26/05/2021	06.00 AM	27.76
	12.00 PM	28.54
	06.00 PM	28.42
	00.00 AM	27.12
27/05/2021	06.00 AM	27.42
	12.00 PM	28.91
	06.00 PM	28.54
	00.00 AM	27.49
28/05/2021	06.00 AM	27.31
	12.00 PM	28.94
	06.00 PM	28.54
	00.00 AM	27.89
29/05/2021	06.00 AM	28.25
	12.00 PM	28.40
	06.00 PM	28.14
	00.00 AM	28.82
29/05/2021	06.00 AM	28.19

	12.00 PM	28.17
	06.00 PM	28.19
	00.00 AM	28.11
30/05/2021	06.00 AM	28.02
	12.00 PM	27.81
	06.00 PM	27.67
	00.00 AM	28.26
31/05/2021	06.00 AM	28.22
	12.00 PM	28.01
	06.00 PM	28.03
	00.00 AM	28.11

Post-monsoon reading for the month of October 2020

DATA	TIME	Ground Water Level (m)
01/10/2021	06.00 AM	5.21
	12.00 PM	5.34
	06.00 PM	5.21
	00.00 AM	5.26
02/10/2021	06.00 AM	5.23
	12.00 PM	5.09
	06.00 PM	5.08
	00.00 AM	5.07
03/10/2021	06.00 AM	5.04
	12.00 PM	5.02
	06.00 PM	4.99
	00.00 AM	4.97
04/10/2021	06.00 AM	4.95
	12.00 PM	4.90
	06.00 PM	4.88
	00.00 AM	4.76
05/10/2021	06.00 AM	4.74
	12.00 PM	4.69
	06.00 PM	4.64
	00.00 AM	4.59

06/10/2021	06.00 AM	4.45
	12.00 PM	4.42
	06.00 PM	4.38
	00.00 AM	4.34
07/10/2021	06.00 AM	4.23
	12.00 PM	4.15
	06.00 PM	4.21
	00.00 AM	4.23
08/10/2021	06.00 AM	4.25
	12.00 PM	4.24
	06.00 PM	4.32
	00.00 AM	4.24
09/10/2021	06.00 AM	4.31
	12.00 PM	4.45
	06.00 PM	4.46
	00.00 AM	4.65
10/10/2021	06.00 AM	4.78
	12.00 PM	4.24
	06.00 PM	4.68
	00.00 AM	4.78
11/10/2021	06.00 AM	4.43
	12.00 PM	4.76
	06.00 PM	4.56
	00.00 AM	4.32
12/10/2021	06.00 AM	4.19
	12.00 PM	4.15
	06.00 PM	4.26
	00.00 AM	4.25
13/10/2021	06.00 AM	5.06
	12.00 PM	5.12
	06.00 PM	5.15
	00.00 AM	5.23
14/10/2021	06.00 AM	5.21
	12.00 PM	5.24
	06.00 PM	5.26
	00.00 AM	5.21
15/10/2021	06.00 AM	5.43
	12.00 PM	5.34

	06.00 PM	5.23
	00.00 AM	4.21
16/10/2021	06.00 AM	5.25
	12.00 PM	4.43
	06.00 PM	4.41
	00.00 AM	4.41
17/10/2021	06.00 AM	4.32
	12.00 PM	4.87
	06.00 PM	4.21
	00.00 AM	4.45
18/10/2021	06.00 AM	4.24
	12.00 PM	4.28
	06.00 PM	4.21
	00.00 AM	4.98
19/10/2021	06.00 AM	4.21
	12.00 PM	5.06
	06.00 PM	5.12
	00.00 AM	5.15
20/10/2021	06.00 AM	5.23
	12.00 PM	5.21
	06.00 PM	5.24
	00.00 AM	5.26
21/10/2021	06.00 AM	5.21
	12.00 PM	5.43
	06.00 PM	5.34
	00.00 AM	5.23
22/10/2021	06.00 AM	4.21
	12.00 PM	4.19
	06.00 PM	4.26
	00.00 AM	4.31
23/10/2021	06.00 AM	4.89
	12.00 PM	4.99
	06.00 PM	5.03
	00.00 AM	4.97
	06.00 AM	4.95
24/10/2021	12.00 PM	5.01
	06.00 PM	5.02
	00.00 AM	4.99

25/10/2021	06.00 AM	4.97
	12.00 PM	5.02
	06.00 PM	4.98
	00.00 AM	4.98
26/10/2021	06.00 AM	4.94
	12.00 PM	5.01
	06.00 PM	4.99
	00.00 AM	4.94
27/10/2021	06.00 AM	4.95
	12.00 PM	5.01
	06.00 PM	4.99
	00.00 AM	4.94
28/10/2021	06.00 AM	4.42
	12.00 PM	4.98
	06.00 PM	4.94
	00.00 AM	4.92
29/10/2021	06.00 AM	4.90
	12.00 PM	4.96
	06.00 PM	4.96
	00.00 AM	4.95
30/10/2021	06.00 AM	4.93
	12.00 PM	4.99
	06.00 PM	5.03
	00.00 AM	4.93
31/10/2021	06.00 AM	4.92
	12.00 PM	5.07
	06.00 PM	4.23
	00.00 AM	4.95

Picture 1: Photos of Bore well

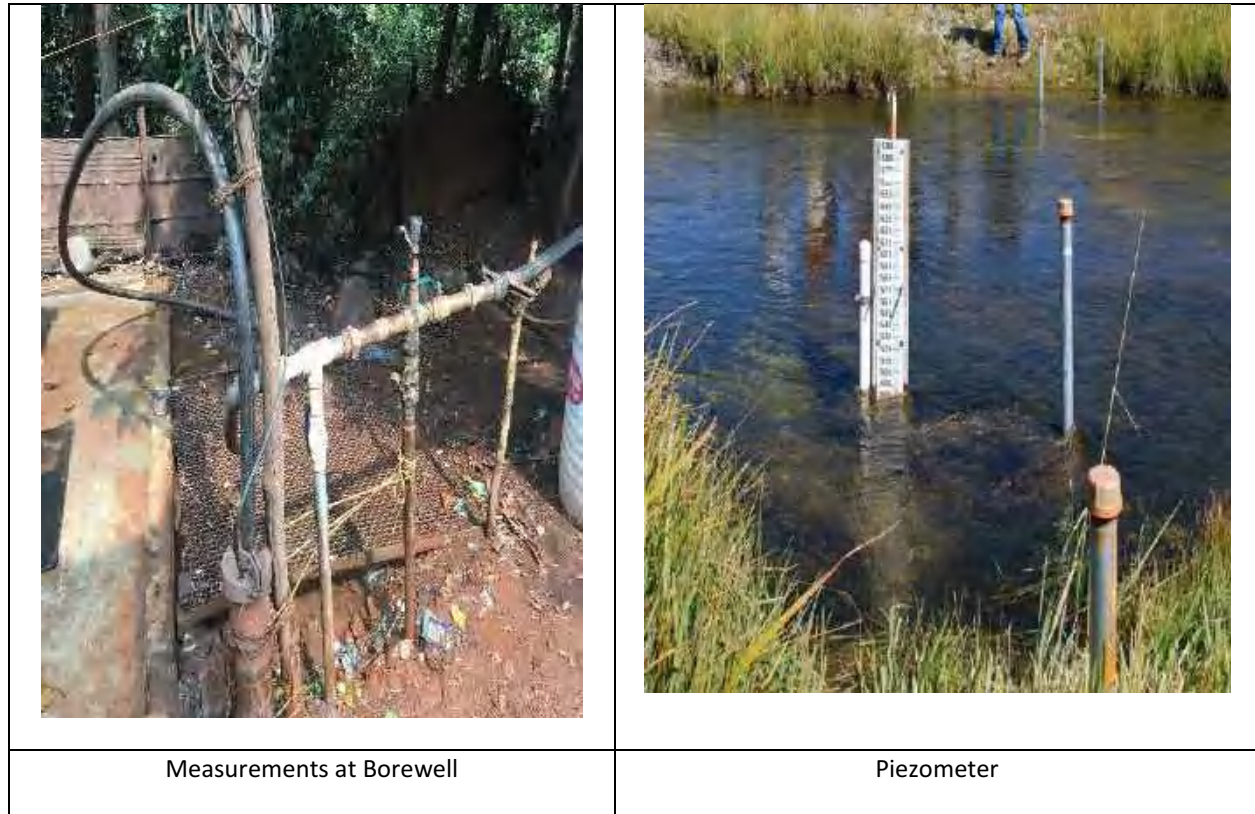


The Piezometer is used to measure pressure via the rise of fluid column. It is m deep and at a distance of more than m from the bore well.

Table 4: Details of piezometer wells (observation well)

Piezometer	Location of piezometer	Depth of piezometer	Distance from the existing bore well (meter)
1	21°52'16.70" 85°11'05.89"	20mtr	1.0mtr

Picture 2: Picture taken during measurements at bore well and picture of Piezometer



Apart from freshwater, the plant also uses STP treated water for horticulture and vehicle washing. Therefore, the total estimated water requirement of the mines is about 294.7 m³/day (freshwater, treated, and recycled water) in various sections of the mines as shown Below.

Table 5: Sources of water at the Mines

S.No.	Source of Water	m ³ /day	Water Quality
1	Bore well Water	180.0	Fresh water
2	Rain water harvesting pond	88.0	Fresh water
2	STP Treated water	13.7	Recycled
3	ETP Water	6.1	Recycled
		287.80	

Figure 1 : Sources of Water (Freshwater, treated water and recycled water)

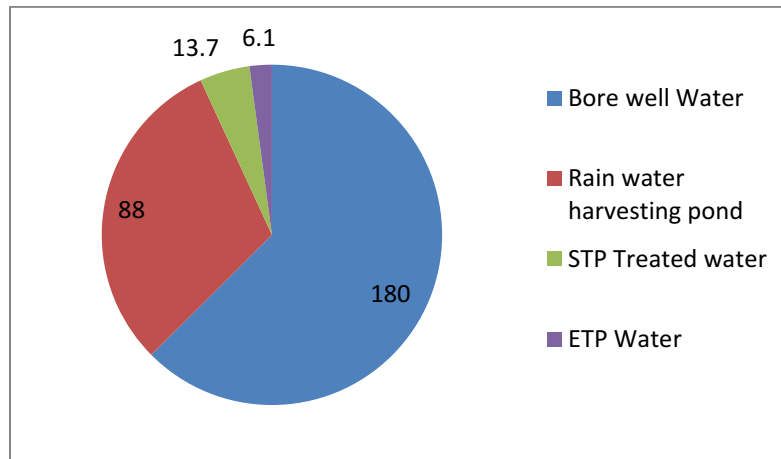
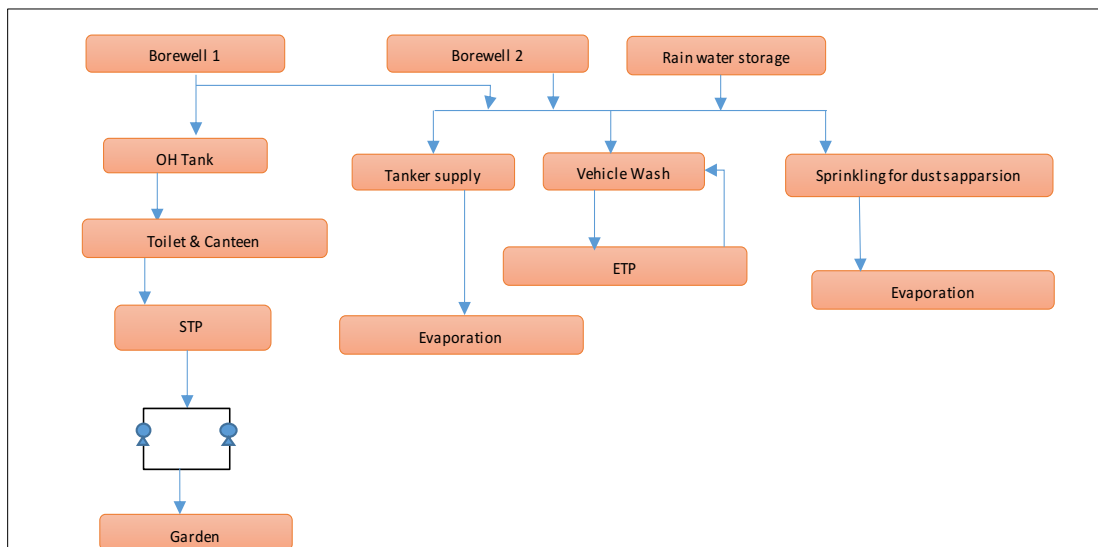


Table 6: Percentages of Freshwater and recycled water

S. No.	Major Sections	Wastewater discharged (m ³ /day)	Recycled/Discharge	M3/day
1	Domestic Use	24.50	Reused in Green Belt	8.2
2	Vehicle Wash	8.20	Reuse of Vehicle washing	0
	Total	32.70		8.2

Figure 2: Existing water circuit diagram of the plant



2. Bore well Water Quality

The plant regularly checks the water quality of the Groundwater.

Table 7: Groundwater quality report

Parameters for bore well water	Unit	Date of sample 07.04.2021	Date of sample 08.06.2021
TDS	mg/l	36	44
Iron	mg/l	<0.05	<0.05
Calcium	mg/l	6.4	8
Alkalinity	mg/l	31	34
Suspended Solids	mg/l	<0.4	<0.4
Fuloride	mg/l	<0.05	<0.05
Arsenic	mg/l	<0.001	<0.001

3. Water Distribution and water balance

During the opening meeting, On-site training and discussion with facility manager was conducted to explain to the plant officials about effective management of groundwater, purpose of water audit and basic guidelines of the CGWA notification.

As per the measurements conducted by FICCI team, water distribution and water balance were prepared for the plant.

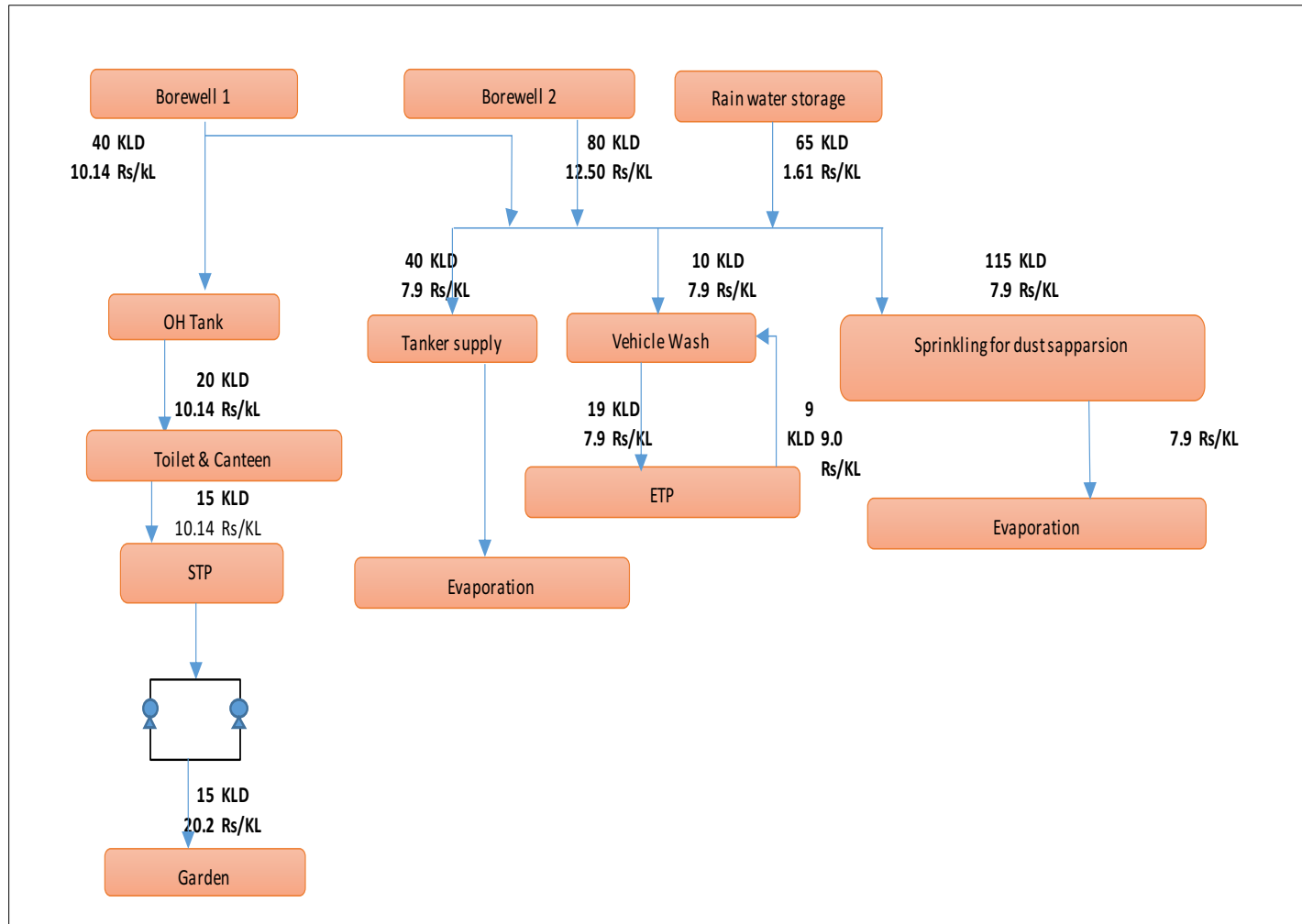
The plant abstracts about 120 m³/day of groundwater from 2 no. of bore wells. Instantaneous water flow was measured using ultrasonic flow meters. The measured flow of bore well is 8 & 20 m³/hr. The bore well has 3 HP motor that runs for about 5 & 4 hours daily. Abstracted bore well water is pumped to KL tank. The water from KL tank is pumped to water storage tank

Table 8: Water Storage Tanks in the Mines

Location	Storage Capacity
Near office	5000l

Raw water is pumped from bore well to KL tank. About total of 11 m³/day ground water is daily pumped into the system. Out of 180 m³/day of total water, 20m³/day is used for domestic applications like hand washing, drinking etc., 8.20 m³/day is used for Vehicle Washing, 211 m³/day of water is used in dust separation, 15m³/day is used for horticulture. All the wastewater from vehicle washing is drained to ETP. After treatment in ETP, treated water is stored and used for vehicle washing. Details of Storage tanks in different units of plant are mentioned in Figure 2.

Figure 2: depicts the existing water and wastewater balance diagram of Mines.



4. Water Metering System

There is one meters in the plant. All meters are mechanical flow meter. The meter readings are recorded regularly. Details of the meter are mentioned in the Table 9 below.

Table 9: Location of Identified Water Meters

Sr. No.	Meter Location	Type of Meter	Regularly recorded (Yes/No)	Calibrated (Yes/No)
2105400633	21°52'14.35" 85°11'02.85"	Digital Flow rate Indicator Totalizer	Yes	Yes

5. Water Use Baseline Data as provided by the Plant

The month-wise meter readings were provided by the plant for the quantity of water drawn from the bore wells. Table 10 below depicts the Total groundwater intakes for FY 2020-2021

Table 10: Monthly water abstraction from bore wells (FY 2020-21)

(m ³ /month)	Bore well Water withdrawn
20-Apr	5400
20-May	5580
20-Jun	5400
20-Jul	4495
20-Aug	4495
20-Sep	5400
20-Oct	5580
20-Nov	5400
20-Dec	5580
21-Jan	5580
21-Feb	5520
21-Mar	5580

6. Water Costing

Water and wastewater cost at plant includes water cess, cost of pumping, cost of raw water treatment, cost of STPR and Cost of ETP. **The actual weighted average cost of abstraction bore well water is estimated to be Rs 1 /m³, cost of Bore well Pumping water supply is Rs 1.86/m³, and the cost of STP is estimated to be about Rs 3.55/m³ and the cost of ETP treatment is about Rs 6.10/m³, as discussed below.** The water and wastewater costing for various user points is shown in Figure 3.

1. Cost of abstraction of Bore well Water

Rates of ground water abstraction charges for other industries and infrastructure projects in safe, semi-critical and critical assessment units is given in table below. Since the M/S GEETARANI MOHANTY RAIKELA MINES Odisha , is in and NOC limit for water abstraction is $180 \text{ m}^3/\text{day}$, which is under range of $< 200 \text{ m}^3/\text{day}$, therefore the cost of groundwater abstraction is **Rs 1/ m^3 as per Table 11** .

Table 11: Cost of bore well water abstraction

S. No.	Category of area Ground water use	Quantum of ground water withdrawal			
		$< 200 \text{ m}^3/\text{day}$	200 to $<1000 \text{ m}^3/\text{day}$	1000 to $<5000 \text{ m}^3/\text{day}$	$5000 \text{ m}^3/\text{day}$ and above
1.	Safe	1.00	2.00	3.00	5.00
2.	Semi-critical	2.00	3.00	5.00	8.00
3.	Critical	4.00	6.00	8.00	10.00

2. Pumping cost-energy

Flow measurements were made during the field study. The Transit time ultrasonic flow meter was used for water flow measurements. Table 12 below summarises the water flow measurements at Pump discharge line. Apart from pump discharges, power measurements including voltage, current and power factor etc were taken. Using the measured data for the pumps, the actual pumping costs are calculated for various pumps. Total cost of pumping is Rs 192990/Annum.

Table 12: Cost of pumping system at M/S GEETARANI MOHANTY RAIKELA MINES

S. No	Pump name	Total Flow	Power Consumption	Sp. Power	Cost of Pumping	Daily Run hours	Daily flow	Daily Pumping Cost	Total Annual Cost
				Consumption					
	Electricity Charges @ 6.50 Rs/kWh	m ³ /h	kW	kWh/m ³	Rs/m ³	h/day	m ³ /day	Rs/day	Rs/yr
1	Bore well Pump no.1	8.00	1.10	0.14	0.86	5.0	40.00	34	10725
2	Bore well Pump no.2	20.00	8.00	0.40	2.50	4.0	80.00	200	62400
3	STP Pump and Blower	2.50	2.40	0.96	6.00	6	15.00	90	34164
4	Rain water Harvesting Pump	12.40	3.20	0.26	1.61	6	68.20	110	41756
								434	149045

3. Cost of Treatment

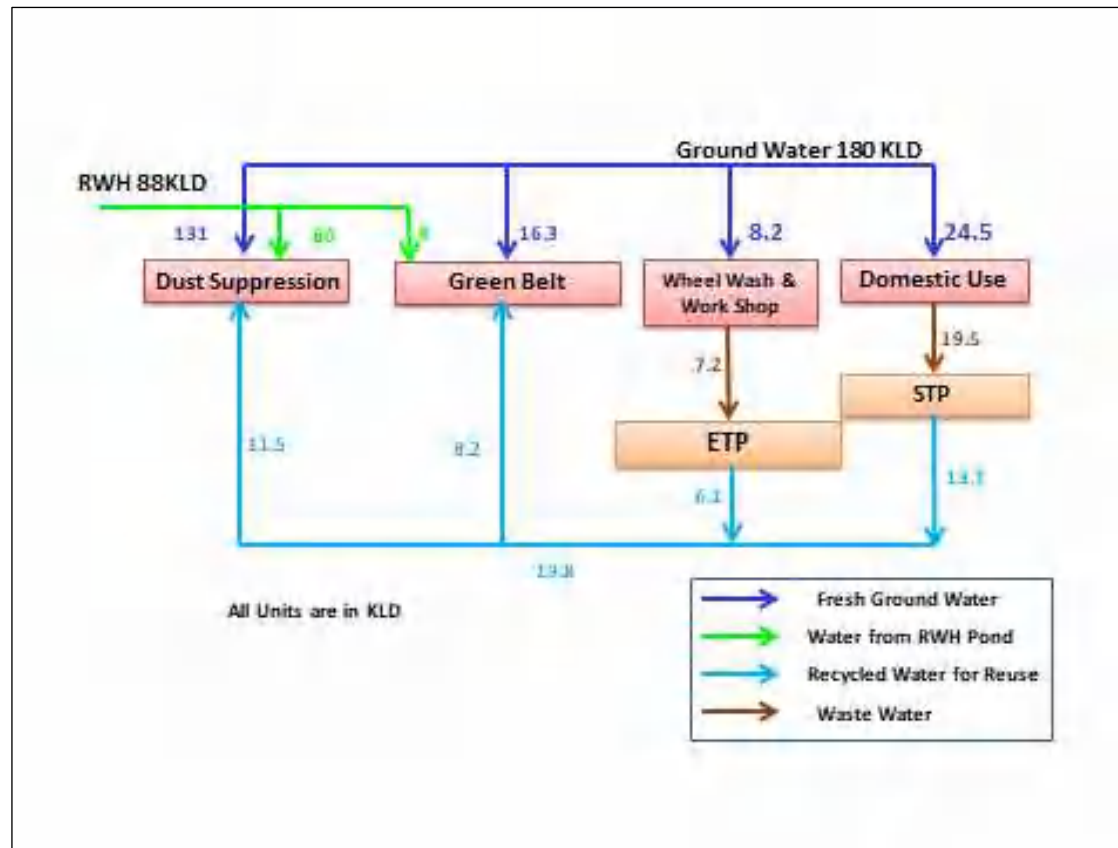
Cost of STP Treated Water

About 15 m³/year water is treated daily at the Effluent treatment Plant. The cost of chemical treatment at ETP is Rs 3.55/m³ and Electrical Cost is Rs 6.50/m³. The total cost of ETP Treated water is Rs 10.05/m³ as shown in table below

Table 13: Cost of STP treated water

	STP			
Average Quantity of treated water (m ³ /day)	15			
Chemical Cost				
Name of Chemical/s	Quantity kg/month	Rate Rs/Kg	Rs/month	Rs/day
Chlorine	45	18	810	29
Total Chemical Cost (Rs/Day)				53
Total Cost of chemical treatment (Rs/m³)				3.55
Electricity Cost				
Power Consumption (Units/day)				15.0
Specific Power Consumption (kWh/m ³)				1.00
Cost per unit (Rs/kWh)				6.5
Electrical cost (Rs/day)				98
Electrical cost (Rs/m ³)				6.50
Total Cost of treatment (Rs/m³)				10.05
Total Cost of treatment (Rs/day)				151

Figure 3: Existing water cost at user location accounting water pumping and treatment cost at Mines



7. Annual Water & Wastewater Management Cost of the Plant

The total annual water and wastewater cost is calculated by the sum of Total Water abstracted, Total Pumping cost and Total Water and Wastewater Treatment cost as mentioned in the previous part. The total annual water cost for plant as shown below in Table 14.

Table 14: Total Annual Water Cost of M/S GEETARANI MOHANTY RAIKELA MINES

S. No.			Total cost	Total Annual Cost	Water Consumption
		Rs/m ³	(Rs/day)	(Rs/year)	(m ³ /day)
1	Cost of Bore well abstraction	1.00	120	39600	120.0
2	Pumping Cost			114881	
	Energy	1.86	344	114881	185
4	Wastewater Treatment			62116	
	STP				
	Cost of chemical treatment at STP	3.55	53	19411	
	Cost of Electrical treatment at STP	6.50	98	35588	15
	ETP				
	Cost of Electrical Treatment	1.03	20	7118	19
	Total Water Cost			2,16,597	

CHAPTER -5: WATER & WASTEWATER TREATMENT & RECYCLING PRACTICES

The plant has installed the following water and wastewater treatment systems for treating the incoming freshwater:

❖ STP

STP Plant- SEWAGE WATER TREATMENT

Plant treats Domestic Sewage in well-designed existing sewage treatment plants (Total Capacity 15 KLD).

In STP there are three major input from plant labour Toilet etc. as per data observation. Average operation of 15 KLD water is treated and bank to gardening. The Description installed STP is given below.

The term treatment means separation of solids and stabilisation of pollutants. In turn stabilisation means the degradation of organic matter until the point at which chemical or biological reactions stop. COD (Chemical Oxygen Demand) is said to be the most general parameter to measure organic pollution. COD describes how much oxygen is required to oxidise all organic and inorganic matter found in the wastewater sample. BOD (Biological Oxygen Demand) describes what can be oxidised biologically, with the help of bacteria and is always a fraction of COD. Usually, BOD is measured as BOD meaning that it describes the amount of oxygen consumed over a five-day measurement period. It is a direct measurement of the amount of oxygen consumed by organisms removing the organic matter in the waste. SS (Suspended Solids) describes how much of the organic or inorganic matter is not dissolved in water and contains settle able solids that sink to the bottom in a short time and non-settle able suspended solids. It is an important parameter because SS causes turbidity in the water causing clogging of filters.

Input –Output Parameters Details of Sewage Treatment

Parameters for STP outlet water	Unit	Date of sample 08.06.2021
COD	mg/l	40
BOD	mg/l	10
TSS	mg/l	28
Oil & Grease	mg/l	<0.1
pH	mg/l	6.7
TDS	mg/l	380

ETP Plant - Effluent Treatment Plant

The ETP consists of primary treatment, physio-chemical treatment , tertiary treatment further description is bar screen chamber, oil and grease trap, collection cum equalization tank, effluent lift pumps, reaction, coagulation and flocculation tank, chemical dosing for reaction tank and flocculation, primary tube settler, aeration tank, membrane bio reactor, centrifuge and centrifuge feed pump. During manufacturing process of EO/EG, effluent gets generated from the process in the Plant.

Effluent Characteristics:

S.NO	PARAMETERS	CHARACTERISTICS	UNITS
1.	pH	6.5 – 8.5	-
2.	BOD 5	<10	mg/l
3.	COD	<50	mg/l
4.	TSS	<5	mg/l
5.	Oil & Grease	Nil	mg/l
6.	TDS	<1300	mg/l

EFFLUENT TREATMENT PLANT The term treatment means separation of solids and stabilization of pollutants. In turn stabilization means the degradation of organic matter until the point at which chemical or biological reactions stop. COD (Chemical Oxygen Demand) is said to be the most general parameter to measure organic pollution. COD describes how much oxygen is required to oxidize all organic and inorganic matter found in the wastewater sample. BOD (Biological Oxygen Demand) describes what can be oxidized biologically, with the help of bacteria and is always a fraction of COD. Usually BOD is measured as BOD5 meaning that it describes the amount of oxygen consumed over a five-day measurement period. It is a direct measurement of the amount of oxygen consumed by organisms removing the organic matter in the waste. SS (Suspended Solids) describes how much of the organic or inorganic matter is not dissolved in water and contains settle able solids that sink to the bottom in a short time and non-settle able suspended solids. It is an important parameter because SS causes turbidity in the water causing clogging of filters.

CLASSIFICATION OF EFFLUENT WATER TREATMENT

Effluent treatment options may be classified into groups of processes according to the function they perform and their complexity:

Primary Treatment – includes simple processes that deal with debris and solid material. The purpose of preliminary treatment is to remove the big size particles. This is usually performed by screening (usually by bar screens) and grit removal. Their removal is important in order to increase the effectiveness of the later treatment processes and prevent damages to the pipes, pumps and fittings.

Physio-chemical Treatment– In Physio-chemical Treatment, first increase the pH up to 9 by lime dosing then add Ferric Chloride & poly electrolyte into Reaction Tank, Coagulation Tank & Flocculation has been

generate by slow mixing into Flocculator. Outlet of Flocculator feed to Primary Tube Settling Tank to remove suspended solids.

Tertiary treatment – is the polishing process whereby treated effluent is further purified to acceptable levels for discharge. It is usually for the removal of specific pollutants e.g. remaining suspended solid, colour and order for the Effluent. Tertiary treatment processes are generally specialized processes.

UNIT DESCRIPTION

BAR SCREEN CHAMBER

The function of the bar screen is to prevent entry of solid particles above a certain size: such as plastic cups, paper dishes, polythene bags, ETC into the ETP. (If these items are allowed to enter the ETP, they clog and damage the ETP pumps, and cause stoppage of the plant.) The screening is achieved by placing a screen made out of vertical bars, placed across the Effluent flow. The gaps between the bars may vary between 10 and 25 mm. ETPs may have two screens: A coarse bar screen with larger gaps between bars, followed by a fine bar screen with smaller gaps between bars. If this unit is left unattended for long periods of time, it will generate a significant amount of odour: it will also result in backing of Effluent in the incoming pipelines and chambers.

OIL AND GREASE TRAP

The oil and grease trap is placed before EQT to arrest solid and fatty matter at source or it is placed after screen chamber so as prevent the fatty matter to enter Equalization chamber. The wastewater output from this unit is taken to the equalization tank. The solids and fats that are separated in this unit are disposed off along with other biodegradable waste, and can be used as feed for piggeries.

COLLECTION CUM EQUALIZATION TANK

The EFFLUENT from the bar screen chamber and oil, grease and grit trap comes to the equalization tank. The equalization tank is the first collection tank in an ETP. Its main function is to act as buffer: To collect the incoming raw Effluent that comes at widely. Equalization tank is used only for buffering the daily fluctuations in the Effluent flow quantity. The equalization tank must be of sufficient capacity to hold the peak time inflow volumes. Equalization tank with a capacity to hold 4-6 hours of average hourly flow should be adequate.

EFFLUENT LIFT PUMPS

EFFLUENT transfer pump is use to lift Effluent from equalization tank to anoxic chamber. It typical pair of pumps (working and standby). The pumping rate can be set at a calibrated uniform flow, so that downstream units are not affected by fluctuating flows. These pumps are submersible pump submersed into the equalization tank.

REACTION, COAGULATION AND FLOCCULATION TANK

It is a chemical water treatment technique typically applied prior to sedimentation and filtration (e.g. rapid sand filtration) to enhance the ability of a treatment process to remove particles. Coagulation is a process used to neutralize charges and form a gelatinous mass to trap (or bridge) particles thus forming a mass large enough to settle or be trapped in the filter. Flocculation is gentle stirring or agitation to encourage the particles thus formed to agglomerate into masses large enough to settle or be filtered from solution.

CHEMICAL DOSING FOR REACTION TANK AND FLOCCULATION

Chemical dosing of Lime, Ferric Chloride & Poly in Reaction, Coagulation and flocculation tank are generally for the chemical treatment. Lime is used to increase the pH in the ETP for the further process and post coagulation and for clarity of water. Ferric Chloride is used as coagulant for much industrial and sanitary waste water treatment application. Due to its high efficiency, effectiveness in clarification, and utility as a sludge dewatering agent. The chemical leaves no residual colour, offers very good turbidity removal. Poly-aluminium chloride is used as a flocculent by which fine particulates are caused to clump together into a floc & increase the sludge water separation. The floc may then float to the top of the liquid (creaming), settle to the bottom of the liquid (sedimentation), or be readily filtered from the liquid.

PRIMARY TUBE SETTLER

Primary tube settler is incorporated before the biological process to settle down the agglomerate form after coagulation and flocculation process purpose and function of the clarifier is threefold: Allow settling of biomass solids in the Mixed Liquor coming out of the flocculation, to the bottom of the clarifier to thicken the settled biomass, in order to produce a thick underflow To produce clear supernatant water, in the overflow from the clarifier feed to Aeration Tank. All the above actions occur due to gravity. The thick biomass is re-circulated back to the aeration tank.

AERATION TANK

Aeration brings water and air in close contact in order to remove dissolved gases (such as carbon dioxide) and oxidizes dissolved metals such as iron, hydrogen sulphide, and volatile organic chemicals (VOCs). Aeration is often the first major process at the treatment plant. During aeration, constituents are removed or modified before they can interfere with the treatment processes.

Aeration brings water and air in close contact by exposing drops or thin sheets of water to the air or by introducing small bubbles of air (the smaller the bubble, the better) and letting them rise through the water. The scrubbing process caused by the turbulence of aeration physically removes dissolved gases from solution and allows them to escape into the surrounding air. Aeration also helps remove dissolved metals through oxidation, the chemical combination of oxygen from the air with certain undesirable

metals in the water. Once oxidized, these chemicals fall out of solution and become particles in the water and can be removed by filtration or flotation.

MEMBRANE BIO REACTOR

The Membrane Bio Reactor Technology is the most advanced development in the field of biological treatment providing treated wastewater for recycling in smaller footprint and under stringent discharge norms.

Tertiary treatment consists of Membrane Bioreactor. The Sewage after the Collection Sump enters into the Anoxic Chamber where it overflow further to Aeration tank for biological Treatment and further over flow to MBR basin. Hollow Fiber membranes are introduced to mixed liquor to separate treated sewage from mixed liquor. Membrane being the absolute physical barriers ensures complete removal of suspended impurities. MBR applications include even retrofits of existing systems as well as installation of new systems, for both meeting the most stringent discharge norms and reuse. Treated wastewater from MBR can be even reused for cooling tower make-up, to generate high purity water through Reverse Osmosis and other non-potable applications. This process can help environment protection by treating wastewater and making it suitable for variety of application and thus conserve precious drinking water. Biological system designed for MBR process operates at higher MLVSS concentration with higher sludge retention time thus produces a low quantum of biological sludge thus reducing the sludge dewatering cost.

MBR technology combines the skills of our membrane specialists to deliver integrated treatment solutions with firm process guarantees such as BOD and TSS less than 5 mg/l and also removal of nutrient (nitrogen & phosphorous) and coliforms etc.

Biological process fluid (mixed liquor) is pumped/Overflow to the Membrane Operating System ("MOS"). The mixed liquor is introduced to membrane, along with air, evenly across the bottom of the tank through a unique two-phase jet system. This mixed liquor fills the membrane tank and flows upward through the membrane sub modules, creating cross-flow dynamics across the membrane surface. This cross- flow continuously scours the membrane surface and prevents solids dehydration at the membrane surface. Applying a low-pressure vacuum to the inside of the membrane fiber pulls water through the membranes and pumps the filtered water to the next process step. Solids, including organics, bacteria, and most viruses, are rejected by the membrane system and retained in the mixed liquor, which overflows the MOS back to the aeration tank.

The Membrane Operating System is an assembly with integral membrane modules arranged in rack assemblies, inserted into the membrane tank.

MOS Mixed Liquor Distribution & Recirculation Jets are designed to distribute the air scour and mixed liquor flow evenly across the membrane sub modules. This feature eliminates potential polarization

(concentration) of suspended solids around the membrane fibers which could be main cause for the failure and damage of individual fibers thus sub modules. Additionally, this feature provides even distribution of mixed liquor solids to each membrane unit, critical so that all membranes see the same process conditions. The return recirculation of mixed liquor ensures influent comes in intimate contact with the concentrated biomass, offering better organism selection and added flexibility in the anoxic cycle for advanced nitrogen removal, when required. This same jet system also acts as an integral part of the membrane cleaning system, providing an efficient scouring of the membranes with chlorine cleaning solution. The integrated cleaning system allows the sub modules to be quickly cleaned in place. Additionally, the clean and efficient procedure eliminates the need for membrane removal from process tanks that can damage membranes and present risks to plant-operators. Relaxation, Maintenance and in site CIP are exclusive features of this MBR Process to ensure consistent water quality and complete membrane life. The entire operation is PLC controlled.

CENTRIFUGE AND CENTRIFUGE FEED PUMP

Biological treatment of wastewater performs produces excess biological solids due to the growth and multiplication of bacteria and other microorganisms in the system. The excess biomass thus produced needs to be bled out of the system, and disposed off efficiently. This is a five-step process: sludge removal, storage, conditioning, dewatering and disposal. Sludge is removed (“bled”) from the system from the sludge recirculation pipeline (through a branch). The sludge is in the form of thick slurry. It is taken into a sludge-holding tank, and kept under aeration (to prevent the living organisms from putrefying) until dewatering operations can be carried out. Before dewatering, polymer or other chemicals may be added for conditioning the sludge, to facilitate the process. Sludge is then dewatered in a Centrifuge.

It consists of three to four parts: Sludge-holding tank with aeration. Centrifuge Feed Pump are used to feed sludge from the sludge holding tank to Centrifuge to dewatering the sludge and convert it into the dry sludge cake.

CHAPTER -6: DATA ANALYSIS & RESULTS

1. Water Consumptive Units and Waste water Mapping

Water consumption pattern

The water consumption pattern shows that out of total water (287.80 m³/day). The water utilization areas are mentioned below in Table 15

Table 15: Water Utilization Scenario at the plant

Key Water Usage Section	Quantity Used (m ³ /day)
Domestic Use	24.50
Vehicle Washing	8.20
Dust separation	211
Horticulture	24.50
Total	287.80

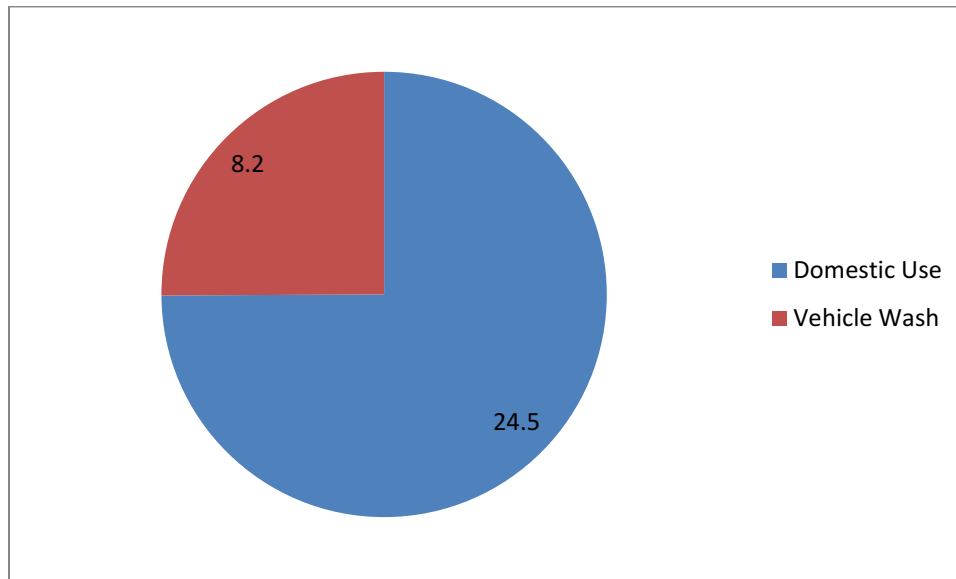
1. Wastewater generation and mapping

The total wastewater generation in the plant is about 34 m³/day, out of which about 44% is generated by domestic use; 56% is generated by process use as given in Table 16 and

Table 16 : Major Wastewater generating areas

S. No.	Major Sections	Wastewater discharged (m ³ /day)	Recycled/Discharge	M3/day
1	Domestic Use	24.50	Reused in Green Belt	8.2
2	Vehicle Wash	8.20	Reuse of Vehicle washing	0
	Total	32.70		8.2

Figure 4: Percentage of wastewater generation



2. Specific Water Consumption in term of Water Use Ratio (WUR) of the Mines

Table 17: Specific Water Consumption - FY 2020-21

Annual Production	Annual Fresh Water Usage	Specific Water Consumption (M3 water/ Ton of product)
3587988	64010	17.84

CHAPTER -7: WATER CONSERVATION OPPORTUNITIES WITH COST BENEFIT ANALYSIS

1. Regularly calibrate & maintain existing water flow meters

The plant has installed water meters at various important locations including bore wells. It is suggested to periodically calibrate the meters and maintain them.

Table 18: List of piezo meters installed in the Raikela Iron ore Mines, M/S GEETARANI MOHANTY

Sr. No.	Meter Location	Type of Meter	Regularly recorded (Yes/No)	Calibrated (Yes/No)
1	21°52'14.35" 85°11'02.85"	Piezometer	Yes	Yes

2. Maintain logbook of daily groundwater abstraction

The plant is suggested to record the water abstraction data, maintain logbook of daily groundwater abstraction and submit the data to CGWA periodically. The following format may be used for maintaining and recording the meter data on daily basis:

Table 19: logbook for water meters

The BGL of pre-monsoon and post-monsoon peizometric reading taken is given in the table given below:

Pre-monsoon readin in the month of May 2020

DATA	TIME	Ground Water Level (m)
01/05/2021	06.00 AM	28.59
	12.00 PM	28.92
	06.00 PM	27.35
	00.00 AM	28.89
02/05/2021	06.00 AM	27.88
	12.00 PM	28.79
	06.00 PM	28.35
	00.00 AM	28.86
03/05/2021	06.00 AM	28.89
	12.00 PM	28.96
	06.00 PM	27.98
	00.00 AM	27.45
04/05/2021	06.00 AM	27.83
	12.00 PM	28.41

	06.00 PM	28.61
	00.00 AM	27.50
05/05/2021	06.00 AM	27.99
	12.00 PM	27.2
	06.00 PM	28.17
	00.00 AM	27.12
06/05/2021	06.00 AM	27.40
	12.00 PM	28.05
	06.00 PM	27.10
	00.00 AM	28.35
07/05/2021	06.00 AM	27.88
	12.00 PM	28.72
	06.00 PM	28.37
	00.00 AM	27.84
08/05/2021	06.00 AM	28.37
	12.00 PM	27.13
	06.00 PM	27.45
	00.00 AM	28.11
09/05/2021	06.00 AM	28.25
	12.00 PM	28.40
	06.00 PM	28.14
	00.00 AM	28.82
10/05/2021	06.00 AM	28.16
	12.00 PM	27.63
	06.00 PM	27.84
	00.00 AM	28.92
11/05/2021	06.00 AM	28.01
	12.00 PM	27.19
	06.00 PM	28.17
	00.00 AM	27.92
12/05/2021	06.00 AM	27.65
	12.00 PM	28.98
	06.00 PM	27.32
	00.00 AM	28.86
13/05/2021	06.00 AM	28.12
	12.00 PM	28.33
	06.00 PM	27.43

	00.00 AM	28.65
14/05/2021	06.00 AM	27.78
	12.00 PM	28.43
	06.00 PM	28.92
	00.00 AM	28.54
	06.00 AM	28.65
15/05/2021	12.00 PM	28.45
	06.00 PM	28.76
	00.00 AM	28.34
	06.00 AM	27.88
16/05/2021	12.00 PM	28.72
	06.00 PM	28.37
	00.00 AM	28.84
	06.00 AM	27.55
17/05/2021	12.00 PM	27.79
	06.00 PM	27.82
	00.00 AM	28.72
	06.00 AM	27.88
18/05/2021	12.00 PM	27.73
	06.00 PM	27.52
	00.00 AM	28.15
	06.00 AM	28.29
19/05/2021	12.00 PM	28.17
	06.00 PM	28.33
	00.00 AM	27.48
	06.00 AM	27.66
20/05/2021	12.00 PM	28.23
	06.00 PM	28.99
	00.00 AM	27.65
	06.00 AM	27.61
21/05/2021	12.00 PM	28.20
	06.00 PM	28.76
	00.00 AM	27.58
	06.00 AM	27.53
22/05/2021	12.00 PM	28.97
	06.00 PM	28.79
	00.00 AM	27.59
	06.00 AM	

23/05/2021	06.00 AM	27.01
	12.00 PM	28.30
	06.00 PM	27.21
	00.00 AM	28.01
24/05/2021	06.00 AM	27.10
	12.00 PM	28.20
	06.00 PM	28.95
	00.00 AM	27.75
25/05/2021	06.00 AM	28.29
	12.00 PM	28.17
	06.00 PM	28.33
	00.00 AM	28.48
26/05/2021	06.00 AM	27.76
	12.00 PM	28.54
	06.00 PM	28.42
	00.00 AM	27.12
27/05/2021	06.00 AM	27.42
	12.00 PM	28.91
	06.00 PM	28.54
	00.00 AM	27.49
28/05/2021	06.00 AM	27.31
	12.00 PM	28.94
	06.00 PM	28.54
	00.00 AM	27.89
29/05/2021	06.00 AM	28.25
	12.00 PM	28.40
	06.00 PM	28.14
	00.00 AM	28.82
29/05/2021	06.00 AM	28.19
	12.00 PM	28.17
	06.00 PM	28.19
	00.00 AM	28.11
30/05/2021	06.00 AM	28.02
	12.00 PM	27.81
	06.00 PM	27.67
	00.00 AM	28.26
31/05/2021	06.00 AM	28.22
	12.00 PM	28.01
	06.00 PM	28.03
	00.00 AM	28.11

Post-monsoon reading for the month of October 2020

DATA	TIME	Ground Water Level (m)
01/10/2021	06.00 AM	5.21
	12.00 PM	5.34
	06.00 PM	5.21
	00.00 AM	5.26
02/10/2021	06.00 AM	5.23
	12.00 PM	5.09
	06.00 PM	5.08
	00.00 AM	5.07
03/10/2021	06.00 AM	5.04
	12.00 PM	5.02
	06.00 PM	4.99
	00.00 AM	4.97
04/10/2021	06.00 AM	4.95
	12.00 PM	4.90
	06.00 PM	4.88
	00.00 AM	4.76
05/10/2021	06.00 AM	4.74
	12.00 PM	4.69
	06.00 PM	4.64
	00.00 AM	4.59
06/10/2021	06.00 AM	4.45
	12.00 PM	4.42
	06.00 PM	4.38
	00.00 AM	4.34
07/10/2021	06.00 AM	4.23
	12.00 PM	4.15
	06.00 PM	4.21
	00.00 AM	4.23
08/10/2021	06.00 AM	4.25
	12.00 PM	4.24
	06.00 PM	4.32
	00.00 AM	4.24

09/10/2021	06.00 AM	4.31
	12.00 PM	4.45
	06.00 PM	4.46
	00.00 AM	4.65
10/10/2021	06.00 AM	4.78
	12.00 PM	4.24
	06.00 PM	4.68
	00.00 AM	4.78
11/10/2021	06.00 AM	4.43
	12.00 PM	4.76
	06.00 PM	4.56
	00.00 AM	4.32
12/10/2021	06.00 AM	4.19
	12.00 PM	4.15
	06.00 PM	4.26
	00.00 AM	4.25
13/10/2021	06.00 AM	5.06
	12.00 PM	5.12
	06.00 PM	5.15
	00.00 AM	5.23
14/10/2021	06.00 AM	5.21
	12.00 PM	5.24
	06.00 PM	5.26
	00.00 AM	5.21
15/10/2021	06.00 AM	5.43
	12.00 PM	5.34
	06.00 PM	5.23
	00.00 AM	4.21
16/10/2021	06.00 AM	5.25
	12.00 PM	4.43
	06.00 PM	4.41
	00.00 AM	4.41
17/10/2021	06.00 AM	4.32
	12.00 PM	4.87
	06.00 PM	4.21
	00.00 AM	4.45
18/10/2021	06.00 AM	4.24
	12.00 PM	4.28

	06.00 PM	4.21
	00.00 AM	4,98
19/10/2021	06.00 AM	4.21
	12.00 PM	5.06
	06.00 PM	5.12
	00.00 AM	5.15
20/10/2021	06.00 AM	5.23
	12.00 PM	5.21
	06.00 PM	5.24
	00.00 AM	5.26
21/10/2021	06.00 AM	5.21
	12.00 PM	5.43
	06.00 PM	5.34
	00.00 AM	5.23
22/10/2021	06.00 AM	4.21
	12.00 PM	4.19
	06.00 PM	4.26
	00.00 AM	4.31
23/10/2021	06.00 AM	4.89
	12.00 PM	4.99
	06.00 PM	5.03
	00.00 AM	4.97
	06.00 AM	4.95
24/10/2021	12.00 PM	5.01
	06.00 PM	5.02
	00.00 AM	4.99
25/10/2021	06.00 AM	4.97
	12.00 PM	5.02
	06.00 PM	4.98
	00.00 AM	4.98
26/10/2021	06.00 AM	4.94
	12.00 PM	5.01
	06.00 PM	4.99
	00.00 AM	4.94
27/10/2021	06.00 AM	4.95
	12.00 PM	5.01
	06.00 PM	4.99
	00.00 AM	4.94

28/10/2021	06.00 AM	4.42
	12.00 PM	4.98
	06.00 PM	4.94
	00.00 AM	4.92
29/10/2021	06.00 AM	4.90
	12.00 PM	4.96
	06.00 PM	4.96
	00.00 AM	4.95
30/10/2021	06.00 AM	4.93
	12.00 PM	4.99
	06.00 PM	5.03
	00.00 AM	4.93
31/10/2021	06.00 AM	4.92
	12.00 PM	5.07
	06.00 PM	4.23
	00.00 AM	4.95

3. Regular ground water quality monitoring and submission of data to CGWA:

The plant is regularly monitoring the groundwater quality of existing bore wells from a NABL accredited laboratory or Govt. approved laboratory. It is required that the plant shall monitor quality of ground water from the abstraction structure(s) once in a year. Water samples from bore wells shall be collected during April/May every year and analysed in NABL accredited laboratories for basic parameters (cations and anions), heavy metals, pesticides/ organic compounds etc. It is also suggested that the Water quality data shall be made available to CGWA through the web portal.

4. Training and awareness of the employees at all levels and placing 'water saving' posters/slogans at various locations:

It is suggested that the plant employees at all levels should be made aware and trained on 'Water Saving & Conservation' and 'Good Housekeeping Practices'. Therefore, it is recommended to periodically organize Awareness Program for office employees including shop floor workers on Water Conservation. It is also suggested that prominent water saving labels/posters should be placed/located in the plant at noticeable locations like process area; near hand washing taps; washroom, reception office etc. This will create awareness & sense of responsibility among staff/employees/visitors.

5. Periodically conduct 'water & wastewater audit'

The plant should periodically conduct 'Water & Wastewater Audits' to assess the efficiency of water usage in processes; reduce water losses in the system and optimize costs & energy consumption. A detailed 'Water & Wastewater Audit' should be done at least once in 2-3 year or as per requirement by

an experienced Audit Team. The plant can create its own internal Audit team for conducting regular comprehensive 'Water & Wastewater Audit' after providing requisite training to the concerned officials.

6. Regular payment of applicable groundwater abstraction charges

The plant needs to pay applicable groundwater abstraction charges as per CGWA notification. The applicable Rates of Ground Water abstraction charges for the plant are Rs 1 per m³ as per the table given below:

Table 20: Rates of Ground Water abstraction charges for other industries & infrastructure projects (Rs per m³)

S. No.	Category of area ↓ Ground water use →	Quantum of ground water withdrawal			
		< 200 m ³ /day	200 to <1000 m ³ /day	1000 to <5000 m ³ /day	5000 m ³ /day and above
1.	Safe	1.00	2.00	3.00	5.00
2.	Semi-critical	2.00	3.00	5.00	8.00
3.	Critical	4.00	6.00	8.00	10.00

7. Ensure to comply with the NOC conditions to avoid any penalty

It is suggested that the plant should comply with the applicable NOC conditions to avoid any penalty. The penalty provisions for non-compliance of NOC are given below:

Table 21: Penalty provision for non-Compliance of No Objection Certificate conditions

S. No.	Item/S	Charges in Rs.
1	Non installation/faulty Digital water Flow meter with telemetry system.	200000
2	Non-disclosure/ construction of additional groundwater abstraction structures ❖ Non-functional Structures. ❖ Defunct/Abandoned Note: Given rates are for unit non-functional/defunct/abandoned structures. This shall be multiplied with total such structures to arrive at consolidated penalty.	200000 100000
3	Reporting of freshwater zones as Brackish / Saline zones in application.	200000
4	Non-Installation of Piezometer.	200000
5	Non-Installation/faulty DWLR/Telemetry system	100000
6	Non-Construction/Inadequate capacity of Recharge / Water conservation structures.	500000

S. No.	Item/S	Charges in Rs.
7	Non maintenance of Recharge structures.	200000
8	Injection of treated/untreated water into the aquifer system. Note: In addition to penalty, the proponent shall bear the cost of aquifer remediation as per the provisions of Environment (Protection) Act, 1986.	1000000
9	Non-Submission of Water level/Water quality Data.	50000
10	Non-maintenance of logbook of daily withdrawal/non submission of Groundwater abstraction data.	50000
11	Non submission of photograph of recharge structure(s).	50000
12	Non-Submission of Self Compliance report.	100000
13	Construction of groundwater abstraction structures by unauthorized/unregistered Drilling Rigs (per structures).	100000
14	Nonregistration of water supply tankers.	500000
15	Submission of false information/ undertaking.	100000

1. Water Savings in the Buildings for Domestic Use

To optimize water use in the buildings for domestic purpose, the following observations and suggestions are made based on the building survey during the water audit:

- ❖ **Optimise water flow in handwashing and other taps:** Water flow rates in hand washing taps vary from 2-10 lpm .It is suggested to install flow restrictors in the hand washing taps of the plant area to reduce the excess flow in hand wash taps to 5 lpm. Generally, the water efficient handwashing taps use 3-5 lpm only.
- ❖ **Reduce water flow in urinals by optimizing the flushing time:** The flush time in the urinals varies from 2.2 seconds/use – 80 seconds/use. It is suggested to optimize the timer for the urinal flushing.
- ❖ **Flush tank capacities are about 6-10 liters/flush –** Use tank bank in existing flush tanks to reduce 2-3 liters water per flush or install water efficient cistern/flush tank with capacity 3/6 liters per flush.

Recommendations: It is suggested to install following water efficient fixtures in the buildings to save domestic water consumption. Overall, 15-20% domestic water consumption will be reduced by installing and maintaining suggested fixtures:

- ❖ **Retrofit flow restrictors in handwashing taps and other taps:** Retrofit high flowrate handwashing taps with ‘aerators and flow restrictors’ so as to have 3-5 lpm flow rate in hand washing taps & other taps in the plant.



- ❖ **Stop use of raw water, instead use recycled, treated wastewater.** It is suggested to use low quality water for flushing instead of good quality filtered water.
- ❖ **Install 'Tank Bank (For Flush Tanks)' or install with Water efficient flushes with dual flush Cistern 3-6 litres capacity flush tanks** – In toilets groundwater is used for flushing and about 7-10 litres of freshwater is flushed per flush. To reduce the flushing water per flush, it is suggested to install scientifically designed easy to install 'Tank-Bank' in the existing flush tanks. By just placing tank bank in the flush tank, we displace and save water equal to the space occupied by the tank bank for every flush. This will save about 20% of flush water in toilets. However, the existing 7-10 litres flush tanks can also be replaced by Water efficient flushes with dual flush Cistern 3-6 litres capacity flush tanks to save water. This will save about 40% of the flush water in toilets.

Table 22: Potential water savings per person per day by replacing Conventional Cistern with Slim dual flush Cistern / Using Flush Tank Bank

Estimated Flush usage per person per day	Conventional Cistern	Slim Dual Flush Cistern		Using Flush Tank Bank
Handle Type	Conventional	Small	Large	
Usage per day per person (Numbers)	5	4	1	5
Cistern Capacity (Litres)	7-10	3	6	6
Water Consumption (Litres)	35-50	12	6	30
Total Water Consumption (Litres/ Person/day)	42.5	18		30
Water Saving (Litres/person/day)		42.5-18 =24.5		42.5-30=12.5
		Reduction in 57% of water use in flushing activity		Reduction in 30% of water use in flushing activity

Picture 3: Tank Bank (For Picture 4: Dual flush Cistern 3-6 liters



Flush Tanks)

1. Install Drip Irrigation in the garden/horticulture area for efficient water use in landscaping/gardening

Existing Scenario: The plant has total area of 675860 meter square out of which about 24770 sq. m is Green Belt. The plant uses a total water for irrigation/landscaping/horticulture.

Recommendation: It is suggested that the plant should install Drip Irrigation system which is water efficient for gardening/horticulture. **The drip irrigation system will save 30-50% of water.** By installing drip irrigation system, the requirement of water for greenbelt (horticulture) could be met from available recycled / treated wastewater. The benefits of the drip irrigation system are given below:

Benefits of a Drip Irrigation System:

- ❖ **Saves Water:** Studies show that drip irrigation systems use 30 – 50% less water than conventional watering methods, such as Nuvoco Vistas Corporation Limited inklers or using open ended hose pipes.
- ❖ **Improves Growth:** Smaller amounts of water applied over a longer amount of time provide ideal growing conditions. Drip irrigation extends watering times for plants, & prevents soil erosion and nutrient runoff. Also, because the flow is continuous, water penetrates deeply into the soil to get well down into the root zone.
- ❖ **Discourages Weeds:** Water is only delivered where it's needed.
- ❖ **Saves Time:** Setting and moving Nuvoco Vistas Corporation Limited inklers is not required. A timer can be added to the system for automatic watering.
- ❖ **Helps control fungal diseases,** which grow quickly under moist conditions. Also, wet foliage can Nuvoco Vistas Corporation Limited disease.
- ❖ **Adaptable:** A drip irrigation system can be modified easily to adjust to the changing needs of a garden or lawn.

CHAPTER 8: IMPLEMENTATION PLAN

Sr. No	Section/Area	Recommendations
1.	Regularly calibrate & maintain existing water flow meters	It was observed that the existing bore well meter are installed and calibrated
2	Maintain logbook of daily groundwater abstraction	It was observed that the plant is maintaining data of daily groundwater abstraction
3	Regular ground water quality monitoring and submission of data to CGWA:	The plant regularly checks the water quality of the Groundwater and submitting the reports to CGWA
4	Training and Awareness of the Employees at all Levels and Placing 'Water Saving' Posters/Slogans at various Locations	Plant is regularly conducting Training and Awareness of the Employees, events to promote water conservation like celebration of world water day, world environment day" and Placing 'Water Saving' Posters/Slogans at various Locations
5	Periodically conduct 'Water & Wastewater Audit'	Plant has formed a cell for assessment of potential for water & wastewater management in the plant for water saving & waste water management.
6	Regular payment of applicable groundwater abstraction charges	The plant needs to pay applicable groundwater abstraction charges as per CGWA notification.
7	Ensure to comply with the NOC conditions to avoid any penalty	It is suggested that the plant should comply with the applicable NOC conditions to avoid any penalty.
8	Water Savings in the Buildings for Domestic Use	It is suggested to install following water efficient fixtures in the buildings to save domestic water consumption. Overall, 15-20% domestic water consumption

Sr. No	Section/Area	Recommendations
9	Install Drip Irrigation in the garden/horticulture area for efficient water use in landscaping/gardening	It is suggested that the plant should install Drip Irrigation system which is water efficient for gardening/horticulture. The drip irrigation system will save 30-50% of water.

ANNEXURES (MEASURED DATA)

Annexure I: Pump Efficiency and other measurements

❖ Pumping Cost

Table 23: Pumping Cost

S. No	Pump name	Total Flow	Power Consumption	Sp. Power	Cost of Pumping	Daily Run hours	Daily flow	Daily Pumping Cost	Total Annual Cost
				Consumption					
	Electricity Charges @ 6.50 Rs/kWh	m ³ /h	kW	kWh/m ³	Rs/m ³	h/day	m ³ /day	Rs/day	Rs/yr
1	Borewell Pump no.1	8.00	1.10	0.14	0.86	5.0	40.00	34	10725
2	Borewell Pump no.2	20.00	8.00	0.40	2.50	4.0	80.00	200	62400
3	STP Pump and Blower	2.50	2.40	0.96	6.00	6	0.00	0	34164
4	Rain water Harvesting Pump	12.40	3.20	0.26	1.61	6	68.20	110	41756
							188.20	344	149045

Annexure:

Fresh Water Details

(m ³ /month)	Bore well Water	Domestic water use	Industrial water use	Others Green Belt
	Withdrawn			
18-Apr	1935	251.55	1490.0	193.5
18-May	1999	259.87	1539.2	199.9
18-Jun	1935	251.55	1490.0	193.5
18-Jul	930	120.9	716.1	93
18-Aug	930	120.9	716.1	93
18-Sep	1550	201.5	1193.5	155
18-Oct	1999	259.87	1539.2	199.9
18-Nov	1935	251.55	1490.0	193.5
18-Dec	1999	259.87	1539.2	199.9
19-Jan	1999	259.87	1539.2	199.9
19-Feb	1806	234.78	1390.6	180.6
19-Mar	1999	259.87	1539.2	199.9

(m ³ /month)	Bore well Water Withdrawn	Domestic water use	Industrial water use	Others
19-Apr	1935	251.55	1489.95	193.5
19-May	1999	259.87	1539.23	199.9
19-Jun	1935	251.55	1489.95	193.5
19-Jul	930	120.9	716.1	93
19-Aug	930	120.9	716.1	93
19-Sep	1550	201.5	1193.5	155
19-Oct	1999	259.87	1539.23	199.9
19-Nov	1935	251.55	1489.95	193.5
19-Dec	1999	259.87	1539.23	199.9
20-Jan	1999	259.87	1539.23	199.9
20-Feb	1806	234.78	1390.62	180.6
20-Mar	1999	259.87	1539.23	199.9

(m ³ /month)	Bore well Water withdrawn	Domestic water use	Industrial water use	others
20-Apr	5400	702.0	4158.0	540.0
20-May	5580	725.4	4296.6	558.0
20-Jun	5400	702.0	4158.0	540.0
20-Jul	4495	584.4	3461.2	449.5
20-Aug	4495	584.4	3461.2	449.5
20-Sep	5400	702.0	4158.0	540.0
20-Oct	5580	725.4	4296.6	558.0
20-Nov	5400	702.0	4158.0	540.0
20-Dec	5580	725.4	4296.6	558.0
21-Jan	5580	725.4	4296.6	558.0
21-Feb	5520	717.6	4250.4	552.0
21-Mar	5580	725.4	4296.6	558.0

Waste water Details

(m ³ /month)	STP Treated water	ETP Treated Water
20-Apr	273.78	282.744
20-May	282.906	292.1688
20-Jun	273.78	282.744
20-Jul	227.8965	235.3582
20-Aug	227.8965	235.3582
20-Sep	273.78	282.744
20-Oct	282.906	292.1688
20-Nov	273.78	282.744
20-Dec	282.906	292.1688
21-Jan	282.906	292.1688
21-Feb	279.864	289.0272
21-Mar	282.906	292.1688

Total No. of buildings						
Building name	No. of employees in building	No. of floors in building	Total no. of washrooms on each floor	No. of taps	No. of urinals	No. of showers
Office	16	2	4	4	4	3
Bachelor accommodation	12	1	6	6	6	-
Driver and operator accommodation	24	2	4	5	4	-

Canteen/ Kitchen Name/Location	Services (Breakfast/ Lunch/ Dinner/ others)	Total no. of visitors per day	Total No. of Taps		
			Drinking water	Utensil Washing	Others
Office canteen	Breakfast, Lunch, Dinner	35	1	1	1

Details of ETP

Effluent Treatment Plant		
Installed Capacity (m ³ /hr)		0.66
Average Quantity of treated wastewater (m ³ /day)		8.2
Chemical Details		
Name of Chemical/s	Quantity kg/month or litres/month	Price (Rs/Kg or Rs/litres)
Power Consumption (Units/day)		
Is treated effluent reused or discharged?		Reused
If reused, provide area of its application & reused quantity (m ³ /day)		Green Belt, Dust Suppression, Wheel wash & toilet flush.
If discharged, provide disposal media like sewerage line, water body, land etc.		

**Please provide Effluent Treatment Scheme and Water Quality data of the Inlet & Outlet of the ETP.*

❖ Details of STP

Sewage Treatment Plant		
Installed Capacity (m ³ /hr)		3.33
Average Quantity of treated sewage (m ³ /day)		14.7
Chemical Details		
Name of Chemical/s	Quantity kg/month or litres/month	Price (Rs/Kg or Rs/litres)
Power Consumption (Units/day)		893
Is treated sewage reused or discharged?		Reused in dust suppression & Green Belt

Total Area under gardening/irrigation (meter square)	24770
Approximate water requirement for the gardening (cubic meter/day)	12
Type of water used in irrigation/gardening (Fresh water/treated wastewater/other)	Recycled/Fresh
Frequency of Gardening per day (once/twice/thrice)	once
Hour of Gardening per day	
Equipment used for gardening (hose pipe/sprinkle/micro-irrigation/other)	hose pipe
Type of irrigation- Drip, Sprinkle, Flood	Flood

❖ Details of Rainwater Harvesting system if implemented:

Total area in meter square: 675860
 Green area in meter square: 24770
 Rooftop area in meter square: 15000
 Open area in meter square: 598100



TC-11225

WCS/LQR/59

TEST REPORT

Report No. : WCSL240405A Issue Date : 02.04.2024
 NABL ULR No. : TC1122524000000082F
 Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohanty)
 Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
 Month of Sampling : March-2024 Quantity of Sample : 08
 Sample Description : Ambient Noise Sample Condition : Good
 Sampling Plan & Method : WCS/QSP/SAMP (NOISE) Sample Collected by : WCS Laboratory

Sample ID No.	Location	Date of Monitoring	Day Time dB(A) Leq	Night Time dB(A) Leq
WCS0324N01A	Nuagaon	04-03-2024	53.8	38.4
WCS0324N01B	Tentulidihi	05-03-2024	51.9	37.1
WCS0324N01C	Dengula	06-03-2024	52.6	37.6
WCS0324N01D	Office	07-03-2024	56.1	40.2
WCS0324N01E	North Boundary	08-03-2024	58.2	38.7
WCS0324N01F	South Boundary	09-03-2024	55.3	42.6
WCS0324N01G	East Boundary	11-03-2024	52.2	38.9
WCS0324N01H	West Boundary	12-03-2024	51.9	36.4
Test Method		IS 9989 : 1981		

Noise Standard in dB(A) Leq as per CPCB		
Category of Area	Day Time dB(A) Leq (6.00 Am to 10.00 Pm)	Night Time dB(A) Leq (10.00 Pm to 6.00 Am)
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area	50	40

Reviewed by
(Mr. Bijaya Kumar Chahatary)

Authorized Signatory
(Mr. Pradeep Mohapatra)

- N.B.: ① Liability for return of sample ceases after 7 days from the date of Test certificate.
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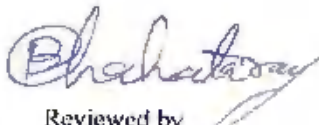
WCS/LQR/59

TEST REPORT

Report No. : WCS240424 Issue Date : 02.05.2024
NABL ULR No. : TC1122524000000064F
Name of the Client : Raikela Iron Ore Mines (M/S Geetarani Mohunty)
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Month of Sampling : April-2024 Quantity of Sample : 08
Sample Description : Ambient Noise Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (NOISE) Sample Collected by : WCS Laboratory

Sample ID No.	Location	Date of Monitoring	Day Time dB(A) Leq	Night Time dB(A) Leq
WCS0424N01A	Nuagaon	08-04-2024	52.6	38.5
WCS0424N01B	Tentulidihi	09-04-2024	54.2	36.9
WCS0424N01C	Dengula	10-04-2024	51.9	37.8
WCS0424N01D	Office	11-04-2024	56.3	41.3
WCS0424N01E	North Boundary	12-04-2024	57.2	40.0
WCS0424N01F	South Boundary	13-04-2024	56.4	41.5
WCS0424N01G	East Boundary	15-04-2024	53.1	39.5
WCS0424N01H	West Boundary	16-04-2024	52.6	37.1
Test Method		IS 9989 : 1981		

Noise Standard in dB(A) Leq as per CPCB		
Category of Area	Day Time dB(A) Leq (6.00 Am to 10.00 Pm)	Night Time dB(A) Leq (10.00 Pm to 6.00 Am)
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area	50	40


Reviewed by
(Mr. Bijaya Kumar Chahataray)


Authorized Signatory
(Mr. Pradeep Chhapatra)

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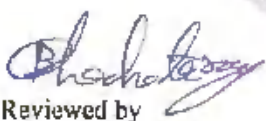
WCS/LQR/59

TEST REPORT

Report No. : WCS240603 Issue Date : 04.06.2024
NABL ULR No. : TC112252400000088F
Name of the Client : **Raikela Iron Ore Mines (M/S Geetarani Mohanty)**
Address : Raikela, Near Tensa, P.O.-Dengula, Dist- Sundargarh- 770048, Odisha
Month of Sampling : May-2024 Quantity of Sample : 08
Sample Description : Ambient Noise Sample Condition : Good
Sampling Plan & Method : WCS/QSP/SAMP (NOISE) Sample Collected by : WCS Laboratory

Sample ID No.	Location	Date of Monitoring	Day Time dB(A) Leq	Night Time dB(A) Leq
WCS0524N01A	Nuagaon	06-05-2024	54.6	40.1
WCS0524N01B	Tentulidihi	07-05-2024	53.9	38.2
WCS0524N01C	Dengula	08-05-2024	50.2	36.9
WCS0524N01D	Office	09-05-2024	55.0	40.5
WCS0524N01E	North Boundary	10-05-2024	56.2	42.6
WCS0524N01F	South Boundary	11-05-2024	58.7	40.8
WCS0524N01G	East Boundary	13-05-2024	51.1	37.7
WCS0524N01H	West Boundary	14-05-2024	54.9	38.1
Test Method		IS 9989 : 1981		

Noise Standard in dB(A) Leq as per CPCB		
Category of Area	Day Time dB(A) Leq (6.00 Am to 10.00 Pm)	Night Time dB(A) Leq (10.00 Pm to 6.00 Am)
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Sensitive Area	50	40


Reviewed by
(Mr. Bijaya Kumar Chahataray)


Authorized Signatory
(Mr. Pradeep Mohapatra)

- N.B.:
- ① Liability for return of sample ceases after 7 days from the date of Test certificate.
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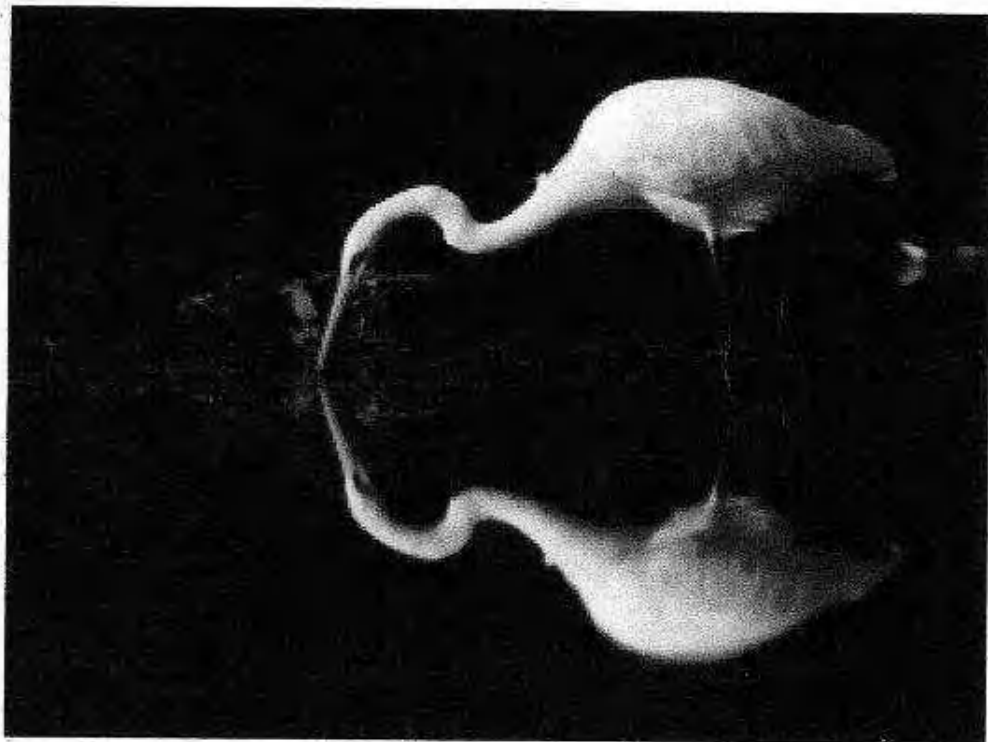


Annexure XVI

BUDGETARY PROVISION FOR GREEN BELT

5 Years Period	Year	Plantation Area	Saplings to be Planted	Survival @ 90 %	Capital Cost in Rs	Recurring Cost in Rs	Budgetary Provision	Location for Plantation/Afforestation
1	21-22	0.346	865					Safety Area
	22-23	0.344	860	774	602000	150500	752500	
	23-24	0.34	850	765	595000	148750	743750	
	24-25	0.33	825	742.5	577500	144375	721875	
	25-26	0.24	600	540	420000	105000	525000	
2	26-27	0	0	0		0	0	21°.86716 N to 21°.871851 N 85°.17599 E to 85°.183089 E
	27-28	6	15000	13500	12000000	3000000	15000000	
	28-29	6	15000	13500	12000000	3000000	15000000	
	29-30	8	20000	18000	16000000	4000000	20000000	
	30-31	6	15000	13500	12000000	3000000	15000000	
3	31-32	7	17500	15750	16625000	4156250	20781250	21°.86514 N to 21°.87186 N 85°.17731 E to 85°.184501 E
	32-33	7	17500	15750	16625000	4156250	20781250	
	33-34	7.4	18500	16650	17575000	4393750	21968750	
	34-35	8	20000	18000	19000000	4750000	23750000	
	35-36	5	12500	11250	11875000	2968750	14843750	
	36-41	2.1	5250	4725	4987500	1246875	6234375	Stabilized Dump
		0.89	2225	2002.5	2113750	528437.5	2642187.5	Rainwater Pond
		64.99	162475	145449	142995750	35748937	178744688	

**SITE SPECIFIC CONSERVATION PLAN
&
WILDLIFE MANAGEMENT PLAN OF
RAIKELA IRON ORE MINES
IN SUNDARGARH DISTRICT OF ORISSA**



OF
M/S GEETARANI MOHANTY
BARBIL , KEONJHAR , ORISSA

Prepared by
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B.K.Patnaik IFS (Retd.)

PREFACE

Raikela Iron Ore Mines of M/s Geetarani Mohanty . in the District of Sundargarh spreads over an area of 67.586Ha out of which 66.671ha comes under Forest Kissam land and the balance 0.915Ha is non-Forest land. The entire lease area is under the control of Revenue Department. There are 50 villages situated within the Zone of Influence with population of 30415. Due to diversion of this area for non forestry activities there will be additional pressure on the adjoining Forest. The Mining activities in the area will affect the Wild-life of the lease hold area as well as the adjoining forest areas and will pose various threats to the Wild animals. As various Mines are in operation adjoining the lease area the problem can be properly addressed only if a comprehensive wild-life Management plan is prepared for the entire belt which will help in protecting the wild-life as well as their habitat. In this Plan therefore it is left to the discretion of the DFO/ Forest Department to alter the proposal depending on the field demand and necessity.

This plan aims at minimizing the threats posed by mining activities and to improve the Wild-life Habitat in the adjoining Forest area such as the Zone of Influence and beyond.

Proper implementation of the Plan will definitely improve the Wild-life Habitat in the area and will reduce man-wild animal conflict.

Our thanks are due to Sri P. K. Sethi IFS, DFO Bonai Forest Division and his staff for providing relevant information for the plan.


B.K.Patnaik.

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Sl.No	Title	Page Nos.
1	Executive Summary	1 - 4
2	Chapter- I Introduction	5 - 6
3	Chapter- II Details of Project site	7 - 21
4	Chapter- III Mining process	22 - 28
5	Chapter- IV Threats to Wild-life and its Habitat	29 - 35
6	Chapter- V Wild-life Management Plan	36 - 47
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Plates

01	Location Map on Toposheet	Plate No. 1
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Annexures

01	Copy of letter No.2840 /6F-dt.29.6.07 of D F O Bonai Forest Division.	<i>Annexure- I</i>
02	Copy of letter No.8-37/2007 Dt.25 th Aug,2008 of MoEF, Govt. of India.	<i>Annexure- II</i>
03	Copy of Letter No. J-11015/ 380/ 2006- IA.II(M) Dated the 2 nd July,2008 of MoEF, Govt. of India.	<i>Annexure- III</i>
04	Copy of Site inspection Report of DFO, Bonai Forest Division.	<i>Annexure-IV</i>
05	Copy of letter No.10F(Cons)120/2006- 6879/F&E Dated 5/5/07 of Govt of Orissa	<i>Annexure-V</i>

EXECUTIVE SUMMARY

0.0.0 This Wild-Life Management Plan is prepared as a partial fulfillment of the requirements of MoEF, Govt. of India for diversion of Forest land for mining activities.

0.1.0 Raikela Iron Ore Mines has been leased out to M/S Geetarani Mohanty for a period of 20 years from Dt.02.07.1991 to Dt.01.07.2011.

The total area of the mine is 67.568ha out of which 66.67ha is Forest kissam Land. Diversion proposal has been submitted for 64.148ha excluding safety Zone. The safety Zone has not been included in the Diversion proposal as the said area will be maintained as such

Different types of Land involved are:

Forest Kissam Land	- 66.671 ha
Non Forest Land	- 0.915 ha
Total	- 67.586 ha

0.2.1 The net Reserve of Iron ore in the lease area has been estimated to be, 17.611 million Tons out of which Mineable reserve has been estimated to be 16.952million Tons. The production target has been fixed at 0.864million Tons per annum which is proposed to be enhanced to 1.50 million Tons per annum.

0.2.2 The lease area of Raikela Iron Ore Mines can be located on Topo sheet No.73G/1 and is bounded by

Latitude – 21° 00' 17" N and 21° 03' 50" N.

Longitude – 85° 01' 50" E and 85° 02' 30" E.

This area is situated at a distance of 2.5kms from Tensa and at a distance of 17kms from Barsuan. The area is highly undulating and mountainous. The altitudes vary from 300 mt. to 1020 mtr. above MSL. The general slope of the area is towards south-west and the drainage ultimately leads to river Baitarani.

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- 0.2.3 The climate is Tropical with a very hot summer, the temperature rising up-to 42°C, a moderate to cool winter and well defined rainy season. The minimum temperature during winter is as low as 7°C.
- 0.2.4 The existing forest standing on the nearby Reserved Forest as well as the Forest kissam lands can be classified as Moist peninsular valley Sal.
- 0.3.1 The lease area does not form a part of any National Park or Sanctuary or Critical Wild Life habitat. No protected area is situated in the vicinity or with in the zone of Influence.
- 0.3.2 The common wild life occasionally noticed in the area is limited to Monkeys, Jackal, Hyena, Kutura, Wild Pig, Porcupine, Neula etc.
- 0.4.1 There is no population within the lease area. There are 50 villages within the zone of influence with total population of 30415, with 69.93% Tribal population.
- 0.4.2 The major employment of the population is mining. The proposed mine will directly employ 194 persons in various mining activities. Besides several other persons will be engaged in scores of related activities on contract basis such as Ore crushing, Transportation etc.
- 0.5.1 The process of mining will be opencast mechanized method with drilling and blasting.
- 0.6.1 The threats perceived due to operation of the mine are:
- (a) Reduction of wild life habitat
 - (b) Soil erosion
 - (c) Water pollution & water scarcity
 - (d) Dust pollution

- (e) Noise pollution
- (f) Lighting problems
- (g) Garbage problems
- (h) Physical threats such as fall of animals in the pits, poaching etc.
- (i) Forest fire

0.6.2 The management plan has addressed all the above threats and tried to minimize such threats.

- (a) Restoration of habitat will be done by planting 33850 nos of seedlings within the lease area. It is also proposed to raise 40 ha plantation and develop 5 ha grass land within the Zone of Influence and to maintain Forest Cover in the safety zone.. The lessee will contribute Rs. 22.50 lakhs for this purpose.
- (b) Soil conservation measures will be taken up by constructing check Dams. The lessee has proposed to contribute Rs.5.00 lakhs for this purpose.
- (c) Sub-soil and ground water recharge will be done through a series of percolation Pits. For this the lessee will contribute Rs.2.50lakhs.
- (d) One large water body will be created at a cost of Rs. 5.00 lakhs to provide water to animals throughout the year.
- (e) Water pollution will be checked by diverting the water to pass through garland drains and settling tanks and treating the water generated in the mine.
- (f) Dust pollution is controlled by regular spray of water on haul roads and the mine product.
- (g) Garbage will be disposed of through efficient garbage management methods.
- (h) Man animal conflict will be reduced by quick payment of compassionate amounts.

(h) The proposed cost for Implementation of this plan is Rs.86.80 lakhs out of which the lessee will take up the activities for Rs. 24.10 lakhs and the Forest Department will take up various measures for Rs.62.70 lakhs. This amount of Rs.62.70 lakhs will be deposited with the Forest Department.

0.6.3 Besides the proposed amount indicated above, the lessee proposes to extend logistic support in shape of equipments, Vehicles etc. as required by the implementing DFO. The lessee further proposes to incur expenditure of up to Rs.6.00 lakhs for the purpose.

M/s GEETARANI MOHANTY

CHAPTER-I

INTRODUCTION

Raikela Iron Ore Mines is being operated by M/S Geetarani Mohanty in the District of Sundargarh.

- 0.2.0 The mining lease was granted on Dt.02.07.1991 for a period of 20years over an area of 67.586ha. The lessee is also proposing to seek further extension of the lease. The total area included,

Forest Kissam Land	-	66.671 ha
Non Forest Land	-	<u>0.915 ha</u>
		67.586 ha

The Forest Diversion Proposal for 64.148 ha in the year 2007 which has been forwarded by Govt. of Orissa to Govt. of India in letter No 10F(Cons)120/2006-6879/F&E, Dated 5/5/07.

- 0.3.0 The lease area of Raikela Iron Ore Mines can be located on Topo sheet No.73G/1 and is bounded by

Latitude – 21° 00' 17" N and 21° 03' 50" N.

Longitude – 85° 01' 50" E and 85° 02' 30" E.

- 1.3.0 The mining plan has been approved by the Indian Bureau of Mines and being renewed from time to time. The last renewal being in the year 2009. The production capacity of the mine as approved is 0.864 million Tons and the lessee proposes to enhance the production capacity to 1.50 million tons per annum. The total mineral resource was estimated to be 24.64 million Tons out of which the present available is 11.60 million Tons proved category and 0.64 million Tons possible category. Therefore the life of the mine is estimated to be 8 years.

Extraction at the enhanced rate is proposed to start immediately after approval by the appropriate authority. All the required infrastructures are available for the enhanced target.

- 1.5.0 The Environment Management plan has been prepared as a part of Mining Plan.
- 1.6.0 Sundargarh District is very rich in Forest as well as wild life. This district is a part of Eastern Ghats and is a continuation of famous Saranda Forest. Various Wild Life species including Elephants are present in this District.
- 1.7.0 The lease area is a part of Bonai Forest Division adjoining Keonjhar District. The entire belt is very rich in mineral deposits such as Iron Ore and Manganese Ore.
- 1.8.0 Sundargarh District is also an Industrial Belt. A number of Industries have come up in the District. Presence of Wild-Life along with Industries and Mining activities create a conflicting situation.
- Hence this Plan aims at minimizing the conflict to the extent it relates with the Mining activities.
- 1.9.0 This plan (Wild Life Management Plan and Site Specific Conservation Plan) is prepared as a partial fulfillment of the conditions as required by the MoEF, Govt. of India for diversion of Forest Land for the Mining activities.
- 1.10.0 This Plan is prepared for a period of 8 years (ie. the proposed life of the mine) after which the same can be reviewed.

CHAPTER – II

DETAILS OF THE PROJECT AREA

2.0.1 This Raikela mining lease for extraction of Iron Ore has been granted in favour of M/S Geetarani Mohanty, with Registered Office at Station Road, Barbil, Dist – Keonjhar, Orissa – 758035.

2.0.2 **Brief of the lease area.**

Raikela mining lease area falls almost at the junction of Sundargarh and Keonjhar Districts. The total area for which the lease has been granted is 67.586 ha including Forest area (forest kissam land) of 66.671ha. Diversion proposal has been submitted for 64.148Ha of Forest land excluding the safety zone of 2.523Ha.

The mining lease area covers portions of non Forest land of 0.915ha.

2.1.0 **Location**

District and State	–	Sundargarh, Orissa
Sub-Division	–	Bonai
Village in the vicinity	–	Raikela
Mining lease area	-	67.586Ha.
Forest land (under control of Revenue Deptt.)	-	66.671Ha
Non Forest land (Sarbasadharan)	-	0. 915 Ha

This area can be located on Topo Sheet No.73G/1 with

Latitude – 21° 00' 17" N and 21° 03' 50" N.

Longitude – 85° 01' 50" E and 85° 02' 30" E.

- (a) The lease area does not come under any Reserve Forest or Protected Forest. The nearby Reserved Forests are, *Sarkunda* Reserved Forest in the North, *Torha* Reserved Forest extending from west to South, *Karo & Kathamala* Reserved Forests are located in the North- East direction of the lease area.

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- (b) This area comes within the Village limit of Raikela, at a distance of 1.5 kms from the settlement. Other Revenue villages situated at the vicinity of the lease area are, Dengula- 4 kms, Bandhal- 2.5 kms, Tantra- 5 kms.
- (c) There are several operating mines around the lease area. Precisely within a radius of 5kms 10active mines are in operation.
- (d) This area can be approached from Koida of Sundargarh District or from Joda of Keonjhar District through a series of mines. The distance of the lease area is 2.5 kms from Tensa, around 17kms from Barsuan.
- (e) The nearest Township are Barsuan, Koida and Joda where all the market facilities, transport and excellent health care are available.
- (f) The nearest Railway Stations is Barsuan which is situated at a distance of 17 kms from the lease area where excellent loading facilities are available . Road Transport facilities at Barsuan, Joda and Koida are also excellent.

The nearest port is Paradeep, situated at a distance of around 370 km. and the Airport at Bhubaneswar at a distance of around 310 kms. from the mining area.

2.1.1 Land use Pattern

The land schedule as per Revenue Department record is as follows

Khata No.	Plot No.	Kissam	Land classification	Area in Acres	Remarks
592	66	Pahad	Abad Ajogya Anabadi (AAA)	0.27	Classified as Forest by DLC
593	66	Pahad	AAA	14.28	Classified as Forest by DLC
594	64	Village Road	Sarbasadharan	2.24	
595	66	Pahad	AAA	35.53	Classified as Forest by DLC
596	66	Pahad	AAA	23.90	Classified as Forest by DLC
607	66	Nayanjori	Sarbasadharan	0.02	
608	66	Pahad	AAA	23.67	Classified as Forest by DLC

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609	66	Pahad	AAA	16.11	Classified as Forest by DLC
610	66	Pahad	AAA	40.00	Classified as Forest by DLC
611	66	Pahad	AAA	10.88	Classified as Forest by DLC
593/793	66	Pahad	AAA	02.09	Classified as Forest by DLC
Total				167.00Ac or 67.586Ha	

The lease area is mostly broken up area and devoid of any human habitation. The actual land use pattern against the proposed land use till date and proposed during the conceptual plan period is as follows.

	Purpose	Target land use in Ha	Actual land use in Ha	Proposed during the Conceptual period in Ha
1	Mining Pit	36.893	29.893	50.893
2	Over Burden Dump	3.000	2.000	3.000
3	Mineral Storage	4.568	3.568	4.568
4	Infrastructure	0.200	0.200	0.200
5	Roads	2.900	2.900	2.985
6	Crushing Plant	1.890	1.890	2.422
7	Green Belt	2.603	2.603	2.603
8	Undisturbed area	15.532	24.532	0.915
	Total	67.586	67.586	67.586

The conceptual plan has been prepared for the next three years and the proposed land use pattern of the lease area is as follows.

towns. There is availability of Electric Power, Water Source with in the lease hold area.

2.1.3 Topographical Features

The Mining lease area lies in the southern continuation of Bonai-Keonjhar Belt of Ranchi Plateau. The area is deeply dissected with rugged topography and distinctly marked by narrow hill ranges and flattops with prominent peaks. The elevation of the lease area varies from 615mt. above MSL to 790mt. above MSL. The highest altitude in the vicinity is 1010mts above MSL.

2.1.4 Climate

The lease are falls with in the Tropical region which is marked by very hot and prominent summer. There are three distinct seasons, a prominent summer season from March to mid June. Well defined rainy season from mid June to October and moderate winter from November to February.

The average annual rainfall is 1370 mm. Maximum rainfall is received due to South West Monsoon. About 80% of the rainfall is received during the month of June to August. The number of rainy days varies from 65 to 80 days during the year.

The temperature during summer rises very high. The maximum temperature rises to 42°C in hot summer where as the minimum temperature is 7°C during winter months.

2.1.5 Drainage

Due to the high altitude the lease area does not contain any perennial water source. There is only one seasonal Nala in the lease area running from NNE to SSW which is along the general slope of the area. There is another seasonal nala situated along the waste of the lease area. During rainy season the surface run off drainage takes place through these two seasonal nalas. The drainage from this area ultimately leads to river Baitarani.

upper shales. Economic mineral deposits of iron & manganese are confined to BIF and shales respectively. The host rocks which forms a part of the eastern limb of the famous horse-shoe shaped, Bonai synclinorium are in consonance with the disposition of the synclinorium.

The latest regional stratigraphy of the area is given as below :

Ultramafic Intrusions
 Kolhan Group
 ----- Unconformity -----
 Dhanajori Group Jaganathpur
 Lavas
 Quartzite, Conglomerates
 ----- Unconformity -----
 Chaibasa Formations
 ----- Unconformity -----
 Singhbhum Granite
 ----- Iron Ore Orogeny -----
 Iron Ore Group
 ----- Unconformity -----
 Older Metamorphic Gneiss
 ----- O.M. Orogeny -----
 Older Metamorphic Group

In this area Lateritisation is a common feature affecting almost all the rock types.

2.2.1 Forest and Forest type :

As per the India State of Forest Report 2009 the total forest area in the district of Sundargarh is as follows.

1. Geographical area	-	9712 sq.km.
2. Very dense forest	-	1047 sq.km
3. Moderately Dense Forest	-	1773 sq.km
4. Open Forest	-	1243 sq.km
5. Total forest	-	4063 sq.km

As per the Orissa forest status report 2003-04 the total forest area in the district of Sundargarh is as follows.

1. Geographical area	-	9712 sq.km.
2. Reserved forests	-	2651.88 sq.km
3. Demarcated Protected forest (DPF)	-	836.85 sq.km
4. Other forest under the control of Rev. Deptt.	-	1466.87 sq.km

Total Forest area 4955.60 sq.km

Thus around 900 sq.kms of Forest land is either barren or utilized for other purpose.

The Forest type of the lease area can be classified as

Group 3C : Northern Tropical Moist Deciduous Forest.

Sub-group-3C/C_e (iii) Moist peninsular valley Sal.

The area contains open crop with very low density.

2.2.2 Working Plan Prescription :

The lease area is under the control of Revenue Department, therefore it is not covered under Forest Working plan.

2.2.3 Flora Fauna :



The lease area doesn't form part of any National Park, Wild Life Sanctuary, Elephant Reserve, Biosphere Reserve or any critical wildlife habitat. In this context The D.F.O, Bonai Forest Division has issued a certificate in his letter No.2840/6F Dated 29.6.07 (Copy enclosed as Annexure). As per the enumeration conducted jointly by the Forest and Revenue Departments along with the lessee the trees have been enumerated. However on field enquiries some of the common species of Flora and Fauna available in the area are as follows.

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CORE ZONE (M.L. AREA)**FLORA**

Local Name	Botanical Name	Family Name
TREES		
Achu	<i>Morinda tinctoria</i>	Rubiaceae
Amba	<i>Mangifera indica</i>	Anacardiaceae
Asan	<i>Terminalia tomentosa</i>	Combretaceae
Bahada	<i>Terminalia belerica</i>	Combretaceae
Bheru	<i>Chloroxylon swietenia</i>	Meliaceae
Bija	<i>Pterocarpus marsupium</i>	Papilionaceae
Char	<i>Buchnanania lanzan</i>	Anacardiaceae
Dhaura	<i>Anogeissus latifolia</i>	Combretaceae
Dhobi	<i>Dalbergia paniculata</i>	Papilionaceae
Gambhari	<i>Gmelina arborea</i>	Verbinaceae
Haldu	<i>Adina cordifolia</i>	Rubaceae
Harida	<i>Terminalia chebula</i>	Combretaceae
Jamun	<i>Syzygium cumini</i>	Myrtaceae
Kangada	<i>Xylia xylocarpa</i>	Mimosaceae
Kashi	<i>Bridelia retusa</i>	Euphorbiaceae
Kendu	<i>Diospyrus melanoxylon</i>	Ebenaceae
Khakada	<i>Casuarina tomentosa</i>	Flacourtiaceae
Kumbhi	<i>Careya arborea</i>	Myrtaceae
Kusum	<i>Schleichera oleosa</i>	Sapindaceae
Mahul	<i>Madhuca indica</i>	Sapotaceae
Moi	<i>Lannea grandis</i>	Anacardiaceae
Pipal	<i>Ficus religiosa</i>	Moraceae
Rai	<i>Dillenia pentagyna</i>	Dilleniaceae
Sal	<i>Shorea robusta</i>	Dipterocarpaceae
Sidha	<i>Lagerstroemia parviflora</i>	Lythraceae
Siris	<i>Albizia lebbek</i>	Mimosaceae
Teak	<i>Tectona grandis</i>	Verbinaceae
Tentuli	<i>Tamarindus indica</i>	Cesalpiniaceae
GRASSES		
Khara grass	<i>Imperata cylindrical</i>	Gramineae
Phulabandhuni	<i>Thysanolaena maxima</i>	Gramineae
SHRUBS / HERBS		
Anantamula	<i>Hemidesmus indicus</i>	Asclepidaceae
Arakha	<i>Calotropis gigantea</i>	Asclepidaceae
Basanga	<i>Adhatoda vasica</i>	Acanthaceae
Dhatki	<i>Woodfordia fruticosa</i>	Lythraceae
Kurei	<i>Holarrhena antidysenterica</i>	Apocynaceae
CLIMBERS		
Atundi	<i>Combretum decandrum</i>	Combretaceae
Baidanka	<i>Mucuna monosperma</i>	Papilionaceae
Bichhuati	<i>Urtica dioica</i>	Euphorbiaceae
Mututri	<i>Smylax macrophylla</i>	Liliaceae

M/s GEETARANI MOHANTY

Local Name	Botanical Name	Family Name
Siali	<i>Bauhinia valii</i>	Papilionaceae
Satabari	<i>Asparagus racemosus</i>	Liliaceae

The lease area being an old lease is devoid of any Wild-life. As per the information collected locally, some of the occasionally stray away from the nearby forest areas and move in the lease area.

FAUNA

Local Name	English Name	Zoological Name	Schedule
MAMMALS			
Barha	Wild Boar	<i>Sus scrofa</i>	III
Bilua	Jackal	<i>Canis aureus</i>	II
Heta	Hyaena	<i>Hyaena hyaena</i>	III
Jhinka	Porcupine	<i>Hystrix indica</i>	IV
Kutura	Barking deer	<i>Muntiacus muntjak</i>	III
Neula	Mongoose	<i>Herpestes edwardsii</i>	II
BIRDS			
Bana Kukuda	Jungle fowl	<i>Gallus gallus</i>	IV
Kapta	Ring Dove	<i>Streptopelia chinensis</i>	IV
Koel	Cuckoo	<i>Eudynamis scolopacea</i>	IV
Kumbhatua	Crow pheasant	<i>Centropus sinensis</i>	IV
Gunduri	Partridge	<i>Perdica asiatica</i>	IV
Kathahana	Wood pecker	<i>Picoides nanus</i>	IV
REPTILES			
Ajagar	Python	<i>Python molurus</i>	I
Dhamana	Rat snake	<i>Ptyas mucosus</i>	II

The Zone of Influence extending over various Reserve Forests is a rich source of Forest and Wild Life. The important Flora and Fauna found in the ZOI are as follows:

BUFFER ZONE (ZONE OF INFLUENCE)

FLORA

Local Name	Botanical Name	Family Name
TREES		
Achu	<i>Morinda tinctoria</i>	Rubiaceae
Amba	<i>Mangifera indica</i>	Anacardiaceae
Amla	<i>Emblica officinalis</i>	Euphorbiaceae
Ankula	<i>Alangium lamarckii</i>	Cornaceae
Asan	<i>Terminalia tomentosa</i>	Combretaceae
Bahada	<i>Terminalia bellerica</i>	Combretaceae
Bara	<i>Ficus bengalensis</i>	Moraceae
Barakoji	<i>Zizyphus mauritiana</i>	Rhamnaceae
Baruna	<i>Crateva religiosa</i>	Capparidaceae

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Local Name	Botanical Name	Family Name
Bandhan	<i>Ougeinia oojenensis</i>	Papilionaceae
Bel	<i>Aegle marmelos</i>	Rutaceae
Bana Bhalia	<i>Semicarpus anacardium</i>	Anacardiaceae
Behenta	<i>Lemonia acidissima</i>	Rutaceae
Bheru	<i>Chloroxylon swietenia</i>	Meliaceae
Bija	<i>Pterocarpus marsupium</i>	Papilionaceae
Char	<i>Buchnanan lanzan</i>	Anacardiaceae
Chhatian	<i>Alstonia scholaris</i>	Apocynaceae
Dhaman	<i>Grewia tillaefolia</i>	Tiliaceae
Dhaura	<i>Anogeissus latifolia</i>	Combretaceae
Dimiri	<i>Ficus glomerata</i>	Moraceae
Gambhari	<i>Gmelina arborea</i>	Verbinaceae
Genduli	<i>Sterculia urens</i>	Sterculiaceae
Haldu	<i>Adina cordifolia</i>	Rubaceae
Harida	<i>Terminalia chebula</i>	Combretaceae
Jamun	<i>Syzygium cumini</i>	Myrtaceae
Kalucha	<i>Glochidion lanceolarium</i>	Euphorbiaceae
Kanchan	<i>Bauhinia variegata</i>	Cesalpiniaceae
Kangada	<i>Xylia xylocarpa</i>	Mimosaceae
Karada	<i>Cleistanthus collinus</i>	Euphorbiaceae
Kasi	<i>Bridelia retusa</i>	Euphorbiaceae
Katrang	<i>Gardenia latifolia</i>	Rubiaceae
Kendu	<i>Diospyrus melanoxylon</i>	Ebenaceae
Khair	<i>Acacia catechu</i>	Mimosaceae
Kumbhi	<i>Careya arborea</i>	Myrtaceae
Kusum	<i>Schleichera oleosa</i>	Sapindaceae
Mahaneem	<i>Melia azadirachta</i>	Meliaceae
Mahul	<i>Madhuca indica</i>	Sapotaceae
Moi	<i>Lannea grandis</i>	Anacardiaceae
Palas	<i>Butea monosperma</i>	Papilionaceae
Pipal	<i>Ficus religiosa</i>	Moraceae
Rai	<i>Dillenia indica</i>	Dilleniaceae
Rohini	<i>Mallotus philippensis</i>	Euphorbiaceae
Sal	<i>Shorea robusta</i>	Dipterocarpaceae
Semul	<i>Bombax ceiba</i>	Bombacaceae
Sidha	<i>Lagerstroemia parviflora</i>	Lythraceae
Siris	<i>Albizia lebbek</i>	Mimosaceae
Sissoo	<i>Dalbergia sissoo</i>	Papilionaceae
Sunari	<i>Cassia fistula</i>	Cesalpiniaceae
Teak	<i>Tectona grandis</i>	Verbinaceae
Tentuli	<i>Tamarindus indica</i>	Cesalpiniaceae
GRASSES		
Bamboo	<i>Bambusa arundinacea</i>	Bambusaceae
Dhantwary	<i>Cymbopogon martini</i>	Gramineae
Khara grass	<i>Imperata cylindrical</i>	Gramineae
Phulabandhuni	<i>Thysanolaena maxima</i>	Gramineae

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Local Name	Botanical Name	Family Name
Sabai	<i>Eulaliopsis binata</i>	Gramineae
SHRUBS / HERBS		
Anantamula	<i>Hemidesmus indicus</i>	Asclepidaceae
Arakha	<i>Calotropis gigantea</i>	Asclepidaceae
Basanga	<i>Adhatoda vasica</i>	Acanthaceae
Dhatki	<i>Woodfordia fruticosa</i>	Lythraceae
Kurei	<i>Holarrhena antidysenterica</i>	Apcynaceae
CLIMBERS		
Atundi	<i>Combretum decandrum</i>	Combretaceae
Baidanka	<i>Mucuna monosperma</i>	Papilionaceae
Bichhuati	<i>Urtica dioica</i>	Euphorbiaceae
Mututri	<i>Smylax macrophylla</i>	Liliaceae
Siali	<i>Bauhinia valij</i>	Papilionaceae
Satabari	<i>Asparagus racemosus</i>	Liliaceae

FAUNA

Local Name	English Name	Zoological Name	Schedule
MAMMALS			
Bana bilei	Jungle cat	<i>Felis chausaffinis</i>	II
Barha	Wild Boar	<i>Sus scrofa</i>	III
Bilua	Jackal	<i>Canis aureus</i>	II
Bhalu	Sloth bear	<i>Melur susursinus</i>	I
Harin	Spotted deer	<i>Axis axis</i>	III
Hafi	Elephant	<i>Elephas maximus</i>	I
Heta	Hyaena	<i>Hyaena hyaena</i>	III
Jhinka	Porcupine	<i>Hystyrix indica</i>	IV
Kutura	Barking deer	<i>Muntiacus muntjak</i>	III
Mankad	Langoor	<i>Presbytis entellus</i>	II
Neula	Mongoose	<i>Herpestes edwardsii</i>	II
Sambar	Sambar	<i>Cervus unicolor</i>	II
Thekua	Hare	<i>Lepus nigricollis</i>	IV
Udanta musha	Bandicoot	<i>Bandicoot indica</i>	V
BIRDS			
Bana Kukuda	Jungle fowl	<i>Gallus gallus</i>	IV
Gunduri	Partridge	<i>Francolinus pondicerianus</i>	IV
Kapta	Ring Dove	<i>Streptopelia decaocto</i>	IV
Koel	Cuckoo	<i>Eudynamis scolopaceus</i>	IV
Kumbhatua	Crow pheasant	<i>Centropus sinensis</i>	IV
Kathahana	Wood peacker	<i>Picoides nanus</i>	IV
Sari	Hill myna	<i>Gracula ptilogenis</i>	IV
Sua	Indian myna	<i>Acridotheres tristis</i>	IV
REPTILES			
Dhamana	Rat snake	<i>Ptyas mucosus</i>	II
Godhi	Yellow monitor	<i>Varanus monitor</i>	I
Ajagar	Python	<i>Python molurus</i>	I

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2.2.4 Population :

Lease area :- Although the lease area falls within the village limits of Raikela, there is no human settlement within the area.

Zone of Influence :

The Zone of Influence within a radius of 10kms spread over fifty villages either fully or partially. The total no of household in these villages is 6531 and total population of this area is 30415.

The details are:

Male Population - 15463 (50.84%)

Female Population - 14952 (49.16%)

Scheduled Caste

Total - 1957 (6.4%)

Male - 989

Female - 968

Scheduled Tribe

Total - 21268 (69.93%)

Male - 10798

Female - 10470

Total Workers - 11653

Male workers - 7947

Female workers - 3706

Total Non Workers - 18732

Male non workers - 7516

Female non workers - 11216

Male literacy is 63% while Female literacy is 31%.

The Village wise details is enclosed in Annexure.

The literacy rate is high because it includes the town area of Barsuan. The total work force is also substantially high.

- 2.2.5 **Employment:** The lease area as well as the zone of Influence comes within the industrial and mining belt of Sundargarh District. The major employment of the population is Mining, and some are however Industrial Workers.

This mine will provide direct employment to 194 persons besides a large number of people will be engaged in various ancillary operations.

- 2.2.6 **Agriculture:** In the villages situated within the Zone of Influence the Agriculture land is only 18.66% of the total land area. Therefore only few people depend on Agriculture alone. Crops like Paddy, maize, millets such as bajara , jawar, cowpea, barsim etc. are raised for their own domestic consumption. At places where there is water availability the people also grow vegetables. The agricultural products are mostly used by people for their own bona-fide consumption.

- 2.2.7 **Industries:** A number of industries are situated around the lease area. The most important Industry is the Ferro-chrome Plant of TATA Steels. Several Iron Ore Crushers are also situated in the nearby areas. Rourkela Steel Plant is also situated within the same district at a distance of about 70 kms.

CHAPTER – III

MINING PROCESS

3.1.0 **Process** : The mining process is open cast mechanized mining method with deployment of mechanized shovel and high capacity dumper of matching size. Drilling and blasting activities will also be taken up. The method is called as shovel dumper system. The Ore will be transported through road. to the crusher unit for crushing. The transport will be by high capacity dumpers and Mechanised. loading arrangements are made at the mine area. Transportation to the Railway siding will also be done through high capacity dumpers. Several high capacity Dumpers are utilized for such transportation. For excavation of the mineral 10 high capacity Dumpers (10 MT capacity) are being utilized.

3.2.0 **Overburden**: The over burden will be drilled and blasted by using Air Compressor Wagon Drills and Jack hammer Drills. Volvo Loaders of 2.3Cum capacity shall be used for Loading of the Ore and removal of over burden. The overburden will be removed by dumpers. Total generation of overburden during the last five years has been as follows.

Year	Target in Cum		Achievement in Cum	
	Waste	Sub grade	Waste	Sub grade
2004-05	130380	43460	244347	137410
2005-06	129804	43268	342000	101400
2006-07	132660	44220	417207	136515
2007-08	143820	47940	82842	27321
2008-09	143940	47980	85461	28548
Total	680604	226868	1171857	431194

The production of Waste (Overburden) and Sub-grade Ore during the Last 5years has been almost double of the estimated target while the production of Ore has been 53% of the target.

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During the conceptual period total waste generation will be as follows

Year	OB	Sub-grade	Waste to be re-handled	Total
2009-10	44240	110600	40000	154840
2010-11	44290	110725	140000	155015
2011-12	15360	38400	40000	53760
Total	103890	259725	220000	363615

Waste generation during the conceptual period – 103890Cum

Re-handling of existing Waste will be - 222000 Cum

On an average annual Waste generation has been estimated to be 45000Cum and total generation of Waste to be 11.24Cum. These Waste will be efficiently managed to create minimum problem to the local people as well as Wild-life.

3.2.1

Waste Management: At present 3Ha area has been set out for OB

Dump: and during the conceptual period an area of 7Ha has been proposed to be used as OB Dump. This area can accommodate 16,00,000Cum of loose material or 13,33,00Cum of compact materials. Hence there will be no problem in accommodating the entire Over Burden. Two dump benches of 10mtr each height will be maintained. Average dump slope will be maintained at 28°.

The Dump site will be surrounded by garland drains which will prevent washing away of the dump materials.



Retaining wall is being provided around the dump area to prevent erosion.

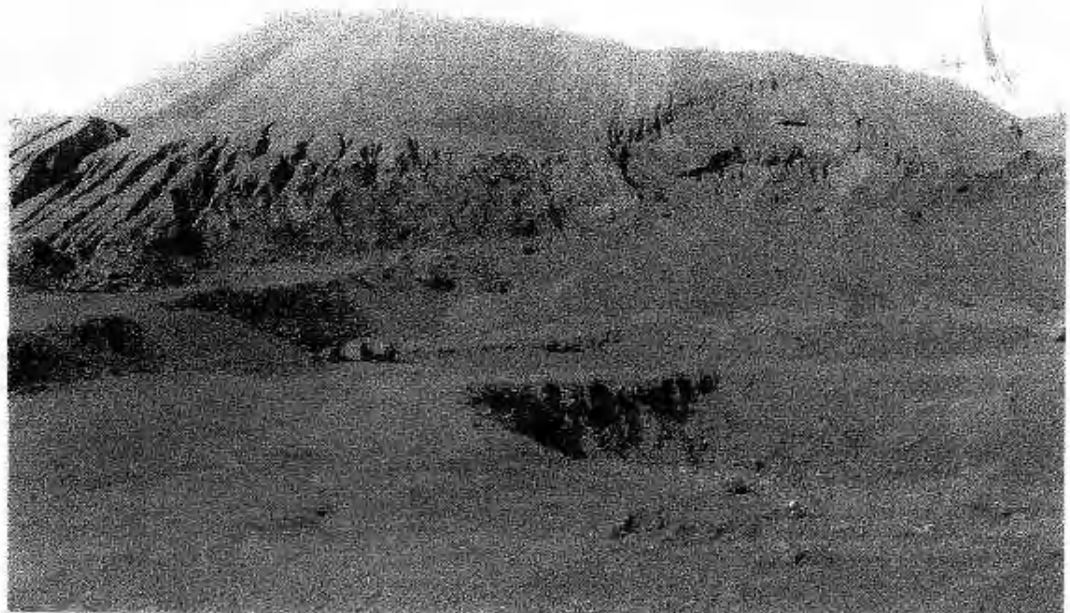
3.3.0 **Production of Ore:** During the 5years the target and production of Iron Ore has been as follows:

Year	Target of Ore Extraction in Tons	Achievements in Tons
2004-05	782280	445907
2005-06	778824	595300
2006-07	795960	794285
2007-08	862920	165370
2008-09	863640	174410
Total	4083624	2175272

Thus only 53% of the Target has been achieved during the last 5years.

3.4.0 **Size of the Benches :** The height and width of the Benches shall be maintained at 6mts and 10mts each respectively.

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The overall bench slopes is proposed to be 35° with the horizontal.

3.5.0 **Drilling & Blasting** : The proposed mining will have 6 m height benches and will be drilled for blast holes by 32mm compressed air operated Jack hammers and 100mm Wagon Drill. Sequential blasting with delayed detonators, proper spacing, usage of optimum explosives etc. will be adopted to reduce fly rock and vibrations.



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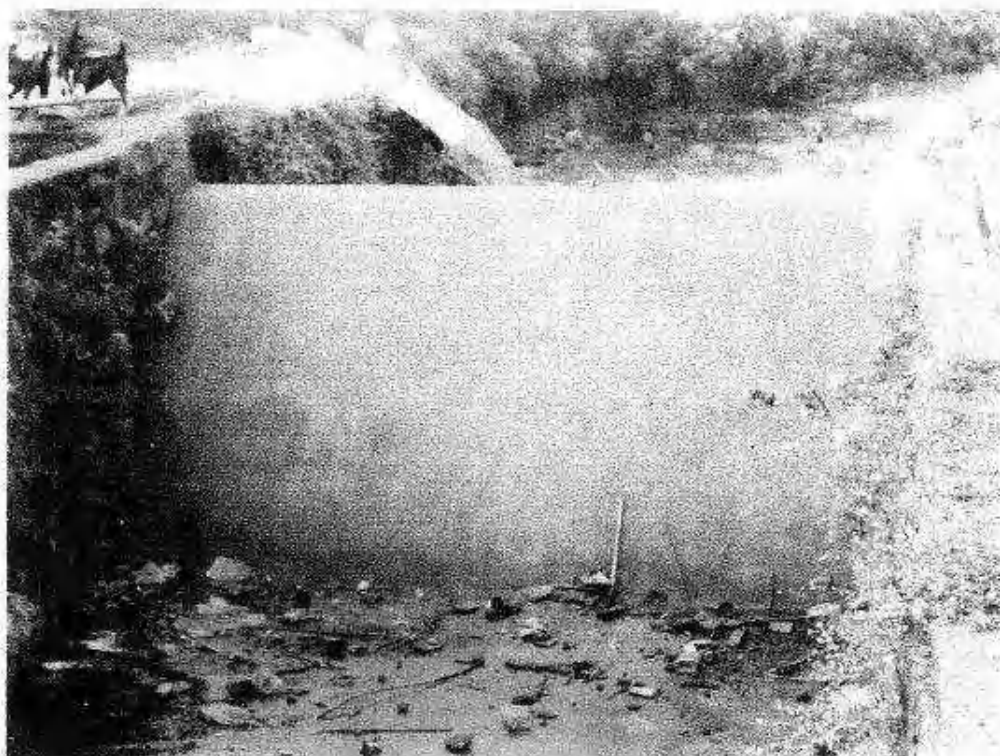
The in-situ massive ore will be dislodged by drilling followed by blasting prior to excavation and loading. The most common type of explosives readily available and will be used for the mine are as under:

- Slurry based explosives.
- Ammonium nitrate fuel oil mixture (ANFO)

3.5.0 **Extent of mine pits** : The lease area at present has pit size of 900m x 400m extending over 49.451 Ha and during the conceptual period the Pit size will be 923m x 590m extending an area of 50.893Ha.

3.6.0 **Ore Crushing Unit** : The ore obtained from the mines will be transported to the crushing unit and the crushed materials will be transported by dumpers to the Railways siding.

3.7.0 **Water Management** : The Ground water table in the lease area is very low and therefore the mine will generate very small amount of water. However during rains there will be accumulation of some water. The rain water will be channelised through garland drains provided around the dumps and mine pits to the settling tanks provided along the drains. The rain water dewatering process if required will involve chanalising the water along with slurry to pass through these garland drains and settling tanks. The treated water will be utilized for spraying the haul road for suppression of dust and the surplus treated water will be released to the natural drainage system.



Photograph of Check Dam and Settling Tank

3.8.0 Vehicles and machineries: The major mining activity will involve excavation and transportation of the Ore. For this purpose large numbers of vehicles will be used in the mining process besides use of drilling machines, generator operated-trolley mounted lighting systems and other required machineries like shovel loaders etc. The following machineries are proposed to be put in operation for the Mining purpose.

1. L&T Poclain CK 90- 0.9Cum	-	1 no
2. P C 200 – 0.9 Cum	-	2 no
3. Kamatsu 180 - 1.7Cum	-	2 no
4. VOLVO Loader - 2.3 Cum	-	1 no
5. L&T 580 – 2	-	1 no
6. Dumper 10MT	-	10 no
7. Air compressor 4" Wagon drill	-	2 no
8. Jack Hammer Drill	-	1 n o
9. Tractor with air compressor	-	1 no

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10. Jeeps	- 2 no
11. Dust screening Plant 200TPH	- 1no
12. ROM Plant	- 1 no

3.9.0 Engagement of Staff: The following persons will be directly employed in the Mining Process.

1. Mines Manager	- 1
2. 2 nd class Manager	- 2
3. Foreman	- 4
4. Supervisors	- 10
5. Mechanical Engineer	- 1
6. Mining Engineer	- 1
7. Electrical Engineer	- 1
8. Geologist	- 1
9. Surveyors	- 2
10. Blaster	- 2
11. Clerical Staff	- 6
12. Supporting Staff	- 11
13. Other Workers	- 152
Total	- 194

Besides the above numbers of staff directly employed in the Mining activities, around 2000 persons will be indirectly benefited in other ancillary works.

3.9.0 Salient Features of mode of working: The Mining can be called as opencast Mechanized method. The mining operation such as excavation, blasting, loading and ore crushing will be mechanized. The overburden transportation will be done through dumpers.

The mine product will be transported through high capacity dumpers to the Railway siding

CHAPTER IV

THREATS TO WILDLIFE AND ITS HABITAT

4.0.1 The lease area of Raikela Iron Ore mines is spread over 67.586Ha. Out of the total area of 67.586Ha, 66.671Ha area is Forest Kissam land which is under the control of Revenue Department.

The vegetation in the Lease hold area is sparse. This area does not form a part of any Sanctuary or National Park. It is also not covered under any Forest Working Plan. No wild animals are present in this area. This area is also surrounded by various mines and mining activities.

This lease area being surrounded by various mining leases is not a good habitat for wild life.

The Forests around the lease area are disturbed due to various Mining activities and therefore the presence of Wild-life is very sparse. As per the information collected the following important Wild life species are occasionally found in the Forests areas within the Zone of Influence.

Local Name	English Name	Zoological Name	Schedule
MAMMALS			
Bana Bilei	Jungle Cat	<i>Felis chausaffinis</i>	II
Barha	Wild Boar	<i>Sus scrofa</i>	III
Bhalu	Sloth bear	<i>Melur susursinus</i>	I
Bilua	Jackal	<i>Canis aureus</i>	II
Gunduchi	Squirrel	<i>Funambullus penanti</i>	IV
Hati	Elephant	<i>Elephas maximus</i>	I
Harin	Spotted deer	<i>Axis axis</i>	III
Heta	Hyaena	<i>Hyaena hyaena</i>	III
Jhinka	Porcupine	<i>Hystyrix indica</i>	IV
Kutura	Barking deer	<i>Muntiacus muntjak</i>	III
Mankad	Monkey	<i>Presbytes entellus</i>	II
Neula	Mongoose	<i>Herpestes edwardsii</i>	II
Neula	Hill Mongoose	<i>Herpestes javanicus</i>	IV

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<i>Local Name</i>	<i>English Name</i>	<i>Zoological Name</i>	<i>Schedule</i>
Sambar	Sambar	<i>Cervus unicolor</i>	II
Thekua	Hare	<i>Lepus nigricollis</i>	IV
Udanta Musa	Giant Squirrel	<i>Ratufa indica</i>	II
BIRDS			
Bana Kukuda	Jungle fowl	<i>Gallus gallus</i>	IV
Kapta	Ring Dove	<i>Streptopelia chinensis</i>	IV
Koel	Cuckoo	<i>Eudynamis Scolopaceus</i>	IV
Kumbhatua	Crow pheasant	<i>Centropus sinensis</i>	IV
Gunduri	Partridge	<i>Perdica asiatica</i>	IV
Kathahana	Wood peacker	<i>Picoides nanus</i>	IV
Kumbhatua	Crow Pheasant	<i>Centropus sinensis</i>	IV
Petcha	Owl	<i>Athenebrama indica</i>	IV
Sari	Indian Moyna	<i>Acridotheres tristis</i>	IV
REPTILES			
Ajagar	Python	<i>Python molurus</i>	I
Boda	Common Boa	<i>Erix conicus</i>	IV
Naga	Cobra	<i>Naja naja naja</i>	II
Dhamana	Rat snake	<i>Ptyas mucosus</i>	II
Godhi	Yellow monitor	<i>Varanus monitor</i>	I

Non of the Endangered or Endemic Wild-Life species are found here. Even though this area does not form a part of any National Park or Sanctuary or Critical Wild Life Habitat, the following threats are anticipated to the wild life and its habitat.

1. Threats within the mining area.
2. Threats within the Zone of Influence.

4.1.0 Threats within the Mining area.

Mining operation in the area will involve various activities such as Drilling, Blasting, Crushing the Ore, movement of large number of Machineries, Vehicles and Workers. Such activities may cause the following threats.

4.1.1 Reduction in wildlife habitats

Due to the mining activities 66.671Ha. forest area will not be available for general purpose such as collection of fuel, small timber and other NTFP items by the local population. This area will also not be available for use by the wild animals however occasional it may

be. Thus Wild-Life Habitat to the extent of lease will be reduced.

4.1.2 Soil erosion

The mining activity will involve removal of all the forest cover and top Soil and digging of large pits. Major part of the forest land will come under the mining pit setting aside the safety zone. The Topographical features of the lease area puts it in high erosion prone area. Therefore Large scale soil erosion is bound to take place which may cause formation of Gullies and Ravines leading to further destruction of adjoining Forest as well as wild-life habitat. The possibility of land slide also cannot be ruled out.

4.1.3 Water availability

- (a) **Loss of Moisture:-** Due to mining activity there will be large scale evaporation from the exposed soil and moisture retention capacity of the soil along the periphery of the mine pits will reduce. The sub-soil water will also be reduced which may lead to destruction of some more vegetation due to desiccation. The process of dewatering and releasing huge quantities of water in to the natural drainage system may reduce the recharge of Sub-soil water and ground water, resulting in water scarcity.
- (b) **Water accumulation:-** Digging of large pits will accumulate huge quantities of water which will lure the Wild animals and ultimately may trap them in the pits which will be fatal for them.

4.1.4 Water pollution

The water source available within the mining area is likely to be muddy due to presence of large amount of dust and broken up soil and mineral particles. It is also likely to be contaminated due to excessive plying and cleaning of heavy vehicles and machineries. Use of Slurry pumps for de-watering purpose and releasing the said water along with Slurry in the natural drainage system will contaminate the natural streams and pose health hazards for the human population as well as animals.

4.1.5 Dust pollution

The mining process includes Blasting, Drilling, movement of
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heavy vehicles and machineries etc. These activities will produce large amount of dust. There will also be some Ore Crushing and Dressing Units which will generate dust along with some mineral powder. The process of internal transportation, unloading, reloading etc. may spread large amount of dust. Such dust mixed with mineral powder is likely to cause air pollution. This will create respiratory problems in wild animals. Large amount of Dust will settle on the Grasses and other fodder plants which when taken by animals will cause Digestive problems.

4.1.6 Noise pollution

The Environmental Management Plan sets out that, there will be no impact of Noise produced in the Mining process. The Noise Levels are proposed to be kept within permissible limits. However operation of heavy machinery and Blasting in the mining area will produce large amount of sound which may cause disturbance to wild animals within the nearby Wild-life habitat. Movement of large numbers of heavy vehicles in and around the lease area will disturb the wild animals and create panic.

4.1.7 Lighting

The entire lease area will be lighted for safety reasons and convenience. Such lighting will create panic in wild animals surrounding the lease area. However due to such lighting the wild animals will try to avoid the mining area.

Movement of large number of vehicles at night with their lights on in and around the lease area will disturb the Wild animals.

4.1.8 Accumulation of Garbage

Due to various activities in the mining process, movement of large number of work force and vehicles within the mining area, a large quantity of garbage will be generated within the mining area.

The Garbage include Solid Wastes such as Over burden, Mine

Waste, Sub-grade Ore etc.

Besides some amount of non Bio degradable Waste and Hazardous waste such as used oil, used batteries, oily sludge, filter materials containing oil are likely to be generated within the lease area.

These dangerous materials will create various health problems for both human population as well as animal population including wild animals.

4.1.9 Fall of animals in Mine pits

The mining pits are dug with very steep slopes. The bench height will be 6mts with slope of 70° and bench width of 12mts makes the overall slope 28° . Usually no physical barrier is provided around the mine pits. Any accidental fall of the animals in those pits may be fatal for the animals.

4.1.10 Poaching

The poachers may also drive the animals and lead them in to the mining pits using the same as animal traps.

4.2.0 Threats in the Zone of Influence.

Due to the mining operation there will be some disturbance in the surrounding area, particularly in the Zone of Influence.

4.2.1 Destruction of wildlife habitat.

Due to mining activity over the lease area, the biotic pressure which was exerted over the lease area will be shifted to the surrounding areas. Collection of fuel wood, small timber and other NTFP by the local people will also be shifted to the surrounding area which will create additional pressure on the surrounding area. Grazing pressure of the local Cattle will also be shifted to these Forests. Therefore the wildlife habitat in these Forest areas is likely to be disturbed.

4.2.2 Water pollution

Large quantities of water produced in the process of mining which are highly polluted will be released in to the natural drainage system, there by contaminating natural water sources. The slurry generated in the mining process will also be pumped out in to the natural drainage system making the natural water source unfit for consumption by animals as well as human beings. Besides large amount of Garbage will be generated in the mining area and will contaminate the water. These contaminated water will create health problems within the Zone of Influence as well as beyond.

4.2.3 Dust pollution

The mining process, Ore Crushing/dressing and transportation will spread large quantities of dust in the surrounding area. There will be heavy air pollution in and around the lease area creating various problems for the animals.

4.2.4 Man animal conflict.

Due to reduction of habitat, additional biotic interference will be exerted in the Zone of Influence which will create disturbance. There will be also shortage of food. The animals are therefore likely to invade cultivated lands and human habitation which will result in man-animal conflict.

4.2.5 Accidental killing of animals

Due to plying of large number of vehicles the animals will be scared and in the process some animals may be killed accidentally by vehicles.

4.2.6 Forest Fire

Forest fire is a common phenomena in almost all forests areas irrespective of mining activity. But due to mining activity such as movement of large number of vehicles, people etc. the incidence of accidental fire is likely to increase. The wildlife habitat is destroyed along with important flora and fauna due to forest fire. The small

animals including reptiles are usually killed in the forest fire. Sometimes the large animals are also trapped in the fire. Increased Biotic pressure in the Zone of Influence will also increase the incidence of fire hazard.

CHAPTER V

WILDLIFE MANAGEMENT PLAN



5.0.0 Although there are no Wild animals within the lease area their occasional movement in the area can not be ruled out. Due to grant of lease and operation of various mining activities the Wild life movement within the lease area will be threatened. Besides the Wild-life habitat is reduced to the extent of lease. The Wildlife Management Plan therefore aims at improving the habitat in the surrounding areas. Certain measures are also required to be taken within the mining area.

 The proposed measures can be taken within the mining area by the lessee and beyond the lease area by the Government (Forest Department) with the financial support provided by the lessee.

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5.0.1 **Management Plan**

Basing on the perceived threats to wildlife as per the foregoing chapter, the Management Plan is prepared to address almost all such threats. The lease hold area as well as the Zone of Influence will be treated for habitat improvement so that, more fodder and water will be available for the wild animals.

The life of the mine has been estimated to last beyond 2018-19. But this plan is proposed for a period of 5 years on the presumption that, the habitat improvement in the adjoining area ie. the Zone of Influence can be achieved to the desired level.

5.1.0 **Measures to be taken within the mining Lease area.**

The activities taken up in the lease area will pose maximum threat to wildlife. It is therefore necessary to minimise such threats. The following steps will be taken within the lease area.

5.1.1 **Safe passage to Existing Wild-life**

Even though Wild animals are not found in the lease area it is probable that, some reptiles and small animals might be living in the area. It is therefore very important to save the existing wild animals available within the lease area and to divert them to safer locations. It can be possible to achieve such objective by commencing the mining activities from locations situated away from the Forest areas. Thereby the Wild animals present within the Lease area will find their way to nearby Forest areas.

5.1.2 **Restoration of habitat**

In the mining lease area the lessee has already planted 17900 seedlings of different species within the lease area over an area of 7.62Ha from the year 2004-05 to 2008-09 and 9550 seedlings planted outside the lease area during the said period. It is further proposed to plant another 6400 seedlings during the next three

years. The safety zone of 7mts around the mining lease area will be maintained with good vegetation creating a green belt around the lease area which will control spreading of dust. This belt will also act as a buffer zone between the mine and the Wild-life habitat. This aspect has been proposed in the approved Mining Plan, hence no additional funds are proposed for this.

Besides the above proposed steps the overburden will be filled back in the mine pits and plantations will be taken up as per Mine Closure Plan.

The major steps taken in regard to restoration of habitat within the lease area are:

- (i) Existing plantation of 17900 seedlings.
- (ii) Proposed plantation of 6400 seedlings in next 3years.
- (iii) Maintain Forest Growth along the safety zone.
- (iv) Planting of grasses and other species on the OB Dumps.

5.1.3 **Soil and water conservation**

There will be substantial loss of moisture as well as occurrence of soil erosion due to mining activity. For enhancing seepage of water and to reduce soil erosion the rain water will be channallised through garland drains provided around the dumps to the settling tanks provided along the drains. The rain water dewatering process if required will involve channallising the water along with slurry to pass through these garland drains and settling tanks. The treated water will be utilized for spraying the haul road for suppression of dust.

In the safety zone the rain water will be diverted through easy gradient drains to minimise soil erosion. Check-dams will be provided on the natural channels in order to prevent soil erosion in the safety zone. These activities have been proposed in the Mining Plan, hence no separate provision is made on this account.

5.1.4 Control of Dust



Dust hazards affect more to the human beings and the workers engaged in the mining activity, besides creating problems for the wild animals. Therefore dust control is a major activity in the mining process. Dust pollution cannot be completely eliminated, but attempt is made to reduce the quantum of dust pollution.

The Haul Road in the mining area are regularly sprinkled with water so that, dust is minimised due to movement of vehicles.

The Ore at the time of loading, transportation and unloading in and around the mining area will also be sprinkled with water to reduce Dust pollution.

Dust control measures have been proposed as a requirement in the approved Mining Plan and therefore special provision is not made for this activity in this Plan.

M/s GEETARANI MOHANTY

5.1.6 Control of water pollution.

Water pollution is the most important factor in mining process. Huge quantities of water will be produced every day along with slurry which are to be removed from the mining pits and released to the natural drainage system. Besides contaminated water due to cleaning of vehicles and machineries, dumping of Garbage etc. will flow to the natural water sources creating health hazards.

The water pollution will be controlled by treatment of water before releasing the same to the natural drainage system

Since the lease area is situated on higher altitude the generation of water from the mine pit will be minimum which can be easily handled.

The discharged water will be collected in sump pits and channelled to treatment plant. The treatment plant will consist of :

- (i) Oil, Grease trap,
- (ii) Sedimentation pond,
- (iii) Chemical dosing arrangement to arrest suspended Solid, oil and Grease.

The treated water instead of releasing to the natural drainage system will be used in dust suppression on haul roads, washing of dumpers and dozers etc.

Oil and Grease recovered in the process will be stored in drums and auctioned.

Surface runoff will be collected through garland drains and diverted to sedimentation tanks. There after the overflow will be diverted to the natural drainage system.

All these measures are required to be complied in the approved Mining Plan, therefore special provision is not made for this in this Plan.

5.1.7 Noise control

The following measures will be taken to keep the noise at the minimum possible level:

- Proper designing of plant & machinery by providing in-built mechanisms like silencers, mufflers and enclosures for noise generating parts and shock absorbing pads at the foundation of vibrating equipment.
- Routine maintenance of equipment,
- Enclosures for Ore Crushing/dressing units etc.
- Rational deployment of noise generating plant and machinery.
- Greenbelts around the quarry, infrastructure sites, service building area
- Provision of isolation for vibrating equipment (both fixed and mobile) foundation.
- Regular monitoring of noise levels at various points.

5.1.8 Lighting



The core area of the mining activity is sufficiently illuminated. Such illumination detracts the animals from the core mining area, which would otherwise be dangerous to their lives. Care will be taken to focus the lights to the mine pits from the safety zone.

The use of vehicular Headlights which disturbs the animals is restricted and only dippers are allowed within the mining area.

These activities have been included in the mining process and hence no special funds are required .

5.1.9 **Garbage Management**

Garbage not only creates problems for the wild life but also creates problems for mining activity. Particularly non-degradable materials like polythene bags etc. pose a lot of problem for the machineries as well as Wild animals. Hence proper Garbage Management is also an important activity in Mining process. Some of the steps to be taken in the Mining area have been indicated under water pollution.

During the next three years of this Plan period the Solid Waste generation is estimated to be 1,03,890Cum. along with 2,20,000Cum. of rehandled waste. An area of 3.00Ha has been set out for the Waste Dump. It is estimated that, the proposed Dump site will be full within a period of 4 years. There after it is proposed to back fill the exhausted and abandoned mine pits so as to generate adequate space for the Waste. The Dump site will be surrounded by retaining walls followed by a series of garland drains. The size of the garland drains will be 1m wide and 0.5m deep. The water percolated through the wastes will be drained to the garland drains and then to settling tanks.

Besides the above steps, the additional steps which are to be taken for Garbage management are as follows.

M/s GEETARANI MOHANTY

- (a) Entry of non-biodegradable materials which are likely to produce Garbage such as Polythene bags, Aluminium foils, Tin foils etc. are restricted in to the Mining area.
- (b) The Garbage generated in the Mining area are regularly collected and segregated in-to Bio-degradable and non-degradable materials.
- (c) The non-degradable materials if any are sent for recycling.
- (d) The Bio-degradable substances are put in the Compost pits of size 10' x 10' x 6' for conversion in-to manure. The Manure obtained from these pits will be utilised for plantation purpose.

Two persons will be engaged on regular basis for collection, segregation of Garbage and putting the same at proper place. The expenditure on this account is proposed to be $(2 \times 4000 \times 12 \times 5 = \text{Rs. } 4,80,000/-)$ + Compost pits Rs.50000/- = Rs5.30lakhs.

5.1.10 Fall of animals in the mining pits.

In order to prevent accidental fall of animals in the mine pits the following steps shall be taken.

- (a) Two persons will be exclusively engaged in the mining area during night who will keep a watch on straying wild animals and drive them away to safe distance. The total expenditure for the animal watcher during the proposed 5 years period will be $(2 \times 4000 \times 12 \times 5 =)$ Rs.4,80,000/-.
- (b) Solar electric fencing will be provided at strategic locations where possibility of entry of wild animals in to the mining area is there particularly towards the forest area. It is proposed to provide Solar Electric fence over 2Kms., at a cost of Rs.6.00lakhs.
- (c) The mining area will be sufficiently illuminated so that the wild animals will avoid the area.
- (d) In-spite of the precautions taken, in case of accidental fall of any wild animal in the mining pit, the workers will be educated to inform the local Forest authorities and act as per their advise.

M/s GEETARANI MOHANTY

5.1.11 Prevention of poaching

The mining area is well guarded and sufficiently illuminated. Hence no poaching can be possible within this area.

5.1.12 Creation of awareness

The lessee will also create awareness around the lease area regarding protection of wild life and its habitat through distribution of leaflets, organising Essay Competition, Debate Competition in the Schools etc. For this purpose the lessee will incur expenditure of Re.2.00lakh.

5.2.0 Measures to be taken within the Zone of Influence

Due to diversion of Forest area of 66.671Ha for mining purpose the wild-life habitat to this extent will be reduced. The congregation of wild animals in the Zone of Influence is likely to increase. These animals will therefore be susceptible to greater threats. There will also be additional Biotic pressure on the Zone of Influence. The Management Plan therefore aims at reducing such threats. These activities beyond the Mining lease area and beyond the control of the Lessee will be undertaken by the Forest Department.

5.2.1 Habitat Improvement

It is proposed to improve the wild life habitat within the Zone of Influence with the following activities.

(a) Plantation :- Creation of cover for the wildlife by planting of suitable species in degraded forest areas. It is proposed to take up plantation over 40 ha. within 5 years period at a cost of Rs.20.00 lakhs.

(b) Grass Land development:- The natural blanks in the forest areas are to be developed as grass lands. It is proposed to create 5 Ha Grass land during the initial two years period at a cost of Rs.2.50 lakh.

(c) Soil and moisture conservation:- Check dams of random rubble

stones are to be provided to prevent soil erosion and conserve moisture. It is proposed to provide Rs.5.00 lakhs for the activity.

(d) It is also proposed to recharge the ground water and sub-soil water by providing a series of percolation pits. These percolation Pits will also arrest soil erosion by reducing surface run-off. The lessee proposes to contribute Rs.2.50 lakhs for the purpose.

(e) Creation of Water body :- In order to contain the wild animals in a safe habitat, it is proposed to make provision for availability of water during summer season. It is proposed to create one water body at a strategic location at a cost of Rs.5.00 lakhs.

5.2.2 **Control of Water pollution.**

Release of untreated water to the natural drainage system will create health hazards for the animals as well as human beings. All the water including slurry generated in the mining process will be treated. Attempt will be made to utilize the total quantity of water generated in the mine itself for suppression of dust and irrigation of the plantation. Only some surplus treated water will be released to the natural drainage system. This aspect has been dealt in the Mine plan and hence no separate provision is made in this Plan.

5.2.3 **Reducing Man-animal conflict.**

In the lease area as well as the areas within the Zone of Influence the man-animal conflict is found to be minimum. Most important man-animal conflict is Man-Elephant conflict. Such conflict will be reduced by creating awareness in the forest fringe villages about the behaviour of the animals and the procedure to tackle the emergency. The local people can be educated regarding the wild-animal habits and how to tackle the emergency situations. It is proposed to engage two motivators for a period of five years. The cost on this account will be $(5 \times 2 \times 4000 / - \times 12 \text{ months} =)$ Rs.4.80 lakhs. This amount is proposed to be borne by the lessee.

5.2.4 **Forest Fire prevention**

Forest fire is the greatest threat, not only to the wild life but also to the

M/s GEETARANI MOHANTY

forest itself. Repeated forest fire destroys the ground vegetation and the humus. The wild animals do not get adequate food and cover due to such repeated forest fire.

The Wildlife Management Plan therefore lays maximum emphasis on prevention of forest fire. The following measures are therefore proposed to be taken to prevent forest fire:

(a) **Engagement of Fire watchers**

Fire watcher shall be engaged in the area from the month of March to June every year for a period of 5 years. The lessee proposes to bear the cost of 3(three) fire watchers during the summer months every year. The total cost on this account will be $(3 \times 4000 \times 4 \times 5 =)$ Rs.2.40lakhs. These Fire watchers will also be equipped with certain tools to attend to emergencies. The lessee therefore proposes to contribute Rs.1.00 lakh for such fire fighting equipments.

(b) **Provision of incentive to fringe villages.**

Awareness will be created among the forest fringe villages to prevent forest fire. The village which can successfully prevent forest fire in the specified patch of the forest near their village will be rewarded with incentive. It is proposed to reward such villages with Rs.10,000/- annually. The lessee proposes to bear the cost of incentive for 5 such villages within the ZOI and the amount will be deposited with the D.F.O. The cost will therefore be Rs2.50lakhs.

(c) **Fire lines**

Fire lines is an effective means to prevent spreading of Forest fire. The lessee proposes to share the cost of 10 kms. of fire line @4,000/- per kms. annually during the proposed period of five years with a total cost of Rs2.00lakh.

5.2.5 Solar Electric Fencing

At important places solar electric fencing can be taken up to prevent the animals from entering in to human habitation. This can be done at the discretion of the Forest Department. The Lessee proposes to contribute Rs.5.00 lakhs for this purpose.

M/s GEETARANI MOHANTY

5.2.6 Provision of Corpus fund

Usually any damage to human life and property by wild-animals are compensated through Compassionate Grants released by Govt. But at times delayed payment of compassionate amount leads to revengeful attitude of local people. It is therefore proposed to create a revolving fund for quick payment of compassionate grants. The lessee proposes to contribute Rs.5.00 lakhs for this purpose.

5.2.7 Collection of Intelligence.

In-order to properly address the problem of Wild Animal Poaching , it is necessary to keep track of the local Poachers and to collect information regarding their movement. For this it is proposed to reward the Informers and Decoys. The reward can be paid to the Informer or Decoy either on regular wage basis or lump sum basis at the discretion of the Forest Department. The VSS or Eco-Development Committees can also be involved with an assured reward system. The lessee proposes to deposit Rs.5.00 lakhs in Fixed Deposit Account in favour of the DFO and the annual interest can be drawn by the DFO and utilized for this purpose.

5.2.8 Provision of equipments & Logistics.

Certain equipments such as Computers, GPS, four wheeler, Motor-cycles, Crackers, Search lights etc, as per the requirement and specification of the Implementing DFO/ Forest Department, will be supplied by the lessee . It is proposed to provide Rs.6.00 lakh for this purpose.

5.3.0 Discretion of Forest Department

Although the above proposals are submitted for the mitigation of various threats to Wild-life and its habitat, the Forest Department is free to make alteration of the proposal or to divert the proposed activities to any other suitable locations.

M/s GEETARANI MOHANTY

CHAPTER-VI FINANCIAL FORECAST

- 6.4 Based on activities suggested in the Chapter-V broad financial estimate for activities within the lease hold area and in the adjoining forest etc. areas.
- 6.5 The activities proposed to be taken up inside the leasehold area are to be executed by the User agency under the supervision and monitoring of DFO, Bonai Forest Division.
- 6.6 The following table indicates the cost estimate for measures to be taken inside & outside the project area within 10-years. The cost of activities to be taken up in the project impact area (ZoI) i.e. outside leasehold area shall be deposited with the Forest Department to be utilized by the Divisional Forest Officer, Bonai Division for execution of works under the guidance of Conservator of Forests, Rourakela Circle. User agency will deposit Rs.72 lakhs with DFO, Bonai Division under CAMPA for implementation of the plan.

6.1.0 Activities within the Project area.

(Rs. In lakhs)

Sl. No.	Item of work	Amount approved by CWLW
1	Garbage Management- Wages Compost pits	To be approved by Pollution control board as per their norms.
2	Wild animal watchers- 2nos.	5.00
3	Solar electric fencing- Fencing should be confined to mining pits and proper corridor and passage should be left for passing wild animals including Elephants moving in the area.	6.00
4	Awareness promotion, livelihood activities, signages, animal and health camps.	2.00
5	Soil & Moisture conservation measures with contour trenches/ series of check dams on nalas & rivulets/ brushwood dams/ especially to avoid choking of nalas/soil erosion etc.	3.00
6	Creation of Water sources in the forest area for the residual wild life including small mammals, reptiles, Avifauna etc in the area for 10 years including artificial refilling if necessary during hot summer months HDPE troughs, ponds etc.	2.00
7	General provision for equipments, such as GPS, Computers, Vehicle, Motor Cycles, Crackers, Search lights etc. as per specification of the DFO.	10.00
	TOTAL	28.00

6.2.0. Activities within the Project Impact area (zone of influence).

Sl. No.	Item of work	Amount proposed for approval by CWLW
1.	Habitat improvement both in project impact area including with Fodder & fruit bearing species block plantations and ANR with gap plantations with above species, meadow development, Bamboo plantations/bamboo clumps silvicultural operations etc.,	23.00
2	Soil & Moisture conservation measures/percolation pits, with contour trenches/ series of check dams on nalas & rivulets/ brushwood dams/ especially to avoid choking of nalas/soil erosion etc.	8.00
3	Creation of Water Body	5.00
4	Fire watchers-3nos.	2.50
5	Fire fighting equipments	1.00
6	Incentive for fire prevention	2.50
7	Fire line tracing	2.00
8	Solar electric fencing	5.00
9	Corpus fund	5.00
10	Intelligence collection	5.00
11	Biodiversity monitoring & Development of communication network / GIS based maps Satellite maps on GIS domain should be procured every year to know the changing profile of the project area in both dry season and wet season for 10 years preferably using the GIS lab of PCCF(WL), Orissa	5.00
12	Awareness promotion, livelihood activities, signages, animal and health camps.	6.00
13	Unforeseen expenditure	2.00
	TOTAL	72.00

N.B: All measures for dump reclamation, dust suppression, garbage bins, soil erosion measures should be taken up including retaining walls, plantation, plantations in the safety zone etc. as per the reclamation plan/safety zone plantation scheme etc to be prepared in terms of the approved plans and other guidelines. These components are to be dealt separately as per the above guidelines and to be approved by competent authority. Hence no financial forecast on this account is indicated in the conservation plan.

Approved by PCCF(WL)& CWLW, Orissa.


Conservator of Forests (WL)

Conservator of Forests (WL)
O/o Chief Wild Life Warden
Orissa, Bhubaneswar

REFERENCES

1. Mining Plan of Raikela Iron Ore Mines.
2. India State of Forest Report 2009
3. Orissa Forest Status Report 2003-2004
4. Working Plan of Bonai Forest Division.
5. District Census Hand Book.

OFFICE OF THE DIVISIONAL FOREST OFFICER: BONAI DIVISION.
Ph/Fax-06626-244434 Email: dfo_bonai@sancharnet.in

No. 2840 /6F-dt. 29.6.07

To,

Sri Srinibas Sahu,
Managing Partner,
M/s Geetarani Mohanty,
Station Road, At/Po-Barbil,
Dist-Keonjhar.

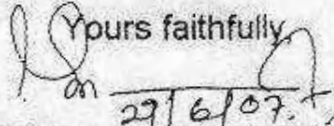
Sub:- Environmental Clearance of Project of Raikela Iron Ore
Mines of M/s Geetarani Mohanty over an area of 67.586 Ha
in village Raikela of Sundargarh District.

Ref:- Your letter No. 45 dt.25.6.2007.

Sir,

With reference to your letter cited above, the Certificate
required for Environmental clearance of your Raikela Iron Ore Mines is
furnished below.

" Certified that the lease-hold area of Raikela Iron Ore Mines
does not form part of any National Park, Wild Life Sanctuary, Bio-sphere
Reserve, Tiger Reserve or, Elephant Corridor."

Yours faithfully

29/6/07
Divisional Forest Officer,
Bonai Division.

F No. 8-37/2007-FC
Government of India
Ministry of Environment and Forests
(F.C. Division)

Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003.
Dated: 25th August, 2008.

To

The Principal Secretary (Forests),
Government of Orissa,
Bhubaneswar.

Sub: Diversion of 64.148 ha. of forest land for Iron Ore mining in favour of M/s Geetarani Mohanty in village Raikela of Bonai Tahasil in Sundargarh district of Orissa.

Sir,

I am directed to refer to the State Government's letter No. 10B(Cons)120/2006.6879/F&E dated 05.05.2007 on the above mentioned subject, wherein prior approval of the Central Government for the diversion of 64.148 ha. of forest land for Iron Ore mining in favour of M/s Geetarani Mohanty in village Raikela of Bonai Tahasil in Sundargarh district of Orissa, was sought, in accordance with Section 2 of the Forest (Conservation) Act, 1980. The said proposal has been examined by the Forest Advisory Committee constituted by the Central Government under Section 3 of the aforesaid Act.

2. After careful consideration of the proposal of the State Government of Orissa and on the basis of the recommendations of the Forest Advisory Committee, the Central Government hereby agrees in principle for the diversion of 64.148 ha. of forest land for Iron Ore mining in favour of M/s Geetarani Mohanty in village Raikela of Bonai Tahasil in Sundargarh district of Orissa, subject to the fulfilment of the following conditions:-

1. Legal status of the diverted forest land shall remain unchanged.
2. (i) The User Agency shall identify and acquire non-forest land equal in extent to the area to be diverted (64.148 ha) for Compensatory Afforestation, which shall be situated in favour of the State Forest Department.
- (ii) The land identified for the purpose of Compensatory Afforestation shall be clearly depicted on a Survey of India toposheet of 1:50,000 scale.
- (iii) The User Agency shall transfer the cost of Compensatory Afforestation to the State Forest Department at an enhanced rate of 2.5 times of the proposed rates.

- (iv) Clarification regarding proximity of CA land for proper management shall be furnished by the State Government.
- (v) The non-forest land identified for raising Compensatory Afforestation shall be notified by the State Government as RF under Section-4 or PF under Section-29 of the Indian Forest Act, 1927 or under the relevant Section(s) of the land Forest Act, as the case may be, within a period of six months. The Nodal Officer (Forest Conservation) shall report compliance in their regard.

3. Fencing, protection and regeneration of the safety zone area (7.5 metre strip all along the outer boundary of the mining lease area) shall be done at the project cost. Besides this, afforestation on degraded forest land, to be selected elsewhere, measuring one and a half times the area under safety zone, shall also be done at the project cost.

4. All measures should be taken to prevent pollution of tanks, rivers and nalas, etc. The desilting of adjoining villages in radius of 5 Km may also be taken up by the User agency from time to time.

5. Following activities shall be undertaken by the State Forest Department at the project cost:

(i) Proper mitigative measures to minimize soil erosion and choking of streams shall be prepared and implemented.

(ii) Planting of adequate drought hardy plant species and sowing of seeds to arrest soil erosion.

(iii) Construction of check dams, retention/toe walls to arrest sliding down of the excavated material along the contour.

6. Wherever possible and technically feasible, the User Agency shall undertake by involving local community, the Afforestation measures in the blanks within the lease area, as well as along the roads outside the lease area diverted under this approval, in consultation with the State Forest Department at the project cost.

7. The period of diversion under this approval shall be twenty (20) years subject to possession of valid lease by User Agency under the MMDR Act, 1957.

8. The State Government shall charge the Net Present Value of the forest area diverted under this proposal from the User Agency as per the Orders of the Hon'ble Supreme Court of India dated 30.10.2002, 01.08.2003, 28.03.2008 and 09.05.2008 in WP(C) No. 202/1995 and as per the guidelines issued by this Ministry vide letters No. 5-1/1998-FC(Pt.II) dated 18.09.2003 and 22.09.2003 in this regard.

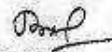
9. At the time of payment of the Net Present Value (NPV) at the present rate, the User Agency shall furnish an undertaking to pay the additional NPV, if so determined as per the final decision of Hon'ble Supreme Court of India.

10. All the funds received from the User Agency under the project shall be transferred to in Account No. 344901010070128 of Union Bank of India, Sunder Nagar, New Delhi-110003.

11. The User Agency will bear the cost of Penal Compensatory Afforestation over equivalent degraded forest land for violating the Forest (Conservation) Act from 1986 to 1996.

12. After receipt of the compliance report on fulfilment of the conditions mentioned above, the proposal shall be considered for final approval under Section-2 of the Forest (Conservation) Act, 1980.
13. Transfer of forest land shall not be affected till final approval is granted by the Central Government in this regard.
14. The lease will remain in the name of M/s Geeta Rani Mohanty and if any change has to be done, it will require prior approval of the Central Government as per guidelines.
15. Any other condition that the CCF (Central), Regional Office, Bhubaneswar / the State Forest Department may impose from time to time for protection and improvement of flora and fauna in the forest area, shall also be applicable.
16. All other conditions under different rules, regulations and regulations including environmental clearance shall be complied with before transfer of forest land.

Yours faithfully,


(B.K. Singh)

Sr. Assistant Inspector General of Forests

Copy to:

1. The PCCF, Government of Orissa, Bhubaneswar.
2. The Nodal Officer, O/o PCCF, Bhubaneswar.
3. The Chief Conservator of Forests (Central), Regional Office, Bhubaneswar.
- ✓ 4. The User Agency.
5. The Monitoring Cell, FC Division, MoEF, New Delhi.
6. Guard File.


(B.K. Singh)

Sr. Assistant Inspector General of Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110003.

Dated the 2nd July, 2008

M/s Geetarani Mohanty
Station Road, Barbil,
Keonjhar,
ORISSA-758 035
E: mail: sahoo_ore@yahoo.co.in

Subject: Expansion of Raikela Iron Ore Mining Project of M/s Geetarani Mohanty located in Village Raikela, Tehsil Bonai, District Sunderarh, Orissa-environmental clearance req.

Sir,

This has reference to your letter No. 231/GRM/MoEF/05-06 dated 17.03.2006 and subsequent letters dated 05.12.2006, 27.07.2007, 15.10.2007, 17.12.2007, 23.03.2008 and 02.04.2008 on the subject mentioned above. The proposal is for enhancement of production of iron ore from 0.142 million tonnes per annum (million TPA) to 0.864million TPA. The total mine lease area of the project is 67.586ha, out of which 66.671ha is forestland and 0.915ha is others (Sarba Sadharana). Area proposed for mining is 50.893ha, an area of 3ha is kept for over burden dump, 4.568ha for mineral storage, 0.2ha for infrastructure, 2.985ha for roads, 2.603ha for green belt, 2.422ha for mineral separation plant and 0.915ha is others. It has been proposed that the Sarba Sadharana land of 0.915ha will not be acquired. The Suna Nallah is located at a distance of 1km toward North West boundary of mine lease area. The Karo River is reported to be located at a distance of 7.5km in South West of the mine lease. No national park/wildlife sanctuary/biosphere reserve/tiger reserve/elephant reserve etc. is reported to be located in the core and buffer zone of the mine and that the area does not report to form corridor for Schedule-I fauna. In support of this, the project proponent has furnished a map duly authenticated by DFO and Wildlife Warden, Boani Division. The Torha RF and Amrohi RF are in the buffer zone of the mine. The mine working will be opencast by semi-mechanised method involving drilling and blasting. The targetted production capacity of the mine is 0.864million TPA of iron ore and life of mine is 15years. Approximately 3000TPD of mineral will be transported through road. Mineral beneficiation is not a part of the project; however, sizing and screening of the ore will be carried out in the lease area. The topography of the area is hilly at an

21-

elevation ranging from 300m-840m AMSL. The ultimate working depth of mine will be 658m RL. The ground water table reported to prevail at 670m RL and the mine working will, therefore, go beyond water table. The water requirement of the project is estimated as 64.5m³ per day, out of which 14m³ per day will be sourced from the groundwater and remaining 50.5m³ per day.

will be met from the surface water. One revenue village namely Raikela having no population is in the core zone of the mine, however, no displacement of population and R&R is involved. Approximately $16,000\text{m}^3$ per month of solid waste comprising $12,000\text{m}^3$ per month of over burden (ferruginous laterite) $4,000\text{m}^3$ per month of sub grade ore will be generated, which will be stacked in the earmarked areas. It is estimated that $21,44,567\text{m}^3$ of waste will be generated during the mine life, out of which $8,17,002\text{m}^3$ will be disposed off in the form of external dump and $13,27,565\text{m}^3$ will be backfilled in 7ha of mined out area. Plantation will be raised in an area of 20.276ha at the end of the mine life. The public hearing of the project was held on 20.10.2005. The consent to establish from the State Pollution Control Board, Orissa obtained on 31.01.2006 for production of 72000TPM of iron ore involving lease area of 64.068ha. The Indian Bureau of Mines had approved scheme of mining along with the progressive mine closure plan of the project on 17.02.2005 for lease area of 67.586ha. The capital cost of the project is Rs.981.4Lakhs.

2. The Ministry of Environment and Forests has examined the application in accordance with Section 12 of the EIA Notification, 2006 read with para 1.2 of the Circular No. J-11013/41/2006-IA.II(I) dated 13.10.2006 and hereby accords environmental clearance under the provisions thereof to the above mentioned Raikela Iron Ore Mining Project of M/s Geetarani Mohanty for an annual production capacity of 0.864million tonnes of iron ore(ROM) by opencast semi-mechanized method involving mining lease area of 67.586ha, subject to implementation of the following conditions and environmental safeguards.

A. Specific conditions

- (i) All the conditions stipulated by the State Pollution Control Board, Orissa in their consent to establish shall be effectively implemented.
- (ii) Necessary forestry clearance under the Forest (Conservation) Act, 1980 for an area of 66.671ha is forestland shall be obtained before starting mining operation in that area. Environmental clearance is subject to grant of forestry clearance.
- (iii) The mining operations shall be restricted to 2m above the reported water table i.e. 672m RL and it should not intersect groundwater table.

..3/-

In case of working below ground water table, prior approval of the Ministry of Environment and Forests and Central Ground Water Authority shall be obtained, for which a detailed hydro-geological study shall be carried out.

- (iv) The project proponent shall ensure that no natural water course and/or water resources shall be obstructed due to any mining operations.
- (v) The top soil, if any, shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for a period more than 3years. The

अनुमोदित

APPROVED

shall be used for land reclamation and plantation.

(vi) The over burden (OB) generated during the mining operation shall be stacked at earmarked dump site(s) only and should not be kept active for long period of time. Proper terracing of OB dump shall be carried out so that the overall slope shall not exceed 28 degree. Out of the total $21,44,567\text{m}^3$ of waste to be generated during the mine life, $8,17,002\text{m}^3$ shall be disposed off in the form of external dump and $13,27,565\text{m}^3$ shall be backfilled in 7ha of mined out area. The backfilled area shall be afforested. The over burden dumps shall be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dumps. Monitoring and management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on six monthly basis.

(vii) Catch drains and siltation ponds of appropriate size shall be constructed around the working pit(s), mineral and OB dumps to prevent run off of water and flow of sediments directly into the Suna Nallah, Karo nallah, rivers and water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted particularly after monsoon and maintained properly.

Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and temporary over burden dumps to prevent run off of water and flow of sediments directly into the Suna Nallah, Karo nallah, rivers and water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.

..4/-

(viii) Dimension of the retaining wall at the toe of over burden dump and over burden benches within the mine to check run-off and siltation shall be based on the rain fall data.

(ix) Plantation shall be raised in an area of 20.276ha including a 7.5m wide green belt in the safety zone around the mining lease, backfilled area, quarry benches, roads etc. by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.

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(x) Regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of SPM and RPM such as around crushing and screening plant, loading and unloading point and transfer points. Extensive water sprinkling should be carried out on haul roads. It shall be ensured that the Ambient Air Quality parameters conform to the norms

prescribed by the Central Pollution Control Board in its regulations.

- (xi) Regular monitoring of water quality upstream and downstream of Nallah and Karo nallah shall be carried out and record of monitoring data should be maintained and submitted to Ministry of Environment and Forests, its Regional Office, Bhubaneswar, Central Groundwater Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.
 - (xii) The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.
 - (xiii) Regular monitoring of ground water level and quality should be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year - pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to Ministry of Environment and Forests and its Regional Office Bhubaneswar, Central Ground Water Authority and Regional Director, Central Ground Water Board.
 - (xiv) The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of water (surface water and ground water) for the project.
 - (xv) Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with Regional Director, Central Ground Water Board.
- ..5/-
- (xvi) Appropriate mitigative measures should be taken to prevent pollution of Karo River in consultation with the State Pollution Control Board.
 - (xvii) Minerals handling plant shall be provided with adequate number of high efficiency dust extraction system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These shall be properly maintained and operated.
 - (xviii) Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The mineral transportation shall be carried out through covered trucks only and the vehicles carrying the mineral shall not be overloaded.
 - (xix) Blasting operation shall be carried out only during the daytime. Controlled blasting shall be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.
 - (xx) Drills shall either be operated with dust extractors or equipped with water

injection system.

- (xxi) Consent to operate shall be obtained from the State Pollution Control Board prior to start of enhanced production from the mine.
- (xxii) Sewage treatment plant should be installed for the colony. ETP should also be provided for workshop and wastewater generated during mining operation.
- (xxiii) The project proponent should take all precautionary measures during mining operation for conservation and protection of endangered fauna, if any spotted in the study area and contribute towards the cost of implementation of the plan and/or Regional Wildlife Management Plan for conservation of flora and fauna so prepared by the State Forest and Wildlife Department. The amount so contributed shall be included in the project cost. A copy of action plan may be submitted to the Ministry and its Regional Office, Bhubaneswar within 3 months.
- (xxiv) A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.

B. General conditions

- (i) No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.
- (ii) No change in the calendar plan including excavation, quantum of mineral iron ore and waste should be made. ..6/-
- (iii) Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO₂ & NO_x monitoring. Location of the 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.
- (iv) Data on ambient air quality (RPM, SPM, SO₂ & NO_x) should be regularly submitted to the Ministry including its Regional office located at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six months.
- (v) Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.
- (vi) Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.

- (vii) Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.
- (viii) 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.

Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.

- (ix) A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.
- (x) The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.

..7/-

- (xi) The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.
- (xii) The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.
- (xiii) The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Bhubaneswar, Central Pollution Control Board and State Pollution Control Board.
- (xiv) A copy of clearance letter will be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.
- (xv) State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and Collector's office/ Tehsildar's Office for 30 days.
- (xvi) The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and

Forests at <http://envfor.nic.in> and a copy of the same should be forwarded to the Regional Office of this Ministry located Bhubaneswar

3. The Ministry or any other competent authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

5. 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 and rules made thereunder and also any other orders passed by any Court of Law relating to the subject matter.

..8/-

6. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if preferred within a period of 30 days as prescribed under Section 11 of the National Environment Appellate Act, 1997.

(SATISH C. GARKOTI)
Additional Director (S)

Copy to:

- (i) The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
- (ii) The Secretary, Department of Environment, Government of Orissa, Secretariat, Bhubaneswar.
- (iii) The Secretary, Department of Mines and Geology, Government of Orissa, Secretariat, Bhubaneswar.
- (iv) The Secretary, Department of Forests, Government of Orissa, Secretariat, Bhubaneswar.
- (v) The Chief Wildlife Warden, Government of Orissa, Bhubaneswar.
- (vi) The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
- (vii) The Chief Conservator of Forests, Regional Office (EZ), Ministry of Environment and Forests, A-3 Chandrashekharapur, Bhubaneswar-751023.
- (viii) The Chairman, Orissa State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
- (ix) The Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.

- (x) The District Collector, Sundergarh District, Government of Orissa.
- (xi) EI Division, Ministry of Environment & Forests, EI Division, New Delhi.
- (xii) Monitoring File.
- (xiii) Guard File.
- (xiv) Record File.

(SATISH C. GARKOTI)
Additional Director (S)

अनुमोदित
APPROVED

1. Name of the Project :- Diversion of 64.148 Ha. of forest land for Mining of Iron Ore in village Raikela in Bonai Division.
2. Name of the District/Division. :- Sundargarh District / Bonai Forest Division.
3. Date of Inspection :- 28/06/2005.
4. Name and designation of Inspecting Officer :- Sri K.C.Hansda, I.F.S.
Divisional Forest Officer, Bonai Division.
5. Name and Designation of other officers who attended the inspection including representative of User Agency. :- 1. Sri A.C.Patra, Range Officer, Barsuan Range.
2. Sri Maheswar Behera, Senior Manager, Raikela Iron Ore Mines, M/s Geclarani Mohanty.
6. Legal Status of forest land with area proposed for diversion :- D.L.C. - 64.148 Ha. - *Got. not forest land included in Dist. level Committee report*
(Deemed forest land)
7. If area required for diversion has been demarcated on the ground :- Yes

8. Item-wise break-up of forest land proposed for diversion.

The item-wise break-up of forest land proposed for diversion is as follows :

i)	Mining	50.893 Ha.
ii)	Storing Mineral / Ore	4.568 Ha.
iii)	Dumping of overburden	3.000 Ha.
iv)	Const. of Building, Power Station, Workshop etc.	NIL
v)	Storing tools & machinery	2.422 Ha.
vi)	Const. of Road / Ropeway / Railway line	3.065 Ha.
vii)	Township / Housing Colony	0.200 Ha.
viii)	Const. of Magazine	NIL
	Sub-Total:-	64.148 Ha.
ix)	Safety Zone area	2.523 Ha.
	Grand Total :-	66.671 Ha.

9. Condition of vegetation and type of forest in applied area :- Vegetation in the applied area is sparse and scattered.

Contd... P/2

10. Position of Wildlife in general

The following migratory animals and birds occur in the applied area.

Animals	English Name	Zoological Name
1. Bhalu	Sloth bear	<i>Melursus ursinus</i>
2. Bilua	Jackal	<i>Canis aureus</i>
3. Banabilei	Jungle cat	<i>Felis chaus</i>
4. Thekua	Hare	<i>Ruficaudatus</i>
5. Musa	Rat	<i>Rattus rattus</i>
6. Neula	Mongoose	<i>Herpestes eudardsi</i>
Birds	English Name	Zoological Name
1. Bani	Indian myna	<i>Acridotheres cristis</i>
2. Baga	Little arget	<i>Eggatta garzetta</i>
3. Kau	Common crow	<i>Corvus splendens</i>
4. Pecha	Spotted owl	<i>Anthena brama</i>
5. Kajalapati	Common dronge	<i>Dicrurus macrocerus</i>
6. Kapta	Ring Dove	<i>Strepto pelia dacaocto</i>
7. Damara Kau	Jungle crow	<i>Corvus macrorhychos</i>
8. Kathahana chadei	Pigmy wood picker	<i>Picodes nanks</i>

11. Whether the applied area is involved with any eco-sensitive zone/ National Park/Sanctuary :- The applied area does not involved with any eco-sensitive zone / National Park / Sanctuary.
12. Number of trees to be felled and its impact on the eco-system :- 633 Nos. of trees are to be felled, which will not have any impact on the eco-system.
13. Details of broken-up area and reclamation done, if any. (Mining cases) :- Out of total 64.148 Ha. applied for diversion, 43.054 Ha has been treated as broken land vide DDM'S memo No.4065 dt.27.7.98 (Annexure-6C) Reclamation shall be undertaken by the User Agency as per reclamation plan enclosed vide Annexure-17.
14. Position of displacement of people and adequacy of rehabilitation, if any :- Displacement of people is not involved, and hence no rehabilitation.
15. Position of rare and endangered species available or importance of area from eco-social point of view :- There is no rare and endangered species in the applied area. The area is also not important from eco-social point of view.
16. Non-forest land used in the project, and non-forest land selected for Comp.Affn. is included in the D.L.C. report or not :- Non-forest land required to be used in the project, i.e., 0.835 Ha., as well as the non-forest land selected for Comp.Affn. are not included in the D.L.C. report.
17. Suitability of the identified non-forest land / degraded forest land for Comp.Affn. :- The non-forest land identified is suitable for Comp.Affn.
18. Violation of F.C.Act, if any, and action taken thereon :- There is no violation under the F.C.Act.


Divisional Forest Officer,
Bona Division.

Government of Orissa
Forest & Environment Department

No.10F(Cons)120/2006. 6879 /F&E, Bhubaneswar, dated. 5/5/07

From

Sri P.N.Padhi, IFS,
Special Secretary to Government.

To

The Assistant Inspector General of Forests,
Govt. of India, Ministry of Environment & Forest,
(F.C.Division), Paryavaran Bhawan,
C.G.O. Complex, Lodhi Road,
New Delhi -110003

Sub: Proposal for diversion of 64.148 ha. of forest land in Village- Raikela of Bonai Tahasil in Sundargarh district, Orissa for Iron Ore mining by M/s Geetarani Mohanty.

Sir,

I am directed to send herewith a proposal received from the PCCF, Orissa for diversion of 64.148 ha. of forest land in Village- Raikela of Bonai Tahasil, Sundargarh district for Iron Ore mining by M/s Geetarani Mohanty as required under the provisions of Forest (Conservation) Act, 1980.

1. **Brief Description.**

Govt. of Orissa in Department of Steel & Mines granted a Mining lease over 67.586 ha. non-forest land for Iron ore mining in village Raikela of Bonai Tahasil in favour of Smt. Geetarani Mohanty for 20 years with effect from 2.7.1991 to 1.7.2011. This lease deed was executed on 02.07.1991 (Page-21/DP). Subsequently this lease was transferred in favour of M/s Geetarani Mohanty a registered firm bearing registration No.5/92, Cuttack (Page-76/DP) with due permission of Govt. of India followed by the permission of State Govt. in Department of Steel & Mines vide Proceeding No.IV(B)SM-8/92-11868 Dt.17.10.1992 (Page-72/DP). This transfer lease deed was executed on 13.01.1993 (Page-75/DP). But consequent upon resignation of one of the partner Smt. Geetarani Mohanty from this firm and joining of two more partners with effect from 01.04.1993 (Page-243-A & 243-B/DP) a partnership deed was reconstituted on 01.04.1996 among three partners viz. Sri Srinibash Sahoo, Sri Duhshasan Sahoo and Smt. Suprasanna Sahoo (Page-244/DP). As per Page-1 of the Reconstituted partnership deed (Page-244 of DP) the name and style of the firm continues to be M/s Geetarani Mohanty.

Originally the lease area comprised of 66.671 ha. of non-forest land and 0.915 ha. of Sarbasadharan land. A Mining Plan was also approved by I.B.M. vide their letter No.QP/CAL/006/87/A/MO-94 Dt.27.6.1990 which was valid up to 1999. Accordingly the mining operation started on 23.8.1993 on the non-forest land.

Subsequently the above non-forest land over 66.671 ha was included as Deemed Forest land in D.L.C. report of Sundargarh Dist. during 1997 but the Sarbasadharan land remained as such. The land schedule of ML area has been furnished at Page-188/DP. The joint verification report Dt.6.6.1998 reveals that 43.054 ha. has been broken (Page-190z/DP & Plate-VIII). Thus the lease area comprises of 43.054 ha of broken land, 23.617 ha of virgin land and 0.915 of Sarbasadharan land. Since the entire broken and virgin lands are Deemed Forest land included in DLC report, out of this the User Agency has now applied for diversion of 64.148 ha. under section 2 of Forest (Conservation) Act, 1980 and balance 2.523 ha. Deemed Forest land has been set aside for Safety Zone.

		Broken	Virgin	Total	Land (Ha)	Total (Ha)
01	Mining	29.893	21.000	50.893	Nil	50.893
02	Storing of minerals	3.568	1.000	4.568	Nil	4.568
03	Dumping of over burden	2.656	0.344	3.000	Nil	3.000
04	Storing of tools & machinery	1.890	0.532	2.422	Nil	2.422
05	Building, Power station & Workshop etc.	Nil	Nil	Nil	Nil	Nil
06	Township/ Housing colony	0.200	Nil	0.200	Nil	0.200
07	Road & Railway etc.	2.900	0.165	3.065	0.835	3.900
	Sub Total	41.107	23.041	64.148	0.835	64.983
08	Safety Zone	1.947	0.576	2.523	0.080	2.603
	Grand Total	43.054	23.617	66.671	0.915	67.586

4. Flora & Fauna

Tree Species which are commonly noticed in this area are Sal, Gambhar, Bija, Kurum, Kumbhi, Kendu, Mango, Dhaura, Kusum, Harida, Bahada, Bheru, Kasr, Char, Mai & Mahul etc. Fauna noticed in this locality are Bear, Jackal, Jungle Cat, Hare, Mongoose, Myna, Jungle fowl, Egret, Owl and Drongo etc. No rare or endangered flora or fauna is noticed in this area.

5. Wildlife Management

Though the area does not form a part of National Park/Wildlife Sanctuary or Elephant Corridor, due care is to be taken for conservation of Wildlife. For this purpose a comprehensive Wildlife Management Plan covering the entire mining belt of Bonai and Keonjhar Division has been prepared. Accordingly the User Agency has to pay @-Rs 15,000/- per hectare of leasehold area as per norm approved by Govt. of Orissa. The lessee has furnished undertaking to bear the cost of Wildlife management (Page-224/DP).

6. Tree enumeration

Total enumeration has been carried out over the entire area applied for diversion and it has been recorded that, 432 trees are standing over the virgin forest land (Page-214/DP) and 201 trees (Page-220/DP) over the broken up forest land. Thus, in total 633 trees will be felled in phases during the process of mining. Besides, 164 trees are existing over the land earmarked for Safety Zone. The canopy density has been reported to be 0.03 over broken up forest land and 0.1 over virgin forest land (Page-7/DP).

7. Compensatory afforestation

In lieu of Deemed Forest land applied for diversion, Tahasildar, Bonai has identified equivalent non-forest land of 65.46 ha for Compensatory Afforestation. This non-forest land includes plot No.1,2/Part,3/Part,4/Part,5/part,7/Part & 9 Part of Khata No.1 of village-Sanathalakudar in Bonai Tahasil of Sundergarh district. The land suitability certificate, non-encroachment and non-encumbrance certificate have been furnished at Page-205 & 207/DP. The D.F.O., Bonai Divn. has prepared a site specific scheme in R.D.F. model with provision for soil conservation and stonewall fencing. The species to be planted in gaps are Karanj, Mahul, Harida, Bahada, Sissoo, Amla, Teak and Bamboo. The total financial outlay of

15. Others

The Basic Information of Bonai Division, District Profile of Sundergarh District and the State profile have been furnished at Page-260, 261 and 262/DP respectively. The Site Inspection Report of DFO has been furnished at Page-10/DP.

Conservator of Forests, Rourkela Circle has also furnished the Site Inspection Report at Page 12/D.P.

N.P.V. is applicable to this proposal. The User Agency has furnished undertaking to pay the NPV at Page 224/DP

The PCCF, Orissa has recommended the proposal.

All the parts of the statutory proforma has been duly filled in.

In view of the above, I would request you to kindly convey the approval of GOI, MoEF for diversion of 64.148ha. of forest land (Virgin 23.041 ha. + Broken 41.107 ha.) for mining purposes in Sundargarh district of Orissa under Sec.2 of Forest (Conservation) Act, 1980 in favour of the user agency to this Department at an early date with the following stipulations.

- i) The user agency shall implement a 'Conservation Plan' in their leasehold area as per guidelines of the Chief Wildlife Warden, Orissa.
- ii) The user agency shall pay the evaluated royalty of 633 enumerated trees before commencement of work on Stage-II approval.
- iii) The user agency shall furnish an undertaking to abide by the policy decision of State Government issued vide Steel and Mines Department Notification bearing SRO No 37/2004 dated 15.1.2004.

Yours faithfully,

Memo No. 6880 /F&E., Dated- 5/5/07 Special Secretary to Government.
Copy alongwith copy of the enclosure forwarded to the Chief Conservator of Forests (Central), Government of India, Ministry of Environment & Forests, Eastern Regional Office, A-3, C.S.Pur, Bhubaneswar for information & necessary action.

Memo No. 6881 /F&E., Dated- 5/5/07 Special Secretary to Government.
Copy forwarded to the Pr.C.C.F., Orissa / PCCF (WL) & CWLW, Orissa for information & necessary action.

Memo No. 6882 /F&E., Dated- 5/5/07 Special Secretary to Government.
Copy forwarded to the C.F., Rourkella / DFO, Bonai for information & necessary action.

Memo No. 6883 /F&E., Dated- 5/5/07 Special Secretary to Government.
Copy forwarded to Steel & Mines Department for information & necessary action.

Memo No. 6884 /F&E., Dated- 5/05/07 Special Secretary to Government.
Copy forwarded to M/S Gitarani Mohanty, Station Road, At/Post- Barbil-758035 for information & necessary action.

Special Secretary to Government

Villages within 10 Kms. Radius from the mine site

Sl. No.	Name of Village	Area of Village in (Ha)	No of House holds	Population			SC		ST		Total Workers		Non-Workers		Literacy rate %	
				Total	M	F	M	F	M	F	M	F	M	F	M	F
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Basada	312.77	22	104	56	48	00	00	56	48	30	04	26	44	39.5	08.1
2	Kusumdihi	662.68	133	678	313	365	03	03	241	274	151	133	162	232	46.3	20.1
3	Reserve forest	N.A.														
4	Kirakudar	202.75	70	324	148	170	00	00	144	170	70	02	78	174	16.7	05.4
5	Bendilada	235.19	71	315	156	159	00	00	154	157	105	97	51	62	55.6	29.8
6	Talidhi	727.90	63	261	132	129	00	00	125	121	66	46	66	83	74.8	11.4
7	Mithirda	4,816.28	38	187	95	92	00	00	94	86	46	37	49	55	46.5	13.0
8	Tada	656.13	555	2,387	1,278	1,109	35	44	1060	938	622	59	656	1050	66.3	34.0
9	Kalla	247.26	519	2,329	1,275	1,054	103	112	758	654	573	49	702	1005	78.6	57.4
10	Kamanda	700.21	209	944	471	473	38	38	365	156	249	65	222	408	71.1	22.8
11	Kula	332.10	112	638	307	331	11	09	165	193	131	48	176	283	59.8	25.0
12	Rengua	265.14	47	235	111	124	00	00	111	124	63	10	48	114	40.2	19.4
13	Bandal	437.14	78	391	195	196	15	08	178	185	116	59	79	137	65.2	17.5
14	Tandra	1,136.12	170	781	419	362	11	06	256	272	262	67	157	295	77.2	44.0
15	Rakela	683.00	252	1,093	539	554	31	27	488	505	322	232	217	322	47.4	15.1
16	Dangua	3,496.11	172	947	513	434	62	39	387	326	189	62	324	372	74.5	28.6
17	Tenaidhi	485.60	59	284	148	136	00	00	148	136	72	18	76	118	39.7	13.4
18	Nuagaon	432.23	79	391	185	206	00	00	185	206	86	38	99	168	91.0	42.1
19	Kadodilia	230.15	125	643	301	342	91	97	151	180	159	102	142	240	77.0	37.3
20	Sidimba(A)	378.00	38	160	89	71	00	00	84	49	52	43	37	28	09.7	01.7
21	Jalidhi	1,104.49	57	226	106	120	03	03	44	48	69	79	37	41	55.1	24.0
22	tanigram	56.60	36	181	82	99	00	00	77	95	51	50	31	49	36.2	07.3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
23	Kalmanga	410.24	252	1091	552	539	72	66	333	329	277	140	275	399	57.4	25.0
24	Baldihi	508.26	74	327	176	151	78	61	98	90	73	23	103	128	59.4	20.3
25	Teherei	544.21	147	602	280	322	04	02	211	249	134	53	146	269	53.9	26.7
26	Sanua	273.20	65	266	132	134	21	25	33	33	60	18	72	116	44.6	23.0
27	Kasira	777.00	173	835	389	446	45	64	307	335	216	171	173	275	61.5	22.7
28	Bhanjapali	554.18	171	659	356	303	26	33	225	221	184	87	172	216	55.4	26.8
29	Segasahi	400.12	58	255	122	133	00	00	117	130	67	68	55	65	29.5	4.8
30	Harischandrapur	122.62	151	662	353	329	69	76	236	212	187	147	166	182	56.7	24.5
31	Choredhara	1,763.28	355	1713	869	844	07	06	784	757	489	440	380	404	37.6	17.4
32	Nuatantira	417.30	98	445	225	220	00	00	224	220	152	138	73	82	41.8	12.7
33	Phatatangara	804.00	160	598	295	303	01	00	294	303	178	175	117	128	51.5	17.4
34	Anteidola	197.09	53	196	98	98	04	04	87	82	54	44	44	54	53.9	11.7
35	Tinko	504.55	87	432	214	218	02	01	67	58	104	50	110	168	76.5	39.3
36	Raikela	602.51	114	48	241	239	00	00	135	123	128	34	113	205	61.9	31.3
37	Kusumdlhi	292.67	30	122	62	60	00	00	62	60	29	20	33	40	44.4	13.5
38	Baurkela	260.67	22	98	45	53	00	00	45	53	22	13	23	40	57.9	13.2
39	Saskela	603.39	396	1714	862	852	19	09	335	368	457	235	405	617	69.8	39.6
40	Barsuan	514.40	675	2798	1449	1349	158	160	489	464	706	121	743	1,228	80.2	62.5
41	Sannuagaon	1,004.82	136	680	340	340	00	00	328	327	159	87	181	253	47.5	28.2
42	Damatu	730.00	85	405	196	209	07	08	125	147	82	49	114	160	53.9	28.1
43	Randa	402.28	52	189	99	90	01	04	86	79	58	40	41	50	37.5	13.6
44	Ranla	1,165.20	154	588	291	297	22	18	210	222	150	79	141	218	49.1	32.8
45	Batagaon	735.63	33	141	78	63	00	00	78	63	35	06	43	57	05.9	00.0
46	Raisuan	479.93	50	221	113	108	11	08	95	93	54	06	59	102	28.6	04.1
47	Bhutuda	1,057.56	153	599	313	286	32	31	201	200	157	119	156	167	49.4	28.5
48	Lasi	1,021.16	127	509	267	242	07	05	235	216	177	20	90	222	24.4	07.7
49	Kensara	1,334.87	28	145	75	70	00	00	72	67	47	02	28	68	08.5	00.0
50	Chada	148.57	10	52	22	30	00	00	09	13	10	04	12	26	28.6	18.8
51	Siliguda	454.44	17	74	30	44	00	00	26	33	17	17	13	27	18.2	09.7

Gende	Name	Yea	Spleen	Tum	Gener	Epile	para	Mental	Right Eye	Left Eye	Locom	Hydro	Night	Other	Colou	Urine R	Squir	Albur	Suga	Skiagram	RightEar	LeftEar	PFT	PFT	Orgar	Inspir	Expira	Anyo	Abno	Abnormal	Abnorm	Abnor	Abnorm	Suggestio	Suggestio	Suggestio	Suggestio	Suggestio	BloodPri	Pulse	Pulse2	Liver	
Male	Shri. JATINDRA PRADHAN	42	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	94	87	NO													114/70	100	Per Minut	Not Palpable
Male	Shri. BRUNDA MUNDA	41	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	92	88	NO												120/80	72	Per Minut	Not Palpable	
Male	Shri. PRAMOD MAHANTA	40	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	104	98	NO												138/86	93	Per Minut	Not Palpable	
Male	Shri. HARI NAIK	46	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	90	83	NO												106/70	89	Per Minut	Not Palpable	
Male	Shri. UGRASEN MAHANTA	50	Not Pal	NO	Good	No	NO	GOOD	6/6 With G	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	94	90	YES	REFRA	DIABETES MELLITUS ON MEDICATI	CONSTAN	FAT FREE	REGULAR	& PHYSICIAN CHECK					124/80	74	Per Minut	Not Palpable		
Male	Shri. PAULUSH LAKRA	40	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	97	93	NO												110/70	104	Per Minut	Not Palpable	
Male	Shri. NATABARA MAHARANA	50	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	93	87	NO											124/80	87	Per Minut	Not Palpable		
Male	Shri. SANTOSH KUMAR BARIK	41	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	+	NORMAL	NORMAL	NORMAL	NORMAL	NO	104	97	YES	DIABETES MELLITUS					REGULAR	(FAT FREE	REGULAR PHYSICAL EXERCISE					110/70	83	Per Minut	Not Palpable
Male	Shri. ANUP SINKU	35	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	105	100	NO												114/70	59	Per Minut	Not Palpable	
Male	Shri. LACHHAMAN NAIK	42	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	86	81	NO												110/70	101	Per Minut	Not Palpable	
Female	Shrimati. SUKUMANI NAIK	43	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	Not A	NO	NO	NO	ACIDIC	NO	+	Nil	NORMAL	NORMAL	NORMAL	NORMAL	OB	NO	82	78	YES	PFT:OBST. WITH POSSIBLE RESTRICTION					REGULAR BREATHING EXERCISE & USE OF PPE					110/70	79	Per Minut	Not Palpable	
Female	Shrimati. DRUPATI NAIK	37	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	Not A	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	90	86	NO												110/70	88	Per Minut	Not Palpable	
Female	Shrimati. LACHHMA NAIK	42	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	Not A	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	83	79	NO												110/70	87	Per Minut	Not Palpable	
Female	Shrimati. JADINI NAIK	37	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	Not A	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	73	69	NO												106/70	88	Per Minut	Not Palpable	
Male	Shri. SATYANANDA JHAMPULA	40	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MODERATE R	NO	98	94	YES	PFT:MOD.RESTRICTION					REGULAR BREATHING EXERCISE & USE OF PPE						134/80	91	Per Minut	Not Palpable	
Male	Shri. SANTOSH OJHA	22	Not Pal	NO	Good	No	NO	GOOD	6/6 With G	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	95	89	YES	REFRACTIVE ERROR CORRECTED BY GLAS	CONSTANT USE OF GLASSES									120/80	83	Per Minut	Not Palpable		
Male	Shri. TANAMANI NAIK	45	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	80	76	NO												110/70	84	Per Minut	Not Palpable	
Male	Shri. TOPI MUNDA	43	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	++	NORMAL	NORMAL	NORMAL	NORMAL	NO	92	88	YES	DIABETES MELLITUS					REGULAR	(FAT FREE	REGULAR PHYSICAL EXERCISE					130/80	89	Per Minut	Not Palpable
Male	Shri. JAGADISH PATRA	46	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	96	90	NO												114/70	60	Per Minut	Not Palpable	
Male	Shri. BASANTA KUMAR PRADHAN	49	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	92	86	NO												110/70	84	Per Minut	Not Palpable	
Female	Shrimati. PRATIMA NAIK	31	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	Not A	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	84	80	NO												114/70	97	Per Minut	Not Palpable	
Female	Shrimati. NIRASA NAIK	44	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	Not A	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	80	76	NO												106/70	72	Per Minut	Not Palpable	
Male	Shri. MILU CHARAN MAHAKUD	33	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MODERATE R	NO	92	87	YES	PFT:MOD. RESTRICTION					REGULAR BREATHING EXERCISE & USE OF PPE						110/70	61	Per Minut	Not Palpable	
Male	Shri. YUDHISTIRA PATRA	40	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	89	84	NO												130/80	73	Per Minut	Not Palpable	
Male	Shri. NIRANJAN NAIK	44	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	86	80	NO												120/84	85	Per Minut	Not Palpable	
Male	Shri. KABITRA DEHURY	42	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	95	88	NO												110/70	93	Per Minut	Not Palpable	
Male	Shri. SURENDRA PALEI	42	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	97	93	NO												136/84	92	Per Minut	Not Palpable	
Male	Shri. SHARATA NAIK	43	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	86	80	NO												110/70	84	Per Minut	Not Palpable	
Male	Shri. HEMAKANT KHORA	30	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	91	87	NO												110/70	92	Per Minut	Not Palpable	
Male	Shri. BIDYADHAR NAIK	50	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	86	81	NO												124/80	80	Per Minut	Not Palpable	
Male	Shri. PRAMOD KUMAR SAHOO	53	Not Pal	NO	Good	No	NO	GOOD	6/6 With G	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	108	101	YES	HYPER	ON MEDICATION				FAT FREE	REGULAR	PHYSICIAN CHECKUP					140/90	94	Per Minut	Not Palpable
Male	Shri. MANAS KUMAR DAS	40	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	102	98	YES	HYPERTENSION ON MEDICATION					FAT FREE	REGULAR	& PHYSICIAN CHECKUP					134/84	78	Per Minut	Not Palpable
Male	Shri. PRAFULLA MAHAKUD	39	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	86	81	NO												110/70	68	Per Minut	Not Palpable	
Male	Shri. SHIVA CHARAN MAHANTA	52	Not Pal	NO	Good	No	NO	GOOD	6/6 With G	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	94	90	NO												116/70	70	Per Minut	Not Palpable	
Male	Shri. DAMDEV DEHURY	45	Not Pal	NO	Good	No	NO	GOOD	6/6 With G	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	91	86	YES	REFRACTIVE ERROR CORRECTED BY GLAS	CONSTANT USE OF GLASSES										130/80	68	Per Minut	Not Palpable	
Male	Shri. SINGA MUNDA	42	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	93	87	NO												130/86	75	Per Minut	Not Palpable	
Male	Shri. BASUDEV DEHURY	51	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	84	80	NO												110/70	71	Per Minut	Not Palpable	
Male	Shri. RAMAKANTA DAS ADHIKARI	57	Not Pal	NO	Good	No	NO	GOOD	6/6 With G	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	91	87	YES	REFRACTIVE ERROR CORRECTED BY GLAS	CONSTANT USE OF GLASSES										110/70	82	Per Minut	Not Palpable	
Male	Shri. ASHOK KUMAR MOHAPATRA	45	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	91	87	NO												110/70	67	Per Minut	Not Palpable	
Male	Shri. PRATAP NAIK	44	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	90	85	NO												110/70	57	Per Minut	Not Palpable	
Male	Shri. NARAHARI NAIK	44	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	++	Nil	NORMAL	NORMAL	NORMAL	NORMAL	NO	91	87	NO												120/80	83	Per Minut	Not Palpable	
Male	Shri. PURNA CHANDRA SAHOO	48	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	Nil	NORMAL	NORMAL	NORMAL	MILD RESTRIC	NO	93	87	NO												124/80	59	Per Minut	Not Palpable	
Male	Shri. GOURANGA CHARAN PARIDA	39	Not Pal	NO	Good	No	NO	GOOD	6/6 Witho	6/6 Witho	NAD	NO	NO	NO	NO	ACIDIC	NO	Nil	++++	NORMAL	NORMAL	NORMAL	NORMAL	NO	99	94	YES	DIABETES MELLITUS UNDER MEDICATION	REGULAR	FAT FREE	REGULAR PHYSICAL EXERCISE						130/80						



RAIKELA IRON ORE MINES

M/S. GEETARANI MOHANTY

06767 275896

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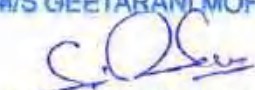
Station Road, Barbil, Keonjhar, Odisha, Pin-758035



UNDERTAKING FOR PERIODICAL HEALTH CHECKUP

We commit to carryout the periodical occupational health checkup of employees and local people at regular interval as per the action plan submitted along with EC report according to the condition No. VIII (ii) in EC ID No. EC22B001OR152352 dated. 27.12.2022 for enhancement of production capacity of iron ore from 2.99 MTPA-4.99 MTPA at Raikela Iron Ore Mines of M/s Geetarani Mohanty.

Occupational health check-up of employees has already been carried out by the assistance of EZMA. The occupational health check report has been furnished along with the compliance report.

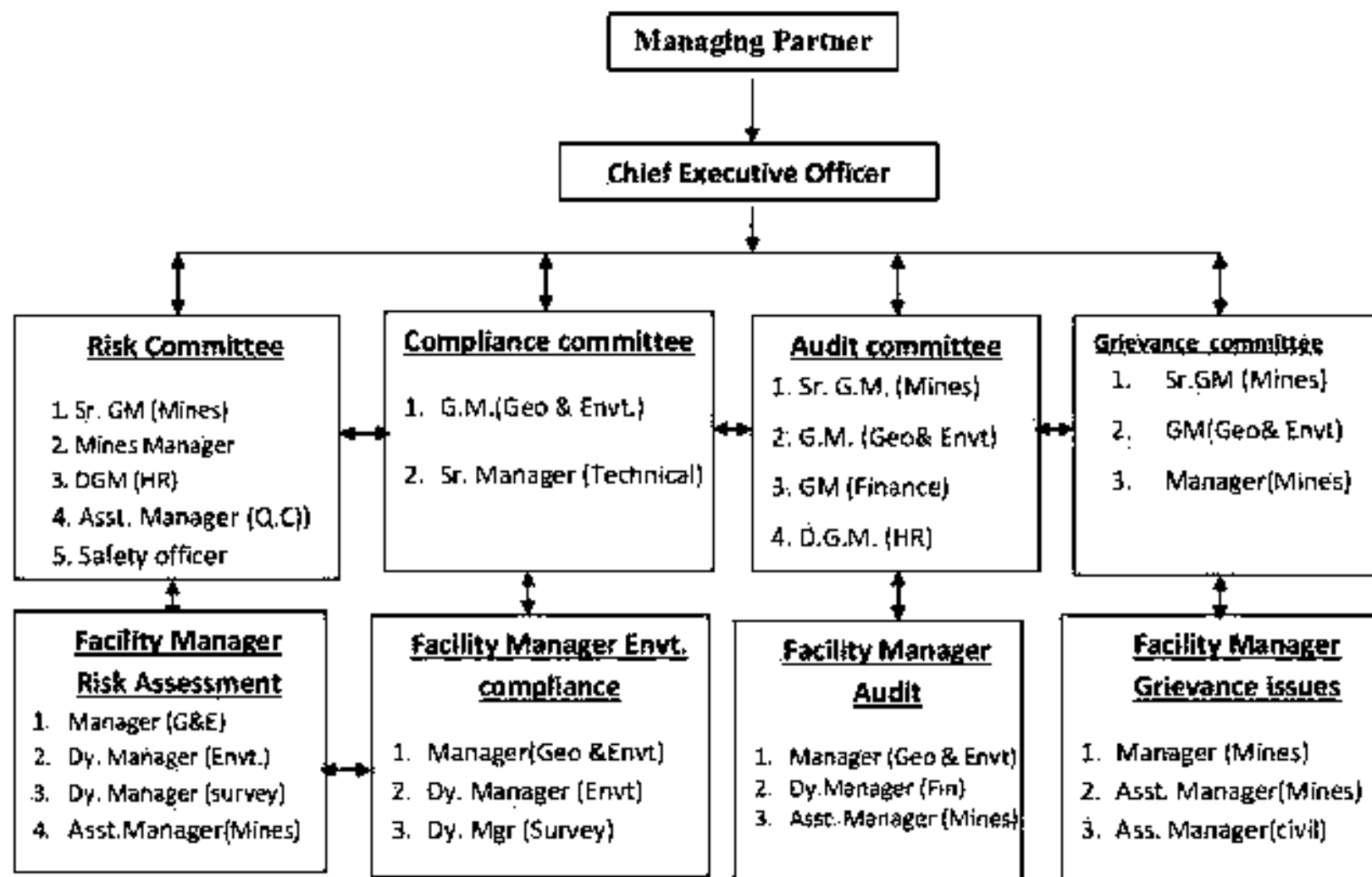
M/S GEETARANI MOHANTY

 MANAGING PARTNER

Action Plan for Issues Raised During the Public Hearing

S. No	Item	Description	1st yr (in lacs)	2nd Yr (in lacs)	3rd Yr (in lacs)	Total (in lacs)
1	Appointment of trainers in industrial training institute.	Salary + other training accessories (3 teachers)	10.50	10.50	10.50	31.50
2	Installation of solar power driven bore wells at Dengula, Raikela, Tentuldihi and Bandhala villages. De-siltation of Karo nala	Installation of tube wells in villages Dengula, Raikela, Bandhala and Tentuldihi – 1 no. each Total: 4nos.@ Rs.40,000 + Solar power plant – 4 nos. @ 1,20,000 Digging @ Rs1000/ft	14.40	-	-	14.40
3	Adoption of 20 girl students	On merit basis Study material, uniform, transportation facilities, coaching	4.08	4.08	4.08	12.24
4	Technical and Infrastructural aid to farmers.	Providing deep irrigation points with electricity, supply of high yield seeds, fertilizer to poor farmers. The villages will be decided in consultation with local administration.	5.0	-	-	5.0
5	Distribution of seeds and Fertilizers Removal of red soil from agricultural fields	Dengula, Tentuldihi, Raikela villages to be supplied with seeds @Rs 5 lakh/village Removal of red soil in Dengula & Raikela village @ 10 Ac/Village	6.5	6.5	5.06	18.06
6	Solar Lighting in Villages	Strategic points of Raikela & Dengula villages will be electrified with solar power @ 10 places in each Village	6.0	6.2	6.6	18.8
Total expenditure			100			

RAIKELA IRON ORE MINES			
CSR ACTIVITIES FOR THE YEAR OF 2022-23 (April-23 to March-24)			
SL NO	NATURE OF PROJECT	DESCRIPTION OF THE ACTIVITY	TOTAL
1	SUPPORT FOR DRINKING WATER	Drilling of Bore well at Raikela Village.	397066
		3 nos. of Bore well have been installed at Raikela, Dengula & Kula Village. All Borewell maintence work had done. Which cost is mentioned in the cost column.	40000
		Drilling of Bore well at Raikela Village near Geetarani Chawk	116800
		Overhead water tank with water supply at Raikela Village.	571216
		Overhead water tank with water supply at Geetani Chowk Raikela	357122
2	SUPPORT FOR ELECTRICITY	We have provide electricity to the runnign pump for supply of drinking water at Raikela and Dengula village and making payments towards the electricity charges. The charges of electricity for the month of is mentioned in the cost column.	88295
3	SUPPORT TO HEALTH MEDICAL SERVICES	The patients of the local villages who are dependent on the dispensary for primary treatment. We are providing him primary treatment freely and provided medicines at free of cost. Ambulance services have been provided to the local villagers. The expenses towards medicine, maintenance & HSD cost of the ambulance is mentioned in the cost column.	721602
			0
			0
			0
		MEGA HEALTH CAMP	1020254
4	SUPPORT TO EDUCATION & SKILL DEVELOPMENT	5 nos. of teacher provided to Raikela Primary School and Dengula Govt. high school. The charges of the teacher is mentioned in the cost column.	562000
		The School bus has been provided to bring the children to the schools from the villages under Dengula Panchayat from their house and drop them back at the same. Total expenses towards maintenance and HSD cost is mentioned in the cost column.	398472
		Financial Asst. to a village poor girl (Ms. Pramila Naik) of Dengula Village for higher study	50000
5	SUPPORT TO COMMUNITY WELFARE	2 nos. tailoring training teacher provided to Raikela Tailoring Training Center and 1 nos. tailoring training teacher provided to Dengula Tailoring Training Center The charges of the is teacher mentioned in the cost coloumn.	145000
		Old age allowance provied to 4 nos. old man of Raikela village for their livelihood.	24000
		Dengula Shiva temple priest	112000
		One Driver engaged for Tehsil for smooth movement of Vehicle.	98000
		One Driver engaged for Tractor for Agriculture purpose for periphery village.	63832
		Distribution of Blankets to Raikela Villagers, Dengula Villagers	240398
6	SUPPORT TO INFRASTRUCTUR E	Drilling of Bore well at Serenda under CSR	1002000
		Bus Stop at Geetarani Chowk (Raikela)	303155
		Renovation work at Revenue IB, Bonai	491422
		Renovation of Raja Dharanidhara Club, Bonai (1st)	6074324
		Restoration of the AC street light system at Koira block office.	50410
		Water pipeline Maintainance work at Koira Block	84497
		Renovation of Raja Dharanidhara Club, Bonai (1st)	6074324
		Repairing work of Shade work at Tensa truck owner association, Tank, Plumbing work at Sub-collector office Bonai & paint work at Dengula forest office.	138752
		Brich & Shed work at Tensa for Rourkela Shramik Sangha	117800
			19342741

ORGANISATIONAL STRUCTURE



COMPLIANCE TO THE NEERI CONDITIONS

NEERI conditions		Compliance	Action Plan
1	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 necessary environmental protection measures.	Since 3 years Dept. of Steel & Mines, Govt. Odisha fixing the annual production capacity of each mine both in Joda & Koira sector considering different limiting factors like requirement, environment, infrastructure etc. In coming years we will abide by the sustainable production limit of State Govt.	Being followed by the Directions from Dept. of Steel & Mines, Govt. of Odisha in this regard.
2	The expansion or opening of new manganese ore mines may be considered only when the actual production of about 80% is achieved. Further, the mines that have not produced MN ore for last two years and have no commitment in the current year as well: EC capacity in such cases may be reviewed. The Department of Steel & Mines. Govt. of Odisha shall submit the Annual Report on this issue to the MoEF&CC for further necessary action.	This is an Iron Ore Mine. For Iron ore we have already achieved the existing EC quantity.	We will abide by said recommendation
3	Analysis of baseline environmental quality data for the year 2014 and 2016 indicates that existing mining activities appear to have little / no potential impact on environmental quality, except on air environment, which was mainly due to re-suspension of road dust. Therefore, all the working mines can continue to operate with strict compliance to monitoring of environmental quality parameters as per EC and CTE/CTO conditions of the respective mine, 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 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.	- Mines is being operated in compliance to monitoring of environmental quality parameters as per EC and CTE/ CTO. - Further suggested measures will be implemented for control of road dust and air pollution. - Six monthly EC Compliance and yearly CTO compliances are submitted to respective Authorities. - Certified EC Compliance Report to be obtained from MOEF&CC, Eastern regional office, Bhubaneswar. - MCDR compliance with the yearly planning to be submitted at IBM.	Monitoring of environmental quality parameters and site inspection by Govt. Authorities say SPCB, MoEF&CC and IBM being followed on regular basis.
4	Considering the existing environmental quality, EC capacity, production rate, iron ore resources availability and transport infrastructure availability, the share of JODA and KOIRA sector works out to be 70% and 30% respectively for the existing scenario for the year 2015-16. However, for additional EC capacity, it can be 50:50 subject to commensurate infrastructure improvement (VIZ. SOTM. pollution free road transport, enhancement of rail network etc.) in the respective regions.	Appx. About 2MTPA mineral is being transported through railways via Barsuan Rly. Sdg. And 0.9MTPA is being transported to local users through existing road.	We are abiding the said recommendation as explained

5	Continuous monitoring of different environmental quality parameters as per EC and CTE/CTO conditions with respect to air, noise, water (surface and ground water) and soil quality in each region shall be done. The environment quality parameters should not indicate any adverse impact on the environment Monitoring within the Mines should be done by individual mine lease holder, whereas outside the mine lease area, monitoring should be done by the Govt. of Odisha through various concerned departments/ authorized agencies, NABET/ MoEF&CC accredited laboratories/organizations. The reports submitted by individual mine lease holders and study reports prepared by other concerned departments/agency for each of the regions should be evaluated and examined by SPCB/MoEF&CC.	- Monitoring of all the environmental parameters is being done in the core as well as buffer zone of the ML area. Monitoring of air, noise, water, soil carried out regularly as per the stipulations of MoEF/SPCB. - Besides the above SPCB, Regional office, Rourkela used to monitor environmental parameter regularly. - Outside the mine lease area Govt. of Odisha through SPCB, Odisha placed online AAQ monitoring station at strategic locations to know the real time data on 24 hour basis. - The reports submitted by the lessee are being evaluated by the SPCB & MoEF &CC (regional office) in six monthly & yearly basis.	Environmental monitoring & submission of compliance and it's evaluation at authorities being followed on regular basis.												
6	Construction of 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 minimum 300 m inside the mine should be done. This should be done within one year for existing mines and new mine should have since beginning. The concerned departments should extend full support; wherever the land does not belong to the respective mine lease holders. 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 above.	Cemented road from mine exit gate to inside the mine has been constructed.	Implemented												
7	In view of high dust pollution and noise generation due to road transport, it is proposed to regulate/guide the movement of iron and manganese ore material based on the EC capacity of the mines. Accordingly, ore transport mode has been suggested, as given below in Table <table><tr><th>Code</th><th>EC</th><th>Suggested Ore Transport Mode</th></tr><tr><td>SOTM 1</td><td>>5 MTPA</td><td>100% by private siding or conveyor belt up to public railway siding or pipeline for captive mines and 70% for non-captive mines.</td></tr><tr><td>SOTM 2</td><td>Between 3 and <5 MTPA</td><td>Minimum 70% by public railway siding, through conveyor belt and maximum 30% by road – direct to destination or other public railway siding or above option.</td></tr><tr><td>SOTM 3</td><td>Between 1 and <3 MTPA</td><td>Minimum 70% by public railway siding and maximum 30% by road-direct to destination or by other public railway</td></tr></table>	Code	EC	Suggested Ore Transport Mode	SOTM 1	>5 MTPA	100% by private siding or conveyor belt up to public railway siding or pipeline for captive mines and 70% for non-captive mines.	SOTM 2	Between 3 and <5 MTPA	Minimum 70% by public railway siding, through conveyor belt and maximum 30% by road – direct to destination or other public railway siding or above option.	SOTM 3	Between 1 and <3 MTPA	Minimum 70% by public railway siding and maximum 30% by road-direct to destination or by other public railway	- Four lining of NH-215 is being constructed as per the IRC guidelines with proper drainage system, fencing, plantation etc. - In recent past meeting held between Collector Sundergarh on dated 03.07.2018 with all lessees regarding safe transportation and prevention of pollution of minerals during transportation from mining area to main road and railway sidings. - We will abide by the SOTM system as and	Govt. of Odisha is preparing its own action plan towards implementation of SOTM as per the minutes of meeting dated 21.06.2018. We will abide by the guidelines formed by the State Govt. as & when.
Code	EC	Suggested Ore Transport Mode													
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			siding or above options.		when guideline formed by the Department of Steel & Mines, Govt. of Odisha in this regard.
	SOTM 4	<1 MTPA	100 % by 10/17 Ton Trucks or above options.		As we have planned for 2.99MTPA production, Minimum 70% by public railway siding and maximum 30% by road - direct to destination or by other public railway siding is applicable for us which we will be abide
	It is mentioned by State Govt. of Odisha that currently about 45% of the iron ore is dispatched using rail network and progressively it will be increased to about 60% by rail/slurry over a period of 5 years, taking into account time required to set up more railway sidings. In view of present ore transport practices and practical limitations, all the 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. However, 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. Transportation of iron & manganese ore through river (jetty) to nearest Sea port(Sea cargo option) may be explored or connecting Sea ports with Railway network from the mines to be improved further so that burden on existing road and rail network and also pollution thereof can be minimized. 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 MoEF&CC and SEIAA, Odisha. Responsibility: Department of Steel & Mines, Govt. of Odisha; Time Period: 5 years for developing railway/ conveyor belt facilities.				
8	Development of parking plazas for trucks with proper basic amenities/ facilities should be done inside mine. This should be done within one year for existing mines and new mines should have since beginning. Small capacity mines (in terms of lease area or production) not having enough space within the mine lease areas should develop parking plaza at a common place within the region with requisite facilities. Responsibility: Individual Mine Lease Holder; Time Period: 1 year.			Parking plaza has been developed within the lease area at the earmarked site. The location of parking plaza has been shown in the approved mining plan. Rest room & toilet facilities established within the parking plaza.	Implemented

9	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. Responsibility: Department of Steel & Mines with PWD/NHAI Time Period: 2 Years.	- NOT applicable for us. However, we may have to implement for Koira-Tensa Road - In this regard we may extend the support if any desired by the State Government.	NA																												
10	Regular vacuum cleaning of all mineral carrying roads aiming at "zero Dust Resuspension" may be considered. Responsibility: PWD / NHAI/ Mine Lease Holders; Time Period: 3 months for existing roads.	Vacuum Cleaner has been purchased and is in operation.	Implemented																												
11	Expansion of existing mines and new mines should be considered after conducting after conducting recent EIA Study as per the Provisions of EIA Notifications 2006, as amended time to time 1)with proper justification on demand scenario for iron ore requirement and availability of population free transport network in the region. Responsibility: IBM, Department of Steel & Mines and MoEF&CC, New Delhi.	Detailed EIA/EMP studies already conducted (as per the provisions of EIA Notification 2006, as amended time to time) with proper justification on demand & supply scenario for Iron ore requirement and availability of adequate transport network in the region.	Implemented																												
12	Mine-wise Allocation of Annual Production: In case the total requirement of iron ore exceeds the suggested limit for that year, permission for annual production by requirement of iron ore exceeds the suggested limit for that year, permission for annual production by 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 as suggested in Table, so that demand for iron ore can be anticipated, and actual production/dispatch does not exceed the suggested annual production. <table border="1"> <thead> <tr> <th rowspan="3">Mine Lease</th><th rowspan="3">EC Capacity</th><th colspan="2">Suggested Annual Production(MT)</th></tr> <tr> <th>2019-20</th><th>2020-21</th></tr> <tr> <th>Yr 4</th><th>Yr 5</th></tr> </thead> <tbody> <tr> <td>Mine 1</td><td>X1</td><td></td><td></td></tr> <tr> <td>Mine 2</td><td>X2</td><td></td><td></td></tr> <tr> <td>Mine 3</td><td>X3</td><td></td><td></td></tr> <tr> <td>Mine n</td><td>Xn</td><td></td><td></td></tr> <tr> <td>Total</td><td>160+</td><td>177</td><td>201</td></tr> </tbody> </table>	Mine Lease	EC Capacity	Suggested Annual Production(MT)		2019-20	2020-21	Yr 4	Yr 5	Mine 1	X1			Mine 2	X2			Mine 3	X3			Mine n	Xn			Total	160+	177	201	In this year most of the operating mines in Joda-Barbi-Koira sector are going to put up for the auction. Therefore, there will be no problem for us in case the state govt allocate mine wise annual production.	Being followed by the Directions from Dept. of Steel & Mines, Govt. of Odisha in this regard.
Mine Lease	EC Capacity			Suggested Annual Production(MT)																											
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13	Expansion of existing Mines having Validity up to 2020: In view of implementation of MMDR Act 2015, wherein many non-captive mines are expected to be closed by March 2020, total Iron ore production scenario has been. It is expected that the non-captive mines having validity till 2020 shall try to maximize their production (limited to EC capacity) in the remaining period. Further, depending upon availability of iron ore resources, these mines may also seek expansion of EC capacity. It may be noted here that total EC capacity of existing 25 working mines having validity upto 2020 is about 85 MTPA, whereas actual production from these mines has been only 44.677 MT (52.6%) during 2015-16 and 57.07 MT (67.1%) during 2016-17. Also, it is expected that these mines would not even be able to achieve ore production as per existing EC capability till March 2020. Therefore, these existing mines should go for production to the fullest extent to meet the requisite demand from the State. However, where EC proposes (i.e, grant of TOR, Baseline data collection, Mining plan/ scheme approval, public hearing, preparation of EIA/EMP Report. Appraisal by the EAC and grant of (EC) takes about one year time. Under such circumstance, it is suggested that further applications for grant of TOR of grant of EC for expansion of production capacity of the mine should be considered for those existing mines, which have exhausted their capacity subject to consideration of all environment aspects. Respectively: Department of Steel and Mines and MoEF&CC, New Delhi.	Not Applicable for us as the validity of our lease is upto 2041.	NA
14	Sustained Iron ore production beyond 2020: Considering the implementation of MMDR Act 2015, total production of iron ore in Odisha State is anticipated to be about 111 MT during 2016-17(actual production was- 102.663 MT), 136 MT during 2017-18, 146 MT during 2018-19 and 146 MT during 2019-20. Then there will be substantial drop in total production (to the tune of 73MT during 2020-21 onwards) due to closer of mines, which are valid up to 2020. Therefore, in order to maintain operation/sustained growth of downstream industries, iron ore mining in the region needs to be continued at a sustainable rate. The State Govt. through Department of Steel and mines should initiate appropriate action to ensure continued availability of iron ore from the region, as per suggested sustainable annual production.	Considering the implementation of MMDR 2015, most of the running mines (valid up to 31.03.2020) are proposed to be put up for auction. There will be substantial drop in total production due to temporary closure of the mines. Hence, the proposed expansion of Raikela Iron ore Mine of M/s Geetarani Mohanty will partly compensate the sustainable growth of downstream industries.	State Govt. is being working in this regard.

15	Reserves Estimation: Mining plan and expansion; Appropriate actions (geo-technical investigation for qualitative and quantitative resource estimation & other preparations for auction of mines), may be initiated taken into account the existing working mines, and the mines which were operational at some point of time (but closed presently due to various reasons). The total iron ore reserves/ resources available within the total lease area of each mine should be estimated by State Govt./NMET/GSI (or any other approved agency) with respect to: (i) total lease area of mine (surface), (ii) Maximum depth to which resources could be available, (iii) resources below the ground water table (if interested), (iv) Reserves are to be estimated as per UNFC code with respect to quantity and quality (% Fe content), (v) Maximum mining rate and area for caution (after 200) will be calculated based on total resources available and proposed life of mine leading to closure of mine in a stipulated time period. Responsibility: Department of Steel & Mines, IBM and GSI; Time frame: 1 year for the mines to be auctioned for next 2 years. The above mentioned organizations shall ensure the compliance with respect to timelines for implementations.	Part of the area have been explored under G1 and G2 category. Based on which the Mining plan has got approved. However. As per the approved Mining Plan the exploration under G1 category will be completed by 2020-2021.	Exploration is under process to assess the reserve under G1 category.
16	Depending upon availability of extractable iron ore resources within a mine, mining below the ground water table may be permitted after conducting necessary geological and hydro-geological study by GSI and requisite approval from the CGWB/CGWA (CENTRAL Ground water Board/ Authority). This can be explored at least in few mines on trial/pilot basis. Further, within a mine, it will be desirable to operate one pit at a time, and next pit should be opened after extracting maximum possible resources from the first pit, so that the exhausted pit can be used for back filling/ storing of low grade iron ore. However, depending upon the quantity and/ or quality of iron/ manganese ore, other mine pits in the same mine lease may also be opened for sustainable scientific mining, as per approved mining plan/scheme of mining by IBM. The department of Steel & Govt. of Odisha should initiate the pilot project so that minerals are fully utilized.	The mine is being operated as per the approved mining plan/scheme by IBM in a sustainable manner. There will be no ground water intersection. There is no existence of Mn ore body within the lease area. The lease has been granted for Iron ore only.	With due approval from IBM scientific mining being followed as per approved scheme of mining.
17	Commercial Utilization of Low Grade Ore: R & D studies towards utilization of low-grade iron ore should be conducted through research/academic institute like IMMT, BHUBANESWAR, NML, JAMSHEDPUR, and concerned metallurgical departments in IITs, NIITs, etc., targeting full utilization of low-grade iron ore (Fe content upto 45% by 2020 and upto 40% by 2025). In fact, life cycle assessment of whole process including	R & D studies towards utilization of low-grade iron ore has been conducted through IMMT, Bhubaneswar and concerned metallurgical departments in IITs, NITs etc., targeting full utilization of low-grade iron ore (Fe content up to 45% by 2020 and beyond 2020. The	We will abide the guidelines by IBM/ Dept. of Steel & Mines for utilization of waste water having high conc. of Fe.

	environmental considerations should be done for techno-economic and environmental viability. R & D studies on utilization of mine waste water 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.	project Proponent has planned to put up a beneficiation plant out side the lease area.	
18	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 upto public railway siding needs to be created. The total length of the conveyor belt system/ rail network to be developed from mines to nearest railway sidings by 11 mines in joda region is estimated to be about 64 km. Similarly, in Koira region, total length of rail network/ conveyor system for 8 mines(under SOTM 1 & 2) is estimated to be around 95 km. Further, it is suggested to develop a rail network connecting Banspani (Joda region) and Roxy railway sidings in Koira region. Responsibility: Dept. of Steel & Mines, Govt., of Odisha and Concerned Mines along with Indian Railways. Time period: Maximum 7 years (by 2025). The Department of Steel & Mines, Govt., of Odisha Should follow-up with the concerned Departments and railways so that proposed proper rail network is in place by 2025.	- As this mine is going for expansion to 1.5 MTPA which is <3 MTPA and as per SOTM conveyor belt and private railway siding is not required. - However, In this regard Dept. of Steel & Mines, Govt. of Odisha, Collector of Sundargarh and Keonjhar and representatives of respective mines has preliminary discussed to find out the way for installation of conveyor belt to railway siding and also development rail network from mines to nearest railway sidings. - We will abide by the decision of Dept. of Steel & Mines, Govt. of Odisha in this aspect.	As a cumulative approach, recommendation with regard to new railway lines and railway sidings forwarded to the Ministry of Railway/Railway Board through Commerce & Transport Department for appropriate action as per the decision taken in the meeting on dated 21.06.2018 at Chief Secretary, Odisha. Further we will abide by the guidelines as & when formed.
19	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.	State Government of Odisha will take decision in this aspect to ensure exhaust of all the iron & manganese ore resources in the existing working mines and from disturbed mining leases/zones in Joda and Koira region.	Dept. of Steel & Mines is being working in this regard.
20	Large and medium mine leases contribute to better implementation of reclamation and rehabilitation plans to sustain the ecology for scientific and sustainable mining. The small leases do not possess scientific capability of environmentally sustainable mining. Therefore, new mine leaves having more than 50 ha area should be encouraged, as far as possible. This will ensure inter-generational resource availability to some extent. Responsibility: Dept., of Steel & Mines, Govt., of Odisha.	- All the mines whether large, medium or small are under operation on the basis of approved Mining plan/Scheme by IBM. PMCP & FMCP are made as per the designed format by IBM and continuously implementing the same. - Department of Steel & Mines, Government of Odisha to take appropriate actions while auctioning the mine towards fixing	Dept. of Steel & Mines is being working in this regard.

		the area.	
22	Air Environment Related: (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 GPCB 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, NO2 and CO monitoring. Location of air quality monitoring stations should be decided based on the meteorological data, topographical features and environmentally and ecologically 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 3MTPA EC Capacity, (iii) Monitoring in buffer zone should be carried out by SPCB or through NABET accredited agency. In addition, air quality parameters (SPM, PM10, PM2.5, SO2, NO2 and CO) shall be regularly monitor at location of nearest human habitation including schools and other public amenities located nearest to source of the dust generation as applicable. Further, 11 continuous air quality monitoring system may be installed in Joida and koiria regions and one in Baripada/ Rairangpur region (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 3 using 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.	• The monitoring of AAQ will be done in the core as well as buffer zone of the ML area in 4 locations. Monitoring of AAQ is carried out twice in a week per station. The monitoring report reveals that the parameters like PM10, PM2.5, SO2 and NO2 are within the norm as per NAAQs notifications made by the CPCB. • The monitoring stations will be established basing on the metrological data, topographical features and environmentally and ecologically sensitive targets. • To control fugitive emission of dust from the mine, we will adopt fixed water sprinkling system for sprinkling of water on haul roads & processing yards. • In addition, portable water sprinklers to be deployed for water sprinkling on haul roads and other dust prone areas. • We will regularly monitor the emission of the vehicle to ascertain emission limits as per the pollution norms. The tests will be conducted on regular basis by engaging authorized Pollution Testing Centre.	Being followed on regular basis.

23	Noise and Vibration Related: (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 (detailed in section 5.4)should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM etc. should be provided with ear plugs/muffa,(iii) Noise levels should be monitored regularly(on weekly basis) near the major sources of noise generation with 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, 20000 (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.	• Blasting operation is being carried out in day time only. Control blasting will be carried out as per the recommendation/ suggestion by Central Institute of Mining & Fuel research (CIMFR). • Noise & vibration will be monitored on fortnightly basis. • Source wise noise also to be monitored on regular basis. • Workers will be engaged in operations of HEMM, etc. will be provided with ear plugs/muffs, nose mask etc.	Being followed on regular basis as explained.
24	Water/Wastewater Related : (i) In general, the mining operations should be restricted to above ground water table and it should not intersect groundwater table. However, if enough resource 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 NH 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 passing through 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 resource in the area should be undertaken in consultation with central Ground water Board (CGWB). (v) Suitable rainwater harvesting measures on long term basis should be planned and implemented and consultation with CGWB, to recharge the ground water source. Further, CGWB can	• Hydrological Study has been undertaken. • No natural watercourse is being obstructed due to mining activity. Regular monitoring of flow rate, quality both in up-stream & down-stream is being carried out. • Ground water quality & level monitoring is being carried out both in core & buffer zone. Piezometer has been installed in observation well inside lease area. • Roof top rain water harvesting structures has been established in the hutment with recharge wells.	Being followed on regular basis as explained. Further, Proposed activities towards environmental measures will be implemented soon after grant of Environmental Clearance

	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 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 he employees/colony, wherever applicable, (ix)Mine leaseholder should ensure that no slit 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 slit 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 geotextile 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 should be arrest silt from being carried to water bodies. Adequate number of check dams should be constructed across seasonal/perennial nallas (if any) flowing through the mine lease areas and silt be arrested. De-silting at regular intervals should be carried out and quantity should be recorded for its better utilization. After proper soil quality analysis. (xii) The water so collected in the reservoir within the mine should be utilized for the sprinkling on hauls roads, green belt development etc. (xiii) There should be zero waste water discharge from the mine. Based on actual water withdrawal and consumption/ utilization in different activities, water balance diagram should be prepared on monthly basis, and efforts should be made to optimize consumption of water per ton of ore production in successive years. Responsibility: Individual Mine Lease Holders, SPCB and CGWB.		
25	Land/soil/overburden Related : The top soil should temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long(not more than 3years or as per provisions mentioned in the mine plan/scheme).THE TOPSOL Should be used for land reclamation and plantation	All the conditions is/will be complied as per approved Mining Plan, and imposed by MoEF, SPCB,DGMS etc.	Further, Proposed activities towards environmental measures will be implemented soon after grant of Environmental

	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 kept active for long speriod . 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 ssilt 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 setting 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 OB dumps outside the mine lease area. The backfilled area should be afforested, aiming to restore the normal ground level. Monitoring and management of rehabilitated areas should continue till the vegetation is established and becomes self-generating, (vi) Hazardous waste such as, waste oil, lubricants, resin, and coal tar etc. should be disposed off as per provisions of Hazardous waste management Rules, 2016, as amended from time to time. Responsibility: Individual Mine Lease Holders.		Clearance.
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26	Ecology/Biodiversity (Flora-Fauna) Related: (i) As per the Red List of IUCN (International Union for conservation of Nature), six floral species and 21 faunal species have been reported to be under threatened, vulnerable & endangered category. Protection of these floral and faunal species should be taken by the state forest & Wildlife Department on priority, particularly in the mining zones, if any, (ii) The mines falling within 5-10 km of the Karo- Karampada Elephant corridor buffer need to take precautionary measures during mining activities. The forest and existing elephant corridor routes are to be protected and conserved. Improvement of habitat by providing food, water and space for the elephants is required to be ensured to avoid Man-Elephant conflicts. Though as per the records of state forest Department, movement of elephants in the Karo-Karampada elephant corridor within 10km distance from the mines in Joda and Koira is not observed. The forest Department shall further record and ensure that elephant's movement is not affected due to mining activities, (iii) 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 conservation 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, (iv) 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 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 trees species/grass species/scrub etc. distance between the plants and survival rate should be recorded, (vi) 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 particular pollution. Thus the identified native trees in the mine area may be encouraged for plantation. Tree species having small leaf area, dense hair on	• The bio diversity study has been conducted by Central Institute of Mining and Fuel Research (CIMFR), Dhanbad. As per the study there is no schedule I fauna within the core zone. In the buffer zone, Schedule I fauna species like Sloth bear, Hyaena, Spotted deer and python are found. No endangered or endemic species was found in core or buffer zone. • Further, the site specific Wildlife Conservation Plan has been prepared & got approved by PCCF (Wildlife), Chief Wildlife Warden, Odisha. The project has estimated cost of Rs. 100 Lakhs which includes cost for both buffer zone i.e. Rs. 72.00 Lakhs which is already deposited in favor of CA Fund and core zone i.e. Rs. 28.00 Lakhs for the conservation and management of wildlife. • The project proponent has constructed check dam & check weirs to restrict the mixing of undesired substances in nearby streams & also established guard wall along the sides of nallas. • The project proponent is carrying out different measures towards protection of wild animals i.e. awareness program among local and staff members etc., engagement of the fire watchers, van sahayaks etc. • Karo-Karampada elephant corridor is beyond 11.2 KM from the mine lease boundary. The distance map is given in Chapter-4. • Till date 2.477 ha has been covered under plantation to control erosion and surface run off. Further, it has been planned to make plantation as per the approved mining plan, and as per the instruction	We will abide by the suggestion of State Forest & Wildlife Department in this aspect.
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	leaf surface (rough surface), deep channels on leaves should be included for plantation. (vii) Vetiver plantation on inactive dumps may be encouraged as the grass species has high strength of anchoring besides medicinal value. (viii) Details of compensatory afforestation done should be recorded and documented by respective forest divisions, and State forest Department should present mine-wise annual status, along with expenditure details,(ix) Similarly Wildlife Department is also required to record and document annual status of wildlife in the region and should identify the need for wildlife management on regional level (x) Maintenance of the ecology of the region is prime responsibility of the State Forest and wildlife Department. They need to periodically review the status and identify the need for further improvement in the region. The required expenditure may be met from the funds already collected in the form of compensatory afforestation and wildlife management. Further, additional fund, if required can be sought from DMF. Responsibility: Individual Mine Lease Holders and State Forest & Wildlife Department.	of State Forest Dept. The project has made retaining wall and garland drains at toe of the all-around dumps connecting to the Settling pit.	
27	Socio-Economic Related: (i) public interaction should be done 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 outtees and land losers/affected people if any should be compensated and rehabilitated as per the national/state policy on Resettlement and Rehabilitation, (iii) The socioeconomic development in the region should be focused and aligned with the guide guidelines/initiatives of Govt. of India/ NITI Aayog /Hon'ble Prime minister's Vision centring 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 "SamagraVikas" 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 MantriKhanijKshetraKalyanYojna (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	- There is no such Resettlement and Rehabilitation as there is no Land outies and land losers/ affected people. We will extend our support to District Administration towards growth of education, medical and developing skills in the people of the region. - The project proponent will abide by all the guideline to make the expenditure against CSR, DMF, NMET, etc. - Till date GRM has spent more than Rs.4.47 crores for infrastructure facilities like education, medical, roads, safe drinking water, sanitation, employment, skill development under CSR activities. Further Rs 80 lakhs budgetary provision has been made for next 3 year under CER.	Being followed on regular basis as explained. Further, Proposed activities towards environmental measures will be implemented soon after grant of Environmental Clearance.

	Individual Mine Lease Holders.		
28	Road Transportation Related: (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 miner as suggested in chapter 10. 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 in 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.	• We will abide by the suggested ore transport mode (SOTM) by State Govt. in future. • As Koira -Tensa Road passes through the lease area with blacktopped and under four-lining, so the transportation is free from dust. • Construction of cemented road from mine exit gate to inside the mine is completed. • The vehicles carrying the loaded materials are being released with tarpaulins covers and we are ensuring no spillage of ore/dust takes place on the transportation road. • Air quality monitoring is being done near the mineral transport road in regular basis.	Construction of concrete road from the exit gate to inside the mine is under process. Maintenance of road & monitoring of dust is a continuous practice by lease holder. Further we will abide by the guidelines formed by State Govt. in regard to SOTM
29	Occupational Health Related: (i) personnel working industry 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 mineral 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 actions wherever required. Occupational health centre should be established near mine site itself. Responsibility: Individual Mine Lease Holders and district administration (District	• Workers engaged in Operations are provided with earplugs / muffs. 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. This is being carried in compliance to Mines Act, 1952 & Rules 1956 and amendments there to. • The occupational health surveillance shows that there no occurrence of any kind of occupational health diseases. A medical dispensary with full time Doctor has been appointed at camp	Being followed on regular basis as explained. Further, Proposed activities towards environmental measures will be implemented soon after grant of Environmental Clearance.

	Medical Officer).	area for the health check-up of employees and also the locals.																									
30	Reporting of Environmental Sustainability Achievement: All the mines should prepare annual environment sustainability report (ESR) highlighting the efforts made towards environmental protection with respect to different environment components vis-à-vis production performance of the mine on monthly basis. The data collected as per EC and CTE/CTO conditions should be utilized to prepare the annual sustainability report. The mines performing high with effective environmental safeguards may be suitably recognized/ rewarded. "Star Rating Format" formulated by the Ministry of mines along with environmental sustainability report may be used,	As per the "Star Rating Format" formulated by the Ministry of Mines GRM will obtain the rating during next year. Environmental Sustainable report will be prepared in yearly basis highlighting the efforts made towards environmental protection	This project is being followed the star rating mechanism formulated by the Ministry of Mines along the Environmental Sustainable reporting & rated as 5 star in the recent past evaluated by IBM.																								
31	Environmental Monitoring Requirements at Regional Level: Apart from strict compliance and monitoring by individual mine lease holder. There is a need for simultaneous monitoring in each of the regions by competent expert agencies under the guidance/supervision of concerned regulatory agency Details of the studies required to be done on regular basis(continuously for 5 years) through responsible agency (organisation of national/state repute) and time frame are suggested in Table. <table border="1"> <thead> <tr> <th>Sl. No</th><th>Study component / Action Plan</th><th>Responsibility</th><th>Monitoring and Reporting Time Frame (Approx.)</th></tr> </thead> <tbody> <tr> <td>1</td><td>Environmental Quality Monitoring with respect to Air, Water, Noise and Soil Quality in each region (Joda, Koira and Baripada/ Rairangpur) as per specified frequency shall be done by a third party (preferably Govt.) and/or laboratory approved/ recognized by NABET/CPCB/SPCB/MoEF&CC. All the water bodies (rivers, nalias, ponds etc.) shall be monitored. National /State level research/academic institutes may be involved initially for couple of years to streamline the activity. The report shall be brought out annually by June each year. The study shall be conducted in consultation with MoEF&CC-RO.</td><td>SPCB</td><td>Continuous Annually</td></tr> <tr> <td></td><td>Installation of online ambient air quality monitor for PM10, PMP.S, SOX AND NOX within the mine having more than 3MTPA EC Capacity.</td><td>Respective Mine Lease Holders</td><td>Continuous annually</td></tr> <tr> <td></td><td>Installation of online ambient air quality monitor for PM10, PM2.5, SOx and NOx in the Joda and Koira Region (total 11 locations).</td><td>SPCB</td><td>Continuous Annually</td></tr> <tr> <td>2</td><td>Status of Flora and fauna in each of the regions shall be assessed on annual basis. Changes, if any, taking place in the region shall be brought out clearly. 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Respective District Administration	Annually	• Presently air quality monitoring system has been established in some of the mines core zone area and also in transportation route under guidance of SPCB. • On the basis of gathered data R&D work will be done by Govt. Authorities. • Three numbers of online ambient air quality monitoring system has been installed and commissioned in pre-dominant wind direction making an angle of 120° with each other. • Existing Koira - Tensa road is passing through the lease and exit gate of mine working area is connecting the same. We are ensuring the dust free road on the stretch of the road passes through the mine lease area. • We will extend support towards monitoring of all environmental parameters by SPCB, Flora & Fauna study by State Forest & Wildlife Dept., Socio-economic study by District Administration, Hydrogeological study by CGWB, Traffic study by CRRI, Remote sensing study by ORSAC	3nos CAAQMS already commissioned. For technical studies we will extend our support as per the instruction from Authorities.
Sl. No	Study component / Action Plan	Responsibility	Monitoring and Reporting Time Frame (Approx.)																								
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	<table><tr><td>4</td><td>A detailed hydro-geological study in each of the regions shall be conducted in an integrated manner in consultation with Regional Director, Central Ground Water Board. Accordingly, all project proponents shall implement suitable conservation measures to argument ground water resources in the area.</td><td>SPCB</td><td>Once in 2 years</td></tr><tr><td>5</td><td>The State Govt. shall ensure construction and maintenance of dust free common roads/ appropriate rail network for transport of ore from mines to the consumer end.</td><td>Dept. of Steel & mines</td><td>12months for road network and 5-7 years for rail network</td></tr><tr><td>6</td><td>Construction and maintenance of dust free roads from respective mine to the main road</td><td>Respective Mine Lease Holders</td><td>Continuous 6 months</td></tr><tr><td>7</td><td>Traffic/road inspection study addressing the condition of traffic/roads leading to different mines and connecting to different railway siding shall be undertaken on annual basis. Further, detailed traffic study shall be undertaken on every 5 yearly basis to ensure adequacy of road/rail infrastructure in each of the regions. The study can be undertaken through national/ state level research/ academic institute (such as CSIR-CRRI, New Delhi).</td><td>Dept. of Steel & mines</td><td>Continuous 6 months</td></tr><tr><td>8</td><td>Assessment of land use/land cover changes in each of the regions, with particular focus on mining areas, afforestation activities, variation in flow path of various water bodies etc. using remote sensing data</td><td>ORSA C</td><td>Annually</td></tr><tr><td>9</td><td>R & D Studies for utilization of low-grade iron ore</td><td>Dept. Steel & Mines through R&D / Academic Institutes</td><td>Upto 45% by 2020 and upto 40% by 2025</td></tr></table>	4	A detailed hydro-geological study in each of the regions shall be conducted in an integrated manner in consultation with Regional Director, Central Ground Water Board. Accordingly, all project proponents shall implement suitable conservation measures to argument ground water resources in the area.	SPCB	Once in 2 years	5	The State Govt. shall ensure construction and maintenance of dust free common roads/ appropriate rail network for transport of ore from mines to the consumer end.	Dept. of Steel & mines	12months for road network and 5-7 years for rail network	6	Construction and maintenance of dust free roads from respective mine to the main road	Respective Mine Lease Holders	Continuous 6 months	7	Traffic/road inspection study addressing the condition of traffic/roads leading to different mines and connecting to different railway siding shall be undertaken on annual basis. Further, detailed traffic study shall be undertaken on every 5 yearly basis to ensure adequacy of road/rail infrastructure in each of the regions. The study can be undertaken through national/ state level research/ academic institute (such as CSIR-CRRI, New Delhi).	Dept. of Steel & mines	Continuous 6 months	8	Assessment of land use/land cover changes in each of the regions, with particular focus on mining areas, afforestation activities, variation in flow path of various water bodies etc. using remote sensing data	ORSA C	Annually	9	R & D Studies for utilization of low-grade iron ore	Dept. Steel & Mines through R&D / Academic Institutes	Upto 45% by 2020 and upto 40% by 2025	and R&D studies for utilization of low grade iron ore by Dept. of Steel & Mines through academic institutes. For the proposed expansion, towards EIA/EMP study a 3 months baseline data has been conducted during summer season.
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	he data so generated for the region should be made available on the website of Department of steel & Mines and also at MoEF&CC website, so that it can be effectively utilized by individual Mine Lease holders for Preparing EIA/EMP reports. This will meet the requirement for separate one season baseline environmental quality data collection by the individual proponents, if the mine proposed is in the same study region. Further MoEF&CC through EAC1 can also utilize the data base available in evaluating the proposals for expansion of existing mines or new mines while granting ToR or EC to the mine taking an holistic view of the region. State Govt. of Odisha should bring out an integrated environmental sustainability report for each of the regions (mainly for Joda and Koira region) incorporating ESR of individual mines and data collected in the region through various agencies, once in 5years to plan level of scientific and sustainable mining for the next 5years.																									
32	Institutional mechanism for implementation of environmentally sustainable mining: The present study is not a once-time study, but a process to ensure environmentally sustainable mining activities in the region on long term basis. Looking into the large-scale mining activities and long term perspective for mining vis-a-vis environmentally sustainable mining and upliftment of people of the region, there is a need to create an	We will extend our support in every aspect towards environmentally sustainable development plan for economic growth in mining sector as well as for improvement in quality of life of the people of the region inline to State Govt. policy.	M/s. GRM is contributing towards upliftment of livelihood. Till now the company has spent 10.75 crores against CSR activities as a part of environmental sustainability.																							

	agency, who will integrate all the aspects relating to sustainable mining in the region on long term basis.it could be a SPV of Govt. of Odisha or a cell within the overall control and supervision of dept. of Steel & Mines, with members from IBM, GSI, OSPCB, MoEF&CC-RO and other concerned departments and mine owners (EZMA), District Administration. It is found that the strong database available for the region needs to be taken into account to map and establish environmental quality of the region on needs to be taken into accounts to map and establish environmental quality of the region on daily, monthly, seasonal and annual basis. Further, the efforts and initiatives of the mines towards environmental protection as well as upliftment of the people of the region are require to be integrated and a systematic plan at the block/regional level needs to be framed for the overall benefit of the local society, region, district, state and the country as a whole. It will be desirable to have proper environmental quality data management and analysis by NEERI OR any other agency for next 5 years (six monthly compliance reports followed by field verification) ensuring sustainable mining practices in the region leading to an overall development of the region. District mineral funds should be utilized appropriately for various developmental activities/needs of the region coupled with social upliftment may be brought out by SPCB or any other authorized agency on annual basis. This report can be used supporting the regional EIA study and also need for environmental quality monitoring by individual mine seeking environmental clearance for new mine/expansion of mine including public hearing. Since, outcome of the above study reports shall be in the overall interest of all the stakeholders (including local population) of the region further planning for the region shall warrant cooperation and assistance of all the stakeholders (mine operators, industries, transporters, state & central Government offices, MoEF&CC, CPCB, SPCB, Dept. of Steel &mines, IBM,IMD,NGOS and local people) in sharing the relevant data/information/reports/documents etc. to continuously improve upon the environmentally sustainable development plan for economic growth on mining sector as well as for improvement in quality of life of the people of the region.		
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Photographs regarding NEERI Compliance









 GPS Map Camera

Dengula, Odisha, India
V59J+2JG, Dengula, Odisha 770048, India
Lat 21.867751°
Long 85.181136°
04/09/24 03:30 PM GMT +05:30





Email Letter

Letter No

330270|SEZ|Chaibasa Region|Perm|2020|7414|PLCommon_MMR1961|2

	भारत सरकार Govt. of India श्रम एवं रोजगार मंत्रालय Ministry of Labour & Employment खान सुरक्षा महाविदेशालय Directorate-General of Mines Safety	
NO: 330270 SEZ Chaibasa Region Perm 2021 7414 Date 13.01.2021		

From:

Altaf Hussain Ansari

Director of Mines Safety

Chaibasa Region, Chaibasa.

To,

The Owner,

Raikela Iron Ore Mines

M/s Geetarani Mohanty,

Station Road, Barbil – 758 035,

Dist – Keonjhar (Odisha).

Subject: Permission under Regulation 106(2)(b) of the Metalliferous Mines Regulations, 1961 to deploy Heavy Earth Moving Machineries for excavation, digging and removal of OB and ore and/or conduct deep hole blasting at Raikela Iron Ore Mines of M/s Geetarani Mohanty.

Sir,

Please refer to your online application Id 140570 dated 23.11.2020 and the plans and sections submitted offline, on the above mentioned subject.

The matter has since been considered and examined in the light of the particulars furnished by you. In exercise of the powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under provisions of Regulations 106(2)(b) of the Metalliferous Mines Regulations, 1961 and by virtue of the authorisation granted to me by the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Section 6(1) of the Mines Act, 1952, I, in suppression of earlier permissions granted on the above subject, hereby permit you to deploy Heavy Earth Moving Machineries for excavation, digging and removal of Overburden & Ore in the areas bounded by “A-B-C-D-E-F-G-H-I-J-K-A” and “L-M-N-O-P-Q-L” as shown in blue colour bold lines and conduct deep hole blasting in the area bounded by “1-2-3-4-5-6-7--1” as shown in pink colour bold lines on the Surface Plan No. GRM/SUR/01 dated 18.11.2020

at Raikela Iron Ore Mines of M/s Geetarani Mohanty; subject to the conditions specified in the Annexure 'A' attached with this permission and the following conditions being strictly complied with-

(1) A person holding a First Class Managers' Certificate of Competency under Metalliferous Mines Regulations, 1961, shall remain as Manager of the mine. This permission shall stand revoked as soon as the qualified Manager ceases to work at the mine.

(2) Adequate numbers of supervisors including qualified Foreman & Mates shall be appointed to assist the manager. Mine Foreman's district shall not contain more than two excavators ancillary equipment viz. dumpers, loaders and drills etc and one Foreman shall not supervise work of more than two Mining Mates.

(3) No ore dressing/ handling/processing plant shall be attached with the mine.

(4) No person shall be engaged in ore/overburden benches within 60m of any Heavy Earth Moving Machinery deployed therein.

(5) Adequate general lighting as required under notification No. GSR-618(E), dated 28th April, 2017, published in the Gazette of India dated 21st June, 2017, Part II Section 3(i) (DGMS Legis. Circular No.3 of 2017) shall be kept provided and maintained during working hours at different places or areas where natural light becomes insufficient.

(6) Drilling, Charging and Blasting operation shall be done under the personnel supervision of the Mine Manager or a separate Officer holding at least a Second Class Managers' Certificate of Competency under Metalliferous Mines Regulations, 1961.

(7) Blasting parameters with a rough sketch showing the drilling pattern and the holes charged shall be maintained in a register kept for the purpose for each blast.

(8) No work of removal of overburden and extraction of ore by use of explosives shall be done within 300m of surface structure/ buildings unless separate permission under Regulation 164(1-B) of the Metalliferous Mines Regulations, 1961 is obtained from this Directorate.

(9) No working with Heavy Earth Moving Machinery shall be extended within 45.0m of any surface feature or public road not belonging to the owner unless the same is acquired or consent to operate is obtained from the owner concerned.

(10) A suitable 'Code of Traffic Rules' for regulating the movement of Heavy Earth Moving Machinery (commensurate with the capacity/size type of machines used in the mechanised opencast mine) shall be framed and enforced immediately. Such Code of Traffic Rules should be approved by Tri-partite Committee. A copy of such Code shall be submitted to Director of Mines Safety, Chaibasa for record.

(11) The operator's cabins of heavy earth moving machinery shall be well designed and substantially built so as to ensure adequate protection to the operator against heat, dust, noise etc. and at the same time provide adequate safety to the operator in the event of overturning of heavy earth moving machinery. A seat belt for the safety of the operator shall also be provided.

(12) A code of practice shall be drawn up for dealing with fires at different locations in the opencast mine, including HEMM. Arrangements for fighting fire should be provided on all heavy earth moving machineries. Such arrangements should, if possible, operate automatically on appearance of fire.

(13) Separate ore stockyards shall be maintained for dumping and dispatch of ore and it shall be ensured that dispatch of mineral is not carried out from the dump yard where dumping is under progress. Further, buyers' trucks shall be parked away from the mine premises and only such trucks shall be allowed to enter the mine, which are due for loading during the shift. Also, it shall be ensured that only permitted quantity of mineral is loaded in the trucks so as to obviate the risk of accidents due to overloaded trucks in the mine premises.

(14) All persons to be employed to drive/operate HEMM should be trained and their competency should be evaluated by a Board constituted by the management. The members of such board shall be persons who are

not connected with imparting of training. However, the training officers may be co-opted in the Board as observer.

(15) Only such fitters/mechanics who possess driver's/ operator's license should be allowed to carry out test-run of HEMM.

(16) The portion of surface haul road in mine premises where there is heavy traffic of men and machines should be provided with a separate lane properly fenced off from the haul road for pedestrians and two wheelers.

(17) Trucks and other heavy vehicles, not belonging to management should not be allowed in the mine premises without a valid pass issued by the manager or other competent person. Before the pass is issued the engineer shall check the road-worthiness of such vehicles.

(18) In order to check entry of unauthorized vehicles into the mine premises, a properly manned check gate(s) at the entrance(s) shall be set up where record of entry and exit of each such vehicle shall be maintained.

(19) At the check gate the license of the drivers shall also be checked for eliminating the possibility of unlicensed persons driving the vehicles.

(20) Persons engaged in surface operations and, in particular, the contractor's workers, who incidentally are often inexperienced and least informed about job-safety matters, need closer and more competent supervision. To minimize accidents due to surface operations it shall be ensured that all persons engaged at any work within the mine premises through the contractors have received relevant training and other job-related briefings and that the drivers of vehicles belonging to contractors entering the mine premises have additionally been explained the salient provisions of "traffic rules".

(21) Each and every operation, including the operation carried out through contractor's workers or by outside agency, shall be placed under the charge of a competent supervisor, duly appointed and authorized by the manager, his jurisdiction being clearly demarcated.

(22) (a) A code specifying the duties and responsibilities of all officers of mining cadre, Mine Engineer, Supervisors, Technicians, Mechanics, Fitters, Machine Operators, helpers, loading supervisors etc. shall be drawn up and distributed to all.

(b) It shall be the responsibility of the Manager, Engineer and other supervisors to see that all persons working in the mine in all machines/equipments etc. work as per the code and all machines and equipments etc. are installed, operated and maintained in safe working conditions.

(c) All damages to the lives and property not belonging to the management of the mine and damages or injuries to persons as a result of blasting or mining operations shall be adequately indemnified. Shall there be any controversy in this respect, the decision of the Director General of Mines Safety shall be final and binding on the management.

(23) In the event of any change in the circumstances connected with this permission which is likely to endanger the life of persons employed in the mine or the mining operations for which this permission has been granted shall be stopped forthwith and intimation sent to the Director of Mines Safety thereof. The said mining operation shall not be resumed without express and fresh permission in writing from this Directorate.

(24) If at any time any one of the conditions subject to which this permission has been granted is violated or not complied with, this permission shall be deemed to have been revoked with immediate effect.

(25) This permission may be amended or withdrawn at any time if considered necessary in the interest of safety and is being issued under Regulation 106(2) (b) of the Metalliferous Mines Regulations, 1961 only without prejudice to any other provisions of law which may be or may become applicable at any time.

(26) This Directorate shall be informed as soon as the mining operations are commenced in accordance with the above permission. Intimation about completion of the mining operations should also be sent promptly

and in any case not later than one month thereof.

(27) This permission shall be valid for a period of five (5) years from the date of issue of this letter.

Annexure 'A'

1.0. GENERAL:

I. Except where otherwise provided for in this conditional permission all provisions of the Metalliferous Mines Regulations, 1961 relating to opencast workings, use of explosives and machinery shall be strictly complied with.

II. (a) All damages to property not belonging to the owner of the mine and injuries to persons as a result of mining operations shall be adequately indemnified. Should there be any controversy in this respect; the decision of the DGMS shall be final and binding on the management.

(b) No workings shall be extended to any point within 45m of village, dwellings, Roadway, Roadway, Railway acquired land and Public structure, H.T. Power line etc.

III. No work whatsoever shall be done where the provisions of Regulation 127 are attracted due to the presence of River, jore and nallah in the vicinity. The entire ground lying within 15m of all the River, nallahs and jores shall be filled up and raised and consolidated to a RL of at least 3m above the Highest Flood Level.

IV. No person shall be engaged or work or allowed to travel close to high sides/ benches, from which he is likely to fall for more than 1.8 m vertically down, unless he is provided with and uses a safety belt or rope.

V. Quarrying operations shall be conducted from top downwards.

VI. No person other those required for operating the machinery shall be allowed to remain near the foot of the benches exceeding 3.0m in height. When persons are employed within 3.0m of the bench sides, adequate precautions shall be taken to ensure their safety by dressing or/and supporting the sides of the benches.

VII Sufficient number of safety belts shall be available at the site and shall be ensured the use of the same.

VIII. Proper drains shall be provided at the benches to prevent accumulation of water.

2.0. OPENCAST WORKINGS:

(a) The height of the benches in alluvium and soft rock formation shall not be more than 3m and in overburden, ore or other hard rock formation not be more than the digging height of the machine used for digging, excavation or removal.

(b) The width of any bench shall not be less than; (i) the width of the widest machine plying on the bench plus two meters, or (ii) if dumpers ply on the bench three times the width of the dumper, or (iii) the height of the bench, whichever is more.

(c) If tippers or similar transport vehicles are deployed for transportation of ore, separate roads for such tipping trucks or similar vehicles shall be provided and safe loading practices shall be adopted avoiding plying of trucks on the same bench where men are to work, travel or rest.

(d) No manual workers shall be employed where HEMM is deployed in the mine.

3.0. FENCING AROUND OPENCAST WORKINGS:

(a) The periphery around the limits of opencast workings shall be kept fenced with a masonry wall not less than 0.40m thick and not less than 1.2m high, with parapet top.

(b) The edges of benches of the opencast workings shall be kept fenced with wire ropes strand or barbed wire supported by movable posts (wooden, iron or concrete). The gap between the adjacent rope strands or wires

shall not be more than 0.30m and the bottom most rope strand wire shall not be more than 0.25m and the top most rope strand or wire not less than 1.0m from ground level.

(c) Before abandoning the mine, the pits/quarry shall be filled upto adjuscent ground level by earth, where ever applicable.

4.0. SPOIL OVERBURDEN OR DEBRIS BANKS:

I (a) Spoils, overburden or debris shall be deposited at places belonging to the mine and duly approved by the manager in writing.

b) Spoils, overburden or debris shall not be deposited, beneath transmission, telephone or power lines or near any public structure.

(c) The slope of a spoil bank face shall be determined by natural angle of repose of the material being deposited, but shall in no case exceed 37.5 degree from the horizontal. The spoil bank face shall not be retained by artificial means at an angle in excess of its natural angle of repose.

(d) Any spoil bank exceeding 30m in height shall be kept benched so that no such bench exceeds 30m in height and the general slope does not exceed 1 vertical to 1.5 horizontal. In no case, the height of any spoil bank shall be allowed to exceed 60m unless a scientific study on its stability has been done and a separate permission is obtained from this Directorate.

(e) The spoil bank face shall not be retained by and artificial means at an angle in excess of it's natural angle of slope.

II. (a) The spoils overburden or debris shall not be deposited within 45m of a railway or other structures and it shall not be permitted to approach any of the above said structures closer than a distance equal to 1.5 times the vertical height of its face.

(b) The toe of a spoil-bank shall not be permitted to approach a railway or other public works, public road or building or other permanent structure not belonging to the owner of the mine closer than distance equal to the vertical height of its face.

(c) A suitable fence shall be erected between any railways of public works or road or building or structures and the toe of an active spoil bank so as to prevent un-authorised persons from approaching the spoil bank.

(d) The backfilled area shall be kept benched and the distance of any active mine workings (faces) from the toe of bottom-most backfilled face (bench) shall not be less than 100m.

(e) Spoils, overburden or debris shall not be deposited within 45m of any river, jore or any natural course of water, power transmission line, any building, structures, road etc.

III. No person shall, or shall be permitted to approach the toe of an active spoil bank where he may be endangered from material rolling down the face. Suitable signs for warning the persons at conspicuous places shall also be displayed.

IV. Dozers shall be provided with the following safety features in addition:

- 1) Roll over protection
- 2) Turbo charge guard.
- 3) Fire resistant hydraulic hoses and wiring near hot zone
- 4) Seat belt.

5.0. ROADS FOR TIPPING TRUCKS AND DUMPERS ETC:

I. All haul roads for dumpers or other mobile machinery shall be constructed to suit its load capacity and maintained in good condition. No vehicles other than heavy transport vehicles shall use haul roads except between designated points and when permitted in writing by the manager.

II. Where practicable, all roads leading from the opencast workings to surface shall be arranged to provide one-way traffic and no road shall be of a width less than three times plus 5m the width of the largest vehicle plying on that road. Where it is not practicable, definite turnouts, crossing points and waiting points shall be designated for use of vehicle.

III. All corners and bends shall be made in such a way that the operators and drivers of vehicle have clear view of distance of not less than 3 times the breaking distance of largest HEMM working at 40 KM/hour.

IV. Where it is not possible to ensure a visibility for a distance as mention in (III) there shall be provided with two roads of width not less than 2 times plus 3m of largest vehicle plying on the road with a strong road divider at centre with adequate lighting and reflector along the divider.

V. Where any road existing above level of surrounding area, it shall be provided with strong parapet wall or embankment of following dimensions:

(a) Width at top not less than 1m.

(b) Width at bottom not less than 2.5m.

(c) The height not less than the diameter of any type of largest vehicle plying on road. It may be noted that just dumping of mud or OB shall not be treated as strong parapet wall.

VI. No road shall have gradient more than 1 in 16. Ramps with 1 in 10 gradients should not be more than 10m at one stretch.

VII. If large capacity dumpers and smaller capacity tipping trucks or similar transport vehicle are deployed in the mine, separate roads for tipping trucks or similar transport vehicles shall be provided.

VIII. Plying of dumpers or tipping trucks on the same bench where men are to work, travel or rest shall be avoided.

IX. Warning notices and road signs shall be posted along the haul roads at appropriate places like crossings, curves etc for guidance of drivers of dumpers/trucks/tippers.

X. At every curve, parapet wall or vertical posts with Zebra lines shall be provided to help the drivers to keep the trucks/tippers/dumpers on the track.

6.0. ADDITIONAL DUTIES OF ASSISTANT MANAGER INCHARGE OF OPENCAST WORKING:

I. During every shift, the opencast workings shall be placed under the charge of a qualified experienced Assistant Manager to have overall control and guidance of all operations.

II. During his shift the Assistant Manager shall: -

a) Make frequent inspections for evidence of any unsafe conditions including evidence of slide of material from high wall and shall guide so that operations are conducted in a safe and efficient manner.

b) Not allow any person to work under overhanging edges or where there is evidence of slides, until such danger has been removed.

c) Ensure that every person engaged in dressing operations on high walls is provided with and uses safety belt of a type approved by this Directorate.

d) Ensure that all loose material is removed from high walls before drillers are engaged there; and

(e) Ensure that parapet walls along truck roads are properly maintained.

7.0 ADDITIONAL DUTIES OF ENGINEERS PLACED IN CHARGE OF MACHINES AND EQUIPMENTS IN OPENCAST WORKINGS:

The machines and equipments at work shall be placed under the charge of qualified and experienced engineer to effect inspection, examination, safe operations and maintenance of the machines, equipments and accessories. The engineer/engineers shall;

- a) inspect, examine machines, equipments and accessories and satisfy himself that they are in sound and safe working order;
- b) not allow any machine, equipment to be used, if it is found defective;
- c) ensure that every machine, equipment, accessory used is in a safe and efficient order;
- d) ensure that each operation, activity is carried on in safe and efficient manner.

8.0. INSPECTION, EXAMINATION, REPAIR AND MAINTENANCE OF HEMM AND OTHER MACHINES:

I. a) A code of practice for inspection, examination and repair of all breakdowns and repairs etc. shall be drawn up and practiced. A copy of the same shall be submitted to this Directorate promptly.

b) Every drilling and earth moving machinery or equipment or accessory (herein after called machine) shall be thoroughly examined at least once in each shift and maintained in good and safe working conditions.

c) A record of all such examinations and maintenances shall be maintained in a bound paged register and shall be signed by the engineer in charge of the shift and countersigned by the mine Engineer.

d) The layout of the workshop for maintenance of HEMM and other equipments shall be as per requirement mentioned in the DGMS Circular No.08 of 2003.

II. a) Every machine shall be allocated at least one day in every week for examination and maintenance, when it shall be thoroughly examined and inspected by the Engineer, who shall satisfy himself that it is mechanically sound and is in efficient working order before it is allowed to be re-used.

b) A report of every maintenance made under clause (a) shall be recorded in a bound paged book kept for the purpose, and shall be signed and dated by person making the inspection and countersigned by the Engineer.

c) If the engineer, mechanical Foreman or other competent person making an inspection under Clause (I) (a), notices any defect in any machinery, the said machinery shall not be used until the defect has been remedied.

d) Any defect in machinery reported by its operator shall be promptly attended to.

III. a) Any machinery found to be in an unsafe operating condition shall be tagged at the operator's position; "Out of Service, Do not Use" and its use shall be prohibited until the unsafe condition has been corrected.

b) All repairs to a machine shall be done at a location, which will provide a safe place for the persons engaged on repairs.

c) Except for testing, trial or adjustment, which must necessarily be done while the machine is in motion, every machine shall be shut down and positive means taken to prevent in operation while any repair or manual lubrication is being done.

d) Any machinery, equipment or part thereof which is suspended or held apart by use of slings, hoists jacks shall be substantially blocked or cribbed before men are permitted to work underneath or between the same.

e) The operator or driver shall not leave the machine while it is running unless it is placed under the charge of a competent person.

f) Power shall be disconnected when repairs are to be carried on any electrically powered machine/apparatus.

IV. In addition following provisions shall be ensured in general:

- 1) The approved type of audio visual alarm shall be provided in all equipment.
- 2) The approved type of fire suppression system shall be provided in all equipment.
- 3) The stability of HEMM shall be carried out at least once in year and after every major overhaul by an independent agency.
- 4) The crane and overhead crane shall be subject to proof load test and NDT test once in a year from a competent authority.
- 5) The pressure vessel receiver are subject to hydraulic and NDT test and shall be carried out by a competent authority.
- 6) In case of any defect in equipment such as brake, steering and safety device the equipment shall be immediately taken out of use and a record shall be kept.
- 7) The code of practice for installation operation and maintenance of all equipment shall be prepared and implemented before putting the equipment to use in mine.
- 8) The safety feature recommend in equipments shall be a part of notice inviting tender for new procurement and the design and drawing shall be obtained from OEM for fitting the same in old equipment.

9.0 PROTECTIVE EQUIPMENT, DUST ETC:

I. PROTECTIVE EQUIPMENT: Every person working in the opencast working shall be provided with, and shall use a hard hat and reinforced safety boots of a type approved by the Chief Inspector of Mines.

II. PRECAUTIONS AGAINST DUST: Adequate arrangements, to allay dry dust by wetting shall be made on roads and benches where HEMM, trucks and dumpers operate. All drills shall be provided with wet drilling arrangement and it shall be maintained in working order. No dry drilling operation shall be carried out.

10.0 DRILLING AND BLASTING OF DEEP HOLE:

10.1 GENERAL:

(a) Operations connected with Drilling, Charging, Stemming and Blasting of deep holes shall be placed under overall charge of the Mine Manager or an Assistant Manager, holding at least a second class manager's certificate of competency granted under the Metalliferous Mines Regulations, 1961, who shall supervise the said operations in accordance with the guidelines and directives issued by the Manager.

(b) Notwithstanding anything contained in the Metalliferous Mines Regulations, 1961, preparation of charges, charging and stemming of holes shall be carried out under the personal supervision of a Foreman, who shall fire the shots in deep holes himself.

(c) A proper record for every blast, showing blasting parameters like hole size, spacing, burden, depth of holes, number of holes fired in the round, charge/hole, charge/delay and total charge of explosives fired in the round, with a rough sketch showing the drilling and firing pattern shall be kept maintained in a bound pagged register kept for the purpose.

(d) Lives of persons and property not belonging to the management against injury and damages resulting out of blasting or operations being carried on in the mine shall be adequately indemnified. Should there be any controversy in this regard, decision of the D.G.M.S. shall be final and binding.

10.2 DRILLS: The following safety features shall provide.

- 1) Approval type of dust prevention or suppression system.
- 2) Each moving parts of the machinery shall be guarded/f encd and also ensure its effectiveness all the time.
- 3) (i) Emergency of push bottom in
 - a) Operator's cabin.
 - b) Main frame.
 - c) Propeller pendent.
 - d) Rear end.(ii) Tripping device to trip the field switch.
- 4) Thermostat motor protection relay in winding temperature and other related parts.
- 5) Explosive vent in transformer.
- 6) Propel interlock (an electric interlock between drilling and propeller operation).
- 7) High air discharge temperature switch.
- 8) Low lubrication oil pressure switch.
- 9) Oil stop valve (electric solenoid valve in compressor lubrication line.
- 10) No lump circuit.
- 11) Tower lock and lock check valve.
- 12) Propel joystick-spring loaded type to return to neutral (dead man safety).
- 13) Disk-brake and brake valve and its testing parameters.
- 14) Lock check valve for preventing creeping in drill.
- 15) Seat belt.
- 16) Fire resistant hydraulic hoses and wiring near hot zone.
- 17) Turbo charge guard.
- 18) Cabin for the operator.

10.3 PRECAUTIONS WHILE DRILLING:

- I. The position of every deep hole to be drilled shall be distinctly marked by the mine foreman so as to be readily seen by the drillers.
- II. a) No drilling shall be commenced in an area where shots have been fired, until the shot firer has made a thorough examination at all places, including remaining butts of old deep holes, for unexploded charges that the drill may strike.

b) No drill or bore rod or pick shall be inserted in butts of old deep holes even if an examination under clause (a) has failed to reveal presence of explosives.
- III. a) Drilling and charging of deep holes shall not be carried out in the same area at the same time.

b) Drilling operations shall not be carried on simultaneously on two benches, at places directly one above the other.

10.4 DUTIES OF DRILL OPERATORS:

I. At the beginning of his shift, the drill operator shall examine the drilling equipment and satisfy himself that:

- a) Crown blocks are mounted securely;
- b) where compressed air operated drills are used, all hoses' connections are in order; and
- c) the drilling equipment is in safe working condition.
- d) Wet drilling system is in order.

II. The drill operator shall ensure that;

- a) work-persons keep clear of auger and drill stem while the drill is in motion;
- b) work-persons do not work under suspended tools, when tools are removed from the holes, these shall be lowered on the platform; and
- c) all finished drill holes are properly plugged so as avoid possible leg injuries to any one accidentally stepping into the hole.

10.5 TRANSPORT OF EXPLOSIVES:

Where explosives are transported in bulk for deep hole blasting, the following precautions shall be taken: –

(I) Transport of explosives from the magazine to the priming station or the site of blasting shall not be done except in the original wooden or cardboard packing cases. The quantity of explosives transported at any time at the site of blasting shall not exceed the quantity required for use in one round of shots. The explosives shall be transported to the site of blasting not more than 90 minutes before the commencement of charging of the holes.

(II) (a) No mechanically propelled vehicle shall be used for the transport of explosive unless it is of a type approved. A jeep or land rover may be used for the transport of detonators from magazines to priming stations subject to the following conditions -

- (i) Not more than 200 detonators are transported in a vehicle at a time.
 - (ii) The detonators are packed suitably in a wooden box.
 - (iii) The wooden box containing detonators is placed, inside an outer metal case.
 - (iv) The outer metal case shall be suitably bolted to the floor of the vehicle or otherwise fixed in a wooden frame so that the container does not move about while the vehicle is in motion and
 - (v) No person shall ride on the rear portion of the vehicle.
- (b) Every vehicle used for the transport of explosive shall be marked or placarded on both sides and ends with the word "EXPLOSIVES" in red letters not less than 15cm high on a white background.
- (c) Every mechanically propelled vehicle transporting explosives shall be provided with not less than two fire extinguishers (one suitable for petroleum fire and the other for electrical fire) suitably placed for its convenient use.

(III) (a) The vehicle used for transport of explosives shall not be overloaded and in no case shall the explosive cases be piled higher than the sides of its body.

b) Explosives and detonators shall not be transported the same vehicles, at the same time.

(IV) (a) No person other than the driver and his helper (not below 18 years of age) shall ride on a mechanically propelled vehicle used for the transport of explosives.

b) The explosive van shall not be left unattended.

c) The engine of the vehicle transporting explosives shall be stopped and the brakes set securely before it is unloaded or left standing.

d) A vehicle transporting explosives shall not be driven at a speed exceeding 25km per hour.

e) A vehicle loaded with explosives shall not be taken into repair shop and shall not be parked in a congested place.

f) A vehicle transporting explosives shall not be refueled except in emergencies and then also, when its engine is stopped and other precautions taken to prevent accidents.

g) No trailer shall be attached to a vehicle transporting explosives.

(V) Every vehicle used for the transport of explosives shall be carefully inspected once in every 24 hours by a competent person to ensure that –

i) The Fire extinguishers are filled and are in place;

ii) The electric wiring is well insulated and firmly secured;

iii) The chassis engine and body are clean and free from surplus oil and grease;

iv) The fuel tank and feed lines are not leaking; and

v) Lights, brakes and steering mechanism are in good working order.

All reports of every inspection made as above shall be signed and dated by the competent person making the inspection.

(VI) All operations connected with the transportation of explosives shall be conducted under the personal supervision of a Foreman/ Blasting in charge so authorised by the Manager and who shall assist the officer in charge of blasting operations at the mine.

(VII) The blasting incharge shall personally search every person engaged in the transport and use of explosives and satisfy himself that no person so engaged has in his possession any cigarette, BEEDI or other smoking apparatus of any kind capable of producing a light, flame or spark.

11.0 DESIGN, OPERATION AND MAINTENANCE OF EXCAVATORS:

(A) DESIGN:

I. a) Every excavator shall be so designed as to afford the operator clear and uninterrupted vision all around.

b) Every excavator shall be provided with: -

i) efficient warning devices;

ii) adequate front and rear lights and a portable lamp for emergency, unless the excavator is not used after day-light hours; and

iii) an efficient portable fire extinguisher so placed as to be within easy reach of the operator.

II. A special retracting ladder mounted on the excavating machine.

III. The following safety feature shall be provided with Excavators:

- i) All functions cut off switch.
- ii) Swing Motor Brake.
- iii) Fire resistant hydraulic hoses in place of ordinary hoses to decrease the chance of Fire. All the sleeves and conducts where cable/wire are passed shall be fire resistant.
- iv) Turbo charger Guard.
- v) Seat belt.
- vi) Vent valve on top of hydraulic tank should be able to be removed without any tool.
- vii) A baffle plate between cold zone and hot zone.
- viii) Provision for Limiting of hydraulic cylinders-Stoppers.

(B) OPERATION:

I. Every excavator shall be under the charge of a competent person authorised in writing by the manager, herein called the 'Operator'.

II. a) No person other than the operator or his helper if any, or the manager or any person so authorised in writing by the manager shall ride on any excavator.

b) No person shall be permitted to ride in the bucket of a excavator.

III. Excavator boom shall be lowered to the ground during greasing operations.

IV. a) No excavator shall be operated in a position where any part of the machine suspected and leads or lines are brought closer than 3m to exposed high voltage lines, unless the current has been cut off and positive means taken to prevent the lines from being energized. A notice of this requirement shall be posted at the operator's position.

b) Electrical cables, if any, shall be laid in such a manner that they are not endangered either by falling rocks or by any mobile equipment.

V. The excavator bucket shall be pulled out of the bank as soon as it is full.

VI. a) When being operated in soft or unstable ground, every excavator shall be supported by mats, heavy planks or poles so as to distribute the load of the machinery over larger area and to prevent any danger of the excavator overturning itself.

b) When not in use, the excavator shall be moved to and stood on stable ground.

VII. If more than one stripping machines are in use in any area either on the same bench or on different benches, the machines shall be so spaced that there is no danger of accident from flying or falling objects etc. from one machine to the other.

(C) DUTIES OF EXCAVATOR OPERATORS:

I. a) At the commencement of every shift, the operator shall personally inspect and test the machine, paying special attention to the following details:

i) that every warning device is in working order; or

ii) if the machine is required to work after day-light hours, he shall not take out the machine for work nor shall he work the machine, unless he is satisfied that it is mechanically sound and in efficient working order

including the lighting fixtures.

b) The operator shall maintain a record of every inspection made under clause (a) in a bound paged book kept for the purpose and shall sign every entry made therein.

II. a) The operator shall keep the cab window clean so as to ensure clear vision at all times.

b) The walkways in or about the cab of any excavator shall be kept free of loose tools, grease containers or other materials that might fall or present a falling or tripping hazard.

III. a) The operator shall not operate the machine when persons are in such proximity as to be endangered.

b) He shall not swing the bucket over passing haulage unit when the trucks/dumpers are being loaded, he shall swing over the body of the truck/dumpers and not over the cab, unless the cab is protected by a substantially strong cover.

IV. Before leaving the machine, the operator shall lower the bucket to the ground.

V. The operator shall not allow any un-authorized person to ride on the machine.

12.0 DESIGN, OPERATION AND MAINTENANCE OF DUMPERS AND TIPPING TRUCKS:

(A) DESIGN:

(I) Every tipping truck or dumper shall be provided with:

i) efficient brakes;

ii) efficient audible warning devices; and

iii) efficient head-lights, if the truck or dumper is required to work after day-light hours.

iv) an automatic audio-visual alarm which shall operate on reversal and be of such intensity which is not less than 5dB(A) above the surrounding noise level..

(II) In addition, the following safety features shall be provided in dumper:

1. Mechanical steering locking to prevent untoward movement of steering wheel and tyre while work persons working below the cabin while engine is running.

2. Blind spot mirror apart from rear view mirror to enable operator to have clear visibility of blind spot in and around dumpers.

3. Mechanical type Anti collision device to avoid head to tail collision on haul road such as tail gate, bumper extension or any other strong device.

4. Fire resistant hydraulic hoses in place of ordinary hoses to decrease the chance of fire. All the sleeves and conducts where cable/ wire are passed shall be fire resistant.

5. Seat belt for operator.

6. The maximum speed of vehicle shall be restricted to 30km/hours by blocking higher gear or any other automatic means.

7. Propeller shaft guard.

8. Proximity warning device.

9. Cabin Guard Extension: Canopy shall cover the operator's cabin fully.

10. Exhaust/Retard Brake: Device to control the speed of truck while operating down the gradient. Refer DGMS (Tech.) Circular No.02 of 2004.

11. Tail gate protection: Protection of operator against collision either by head on or head to tail.

12. Limiting speed device: Enable mine management to decide the maximum speed of vehicle to be operated in mine. The device may be Electronic or mechanical type speed governors.

13. Audio-visual alarm while reversing: The audio-visual alarm provided should confirm to DGMS (Tech.) Circular No.01 of 2010.

14. Provision of two brakes: One of brakes shall be fail safe. For details refer DGMS Circular No.09 of 1999.

15. Body lifting position locking arrangement: A hooter along with an indication is provided to indicate the body is still in lifted position.

16. Fire suppression System: Refer DGMS Circular No.10 of 2004. The fire suppression system shall be a factory fitment and of approved type from Directorate.

17. Electric Wires and sleeves are to be of fire resistant quality: To decrease chance of fire.

18. Turbo Charge and Exhaust tube coated with heat insulated paint: To decrease chance of fire.

19. Battery Cut off Switch: To decrease chance of fire.

20. Retro reflectors on all sides: For visibility of truck during beyond daylight hours.

21. Proximity warning device: To alert operator when approaching any vehicles/obstructions.

22. Rear Vision System: To assist operator during reversing. Refer DG Circular No.12 of 2009.

23. Auto dipping System: To reduce glaring on eyes of operator during night operation.

24. Load Indicator and Recorder: Enables management to detect and prevent over loading.

(B) OPERATION:

I. Every truck or dumper shall be under the charge of a competent person authorised in writing by the manager herein called the 'driver'. No person shall be so authorized unless he possesses a valid driving license to drive a heavy vehicle under the Motor Vehicles Act.

II. a) No person other than the driver or his helper, if any or the manager or any person authorised in writing by the manager shall ride on a truck or dumper.

b) No person shall be permitted to ride on the board of a running truck or dumper.

III. a) As far as possible, loaded trucks or dumpers shall not be reversed on gradients.

b) Sufficient stop blocks shall be provided at every tipping point and these shall be used on every occasion, material is dumped.

c) Standard traffic rules shall be adopted and followed during movement of all trucks and dumpers. They shall be prominently displayed at relevant places in the opencast workings and truck/dumpers roads.

IV. When not in use, every truck or dumper shall be moved to and parked at proper parking places.

V. No person shall be permitted to work on the chassis of a truck or dumper, with the body in a raised position until after the truck or dumper body has been securely blocked in position. The mechanical hoist mechanism shall not be depended upon to hold the body of the truck or dumper in a raised position.

VI. The safety features recommended in the dumpers/truck/tippers shall be made a part of the notice inviting tender for new procurement and the design drawing shall be obtained from OEM for fitting the same in old equipment.

(C) DUTIES OF TRUCK/DUMPER OPERATORS:

I. A) Before commencing work, the driver shall personally inspect and test the vehicle, paying special attention to the following details:

i) that the brakes are in working order;

ii) that the warning devices including automatic audio visual reversing alarm are in working order and he shall not take out the vehicle for work nor shall he drive the vehicle, unless he is satisfied that it is mechanically sound and in efficient working order.

b) The driver shall maintain a record of every inspection made under clause (a) in a bound paged book kept for the purpose and shall be signed and dated by the person making the inspection.

II. The driver shall keep the cab window clean so as to ensure clear vision at all times

a) The driver shall ensure that the gear is in neutral position before stopping the engine.

b) The driver shall handle the truck/dumper carefully and keep it under control at all times. He shall negotiate downhill gradients in low gear so that minimum of braking is required.

c) He shall not drive too fast, shall avoid distractions and shall drive defensively. He shall not attempt to overtake another vehicle unless he can see clearly for enough ahead to be sure that he can pass it safely. He shall also sound audible warning signal before overtaking.

d) When approaching stripping equipment, the driver of the truck or dumper shall sound the audible warning signal and shall not attempt to pass the stripping equipment until he has received a proper audible signal in reply.

e) Before crossing a road or railway line, he shall reduce his speed, look in both directions along the road or line and shall proceed across the road or line only if it is safe to do so.

f) The driver shall not operate the truck or dumper in reverse unless he has a clear view of the area behind the vehicle or he has the assistance of a 'spotter' or 'pitmen/trip man' duly authorised in writing for the purpose by the manager. He shall give an audible warning signal before reversing a truck or dumper.

g) The driver shall be sure of clearance before driving through tunnels, archways, plant structure etc.

III. The driver shall see that the vehicle is not overloaded and that material is not loaded in a truck or dumper as to project horizontally beyond the sides of its body and that any material projecting beyond the front or rear is indicated by the red flag during day and a red light after daylight hours.

IV. The driver shall not allow any unauthorized person to ride on the vehicle. He shall also not allow more than the authorized number of persons to ride on the vehicle.

(D) TESTING OF BRAKES:

At least once in two weeks, the brakes of the truck, dumper or any such other vehicles shall be tested as indicated below:

I. a) SERVICE BRAKE TEST:

The brake shall be tested on a specified gradient and speed when the vehicle is fully loaded. The vehicle shall stop within a specified distance when the brake is applied. The specified stopping distance shall be obtained from the manufacturer of the vehicle.

b) PARKING BRAKE TEST:

The parking brake shall be capable to hold the vehicle when it is fully loaded and placed at the maximum gradient of roadway, which is permitted for a period of at least ten minutes.

c) A record of such test shall be maintained in a bound paged book and shall be signed by the person carrying out the test and the engineer and manager.

(E) INSPECTION AND OTHER PRECAUTIONS:

I. Surprise inspection shall be carried out by the Engineer/Superior official at an interval not exceeding 15 days to ensure that the examination schedule of machinery/equipment are carried out.

II. While inflating tyres, suitable protective cages shall be used. Tyres shall never be inflated by sitting either in the front or on the top of the same.

III. While the vehicle is being loaded/unloaded on gradient, the same shall be secured stationary by parking brake and other means such as suitably designed stopper blocks, which could be placed below the tyres.

IV. Operation and maintenance of heavy machineries such as excavators, dumpers etc. shall be done strictly in accordance with the operation instructions. The operation instructions and maintenance schedule shall be obtained from the manufacturers.

V. a) Automatic fire protection system shall be provided and maintained in working order for surface heavy machinery such as blast hole drills, hydraulic excavators etc. It is also necessary that the recommended procedure for testing of such fire protection system at a given schedule by the manufacturer be also adopted. The automatic fire systems consist of one or more containers of fire suppressant (usually a dry chemical) connected by a fixed plumbing network to nozzles directed at specific pre-determined fire hazard areas of the machinery.

b) Optical, thermal or any other suitable type of sensing device shall be suitably located to sense the fire and actuate the suppressant to come out through the nozzles already fixed to deal with the fires. An over riding manual system along with fire alarm shall also be additionally provided for better effectiveness of the system.

VI. Entry of private trucks within the mine premises for dispatch of ore etc. shall be regulated and checks for driving license and it's validity, road worthiness of the vehicle, identity of the driver and his helpers, etc. shall be carried out whenever such trucks are allowed to enter into the mine premises. Further crowding of trucks near ore stockyards or inside the mine premises shall not be allowed and only required trucks for immediate loading shall be allowed inside the mine. The management shall provide proper supervision of the trucks and the loading Mazdoors. Management shall be responsible for ensuring compliance of all statutory provisions of the Mines Act, 1952 and subordinate legislation framed there under by all the contractor workers/truck drivers, helpers etc in so far as it applies to them. Further no truck shall be allowed to be loaded beyond its permissible capacity.

13.0 It shall be the duty of the Owner, Agent or Manager of every mine to establish and follow a ground control plan for control of all sides, slopes, faces in all opencast workings and overburden dumps. The height of bench and slope of its sides shall be so kept so as to ensure absolute stability under all conditions and shall not, in any case, exceed the general provisions as incorporated in this permission.

Yours faithfully



ALTAF . HUSSAIN (DIRECTOR - CHAIBASA REGION)

THIS IS A SYSTEM GENERATED DOCUMENT, DOES NOT REQUIRE ANY SIGNATURE.