



The Additional PCCF (C)
Eastern Zone Regional Office
MoEF & CC, Govt. of India
A/3, Chandrasekharapur
Bhubaneswar-751 013 (Odisha)
Email: roez.bsr-mef@nic.in

MD/ENV/ 666 /106 / 2020
Date: 26.05.2020

Ref: Environmental Clearance letter no. J-11015/888/2007-IA.II (M), dated: 21.12.2011 & its amendment dated 7th Sept.2018.

Sub: **Submission of Half-yearly compliance status report of Environmental Clearance conditions for the period October'19 - March'20 in respect of Khondbond Iron & Manganese Mine, Tata Steel Ltd.**

Dear Sir,

Kindly find attached herewith submitting the six monthly compliance report as on date of Khondbond Iron & Manganese Mine, Tata Steel Ltd. for the period from **October'2019 - March'2020** as per EIA Notification, 2006. Also the compliance for the same period vide office memorandum no. Z-11013/57/2014-IA.II (M), dated 29.10.2014, is also attached herewith as Annexure - A. The same has been mailed in soft copy to your good office on e-mail to roez.bsr-mef@nic.in for your ready reference.

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

Thanking you,

Yours faithfully,
f: M/s Tata Steel Limited


Head (Planning), OMQ

Encl.: As above

Copy to : The Chairman, Central Pollution Control Board, Southern Conclave, Block 502, 5th & 6th Floors, 1582 Rajdanga Main Road, Kolkata - 700107 (W. B.)
: The Member Secretary, State Pollution Control Board, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit - VIII, Bhubaneswar - 751012 (Odisha)
: The Regional Officer, SPCB, College Road, Baniapata, Keonjhar - 758001 (Odisha)

TATA STEEL LIMITED

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Tel 91 7440037036

Registered Office Bombay House 24 Homi Mody Street Fort Mumbai 400 001

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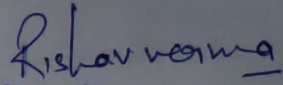
Corporate Identity Number L27100MH190721C000260 Website www.tatasteel.com





**Point wise compliance Environmental Clearance
of**

Khondbond Iron & Manganese Mine Tata Steel Ltd.

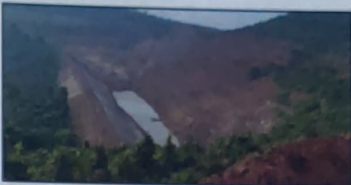

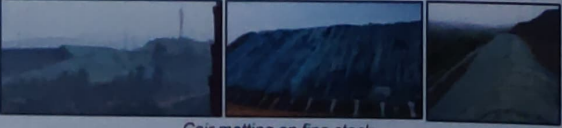
EC no J-11015/888/2007. IA. II (M), dated 21st Dec. 2011 & its amendment dated 7th Sept.2018
Production: Iron 08 MTPA (ROM) & beneficiation plant 08 MTPA & Manganese Mine 0.1MTPA (ROM)
(October 2019- March 2020)




Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
1.	No mining shall be carried out in the forestland without obtaining requisite prior forestry clearance under the Forest (Conservation) Act, 1980 for forestland involved in the project. The environmental clearance is subject to grant of forestry clearance.	Being complied with. The total project area of Khondbond is 1019.472 ha, which includes mine lease area of 978ha. Out of which the mine has obtained the Stage -II forest clearance of 453.150ha vide letter no. F. No. 8-98/2004/FC dated: 09.08.2006 (317 ha. fresh + 136.15 ha broken prior to 1980). All the mining operations are restricted within same. For the rest of area, forest diversion proposal is applied & are at advanced stage of approval.
2.	The project proponent shall obtain Consent to Establish and Consent to Operate from the State Pollution Control Board, Orissa and effectively implement all the conditions stipulated therein.	Complied with. Khondbond Iron & Manganese mine has valid Consent to Establish & Consent to Operate from State Pollution Control Board till 31.03.2021.
3.	The environmental clearance is co-terminus to mining lease and the proponent shall obtain fresh Environmental Clearance at the time of renewal of mine lease in accordance with the provisions of the EIA Notification, 2006 as amended subsequently	Noted and shall be complied. Fresh EC shall be obtained at the time of next lease renewal as per EIA Notification, 2006 as amended subsequently.
4.	The mining operations shall be restricted to above ground water table in the iron ore zone and it should not intersect the ground water table. In case of working below the ground water table in the iron ore zone, prior approval of the Ministry of Environment and Forests and the Central Ground Water Authority shall be obtained, for which a detailed hydrogeological study shall be carried out.	Noted & complied with. However, in iron mine, the lowest working depth of the mine is 654 RL which is above the ground water table 555AMSL - 553AMSL. But in manganese mine the ground water table may be breached, for which a detailed hydro-geology report is under process.
5.	The Company shall submit within 3 month their policy towards Corporate Environment Responsibility which should inter-alia address (i) Standard Operating process/ procedure to bring into focus any infringements/ deviation/ violation of environmental or forest norms /conditions, (ii) Hierarchical system or Administrative order of the company to deal with environmental issues and ensuring compliance EC conditions and (iii) System of reporting of noncompliance / violation environmental norms to the Board of Director of the company and/ or stake holders or shareholders.	Noted & complied vide letter No. MD/ENV/775 /106/2012, Dated. 20.03.2012. Tata steel Ltd. has various committee to address all the environmental issues adequately.
6.	A safety zone of 50m shall be left as no mining zone and no waste shall be dumped within this safety zone along the side of Suna Nadi (Kundra Nallah) & the Kakrapani nallah flowing adjacent to the mine lease area.	Before this condition was given, there exists an old waste dump within the 50m distance from Kundra nallah and that has been stabilized by plantation along with garland drains and Toe walls. However, at present no mining activity is being carried out within the safety zone of 50m along the side of Kundra nallah.


 Manager (Environment)
 Khondbond Iron Mine



7.	The project proponent shall ensure that no natural watercourse and/or water resources shall be obstructed due to any mining operations. Adequate measures shall be taken for conservation and protection of the first order and the second order streams, if any emanating from the mine lease area during the course of mining operation.	Complied with. No natural watercourse or water resources are obstructed due to our mining operations. Further, no first order and the second order streams are emanating from the mine lease area.
8.	The top Soil, if any shall temporarily be stored at earmarked site(s) only and it should not be kept unutilized for long. The topsoil shall be used for land reclamation and plantation.	Noted and complied. An area of 0.50 ha has been identified for storage of top soil. Top soil that is generated is used for plantation.   <i>Top soil storage used which is used for plantation</i>
9.	The project proponent shall carry out conditioning of the ore with water to mitigate fugitive dust emission, without effecting flow of ore in the ore processing and handling areas.	Noted and shall be complied. Currently the wet ore processing plant is under construction. All the structures are under construction phase. However, to mitigate fugitive dust emission in existing dry plant, dry fogs are used in crushing and screening plant.  <i>Picture of under construction processing plant of Khondbond</i>  <i>Dry fog at crushing and screening plant</i>
10.	The effluent from the ore beneficiation plant shall be treated in the tailing thickener and the tailings slurry shall be transported through a closed pipeline to the tailing ponds.	Noted and shall be complied. At present, wet processing plant is under construction and hence has not started functioning. When the wet processing plant shall be operational, tailing management shall be made as per the condition given.

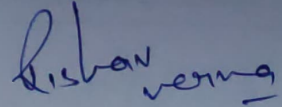
Rishav Verma
 Manager (Environment)
 Khondbond Iron Mine


11.	The tailing ponds shall be lined HDPE lining.	<p>Noted and shall be complied.</p> <p>Currently the processing plant with tailing management system (tailing pond) is under construction. When tailing ponds shall be constructed, it will be provided with HDPE lining.</p>  <p style="text-align: center;"><i>Tailing pond under construction</i></p>
12.	The decanted water from the tailing dam shall be re-circulated and there should be zero discharge from the tailing dam.	<p>Noted and shall be complied.</p> <p>Currently the processing plant is under construction. This will be ensured when both the wet processing plant and tailing ponds are operational.</p>
13.	Appropriate technology shall be used for maximum recovery of ore in order to reduce slurry discharge and to increase the life of the tailing ponds	<p>Noted & shall be complied.</p> <p>This will be ensured when both the wet processing plant and tailing ponds are operational.</p>
14.	The project proponent shall constitute an emergency management Team under the control of project in charge to deal with the emergency situation pertaining to the tailing pond for the timely & effective control of emergency situation, it shall be ensured that training programme and mock drill shall be organised for the employees	<p>Noted & shall be complied.</p> <p>Currently the processing plant with tailing management system (tailing pond) is under construction. To handle any emergency situation, emergency preparedness plan shall be made & executed.</p>
15.	<p>The Over burden (OB) generated during the mining operations shall be stacked at earmarked dump site (s) only and it should not be kept active for a long period of time and its phase-wise stabilisation shall be carried out. Backfilling shall commence from the fifth year onwards. There shall be six over burden (four for iron and two for manganese ore). proper terracing of the OB dumps shall be carried out so that the overall slope of the dumps shall be maintained to 28°. The overburden 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 dump. Out of the total excavated area of 763.665ha, an area of 758.665ha shall be reclaimed and afforested. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self- sustaining. Compliance status shall be submitted to the Ministry of Environment & Forest and its regional office located at Bhubaneswar on six monthly basis.</p>	<p>Currently all Over burden (OB) is being handled as per approved mine plan. The land use and land cover shall be abided which includes the earmarked storage of OB. OB dumps are scientifically being vegetated with suitable native species.</p>  <p style="text-align: center;"><i>Plantation on OB dump</i></p> <p>Also, coir matting has been made in some fine stock yards. The pictures of which is attached.</p>  <p style="text-align: center;"><i>Coir matting on fine stock</i></p>

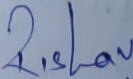
<p>16.</p>	<p>Catch drains and siltation ponds of appropriate size should be constructed around the tailing ponds, mine working, soil, OB and mineral dump(s) to prevent run off of water and flow of sediments directly into the Suna Nadi (Kundra Nalla), the Jalpa Nadi, the Baitarni River, the Karo Nadi, the kakrapani nalla, the kundru nalla, the Dalko nalla, the kashi nalla, the Tapodihi nalla, the Teherei nalla, the Achanda nalla and other 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 the monsoon and maintained properly. Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed around the tailing ponds, mine pit, soil, OB and mineral dump(s) to prevent run off of water and flow of sediments directly into the Suna Nadi (Kundra Nalla), the Jalpa Nadi, the Baitarni River, the Karo Nadi, the kakrapani nalla, the kundru nalla, the Dalko nalla, the kashi nalla, the Tapodihi nalla, the Teherei nalla, the Achanda nalla and other water bodies and sump capacity should be designed keeping 50% safety margin over and above the 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 shall be constructed at the corners of the garland drains and desilted at regular intervals.</p>	<p>Catch drains, siltation ponds are made along with toe wall and garland drains in and around mine dumps areas to prevent surface runoff.</p>  <p><i>Siltation pond and catch drains in iron mines area</i></p> <p>A series of check dams and siltation's ponds are also made in manganese area</p>  <p><i>Siltation pond and catch drains in manganese mines area</i></p>
<p>17.</p>	<p>Dimension of retaining wall at the toe of the OB dumps and benches within the mine to check run-off and siltation should be based on the rainfall data.</p>	<p>All the retaining walls at the toe of OB dumps are made adequately. All the siltation ponds and garland drains are made based on rainfall data for adequate surface runoff management.</p>  <p><i>Retaining wall in Khondbond mines area</i></p>
<p>18.</p>	<p>The void left unfilled in an area of 5ha shall be converted into water body. The higher benches of excavated void/ mining pit shall be terraced and plantation done to stabilize the slopes. The slopes of higher benches shall be made gentler for easy accessibility by local people to use the water body. Peripheral fencing shall be carried out all along the excavated area.</p>	<p>Noted and shall be complied at end of mine life.</p> <p>This being the activity at the end of mine life is been incorporated in progressive mine closure plan.</p>

Rishav
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 Manager (Environment)
 Khondbond Iron Mine

19.	<p>Plantation shall be raised in an area of 965.018 ha including a 7.5 wide green belt in the safety zone around the mining lease by planting the native species around reclaimed area, mine benches, water body, tailing ponds, along the roads etc. In consultation with the local DFO/Agriculture Department. The density of the tree should be around 2500 plants per hectare. Greenbelt shall be developed all along the mine lease area in a phased manner and shall be completed within first five years.</p>	<p>Noted and being complied.</p>  <p style="text-align: center;"><i>Plantation on dumps</i></p>
20.	<p>Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as around crushing and screening plant, loading and unloading point and transfer point. Extensive water sprinkling shall be carried out on haul roads. It should be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard.</p>	<p>Noted & being complied.</p> <p>Regular water sprinkling is being carried out by use of mobile water sprinklers around the crushing and screening plant, loading & unloading area and haul roads. Regular monitoring of ambient air quality is being done and the results are within the permissible limits as prescribed by the Central Pollution Control Board.</p>  <p style="text-align: center;"><i>Dry fog at crushing and screening plant</i></p>
21.	<p>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.</p>	<p>Noted & complied.</p> <p>Regular monitoring of Kundra Nallah is being out and records are maintained.</p>
22.	<p>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.</p>	<p>Noted & complied.</p> <p>For the ground water augmentation Hydrogeology study has been conducted and it has been submitted to CGWB. As per the study four ponds and four number of recharge pit are being constructed.</p>


 Manager (Environment)
 Khondbond Iron Mine

		 <p style="text-align: center;"><i>Ground water recharge pond Outside lease area Khondbond</i></p> <p style="text-align: center;"><i>Ground water recharge pond within lease area Khondbond</i></p>
23.	<p>Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The periodic monitoring (at least four times in a year – pre-monsoon (April/May), monsoon (August), post-monsoon (November) and winter (January) once in each season) shall be carried out in consultation with the State Ground Water Board/ Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Director, Central Ground Water Board. If at any stage, it is observed that the ground water table is getting depleted due to the mining activity, necessary corrective measures shall be carried out.</p>	<p>Noted & complied.</p> <p>Regular ground water level with quality as per defined frequency is being submitted to CGWA. A copy of same is attached as Annexure I</p>
24.	<p>The ground water quality around the tailing pond shall be monitored regularly and time series data generated. It shall be ensured that the groundwater quality is not affected adversely due to the project.</p>	<p>Noted and shall be complied.</p> <p>Currently the mineral processing plant with tailing pond is under construction.</p>
25.	<p>The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water required for the project.</p>	<p>Noted and complied.</p> <p>The mine has valid surface water drawl permission from water resource division vide letter no 3300, dated: 11.02.2016.</p>
26.	<p>Appropriate mitigative measures should be taken to prevent pollution of the Baitarni River, the Suna Nadi & the Karo Nadi in consultation with State Pollution Control Board.</p>	<p>Noted & complied.</p> <p>To prevent pollution of surrounding rivers during rains, all the mitigative measures are taken such as toe wall, garland drains, check dams, settling pits etc.</p>
27.	<p>The Project proponent shall practise suitable rainwater harvesting measures on long term basis and work out a detailed scheme for rain water harvesting in consultation with the Central Ground Water Authority and submit a copy of the same to the MoEFCC & its Regional Office, Bhubaneswar.</p>	<p>In Khondbond iron and manganese mine about 8393 cu.m of ground water recharge is being done through existing structures such as garland drains, mine pits etc.</p>


 Rishav Kumar
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 Khondbond Iron Mine

Four recharge pit with bore hole has been constructed and four number of existing ponds are being modified to achieve the ground water recharge of 93,090 cum/yr.



Four number of recharge pit with bore hole

S.No	Pit No.	Dimension	Total (m ³)	Bore Hole Depth
1.	Recharge Pit 1	43 x 16 x 4 m	2752	6 x 10 m
2.	Recharge Pit 2	47.2 x 17.2 x 4.3 m	3491	8 x 10 m
3.	Recharge Pit 3	33.2 x 13.7 x 3.5 m	1592	4 x 10m
4.	Recharge Pit 4	43 x 13 x 3.3 m	1845	4 x 10 m
Total			9680	



Four number of ponds being modified

Pond No.	Dimension(m ³)	Total (m ³)
Pond 1	$\{(16 \times 13) + (75 \times 57) + (42 \times 30)\} \times 6.5$	37,329.5
Pond 2	50 x 15 x 6.5	4875
Pond 3	43 x 16 x 6.5	4472
Pond 4	60 x 50 x 8	24000
Total		70,676



Final volume after modification is complete

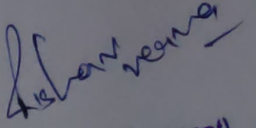
28.


Vehicular emission shall be kept under control and regular monitored. Measures shall be taken for

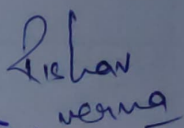
Noted & complied.



Subhanshu
(Environment)
Khanabond Iron Mine

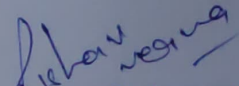
	<p>maintenance of vehicles used in mining operations and in transportation of mineral. The mineral transportation shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded</p>	<p>Emission checks for all the vehicles are carried out once in every six months. Effective water sprinkling is done on haul roads to control fugitive dust. Moreover, outside transportation of mineral is carried out through covered trucks. Further, overloading of trucks is restricted to prevent spillage of material.</p>
29.	<p>No transportation of ore outside the mine lease area shall be carried out after sunset.</p>	<p>Transportation of ore is being made as per District Collector, Keonjhar, order.</p>
30.	<p>No blasting shall be carried out after sunset. 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.</p>	<p>Blasting is being carried out during day time only. Controlled Blasting is being carried out for control of ground vibrations and to arrest fly rocks, as per the recommendations of CIMFR, Dhanbad.</p>
31.	<p>Drills shall either be operated with Dust extractors or equipped with water injection system.</p>	<p>Wet drilling is in practice. Drills have been provided with dust suppression system.</p>  <p style="text-align: center;"><i>Wet drilling</i></p>
32.	<p>Mineral 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 should be properly maintained and operated.</p>	<p>Currently the ore processing plant is under construction. All the structures are under construction phase. However, mineral handling plant shall have an effective dust control system in all dust generated points.</p>  <p style="text-align: center;"><i>Picture of under construction processing plant of Khondbond</i></p>
33.	<p>Sewage treatment plant shall be installed for the colony. ETP shall also be provided for workshop and wastewater generated during mining operation.</p>	<p>Sewage Treatment Plant (STP) of 10 KLD installed & operational in mine area for the treatment of waste water generated. Khondbond doesn't have any separate colony. Mine and for waste water from workshop, oil and grease separation pits are provided. ETP shall be construed as per requirement.</p>


 Manager (Environment)
 Khondbond Iron Mine


	 <p style="text-align: center;">10 KLD STP at Khondbond</p> <p style="text-align: center;">Oil and Grease separation pit</p>
<p>34. During operation of the project, special emphasis shall be given to minimise risks and hazards due to manganese poisoning.</p>	<p>Noted and shall be complied.</p>
<p>35. Pre-placement of medical examination and periodical examination of the workers engaged in the project shall be carried out and record maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.</p>	<p>Complied</p> <p>Pre-placement medical examination and periodical examination of the workers engaged are being conducted & record maintained. The schedule of Periodical Medical Examination is once in every 3 years for the employees of age more than 40 years and once in 5 years for the employees of age less than 40 years.</p>
<p>36. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.</p>	<p>Noted & complied.</p> <p>During construction of project work at Khondbond local labours are engaged, which are from nearby villages. Thus, residential facility is not required. However, various amenities such as canteens for food, a safe drinking water facility, toilets, medical facility with site medical officer etc are provided. A sewage treatment plant of 10KLD is also operational in area.</p>
<p>37. Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment and Forests and its Regional Office, Bhubaneswar.</p>	<p>Noted & complied.</p> <p>Digital processing of the entire lease area was carried by high resolution satellite imagery. And M/s Geo Consultants Pvt. Ltd., (Authorized organisation of ORSAC) was engaged for the work. Land use and land cover of the core and buffer zone is attached. Annexure-II</p>
<p>38. The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna namely sloth bear, elephant, godhi etc. spotted in the study area. The critical habitats if any within the impact zone shall be individually identified and the conservation plan prepared specific to this project in consultation with the state forest and wild life deptt. Should</p>	<p>Noted & complied.</p> <p>Khondbond is an operational mining area of Tata Steel and various precautionary measures are ken for conservation and protection of endangered flora and fauna.</p> <p>The mine has approved wildlife management 843/1 WLSSP-100/2016; dated 28th January 2016 and various measures</p>

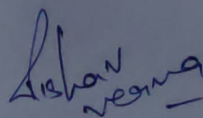

 Lichan Verma
 Manager (Environment)
 Khondbond Iron Mine

	<p>effectively address the same. All the safeguard measures brought out in the wild life conservation plan prepared specific to this project site shall be effectively implemented in consultation with the state forest and wild life deptt. A copy of approved wild life conservation plan shall be submitted to the Ministry & its Regional office, Bhubaneswar within three months.</p>	<p>are taken with state forest and wild life department as on when required. The approved copy of wildlife management plan is already submitted to Ministry & its Regional office, Bhubaneswar.</p>
<p>39. The entire mining lease area shall be fenced by erecting solar power electric fencing all around it. The fencing so erected shall be maintained properly and the cost towards erection and maintenance of the solar power electric fencing shall be borne by the project proponent out of the project cost.</p>	<p>Noted & being complied.</p> <p>The Khondbond mine lease comprises of 874.198 ha of forest land including sabik forest with some private lands owned by Schedule Tribes.</p> <p>Area having surface right and forest clearance are being fenced with solar electric fence. Lease boundary of 2.8 km length has been successfully fenced and further fencing is under process.</p>	 <p style="text-align: center;"><i>Solar fencing around lease boundary</i></p>
<p>40. The critical parameters such as RSPM (Particulate matter with size less than 10 micron i.e., PM10) and NOx in the ambient Air within the impact zone, peak particle velocity at 300m distance or within the nearest habitation, whichever is closer shall be monitored periodically. Further, quality of discharged water shall also be monitored (TDS, DO,PH, and total suspended Solids (TSS)). The monitored data shall be uploaded on the website of the company as well as displayed on a display board at the project site at a suitable location near the main gate of the company in public domain. The circular No. J20012/1/2006-IA.II(M) dated 27.05.2009 issued by Ministry of Environment and Forests, which is available on the website of the Ministry www.envfor.nic.in shall also be referred in this regard for its compliance.</p>	<p>Noted & complied.</p> <p>The critical parameters like RSPM & NOx in ambient air are being monitored regularly and all the results are within the limits. Peak particle velocity at the time of blasting is also monitored regularly at 300m distance. Quality of discharged water (TDS, DO,PH, and total suspended Solids (TSS)) is also being monitored and all the results are within the limits.</p> <p>All the environmental monitoring data is being uploaded on the Company's website as part of this report and also displayed on a display board at the main entrance gate of the mine</p>	 <p style="text-align: center;"><i>Display of environmental information in public domain</i></p>

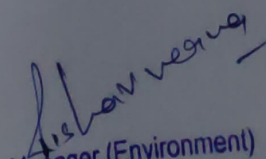

 Manager (Environment)
 Khondbond Iron Mine

41.	A final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.	A progressive mine closure plan approved by IBM is in place. The final mine closure plan along with details of Corpus fund will be submitted to the Ministry of Environment & Forests 5 years in advance.
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Sl No.	EC Condition	Compliance status as on date
General Conditions		
1.	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	We are operating as per the approved mining technology and scope of working mentioned in Environmental Clearance granted to us and no change in mining technology and scope of working shall be made and adhered to the condition of MoEF&CC.
2.	No further expansion or modification in the plant shall be carried out without prior approval of the MoEF&CC.	For any expansion or modification in future prior approval shall be sought from MoEF&CC.
3.	No change in the calendar plan including excavation, quantum of mineral iron ore and waste should be made.	Calendar plan (IBM Approved Mining Plan) prepared for the mine is being strictly adhered to and we are well within the limits specified in Mining Plan as well as EC and CTO granted capacity.
4.	At least four ambient air quality-monitoring stations should be established in the core Zone as well as in the buffer zone for RSPM (Particulate matter with size less than 10 micron i.e. PM10) and NOx 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.	<p>Noted & complied.</p> <p>Ambient Air Quality monitoring is regularly carried out at four different stations within the core & buffer zone. Two continuous ambient air quality monitoring stations with PM₁₀ & PM_{2.5} are installed in core zone and one at buffer zone.</p>  <p style="text-align: center;"><i>Continuous ambient air quality monitoring stations in Khondbond</i></p> <p>Few additional parameters such as SOx, NOx & CO are also being installed additionally. All the continuous data is uploaded in state pollution control board server.</p> <p>Ambient air quality report is attached as Annexure-III for reference.</p>
5.	Data on ambient air quality [(RSPM (particulate matter with size less than 10 micron i.e. PM10) and NOx) 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.	RSPM (Particulate matter with size less than 10micron i.e. PM10) and, NOx in ambient air are being monitored as per standard guidelines and the reports are submitted to Regional office, MoEF&CC, Bhubaneswar on half yearly basis and SPCB, Odisha on monthly basis.
6.	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.	Fugitive dust emissions from all the sources are controlled regularly. Effective water sprinkling is being done on haul roads, loading and unloading and at transfer points Dry fog system is being used in plant areas to avoid generation of fugitive dust.


 Ashan Veena
 Manager (Environment)
 Khondbond Iron Mine

7.	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.	Regular noise monitoring is done at different work areas. High noise areas are earmarked and people working there are provided with ear protection equipment and the system is ensured by certification to OHSAS 18001 and regular field audits.
8.	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 19 th May, 1993 and 31 st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	Oil & Grease separation pits have been provided to take care of effluents from the workshop. The same water quality is monitored regularly, and the parameters meet the prescribed standard. There is no waste water generation from the mines.
9.	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.	Adequate dust masks are provided to employees engaged in dusty areas. It is also ensured that they use the same. Respirable dust survey at different locations is done regularly. The employees are also given regular awareness training on safety and health aspects as part of implementation process of OHSAS-18001 systems. Further, employees undergo Lung Function Tests during the Periodical Medical Examination. Periodical Medical Examination of employees and contractor workers are organised regularly to observe any contractions due to exposure to dust and other occupational hazards.
10.	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.	A separate environmental management cell is in place with the people having relevant qualification on environmental science. The Head of the environment department reports to General Manager i.e. the head of the organization.
11.	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.	Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose. During the year 2019-20 an amount Rs. 725.94 lakhs (approx..) was spent towards environmental protection measures at Khondbond Mine and details are attached as Annexure-IV .
12.	The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closing and final approval of the project by the concerned authorities and the date of start of land development work.	This is a running mine. No specific date of start of land development work can be assigned. However, the copy of the Environmental Clearance has been sent to the Regional Office, MoEF&CC, Bhubaneswar for kind information.
13.	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.	We extend full co-operation to the officers of the Regional Office during their visit and furnish the required data, information and monitoring reports.
14.	The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the Ministry of Environment and Forests, its Regional Office Bhubaneswar, the respective Zonal Office of Central Pollution Control Board and the State Pollution Control Board. The proponent	Six monthly reports are submitted regularly on the status of implementation of the stipulated environmental safeguards to the Regional Office, MoEF&CC, Bhubaneswar, Central Pollution Control Board and State Pollution Control Board. Further, the six monthly compliance report along with the monitoring results are uploaded in Tata Steel's website and updated periodically.


 Ashwini Kumar
 Manager (Environment)
 Khondbond Iron Mine

**Point wise compliance Environmental Clearance Amendment
of
Khondbond Iron & Manganese Mine Tata Steel Ltd.**

EC no: J-11015/888/2007.IA.II (M), its amendment dated 7th Sept.2018
Production: Iron 08 MTPA (ROM) & beneficiation plant 08 MTPA & Manganese Mine 0.1MTPA (ROM)



SI No.	EC Condition	Compliance status as on date
Specific Conditions		
1.	The Environmental Clearance will not be operational till such time the project proponent complies with all the statutory requirements and judgement of Hon'ble Supreme Court dated the 2 nd August 2017 in Writ Petition(Civil)No.114 of 2014 in the matter of common cause verses Union of India and Ors.	Noted and being complied The unit is committed for the statutory compliance of all the requirements and judgement of Hon'ble Supreme Court dated the 2 nd August 2017 in Writ Petition (Civil)No.114 of 2014 in the matter of common cause verses Union of India and Others.
2.	Department of Mining & Geology state govt shall ensure that mining operation shall not commence till the entire compensation levied, for illegal mining paid by the project proponent through their respective department of mining geology in strict compliance of judgement of Hon'ble Supreme Court dated the 2 nd August 2017 in Writ petition(Civil) No. 114 of 2014 in the matter of common cause versus union of India and Ors.	Noted.
3.	Monitoring of ambient air quality to be carried out based on the 2009 notification, as amended from time to time by the central pollution control board	Noted & complied.
4.	The pollution due to transportation load on the environment will be effectively controlled & water sprinkling will also be done regularly. Vehicles with PUC only will be allowed to ply. The mineral transportation shall be carried out through covered trucks only and the vehicles carrying the mineral shall not be overloaded. Project should obtain PUC certificate for all the vehicles from authorized pollution testing centre; washing of all transport vehicle should be done inside the mining lease.	Complied. The transportation of ore is done with compliance to all the conditions stated in order to prevent pollution. Regular sprinkling is done.
5.	The activities and budget earmarked for Environmental Responsibility (CER) shall be as per Ministry's O.M No. 22-65/2017-IA.II(M) dated 01.05.2018 and the action plan on the activities proposed under CER shall be submitted to the Regional Office of the Ministry and State Pollution Control Board.	As per Environmental Responsibility (CER) Ministry's O.M No. 22-65/2017-IA.II(M) dated 01.05.2018, the Khondbond project got approval for investment of ₹2,320Cr as capital expenditure. As per norms the maximum percentage for brownfield projects is 0.25%, which is equal to ₹5.8Cr. Annexure V

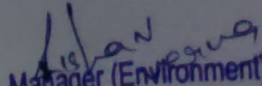
Ashwini Vema





Point wise compliance of
Impact of mining activities on Habitations -Issues related to the mining projects wherein Habitations and villages are the part of the mine lease areas or habitations and villages are surrounded by the mine lease area – regarding

by
Khondbond Iron & Manganese Mine Tata Steel Ltd.

Circular no : Z-11013/57/2014-IA.II(M), dated 29th October, 2014
 As per letter no. 106-9/11/EPE, dated 2nd Dec., 2014 of Dr. S Kerketta, Scientist E, MoEF&CC, BBSR

SI No.	EC Condition	Compliance status as on date
Specific Conditions		
A.	The Project Authority shall adopt Best mining practice for the given mining conditions. In the mining area, adequate number of check dams, retaining walls/structures, garland drains and settling ponds should be provided to arrest the wash – off with rain water in catchment area.	Noted & being complied Adequate number of check dams, retaining walls/structures, garland drains and settling ponds have been constructed to arrest the wash – off with rain water from the mine lease.
B.	The natural water bodies and or streams which are flowing in and 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 Authorities have 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.	Noted & complied Regular monitoring of water table is done by both manual and digital Piezometers.  Piezometer (PB gate, Garden area, N orebody area)  Piezometer (STP) with digital recorder Piezometers installed at Khondbond
C.	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 to darkness and minimal noise levels at night. The Project Proponents (PPs) must ensure that the biological clock of the villagers is not disturbed by orienting the floodlights/ masks away from the noise levels well within the prescribed limit's for day/night hours.	Noted & complied Noise level monitoring is carried out regularly which is well within the prescribed limit. Annexure VI


 Manager (Environment)
 Khondbond Iron Mine

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
D.	The Project Authority shall make necessary alternative arrangements, where required, in consultation with the State Government to provide alternate areas for livestock grazing. In this context, Project Authority should implement the directions of the Hon'ble Supreme Court with regard to acquiring grazing land. The sparse trees on such grazing ground, which provide mid- which provide mid - day shelter from the scorching sun should be scrupulously guarded against felling lest the cattle abandon the grazing ground or return home by noon.	Noted & is complied
E.	Where ever blasting is undertaken as part of mining activity, the Project Authority shall carry out vibration studies well before approaching any such habitats or other buildings to evaluate the Zone of influence and impact of blasting on the neighbourhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoption of alternative means of mineral extraction, such as ripper/dozer combination/rock breakers/ surface miners etc. should be seriously considered and practiced wherever practicable. A provision for monitoring of each blast should be made so that the impact of blasting on nearby habitation and dwelling units could be ascertained, The covenant of lease deed under Rule 31 of MCR 1960 provides that no mining operations shall be carried out within 50 meters of public works such as public roads and buildings of inhabited sites except with in prior permission from the Competent Authority.	Noted & complied
F.	Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt-conveyors should be fully covered to avoid air borne dust.	<p>Noted & is complied</p> <p>The main haulage road is provided with permanent water sprinklers. However, for adequate dust suppression mobile water sprinklers are also used.</p> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;"><i>Fixed water sprinklers Mobile water sprinklers</i></p> <p>To avoid fugitive dust, all dust generated points are adequately addressed by providing dry fog system, mist cannon. The mineral processing plant is under construction and at crushing & screen circuit bag filters also been provided.</p> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;"><i>Dry fog at mobile crushing & screening plant</i></p>

*Sichan
Wang*

Manager (Environment)
Khondbond Iron Mine

SI No.	EC Condition	Compliance status as on date
Specific Conditions		
G.	The Project Authority shall ensure that the productivity of agricultural crops is not affected due to mining operations. Crop Liability Insurance Policy has to be taken by the PP as a precaution to compensate for any crop loss. The impact zone shall be 5km from the boundary of mine lease-area for such insurance policy. In case, several mines are located in a cluster, the Associations of owners of the cluster mines, formed inter-alia, to sub-serve such an objective, shall take responsibility for securing such drop Liability Policy.	Not Applicable
H.	In case any village is located within the mining leasehold which is not likely to be affected due to mining activities during the life of mine, the Expert. Appraisal Committee (EAC) should consider the proposal of Environmental Clearance (EC) for reduced mining area. The Mining lease may be executed for the area for which EC is accorded. The mining plan may also be accordingly revised and required stipulations under the MMDR Act, 1957 and MCR, 1960 met.	Noted
I.	Transportation of the minerals by road passing through the village shall not be allowed. A 'bypass' road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The PP shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such roads.	Noted & complied
J.	Likewise, alteration or re-routing of foot paths, pagdandies, cart roads, and village infrastructure/public utilities or roads (for purposes of land acquisition for mining) shall be avoided to the extent possible and in case such acquisition is inevitable, alternative arrangements shall be made first and then only the area acquired. In these types of cases, Inspection Reports by site visit by experts may be insisted upon which should be done through reputed Institutes.	Noted & complied
K.	As CSR activities by Companies including the Mining Establishments has become mandatory up to 2% of their financial turn-over, Socio Economic Development. of the neighbourhood Habitats could also be planned and executed by the PPs more systematically based on the 'Need based door to door survey' by established Social Institutes/Workers on the lines as required under TOR. "R&R Plan/compensation details for the Project affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SC's /ST's and other weaker sections of the society in the study area, a need based sample survey, family wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments	Noted & complied

Shavendra
 Manager (Environment)
 Khondbond Iron Mine

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
	of the State Government. It may be clearly brought out whether the village located in the mine lease area will be shifted or not. The issues related to shifting of village including their R&R and socio-economic aspects should be discussed in the EIA Report."	

Manager (Environment)
Khondbond Iron Mine

Abhan
Manager (Environment)
Khondbond Iron Mine

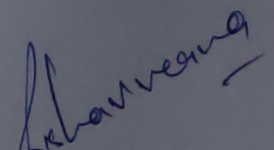
Ground Water Level
Khondbond Iron & Manganese Mine
(October 2019 – March 2020)

Khondbond Iron & Manganese Mine of TATA Steel Ltd. is an operational opencast captive iron mine. Regular monitoring of ground water level in and around the mine lease of existing well is regularly been done in desired frequency. The detailed quality report is attached herewith.

The Khondbond Iron & Manganese Mine has received NOC from CGWA for ground water withdrawal vide no. CGWA/NOC/MIN/ORIC/2018/3887 dated 09.08.2018.

As per recent hydro-geological study & regulatory approval, few additional locations are also incorporated along with proposed piezometers in the area. Monitored water level for of area for the month of November 2019 and February 2020 are as follows:

Sr. No.	LOCATION	MONTH	
		November 2019	February 2020
Existing Dug Well Locations:			
1.	Guruda Village	2 m 45 cm	2 m 89 cm
2.	Ganua Sebasram, Ganua Village	3 m 59 cm	3 m 82 cm
3.	OMC Colony, Near Khondbond Mine Road	3 m 38 cm	3 m 48 cm
4.	Khondbond Village, Near road side	4 m 29 cm	4 m 52 cm
5.	Gonua near MGM Mess area	1 m 59 cm	1 m 98 cm
6.	Khondbond road, near field	3 m 27 cm	3 m 85 cm
NEW PIEZOMETER LOCATIONS			
7.	PB gate	10 m 02cm	13 m 03 cm
8.	Garden Area	86 m 03cm	No water found
9.	N Ore Body	93 m 00 cm	No water found
10.	Near STP	51 m 31 cm	52 m 74 cm
11.	Manganese area	60 m 08 cm	72 m 01 cm


Manager (Environment)
Khondbond Iron Mine

*Piezometer installed at various locations
at
Khondbond Iron & Manganese Mine, Tata Steel Ltd.*



Piezometer (PB gate, Garden area, N orebody area)



Piezometer (STP and Manganese) with digital recorder

Ground water Quality (October 2019 – March 2020) Khondbond Iron & Manganese Mine



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)
(ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified)



SAMI (SRI) LIMITED

Certificate No.: TC-7944
Format No.: 7.8.2/FMT-TRA6

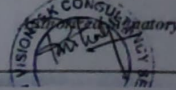
TEST REPORT (GROUND WATER QUALITY ANALYSIS REPORT- NOV-2019)

Customer Name & Address		M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)	
Test Report No	Envlab/19/R-6293	Report Release Date	03.12.19
Sample Code	GW-1-GW-2	Sampled By	VC SPL Representative
Sample Name	Ground Water	Sampled On	11.11.2019
Sample Condition	Sealed & Ice Preserved	Sampling Location	GW-1 Guruda Village GW-2 Khondbondh Village
Test Started On	12.11.2019	Sample Received On	12.11.2019
		Test Completed On	19.11.2019

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS-10500:2012 Amended on 2015 & 2018		Analysis Results	
				Acceptable Limit	Desirable Limit	GW-1	GW-2
Essential Characteristics							
1	*Colour	APHA23 rd Edn.2017. 2120 B, C	Hazen	5	15	Cl	Cl
2	*Odour	APHA23 rd Edn.2017. 2130 B	-	Agreeable	Agreeable	Agreeable	Agreeable
3	*Taste	APHA23 rd Edn.2017. 2160 C	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA23 rd Edn.2017. 2130 D	NTU	1	5	<1	<1
5	pH Value	APHA23 rd Edn.2017. 4500F ¹ B	-	6.5-8.5	No relaxation	7.24	7.32
6	TotalHardness(as CaCO ₃)	APHA23 rd Edn.2017. 2340 C	mg/l	200	600	118.0	146.0
7	Iron (as Fe)	APHA23 rd Edn.2017. 3111 B	mg/l	1.0	No relaxation	0.24	0.26
8	Chloride (as Cl)	APHA23 rd Edn.2017. 4500C1 B	mg/l	250	1000	28.2	31.4
9	*Residual, free Chlorine	APHA23 rd Edn.2017.4500C1, D	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Dissolved Solids	APHA23 rd Edn.2017. 2540 C	mg/l	500	2000	174.0	190.0
11	Calcium (as Ca)	APHA23 rd Edn.2017. 3500A B	mg/l	75	200	26.3	31.2
12	Magnesium (as Mg)	APHA23 rd Edn.2017. 3500Mg B	mg/l	30	100	12.4	13.2
13	Copper (as Cu)	APHA23 rd Edn.2017. 3111 C & B	mg/l	0.05	1.5	<0.02	<0.02
14	Manganese (as Mn)	APHA23 rd Edn.2017. 3111 B	mg/l	0.1	0.3	0.011	0.017
15	*Sulphate (as SO ₄)	APHA23 rd Edn.2017. 4500 SO ₄ ²⁻ E	mg/l	200	400	4.2	6.1
16	*Nitrate (as NO ₃)	APHA23 rd Edn.2017. 4500 NO ₃ ⁻ E	mg/l	45	No relaxation	2.2	3.2
17	*Fluoride (as F)	APHA23 rd Edn.2017. 4500F C	mg/l	1	1.5	0.012	0.018
18	*Phenolic Compounds (as C ₆ H ₅ OH)	APHA23 rd Edn.2017. 5530 B, D	mg/l	0.001	0.002	<0.001	<0.001
19	Mercury (as Hg)	APHA23 rd Edn.2017.3112 B	mg/l	0.001	No relaxation	<0.001	<0.001
20	Cadmium (as Cd)	APHA23 rd Edn.2017. 3111 B	mg/l	0.003	No relaxation	<0.001	<0.001
21	Selenium (as Se)	APHA23 rd Edn.2017. 3114 B	mg/l	0.01	No relaxation	<0.001	<0.001
22	*Arsenic (as As)	APHA23 rd Edn.2017. 3114 B	mg/l	0.01	No relaxation	<0.004	<0.004
23	*Cyanide (as CN)	APHA23 rd Edn.2017. 4500 CN, C, D	mg/l	0.05	No relaxation	ND	ND
24	Lead (as Pb)	APHA23 rd Edn.2017. 3111 B	mg/l	0.01	No relaxation	<0.01	<0.01
25	Zinc (as Zn)	APHA23 rd Edn.2017. 3111 B	mg/l	5	15	<0.01	<0.01
26	*Antimony Detergent (as MBAS)	APHA23 rd Edn.2017. 5540 C	mg/l	0.2	1	<0.2	<0.2
27	*Chromium (as Cr ^{VI})	APHA23 rd Edn.2017. 3500Cr ^{VI} B	mg/l	-	-	<0.01	<0.01
28	*Mineral Oil	APHA23 rd Edn.2017. 5230 B	mg/l	0.5	No relaxation	<0.1	<0.1
29	Alkalinity	APHA23 rd Edn.2017. 2320 D	mg/l	200	600	92.6	110.0
30	*Aluminium as (Al)	APHA23 rd Edn.2017. 3500Al B	mg/l	0.03	0.2	<0.01	<0.01
31	*Boron (as B)	APHA23 rd Edn.2017. 4500B, D	mg/l	0.05	2.4	<0.1	<0.1
32	*Poly Aromatic Hydrocarbon as PAH	APHA23 rd Edn.2017. 6640 B	mg/l	0.0001	No relaxation	<0.001	<0.001
33	*Pesticide	APHA23 rd Edn.2017. 6630 B, C	µg/l	-	No relaxation	Abmt	Abmt
34	*E.Coli	APHA23 rd Edn.2017. 9221 F	MPN/100ml	Shall not be detectable in any 100ml sample	-	<1*	1.1

Note Above (*) parameters are not in our NABL scope. Note: CL: Colorless, ND: Not Detected.
 1M (Below Detectable Limit) Value: Cu 0.025 mg/l, Mn 0.05 mg/l, Cr(VI) 0.001 mg/l, Hg 0.001 mg/l, Cd 0.001 mg/l, Se 0.001 mg/l, As 0.004 mg/l, Pb 0.01 mg/l, Zn 0.03 mg/l, Cr(VI) 0.01 mg/l, H 0.01 mg/l, B 0.01 mg/l, P.H 0.0001 mg/l

1. The test values are reported based on the samples received. 2. Samples will be destroyed after 7 days from date of issue of the test report subject to nature of preservation. Sample will be preserved as per standard method.
3. The test report shall not be reproduced, without written approval of laboratory



(Signature)
Manager (Environment)
Khondbond Iron Mine

Ground water Quality



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

(ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified)



NABL ACCREDITED

Certificate No.: TC-7944

Format No.: T.R.2/FMI/TR.06

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT- NOV-2019)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	ENV/106/19/R-6299	Report Release Date	03/12/19
Sample Code	GW-3-GW-4	Sampled By	VCSPL Representative
Sample Name	Ground Water	Sampled On	11/11/2019
Sample Condition	Sealed & Ice Preserved	Sampling Location	GW-3 Ganua Sebasram GW-4 OMC Colony
Test Started On	12/11/2019	Sample Received On	12/11/2019
		Test Completed On	19/11/2019

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS-10500:2012 Amended on 2015 & 2018		Analysis Results	
				Acceptable Limit	Permissible Limit	GW-3	GW-4
Essential Characteristics							
1	*Colour	APHA23 rd Edn.2017: 2120 B, C	Hazen	5	15	CL	CL
2	*Odour	APHA23 rd Edn.2017: 2150 B	-	Agreeable	Agreeable	Agreeable	Agreeable
3	*Taste	APHA23 rd Edn.2017: 2160 C	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA23 rd Edn.2017: 2130 B	NTU	1	5	-1	-1
5	pH Value	APHA23 rd Edn.2017: 4500H B	-	6.5-8.5	No relaxation	7.36	7.31
6	Total hardness(as CaCO ₃)	APHA23 rd Edn.2017: 2340 C	mg/l	200	600	138.0	140.0
7	Iron (as Fe)	APHA23 rd Edn.2017: 3111 B	mg/l	1.0	No relaxation	0.23	0.22
8	Chloride (as Cl ⁻)	APHA23 rd Edn.2017: 4500C1 B	mg/l	250	1000	30.8	32.6
9	*Residual, free Chlorine	APHA23 rd Edn.2017: 4500C1, D	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Dissolved Solids	APHA23 rd Edn.2017: 2540 C	mg/l	500	2000	210.0	220.8
11	Calcium (as Ca)	APHA23 rd Edn.2017: 3500Ca B	mg/l	75	200	36.6	40.2
12	Magnesium (as Mg)	APHA23 rd Edn.2017: 3500Mg B	mg/l	30	100	14.8	15.6
13	Copper (as Cu)	APHA23 rd Edn.2017: 3111 Cu B	mg/l	0.05	1.5	-0.02	0.02
14	Manganese (as Mn)	APHA23 rd Edn.2017: 3111 H	mg/l	0.1	0.3	0.01	0.016
15	*Sulphate (as SO ₄)	APHA23 rd Edn.2017: 4500 SO ₄ F	mg/l	200	400	5.8	5.6
16	*Nitrate (as NO ₃)	APHA23 rd Edn.2017: 4500 NO ₃ E	mg/l	45	No relaxation	3.4	2.6
17	*Fluoride (as F)	APHA23 rd Edn.2017: 4500F C	mg/l	1	1.5	0.024	0.021
18	*Phenolic Compounds (as C ₆ H ₅ OH)	APHA23 rd Edn.2017: 5530 B,D	mg/l	0.001	0.002	<0.001	<0.001
19	Mercury (as Hg)	APHA23 rd Edn.2017: 3112 B	mg/l	0.001	No relaxation	<0.001	<0.001
20	Cadmium (as Cd)	APHA23 rd Edn.2017: 3111 B	mg/l	0.003	No relaxation	<0.001	<0.001
21	*Selenium (as Se)	APHA23 rd Edn.2017: 3114 B	mg/l	0.01	No relaxation	<0.001	<0.001
22	*Arsenic (as As)	APHA23 rd Edn.2017: 3114 B	mg/l	0.01	No relaxation	<0.004	<0.004
23	*Cyanide (as CN ⁻)	APHA23 rd Edn.2017: 4500 CN C,D	mg/l	0.05	No relaxation	ND	ND
24	Lead (as Pb)	APHA23 rd Edn.2017: 3111 B	mg/l	0.01	No relaxation	<0.01	<0.01
25	Zinc (as Zn)	APHA23 rd Edn.2017: 3111 B	mg/l	5	15	0.01	0.01
26	*Anionic Detergents (as MBAS)	APHA23 rd Edn.2017: 5540 C	mg/l	0.2	1	<0.2	<0.2
27	*Chromium (as Cr ⁶⁺)	APHA23 rd Edn.2017: 3500Cr B	mg/l	-	-	<0.01	<0.01
28	*Manganese (as Mn)	APHA23 rd Edn.2017: 5220 B	mg/l	0.5	No relaxation	<0.1	<0.1
29	Algalinity	APHA23 rd Edn.2017: 2320 B	mg/l	200	600	118.2	120.8
30	*Aluminium (as Al)	APHA23 rd Edn.2017: 3500Al B	mg/l	0.03	0.2	<0.01	<0.01
31	*Barium (as B)	APHA23 rd Edn.2017: 4500B, B	mg/l	0.05	24	<0.1	<0.1
32	*Poly Aromatic Hydrocarbon as PAH	APHA23 rd Edn.2017: 6440 B	mg/l	0.0001	No relaxation	<0.001	<0.001
33	*Pesticide	APHA23 rd Edn.2017: 6610 B,C	µg/l	-	No relaxation	Absent	Absent
34	*EColi	APHA23 rd Edn.2017: 9221 F	MPN/100ml	Shall not be detectable in any 100ml sample	-	<1.1	<1.1

Note: Above (*) parameters are not in our NABL scope. Note: CL: Colorless, ND: Not Detected.

MM (Below Detectable Limit): Valour Cu: 0.025 mg/l, Mn: 0.05 mg/l, Cr(VI): 0.001 mg/l, Hg: 0.001 mg/l, Cd: 0.001 mg/l, As: 0.004 mg/l, Pb: 0.01 mg/l, Zn: 0.05 mg/l, Cr(VI): 0.01 mg/l, B: 0.01 mg/l, PAH: 0.0001 mg/l

1. The test values are reported based on the samples received. 2. Samples will be destroyed after 7 days from date of report subject to nature of preservation. Sample will be preserved as per standard method.
3. The test report shall not be reproduced, without written approval of laboratory

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Sudhakar (Environment)
Khondbond Iron Mine

Ground water Quality



Visiontek Consultancy Services Pvt. Ltd.

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(ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified)



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Certificate No.: TC-7944
Format No.: 7.8.2/FMT/TR/06

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT- FEBRUARY-2020)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	ENV106/19/R-3/20	Report Release Date	02.03.20
Sample Code	GW-1-GW2	Sampled By	VCSP/ Representative
Sample Name	Ground Water	Sampled On	10.02.2020
Sample Condition	In Preserved	Sampling Location	GW-1: Gonda Village GW-2: Khondbondh Village
Test Started On	11.02.2020	Sample Received On	11.02.2020
		Test Completed On	17.02.2020

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:2012 Amended on 2015 & 2018		Analysis Results	
				Acceptable Limit	Permissible Limit	GW-1	GW-2
Essential Characteristics							
1	*Colour	APHA23 rd Edn.2017 2120 B, C	Hazen	5	15	CL	CL
2	*Odour	APHA23 rd Edn.2017 2150 B	-	Agreeable	Agreeable	Agreeable	Agreeable
3	*Taste	APHA23 rd Edn.2017 2160 C	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA23 rd Edn.2017 2130 B	NTU	1	5	<0.2	<0.2
5	pH Value	APHA23 rd Edn.2017 4500H F	-	6.5-8.5	No relaxation	7.26	7.42
6	Total Hardness (as CaCO ₃)	APHA23 rd Edn.2017 2340 C	mg/l	200	600	160.0	168.0
7	Iron (as Fe)	APHA23 rd Edn.2017 3111 B	mg/l	1.0	No relaxation	0.21	0.24
8	Chloride (as Cl ⁻)	APHA23 rd Edn.2017 4500C1 B	mg/l	250	1000	30.8	32.0
9	*Residual free Chlorine	APHA23 rd Edn.2017 4500C1, B	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Dissolved Solids	APHA23 rd Edn.2017 2540 D	mg/l	500	2000	192.0	232.0
11	Calcium (as Ca)	APHA23 rd Edn.2017 3500Ca B	mg/l	75	200	40.0	43.0
12	Magnesium (as Mg)	APHA23 rd Edn.2017 3500Mg B	mg/l	30	100	14.6	15.2
13	Copper (as Cu)	APHA23 rd Edn.2017 3111 Cu B	mg/l	0.05	1.5	<0.05	<0.05
14	Manganese (as Mn)	APHA23 rd Edn.2017 3111 B	mg/l	0.1	0.3	0.018	0.016
15	*Sulphate (as SO ₄)	APHA23 rd Edn.2017 4500 SO ₄ F	mg/l	200	400	5.4	5.2
16	*Nitrate (as NO ₃)	APHA23 rd Edn.2017 4500 NO ₃ F	mg/l	45	No relaxation	3	3.2
17	*Fluoride (as F ⁻)	APHA23 rd Edn.2017 4500F C	mg/l	1	1.5	0.016	0.032
18	*Phenolic Compounds (as C ₁₂ H ₁₀ O)	APHA23 rd Edn.2017 5530 B,D	mg/l	0.001	0.002	<0.001	<0.001
19	Mercury (as Hg)	APHA23 rd Edn.2017 3112 B	mg/l	0.001	No relaxation	<0.001	<0.001
20	Cadmium (as Cd)	APHA23 rd Edn.2017 3111 B	mg/l	0.003	No relaxation	<0.001	<0.001
21	*Selenium (as Se)	APHA23 rd Edn.2017 3114 B	mg/l	0.01	No relaxation	<0.001	<0.001
22	*Arsenic (as As)	APHA23 rd Edn.2017 3114 B	mg/l	0.01	No relaxation	<0.001	<0.001
23	*Cyanide (as CN)	APHA23 rd Edn.2017 4500 CN C,D	mg/l	0.05	No relaxation	<0.001	<0.001
24	Lead (as Pb)	APHA23 rd Edn.2017 3111 B	mg/l	0.01	No relaxation	ND	ND
25	Zinc (as Zn)	APHA23 rd Edn.2017 3111 B	mg/l	5	15	<0.001	<0.001
26	*Anionic Detergents (as Milsky)	APHA23 rd Edn.2017 5540 C	mg/l	0.2	1	<0.05	<0.05
27	*Hexavalent (as Cr ⁶⁺)	APHA23 rd Edn.2017 3500Cr B	mg/l	-	-	<0.05	<0.05
28	*Alkalinity (M)	APHA23 rd Edn.2017 5220 B	mg/l	0.5	No relaxation	<0.01	<0.01
29	Alkalinity	APHA23 rd Edn.2017 2320 D	mg/l	200	600	124.8	136.0
30	*Aluminium (as Al)	APHA23 rd Edn.2017 3500Al B	mg/l	0.03	0.2	<0.001	<0.001
31	*Barium (as B)	APHA23 rd Edn.2017 4500B D	mg/l	0.05	2.4	<0.01	<0.01
32	*Poly Aromatic Hydrocarbon as PAH	APHA23 rd Edn.2017 6440 B	mg/l	0.0001	No relaxation	<0.001	<0.001
33	*Pesticide	APHA23 rd Edn.2017 6630 B,C	mg/l	-	No relaxation	Absent	Absent
34	*ECob	APHA23 rd Edn.2017 9221 F	MPN/100ml	Shall not be detectable in any 100ml sample	-	<1	<1

Note: Above (*) parameters are not in our scope. Note: CL: Colorless, ND: Not Detected.

1/9 Below Detectable Limit Values: Cu: 0.02 mg/L, Mn: 0.03 mg/L, Ni: 0.05 mg/L, Pb: 0.01 mg/L, Se: 0.01 mg/L, Zn: 0.01 mg/L, Cr⁶⁺: 0.01 mg/L, As: 0.01 mg/L, B: 0.01 mg/L, PAH: 0.001 mg/L

1. The test values are reported based on the samples received. 2. Samples will be destroyed after 7 days from date of report unless test report subject to nature of preservation. Sample will be preserved as per standard method.

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Committed For Better Environment



Manager (Environment)
Khondbond Iron Mine

Ground water Quality



Visiontek Consultancy Services Pvt. Ltd.

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TEST REPORT

GROUND WATER QUALITY ANALYSIS REPORT- FEBRUARY-2020

Customer Name & Address		M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)	
Test Report No	Enviab/19/IR-8303	Report Release Date	02.03.20
Sample Code	GW3-GW4	Sampled By	VC SPL Representative
Sample Name	Ground Water	Sampled On	04.02.2020
Sample Condition	Ice Preserved	Sampling Location	GW-3 Gaura Sahasram GW-4 OMC Colony
Test Started On	11.02.2020	Sample Received On	11.02.2020
		Test Completed On	17.02.2020

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS-10500:2012 Amended on 2015 & 2018		Analysis Results	
				Acceptable Limit	Permissible Limit	GW-3	GW-4
Essential Characteristics							
1	*Colour	APHA23 rd Edn.2017: 2120 B, C	Hazen	5	15	CL	CL
2	*Odour	APHA23 rd Edn.2017: 2150 B	-	Agreeable	Agreeable	Agreeable	Agreeable
3	*Taste	APHA23 rd Edn.2017: 2160 C	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA23 rd Edn.2017: 2130 B	NTU	1	5	<0.2	<0.2
5	pH Value	APHA23 rd Edn.2017: 450011 B	-	6.5-8.5	No relaxation	7.56	7.22
6	Total Hardness as CaCO ₃	APHA23 rd Edn.2017: 2340 C	mg/l	200	600	170.0	156.0
7	Iron (as Fe)	APHA23 rd Edn.2017: 3111 B	mg/l	1.0	No relaxation	0.18	0.26
8	Chloride (as Cl ⁻)	APHA23 rd Edn.2017: 4500C B	mg/l	250	1000	36.0	40.0
9	*Residual, Free Chlorine	APHA23 rd Edn.2017: 4500C1, B	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Dissolved Solids	APHA23 rd Edn.2017: 2540 D	mg/l	500	2000	242.0	248.0
11	Calcium (as Ca)	APHA23 rd Edn.2017: 3500'a B	mg/l	75	200	44.0	40.0
12	Magnesium (as Mg)	APHA23 rd Edn.2017: 3500'b B	mg/l	30	100	14.8	15.6
13	Copper (as Cu)	APHA23 rd Edn.2017: 3113 Ca B	mg/l	0.05	1.5	<0.05	<0.05
14	Manganese (as Mn)	APHA23 rd Edn.2017: 3113 B	mg/l	0.1	0.3	0.021	0.024
15	*Sulphate (as SO ₄)	APHA23 rd Edn.2017: 4500 SO ₄ E	mg/l	200	400	4.8	5.6
16	*Nitrate (as NO ₃)	APHA23 rd Edn.2017: 4500 NO ₃ E	mg/l	45	No relaxation	2.4	2.42
17	*Fluoride (as F)	APHA23 rd Edn.2017: 4500F C	mg/l	1	1.5	0.03	0.041
18	*Phenolic Compounds (as C ₁₂ H ₁₀ O)	APHA23 rd Edn.2017: 5530 B,D	mg/l	0.001	0.002	<0.001	<0.001
19	Mercury (as Hg)	APHA23 rd Edn.2017: 3112 B	mg/l	0.001	No relaxation	<0.001	<0.001
20	Cadmium (as Cd)	APHA23 rd Edn.2017: 3111 B	mg/l	0.003	No relaxation	<0.001	<0.001
21	*Selenium (as Se)	APHA23 rd Edn.2017: 3114 B	mg/l	0.01	No relaxation	<0.001	<0.001
22	*Arsenic (as As)	APHA23 rd Edn.2017: 3114 B	mg/l	0.01	No relaxation	<0.001	<0.001
23	*Cyanide (as C ₂ N ₂)	APHA23 rd Edn.2017: 4500 CN C,D	mg/l	0.05	No relaxation	ND	ND
24	Lead (as Pb)	APHA23 rd Edn.2017: 3111 B	mg/l	0.01	No relaxation	<0.001	<0.001
25	Zinc (as Zn)	APHA23 rd Edn.2017: 3111 B	mg/l	5	15	<0.05	<0.05
26	*Anionic Detergent (as MBAS)	APHA23 rd Edn.2017: 5540 C	mg/l	0.2	1	<0.2	<0.2
27	*Chromium (as Cr ⁶⁺)	APHA23 rd Edn.2017: 3500Cr B	mg/l	-	-	<0.05	<0.05
28	*Mineral Oil	APHA23 rd Edn.2017: 5230 B	mg/l	0.5	No relaxation	<0.01	<0.01
29	Alkalinity	APHA23 rd Edn.2017: 2520 B	mg/l	200	600	144.0	158.0
30	*Aluminium (as Al)	APHA23 rd Edn.2017: 3500Al B	mg/l	0.3	0.2	<0.001	<0.001
31	*Boron (as B)	APHA23 rd Edn.2017: 4500B, B	mg/l	0.05	2.4	<0.01	<0.01
32	*Poly Aromatic Hydrocarbons (as PAH)	APHA23 rd Edn.2017: 6440 B	mg/l	0.0001	No relaxation	<0.001	<0.001
33	*Pesticide	APHA23 rd Edn.2017: 6630 B,C	µg/l	-	No relaxation	Absent	Absent
34	*EC ₅₀	APHA23 rd Edn.2017: 9221 F	MPN/100ml	Shall not be detectable in any 100ml sample	-	<1.1	<1.1

Note: Above (*) parameters are not in our scope. Note: CL: Colorless, ND: Not Detected.
 SM: Below Detectable Limits Values: Cu: 0.02 mg/l, As: 0.01 mg/l, Cr⁶⁺: 0.05 mg/l, Fe: 0.30 mg/l, Cd: 0.01 mg/l, Se: 0.01 mg/l, Pb: 0.01 mg/l, Zn: 0.03 mg/l, Cr³⁺: 0.01 mg/l, Al: 0.01 mg/l, B: 0.1 mg/l, PAH: 0.0001 mg/l, Pesticide: 0.0001 mg/l.

1. The test values are reported based on the samples received. 2. Samples will be destroyed after 7 days from date of issues of the test report subject to nature of preservation. Sample will be preserved as per standard method.

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Subhan Kumar
Manager (Environment)
Khondbond Iron Mine

Surface Water Analysis Report (October 2019 – March 2020) Khondbond Iron & Manganese Mine



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(ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified)



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TEST REPORT (SURFACE WATER QUALITY ANALYSIS REPORT- NOVEMBER-2019)

Customer Name & Address		M/s Khondbond Iron & Manganese Mines (M/s TATA Steel Limited)	
Test Report No	ENVLAB/19/R-6299	Report Release Date	03.12.19
Sample Code	SW1-SW2	Sampled By	VCSPL Representative
Sample Name	Surface Water	Sampled On	11.11.2019
Sample Condition	Ice Preserved	Sampling Location	SW1: Sona River Upstream SW2: Sona River Downstream
Test Started On	12.11.2019	Sample Received On	12.11.2019
		Test Completed On	19.11.2019

Sl. No.	Parameter	Unit	Testing Methods	Standards as per IS-2296:1992 (Class -'C')	Analysis Results	
					SW-1	SW-2
1	Dissolved Oxygen (min)	mg/l	APHA 23 ⁰⁰ Ed.2017 4500 O C	4.0	5.6	5.8
2	Total Suspended Solids as TSS	mg/l	APHA 23 ⁰⁰ Ed.2017 2540 C	—	34	46
3	BOD (31 days at 27°C (max)	mg/l	IS 3025(P-44) 1993 RA 2003	1500	<1.8	<1.8
4	Chemical Oxygen Demand (COD)	mg/l	APHA 23 ⁰⁰ Ed.2017 5220 C	—	30	34
5	Total Coli. form	mg/l	APHA 23 ⁰⁰ Ed.2017 9221 B	5000	180	220
6	pH at 25°C	mg/l	APHA 23 ⁰⁰ Ed.2017 4500I B	6.0-9.0	7.46	7.52
7	Colour	mg/l	APHA 23 ⁰⁰ Ed.2017 2120 B, C	300	CL	CL
8	Total Dissolved Solids	mg/l	APHA 23 ⁰⁰ Ed.2017 2540 D	600	210	182
9	Copper as Cu (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 3111 B	1.5	<0.02	<0.05
10	Iron as Fe (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 3500Fe, B	0.5	0.34	0.36
11	Chloride (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 4500Cl B	—	50.8	52.6
12	Sulphates (SO ₄) (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 4500 SO ₄ E	400	5.6	5.8
13	Nitrate as NO ₃ (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 4500 NO ₃ E	50	3.2	3.3
14	Fluoride as F (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 4500F C	1.5	0.022	0.024
15	Phenolic Compounds as C ₆ H ₅ OH (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 5530 B,D	0.005	<0.001	<0.001
16	Cadmium as Cd (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 3111 B	0.01	<0.001	<0.001
17	Selenium as Se (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 3500 Se C	0.05	<0.001	<0.001
18	Arsenic as As	mg/l	APHA 23 ⁰⁰ Ed.2017 3114 B	0.2	<0.001	<0.001
19	Cyanide as CN (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 4500 CN, C, D	0.05	ND	ND
20	Lead as Pb	mg/l	APHA 23 ⁰⁰ Ed.2017 3111 B	0.1	<0.01	<0.01
21	Zinc as Zn(max)	mg/l	APHA 23 ⁰⁰ Ed.2017 3111 B	15	<0.05	<0.05
22	Hexa Chromium as Cr ⁶⁺	mg/l	APHA 23 ⁰⁰ Ed.2017 3500Cr, B	0.05	<0.05	<0.05
23	Anionic Detergents (max)	mg/l	APHA 23 ⁰⁰ Ed.2017 5540 C	1.0	<0.2	<0.2
24	Mercury as Hg	mg/l	APHA 23 ⁰⁰ Ed.2017 3112 B	—	<0.001	<0.001
25	Manganese as Mn	mg/l	APHA 23 ⁰⁰ Ed.2017 3111 B	—	<0.005	<0.005

Note: Above (*) parameters are not in our scope.

1. The test values are reported based on the samples received.
2. Samples will be destroyed after 7 days from date of issues of the test report subject to nature of preservation. Sample will be preserved as per standard method.
3. The test report shall not be reproduced, without written approval of laboratory.



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Surface Water Analysis Report



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Certificate No.: TC-7944
Format No.: T.B.2/FMT/11/06

TEST REPORT

(SURFACE WATER QUALITY ANALYSIS REPORT- FEBRUARY-2020)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	Env/16/10/0-8304	Report Release Date	02-03-20
Sample Code	SW-1-SW2	Sampled By	VCSPL Representative
Sample Name	Surface Water	Sampled On	10.02.2020
Sample Condition	Ice Preserved	Sampling Location	SW-1 Sonariver Upstream SW-2 Song River Downstream
Test Started On	11.02.2020	Sample Received On	11.02.2020
		Test Completed On	17.02.2020

Sl. No	Parameter	Unit	Testing Method	Standards as per IS 2296:1992 Class C ⁻	Analysis Results	
					SW-1	SW-2
1	Dissolved Oxygen (minimum)	mg/l	APHA23 rd Edn,2017: 4500 G C	4	6.2	6.6
2	Total Suspended Solids as TSS	mg/l	APHA23 rd Edn,2017: 2540 C	—	32	48
3	BOD (5) days at 27°C (max)	mg/l	IS 3025 (P-44) 1993 RA 2003	3	5.4	7.2
4	Chemical Oxygen Demand as COD	mg/l	APHA23 rd Edn,2017: 5220 B	—	28	36
5	Total Coli form	MPN/100ML	APHA23 rd Edn,2017: 9221 B	5000	310	440
6	pH Value	—	APHA23 rd Edn,2017: 4500 H B	6.0-9.0	7.62	7.74
7	Colour (max)	Hazen	APHA23 rd Edn,2017: 2120 B,C	300	2	Colorless
8	Total Dissolved Solids	mg/l	APHA23 rd Edn,2017: 2540 D	1500	174.0	224.0
9	Copper as Cu (max)	mg/l	APHA23 rd Edn,2017: 3111 B,C	1.5	<0.05	<0.05
10	Iron as Fe (max)	mg/l	APHA23 rd Edn,2017: 3111 D	0.5	0.41	0.48
11	Chloride (max)	mg/l	APHA23 rd Edn,2017: 4500 CT B	600	42.0	56.0
12	Sulphates as SO ₄ (max)	mg/l	APHA23 rd Edn,2017: 4500 SO ₄ E	400	3.2	5.4
13	Nitrate as NO ₃ (max)	mg/l	APHA23 rd Edn,2017: 4500 NO ₃ E	50	2.60	3.10
14	Fluoride as F (max)	mg/l	APHA23 rd Edn,2017: 4500 F C	1.5	0.018	0.026
15	Phenolic Compounds as C ₆ H ₅ OH (max)	mg/l	APHA23 rd Edn,2017: 5530 B,D	0.005	<0.001	<0.001
16	Cadmium as Cd (max)	mg/l	APHA23 rd Edn,2017: 3111 D	0.01	<0.001	<0.001
17	Selenium as Se (max)	mg/l	APHA23 rd Edn,2017: 3114 B	0.05	<0.001	<0.001
18	Arsenic as As	mg/l	APHA23 rd Edn,2017: 3114 D	0.2	<0.001	<0.001
19	Cyanide as CN (max)	mg/l	APHA23 rd Edn,2017: 4500 CN C,D	0.05	ND	ND
20	Lead as Pb(max)	mg/l	APHA23 rd Edn,2017: 3111 B	0.1	<0.01	<0.01
21	Zinc as Zn(max)	mg/l	APHA23 rd Edn,2017: 3111 B	15	<0.05	<0.05
22	Hexa Chromium as Cr +6	mg/l	APHA23 rd Edn,2017: 3111 B	0.05	<0.05	<0.05
23	Anionic Detergents (max)	mg/l	APHA23 rd Edn,2017: 5540 C	1	<0.2	<0.2
24	Mercury as Hg	mg/l	APHA23 rd Edn,2017: 3112 B	—	<0.001	<0.001
25	Manganese as Mn	mg/l	APHA23 rd Edn,2017: 3111 B	—	<0.005	<0.005

Note: Above (*) parameters are not in our scope. Note: CL: Colorless, ND: Not Detected.
 MFL (Below Detectable Limits) Values: Cu: 0.02 mg/l, As: 0.05 mg/l, Cr+6: 0.05 mg/l, Hg: 0.004 mg/l, Cd: 0.01 mg/l, Se: 0.001 mg/l, As: 0.004 mg/l, Cr+6: 0.01 mg/l
 Pb: 0.01 mg/l, Zn: 0.01 mg/l, Cr+3: 0.01 mg/l, Al: 0.01 mg/l, B: 0.1 mg/l, Hg: 0.001 mg/l, BOD: 1.8 mg/l, COD: 4 mg/l, TSS: 1.8 mg/l

1. The test values are reported based on the samples received. 2. Samples will be destroyed after 7 days from date of issue of the test report subject to nature of preservation. Sample will be preserved as per standard method.



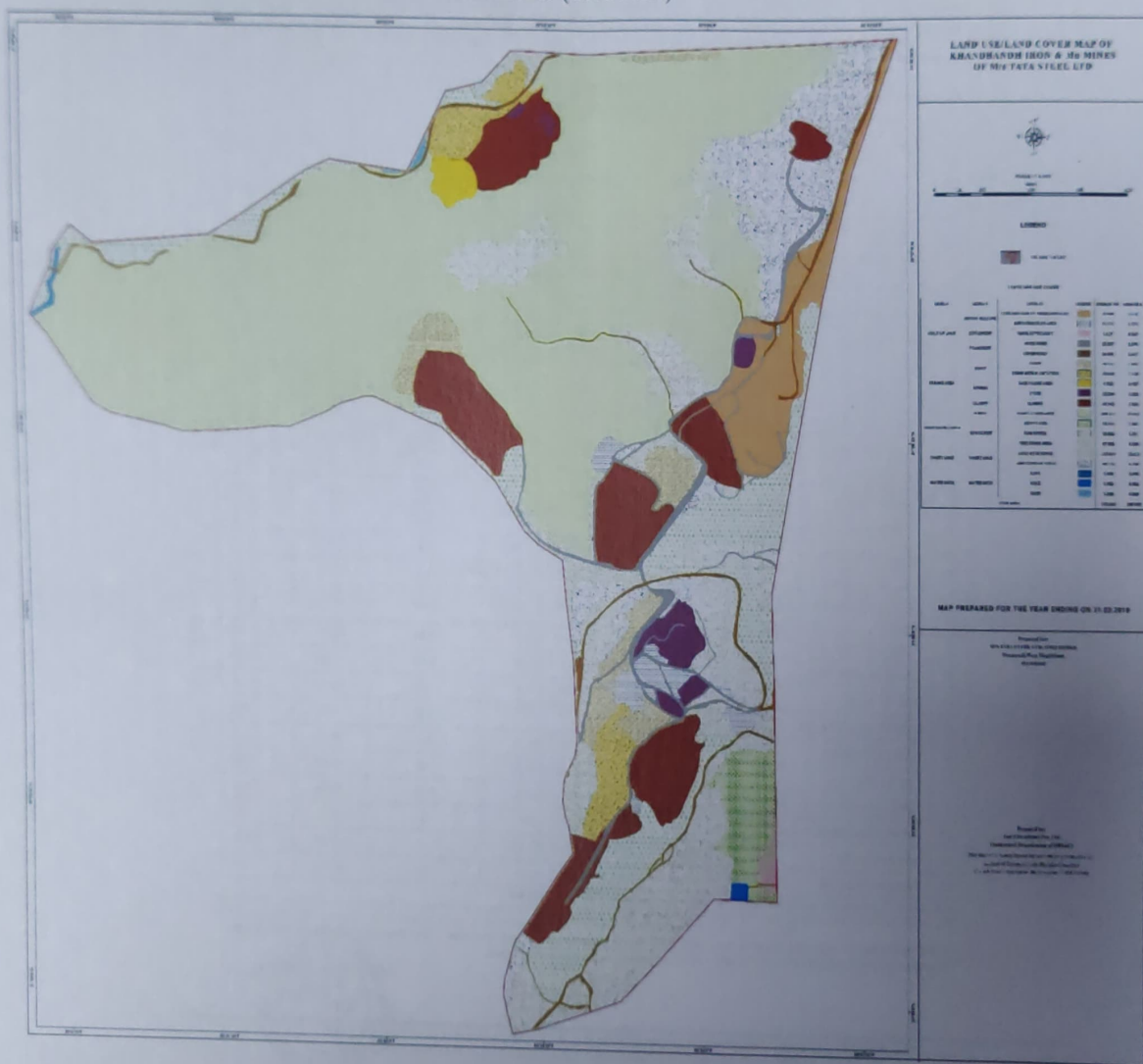
No. AA-22423, Chaudhary Industrial Estate, Patia, Bhubaneswar-751024, India-751024, Odisha, Coimbatore
 Plot E-mail: visiontek@vcspl.org, visiontek.in@yahoo.co.in, visiontek.in@gmail.com, Visit us at: www.visiontek.in
 Visiontek For Better Environment

Ashish Verma
 Manager (Environment)
 Khondbond Iron Mine

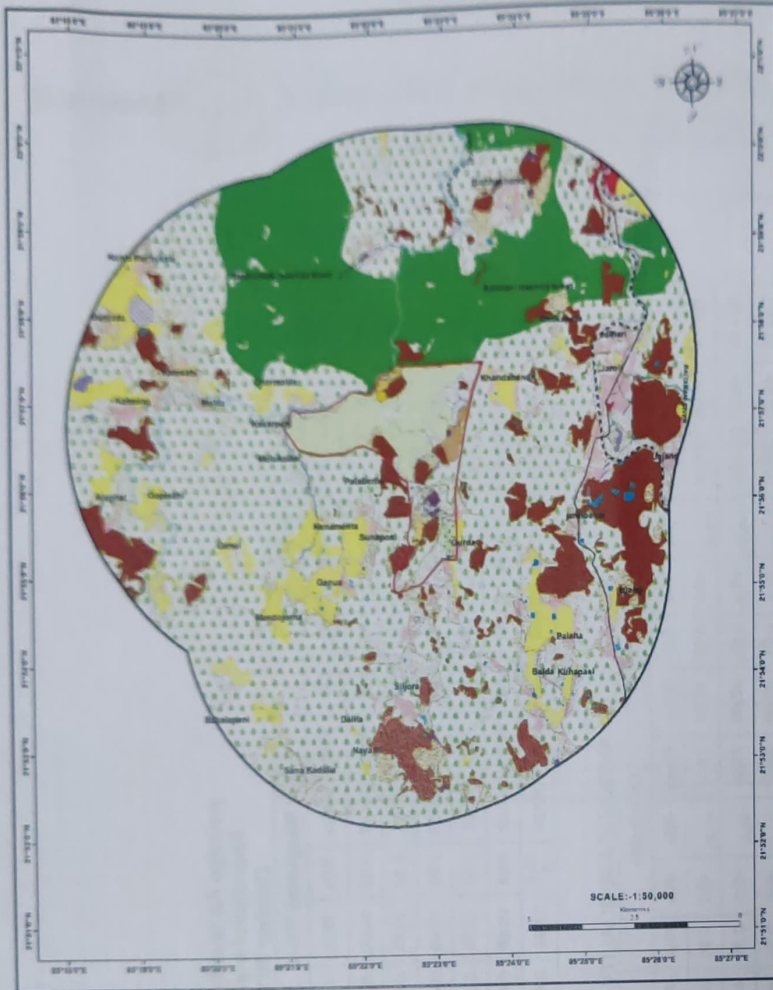
Digital Processing of Lease Area

Land use & Land Cover of Khondbond Iron and Mn Mine Tata Steel Ltd.

Mine Lease (Core Zone)

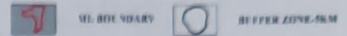


Shivanshu
Manager (Environment)
Khondbond Iron Mine



**LAND USE/LAND COVER MAP OF
KHANDBANDH IRON & Mn MINES
OF M/s TATA STEEL LTD**

LEGEND



LANDUSE/LAND COVER

LEVEL-1	LEVEL-2	LEVEL-3	LANDUSE	AREA IN HECTARE	AREA IN %
AGRICULTURAL	CROP LAND	WHEAT		25,308	2.80
		OTHER CROPS		12,975	1.46
BUILT UP LAND	SETTLEMENT	RESIDENTIAL		1,000	0.11
		INDUSTRIAL		207,100	23.30
		COMMERCIAL		23,000	2.59
		OTHER		1,000	0.11
INDUSTRIAL	INDUSTRIAL	STEEL PLANT		1,000	0.11
		INDUSTRIAL AREA		1,000	0.11
		INDUSTRIAL AREA		1,000	0.11
		INDUSTRIAL AREA		1,000	0.11
WATER BODY	WATER BODY	WATER BODY		1,000	0.11
		WATER BODY		1,000	0.11
		WATER BODY		1,000	0.11
		WATER BODY		1,000	0.11
VEGETATION COVER	FOREST	FOREST		1,000	0.11
		FOREST		1,000	0.11
		FOREST		1,000	0.11
		FOREST		1,000	0.11
WATER BODY	WATER BODY	WATER BODY		1,000	0.11
		WATER BODY		1,000	0.11
		WATER BODY		1,000	0.11
		WATER BODY		1,000	0.11
TOTAL AREA				900,000	100.00

MAP PREPARED FOR THE YEAR ENDING ON 31.03.2019

Prepared for:
M/S TATA STEEL LTD. OMQ Division
Noamundi, West Singhbhum
Jharkhand

Prepared by:
Geo Consultants Pvt. Ltd
(Authorized Organisation of ORSAC)
Plot No-853, Govinda Prasad Mahavidya Nagar (Medical Lane),
In front of Reliance Fresh (Radhika Complex),
Cuttack Road, Laxmisagar, Bhubaneswar-751006, Odisha.

Signature

Manager (Environment)
Khondbond Iron Mine

**Average Air Quality Report (CORE ZONE)
Khondbond Iron & Manganese Mine
October 2019 to March 2020**

Month	Near Heilipad						Near Manganese Mines						Near 16-D						Near Labour Colony							
	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO		
Oct 19	61.71	37.03	10.62	18.43	0.41	53.39	32.03	6.63	15.30	0.30	59.13	35.48	10.6	16.22	0.44	61.04	36.63	9.99	16.60	0.43						
Nov 19	62.63	37.58	9.78	17.95	0.46	55.35	33.21	7.34	15.84	0.38	65.78	39.47	9.56	15.85	0.41	64.78	38.87	10.4	15.75	0.47						
Dec 19	67.88	40.73	9.20	19.85	0.44	56.33	33.80	7.66	17.45	0.43	63.15	37.89	8.69	16.74	0.45	70.53	42.32	10.3	16.80	0.34						
Jan 20	70.36	42.00	12.03	19.80	0.46	60.09	36.08	7.51	18.36	0.41	71.13	42.58	8.77	14.46	0.27	71.56	42.94	10.9	16.18	0.40						
Feb 20	74.20	44.52	15.08	22.58	0.58	65.53	51.32	9.98	15.60	0.44	75.73	45.44	9.05	16.78	0.38	79.33	47.60	14.0	19.85	0.41						
Mar 20	75.66	45.39	15.20	23.06	0.50	83.80	50.28	10.4 3	17.83	0.43	82.40	49.44	10.2	15.57	0.37	82.61	49.57	13.8	19.40	0.43						

AVERAGE AIR QUALITY REPORT (BUFFER ZONE)

Month	Katesahi						Chormalda						Guruda village						Khondbond village							
	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO		
Oct 19	39.00	21.84	<4.0	<9.0	0.33	41.20	23.07	<4.0	<9.0	0.20	38.20	21.39	<4.0	<9.0	0.30	46.70	26.15	<4.0	<9.0	0.29						
Nov 19	42.50	23.80	<4.0	<9.0	0.39	42.00	23.52	<4.0	<9.0	0.29	41.00	22.96	<4.0	<9.0	0.32	48.60	27.22	<4.0	<9.0	0.25						
Dec 19	49.50	28.50	<4.0	<9.0	0.33	43.00	24.08	<4.0	<9.0	0.24	40.30	22.57	<4.0	<9.0	0.34	48.63	27.23	<4.0	<9.0	0.25						
Jan 20	49.70	28.50	<4.0	<9.0	0.39	45.40	25.42	<4.0	<9.0	0.25	40.10	24.60	<4.0	<9.0	0.37	48.70	29.40	<4.0	<9.0	0.29						
Feb 20	50.20	30.12	<4.0	<9.0	0.45	55.40	31.02	<4.0	<9.0	0.33	50.10	30.06	<4.0	<9.0	0.45	51.40	30.84	<4.0	<9.0	0.32						
Mar 20	53.20	31.92	<4.0	<9.0	0.50	55.80	31.25	<4.0	<9.0	0.40	50.30	30.54	<4.0	<9.0	0.47	44.50	26.70	<4.0	<9.0	0.27						

Unit of measurement for all parameters except CO is µg/m³. CO is in mg/m³


 Ashan Veera
 Lab-in-charge


 Ashan Veera
 Manager (Environment)
 Khondbond Iron Mine

Analysis Report – De-dusting



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)
(ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified)



NABL ACCREDITED
Certificate No.: TC-7944
Format No.: 7.B.2/FMT/TR-06

TEST REPORT

(DUSTFALL ANALYSIS ANALYSIS REPORT-NOV-2019)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	031219	Report Release Date	03 12 19
Sample Code	DF-1	Sampled By	VC SPL Representative
Sample Name	Dust Fall	Sampled On	12 11 2019
Sample Condition	Sealed & Ice Preserved	Sampling Location	Dust Fall-1: Mines Area
Test Started On	12 11 2019	Sample Received On	12 11 2019
		Test Completed On	19 11 2019

DF-1	Analysis Result					
Parameters	DF (t/km ² /month)	Ni(%)	Co (%)	Hg(%)	As (%)	Fe (%)
*DF & M	3.12	0.032	0.01	<0.001	<0.001	1.51

Note Above () parameters are not in our NABL scope*

1. The test values are reported based on the samples received. 2. Samples will be destroyed after 7 days from date of issues of the test report subject to nature of preservation. Sample will be preserved as per standard method.
3. The test report shall not be reproduced, without written approval of laboratory



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Manager (Environment)
 Khondbond Iron Mine

Analysis Report – De-dusting Unit



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)
(ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified)



Certificate No.: TC-7944
Format No.: 7.B.2/FMT/TR/06

TEST REPORT

(DUST FALL ANALYSIS REPORT- FEBRUARY-2020)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	Env/lab/19/R-Q301	Report Release Date	02.03.20
Sample Code	DF	Sampled By	VCSPL Representative
Sample Name	Dust Fall	Sampled On	10.02.2020
Sample Condition	—	Sampling Location	SI: Mines Area
Test Started On	11.02.2020	Sample Received On	11.02.2020
		Test Completed On	17.02.2020

SL.No	Parameters	Unit	Analysis Result
1	*Nickel as Ni	%	0.038
2	*Cobalt as Co	%	0.021
3	*Mercury as Hg	%	<0.001
4	*Arsenic as As	%	<0.001
5	*Iron as Fe	%	1.71
6	*Dust Fall	t/km ² /month	2.4

Note Above ()parameters are not in our scope.*

1. The test values are reported based on the samples received.
2. Samples will be destroyed after 7 days from date of issues of the test report subject to nature of preservation. Sample will be preserved as per standard method.
3. The test report shall not be reproduced, without written approval of laboratory.



No.46-22&23 Chardola Industrial Estate, Pitha, Bhubaneswar-751024, Dist-Bhubana, Odisha. Contact No. 7752017965
Plot E-mail: visiontek@vcspl.org, visiontek@vishwa.com, visiontek@vishwa.in, visiontek@vishwa.org. Visit us at: www.vcspl.org
Committed For Better Environment

Rishav Verma

**Manager (Environment)
Khondbond**

Analysis Report – Free silica

(October 2019 – March 2020)

Khondbond Iron & Manganese Mine

Date of Sampling	Report No.	Free Silica (%)
22.10.2019	ENV LAB/19/R-5240	0.38
11.11.2019	ENV LAB/19/R-6095	0.42
17.12.2019	ENV LAB/19/R-6876	0.44
24.01.2020	ENV LAB/19/R-7516	0.32
04.02.2020	ENV LAB/19/R-8297	0.54
07.03.2020	ENV LAB/19/R-9237	0.58


Manager (Environment)
Khondbond Iron Mine

Annual Expenditure on Environment Safeguards

(2019-2020)

Sl. No.	Activity	Amount Lakhs (-)	Recurring/Capital
1	Maintenance Sewage Treatment Plant	9.18	Recurring
2	CAAQMS AMC	3.00	Recurring
3	Expenses in Dry Fog system operation and maintenance in plant (AMC)	7.00	Recurring
4	Spares for maintaining DFS	16.00	Recurring
5	Extension of Dry Fog system	2.50	Recurring
6	Power consumption-cost (running of compressor, DFS pump, sprinkler pump etc)	5.00	Recurring
7	Operation and maintenance of mobile water sprinkler	85.00	Recurring
8	Operation & Maintenance of wet Drill	15.00	Recurring
9	Construction of toe wall & garland drain with sausage net	106.84	Recurring
10	Lease Line Maintenance	55.42	Recurring
11	Maintenance of despatch roads	15.00	Recurring
12	Maintenance of haul roads	95.00	Recurring
13	Construction of settling pit	43.00	Recurring
14	Maintenance of oil separation pit	1.00	Recurring
15	Water Flow meters	2.00	Recurring
16	Coir matting of fine stocks	13.00	Recurring
17	Awareness Programme (MEMC Week, World Environment Day , biodiversity day , swachhata pakwada, earth day etc.)	20.00	Recurring
18	Ground vibration study and Rock fragmentation	16.00	Recurring
19	Blasting technology with electronic detonators	75.00	Recurring
20	Drip Irrigation	10.00	Recurring
21	Maintenance of parks and nursery	8.00	Recurring
22	Transportation of waste	5.00	Recurring
23	CTO & CTE Fees	11.50	Recurring
24	Environmental Monitoring	8.00	Recurring
25	Fixed water sprinklers	35.00	Recurring
27	Installation of bio toilet	10.00	Recurring
28	Hazardous Waste Audit	1.00	Recurring
29	Energy Audit	3.00	Recurring
30	Water Audit	5.00	Recurring
31	Carbon Sequestration Study	10.00	Recurring
32	Display Board AMC	10.00	Recurring
33	Plantation	24.50	Recurring
	Total	725.94	


 Ashwini
 Manager (Environment)
 Khondbond Iron Mine

Budget earmarked for Environmental Responsibility (CER)

Sl. No.	Description	Budget(Cr.)	Allocation for CER(Cr.)	Remarks
1.	Water System	84	45	Complete water package including the Intake pump house at Pichlaghat, water pipe line from IPH to Plant & auxiliaries. As part of CER- a. Water Treatment Plant (400 m ³ per day) worth Rs 1 Cr b. Rain Water Harvesting Reservoir by converting mined pit to water storage reservoir worth 31 Cr c. High Rate Thickener for recovery of process water (Approx Cost Rs 13 Cr)
2.	Crushing and washing plant	628.61	6	Includes crushing & washing plant presently being executed for Khondbond. As a part of CER, orders for DFDS worth Rs 3.55 Cr has been allocated to reduce the emission of fugitive dust. Additionally, Rs 2 Cr has been earmarked for STP-ETP within Mine Premises
3.	Slime dam	102	25	Development of existing mined pit into slime dam for storing plant slimes. Includes excavation preparation of embankments for slime storage. In order to increase recovery of process water paste thickener has been envisaged (Approx Cost 25 Cr)

Ashwini
veena
 Manager (Environment)
 Khondbond Iron Mine

**AMBIENT NOISE QUALITY AT KHONDBOND
AVERAGE OCTOBER 2019 TO MARCH 2020**

	Location	Day Time 8.00 am to 10.00 pm	Limits in dB(A) Leq	Night Time 8.00 am to 10.00 pm	Limits in dB(A) Leq
Residential area	Hospital Premises	53.36	55.00	41.74	45.00
	Training Centre	52.33		42.19	
	Township	54.10		42.47	
	Manager's Office	61.15		57.78	
Industrial area	Mining area	65.14	75.00	59.64	70.00
	Plant area	63.53		61.53	


Arshan Verma
 Manager (Environment)
 Khondbond Iron Mine