The Addnl. PCCF (C)
Eastern Zone Regional Office
Ministry of Environment, Forests & Climate Change,
Govt. of India
A/3, Chandrasekharpur
Bhubaneswar–751 013 (Odisha)
Email: roez.bsr-mef@nic.in

MD/ENV/ 424 /106 / 2019
Date: 27.11.2019

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 April'19 - September'19 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 **April'19 - September'19** 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 is also attached in soft copy to your good office on e-mail to roez.bsr-mef@nic.in for your ready reference.

We trust that the measures taken towards environmental safeguards comply with the stipulated 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: Tata Steel Limited

Head (Planning), OMQ

Encl.: As above

Copy to : The Chairman, Central Pollution Control Board, Southernd 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)

Point wise compliance Environmental Clearance

of

Khondbond Iron & Manganese Mine Tata Steel Ltd.

(April'19- September'19)

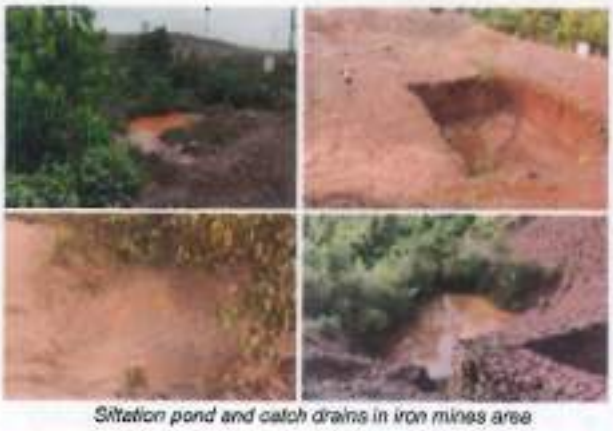
EC no J-11015/588/2007-IA.II (M), dated 21st Dec., 2011 & its amendment dated 7th Sept.2019

Production: Iron 08 MTPA (ROM) & beneficiation plant 08 MTPA & Manganese Mine 0.1MTPA (ROM)

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 -I forest clearance of 453.150ha vide letter no. F No 8-98/2004/FC dated. 05.08.2006 (317 ha. Fresh + 136.15 ha broken prior to 1980). A 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 655AMSL - 653AMSL. But in manganese mine next year 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 non-compliance / 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 /108/2012. 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 with- the safety zone of 50m along the side of Kundra nallah

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
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. Currently no top soil is being generated as the mining is restricted in existing area and no fresh area is undergone for mining.  *Top soil storage used which is used for plantation*
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.  *Picture of under construction processing plant of Khondbond*  *Dry fog at crushing and screening plant*
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	Noted and shall be complied. At present, wet processing plant is under construction and

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
	pipeline to the tailing ponds.	hence has not started functioning. When the wet processing plant shall be operational, tailing management shall be made as per the condition given.
11.	The tailing ponds shall be lined HDPE lining.	Noted and shall be complied. Currently the processing plant with tailing management system (tailing pond) is under construction. When tailing ponds shall be constructed, that will be provided with HDPE lining.
12.	The decanted water from the tailing dam shall be re- circulated and there should be zero discharge from the tailing dam.	Noted and shall be complied. Currently the processing plant is under construction. This will be ensured when both the wet processing plant and tailing ponds are operational.
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	Noted & shall be complied. This will be ensured when both the wet processing plant and tailing ponds are operational.
14.	The project proponent shall constitute on 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	Noted & shall be complied. 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.
15.	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.	Currently all Over burden (OB) is been handled as per approved mine plan. The land use and land cover shall be abided which includes the earmarked storage of OB. At present all the OB dumps are in active, however, coir matting has been made in some fine stock yards. The pictures of which is attached.  *Coir matting in fine stock yards*

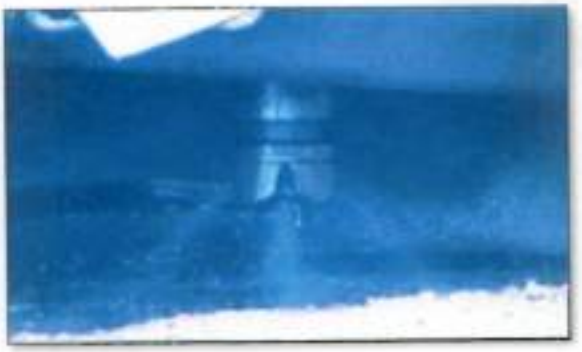
Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
16.	Catch drains and siltation ponds of appropriate size should be constructed around the tailing ponds, mine working, soil, OB and mineral dump(s) to prevent run off of water and flow of sediments directly into the Suna Nadi (Kundra 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.	Catch drains, siltation ponds are made along with toe wall and garland drains in and around mine dumps areas to prevent surface runoff.  *Siltation pond and catch drains in iron mines area* A series of check dams and siltation's ponds are also made in manganese area  *Siltation pond and catch drains in manganese mines area*
17.	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.	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.

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
		  *Retaining wall in Khondbond mines area*
18.	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.	Noted and shall be complied at end of mine life. This being the activity at the end of mine life is been incorporated in progressive mine closure plan
19.	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.	  *Plantation on dumps*
20.	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.	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.   *Fixed water sprinklers* *Mobile water sprinklers*

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
		  *Dry fog at crushing and screening plant*
21.	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.	Noted & complied. Regular monitoring of Kundra nallah is being out and records are maintained.
22.	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.	Note & complied. For the ground water augmentation four ground water recharge structures in and around mine area are made till date with current water recharge potential of area is 47.793 cu.m/ year.   *Ground water recharge pond Outside lease area Khondbond*   *Ground water recharge pond within lease area Khondbond*
23.	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new	Noted & complied. Regular ground water level with quality as per defined

Sl No.	EC Condition	Compliance status as on date
	Specific Conditions	
	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 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.	frequency is been submitted to CGWA. A copy of same is attached as Annexure I.
24.	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.	Noted and shall be complied. Currently the mineral processing plant with tailing pond is under construction.
25	The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water required for the project.	Noted and complied The mine has valid surface water drawl permission from water resource division vide letter no 3300, dated 11.02.2016.
26.	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.	Noted & complied 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. as mentioned in point no 16 & 17, Annexure II
27.	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.	In Khondbond iron and manganese mine about 5393 cu.m of ground water recharge is being done through existing structures such as garland drains, mine pits etc. To avoid alteration in land use pattern, land constraints & expansion in mining operations; new areas for rainwater harvesting is explored with a feasibility study. Last year, four (04) recharge structures are made by mine with a recharge potential of 39400cu m. water. As on date current water recharge potential of area is 47793 cu.m/ year. However as per final recommendations of feasibility study some additional ponds, recharge well and modification in exiting pond shall be made accordingly so as to achieve cumulative recharge of 93090 cu.m water /year

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
		  *Pond -1 & 2 (Outside lease area)*   *Pond -3 & 4 (Within lease area)*
28.	Vehicular emission shall be kept under control and regular 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 the covered trucks only and the vehicles carrying the mineral shall not be overloaded	Noted & complied. 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. For the betterment of environment, in future the mineral shall be transported through conveyors.
29.	No transportation of ore outside the mine lease area shall be carried out after sunset.	Transportation of ore is being made as per District Collector, Keonjhar, order.
30.	No blasting shall be carried out after sunset. Blasting operation shall be carried 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.	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.

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
31.	Drills shall either be operated with Dust extractors or equipped with water injection system.	Wet drilling is in practice. Drills have been provided with dust suppression system.  *Wet drilling*
32.	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.	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.  *Picture of under construction processing plant of Khondbond*
33.	Sewage treatment plant shall be installed for the colony. ETP shall also be provided for workshop and wastewater generated during mining operation.	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.

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
		  *10 KLD STP at Khondbond*  *Oil and Grease separation pit*
34.	During operation of the project, special emphasis shall be given to minimise risks and hazards due to manganese poisoning.	Noted and shall be complied.
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.	Complied 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.
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.	Noted & complied. 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.
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.	Noted & complied. Digital processing of the entire lease area was carried by high resolution satellite imagery of 13th January & 3rd Feb, 2018. M/s Geo Consultants Pvt. Ltd., (Authorized organisation of ORSAC) was engaged for the work. The imagery data of the Buffer and Core zone is attached as Annexure III.

Sl No.	EC Condition	Compliance status as on date
	Specific Conditions	
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 consolation with the state forest and wild life deptt. Should 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 consolation 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.	Noted & complied Khondbond is an operational mining area of Tata Steel and various precautionary measures are ken for conservation and protection of endangered flora and fauna. The mine has approved wildlife management 243/1 WLSSP-100/2016; dated 28th January 2016 and various measures 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.
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.	Noted & being complied. The Khondbond mine lease comprises of 874.198 ha of forest land including sabik forest with some private lands owned by Schedule Tribes For the compliance of condition Assistant Conservator of Forests, Champua is consulted Erection of solar fencing has been started in areas which is under surface rights and has forest clearance
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. J-20012/1/2006-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.	Noted & complied. 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 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

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
		 *Display of environmental information in public domain*
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.

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 been 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.	Noted & complied. 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 PM_{10} & $PM_{2.5}$ are installed in core zone and one at buffer zone.  *Continuous ambient air quality monitoring stations in Khondbond* Few additional parameters such as SOx, NOx & CO are also been installed additionally. All the continuous data is uploaded in state pollution control board server. Ambient air quality report is attached as Annexure-IV for reference.
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.
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 19th May, 1993 and 31st December 1993 or as amended from time to time.	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.

Sl No.	EC Condition	Compliance status as on date
	Oil and grease trap should be installed before discharge of workshop effluents.	
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 2018-19 an amount Rs 1106.44 lakhs (approx) was spent towards environmental protection measures at Khondbond Mine and details are attached as Annexure-V.
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

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

EC no J-11015/88B/2007 IA II (M) its amendment dated 7th Sept 2018
Production Iron 3.8 MTPA (ROM) & beneficiation plant 0.6 MTPA & Manganese Mine 0.1MTPA (ROM)
EC amendment due to RUN OF MINE (ROM)

Sl 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 2nd 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 2nd 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 2nd 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 PUCC only will be allowed to ply. The mineral transportation shall be carried out through coverect 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
5	The activities and budget earmarked for Environmental Responsibility (CER) shall be as per Ministry's O.M No. 22-65/2017-IA.III(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.III(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

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

Sl 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
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 Various water augmentation activities are been practiced in mine. In year 2018-19 four (04) ground water recharge structures are made by mine with a  recharge potential of 39400cu.m water. *Pond -1 & 2 (Outside lease area)*

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
		  *Pond -3 & 4 (Within lease area)* **Water recharge pond made at Khondbond** As on date current water recharge potential of area is 47593 cu.m/year which is about 35% of water withdrawal. However, as per final recommendations of feasibility study some additional ponds, recharge well and modification in exiting pond shall be made accordingly so as to achieve cumulative recharge of 93090 cu.m water /year. 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	Noted & complied Noise level monitoring is carried out regularly which is

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
	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 limits for day/night hours	well within the prescribed limit. Annexure VII
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 nearly 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	Noted & is complied The main haulage road is provided with permanent water sprinklers. However, for adequate dust suppression mobile water sprinklers are also used.  *Front water sprinklers*  *Middle water sprinklers*

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
		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.  Dry fog at mobile crushing & screening plant
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 rind 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	Noted & complied

Sl No.	EC Condition	Compliance status as on date
Specific Conditions		
	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.	
x	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 are submitted accordingly, integrating the sectoral programmes of line departments 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."	Noted & compiled

Annexure – I

Ground Water Level

Khondbond Iron & Manganese Mine

(April 2019 – September 2019)

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 09.082018.

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 May 2019 and August 2019 are as follows:

Sr. No.	LOCATION	MONTH	
		May, 2019	August, 2019
Existing Dug Well Locations:			
1	GURUDA, GURUDA VILLAGE	5 m 55cm	2 m 12 cm
2.	Ganua Sebasram, Ganua Village	6 m 54 cm	3 m 14 cm
3.	OMC COLONY, Near Khondbond Mine Road	6 m 18 cm	2 m 14 cm
4.	KHONDBOND VILLAGE, Near ROAD SIDE	6 m 28 cm	2 m 74 cm
5.	GONUA, Near MGM MESS Area	4m 25cm	1m 40 cm
6	Khondbond road, near field	5m 18cm	2m 08 cm
NEW PIEZOMETER LOCATIONS			
7	NEAR STP		9m 45cm
8	MINING NEAR ROAD SIDE		7m 81cm

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

Piezometer (PB gate, Garden area, N orebody area & Manganese mine area)

Piezometer (STP) with digital recorder

Water recharge pond made at Khondbond Iron & Manganese Mine, Tata Steel Ltd

Pond -1 & 2 (Outside lease area)

Pond -3 & 4 (Within lease area)

Ground water Quality

(April'19 – September'19)

Khondbond Iron & Manganese Mine

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: VRD/SCI/FR/06

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT- MAY-2019)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	Envlab/Isd/R-0685	Report Release Date	03.06.19
Sample Code	GW-1, GW-2	Sampled By	VCSPL Representative
Sample Name	Ground Water	Sampled On	10.05.2019
Sample Condition	Sealed	Sampling Location	GW-1: Gurulia Village GW-2: Khondbond-I Village
Test Started On	11.05.2019	Sample Received On	11.05.2019
		Test Completed On	17.05.2019

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS:10500, 2012	Analysis Results	
					GW-1	GW-2
Essential Characteristics						
1	*Colour	APHA 2120 B, C	Hazen	5	CL	CL
2	*Odour	APHA 2150 B	--	Agreeable	Agreeable	Agreeable
3	*Taste	APHA 2150 C	--	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	1	<1.0	<1.0
5	pH Value	APHA 4500H+ B	--	6.5-8.5	7.51	7.58
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	200	146.8	152.2
7	Iron (as Fe)	APHA 3111 B	mg/l	0.3	0.36	0.31
8	Chloride (as Cl)	APHA 4500Cl- B	mg/l	250	23.5	30.6
9	*Residual, free Chlorine	APHA 4500Cl- B	mg/l	0.2	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	500	192.0	252.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	75	42.0	43.0
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	30	16.0	14.8
13	Copper (as Cu)	APHA 3111 Cu B	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	APHA 3111 B	mg/l	0.1	0.011	0.01
15	*Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	200	5.6	5.7
16	*Nitrate (as NO_3)	APHA 4500 NO_3^- B	mg/l	45	3.4	3.8
17	*Fluoride (as F)	APHA 4500F C	mg/l	1	0.018	0.040
18	*Phenolic Compounds (as C_6H_5OH)	APHA 5530 B,D	mg/l	0.001	<0.001	<0.001
19	Mercury (as Hg)	APHA 3112 B	mg/l	0.001	<0.001	<0.001
20	Cadmium (as Cd)	APHA 3111 B	mg/l	0.003	<0.003	<0.003
21	*Selenium (as Se)	APHA 3114 B	mg/l	0.01	<0.001	<0.001
22	*Arsenic (as As)	APHA 3114 B	mg/l	0.01	<0.001	<0.001
23	*Cyanide (as CN)	APHA 4500 CN C,D	mg/l	0.05	ND	ND
24	Lead (as Pb)	APHA 3111 B	mg/l	0.01	<0.001	<0.001
25	Zinc (as Zn)	APHA 3111 B	mg/l	5	<0.05	<0.05
26	*Anionic Detergents (as MBAS)	APHA 5540 C	mg/l	0.2	<0.2	<0.2
27	*Chromium (as Cr^{6+})	APHA 3500Cr B	mg/l	--	<0.05	<0.05
28	*Mineral Oil	APHA 5520 B	mg/l	0.5	<0.01	<0.01
29	Alkalinity	APHA 2320 B	mg/l	200	134.0	130.9
30	*Aluminium (as Al)	APHA 3500Al B	mg/l	0.03	<0.001	<0.001
31	*Boron (as B)	APHA 4500-B B	mg/l	0.05	<0.05	<0.05
32	*Poly Aromatic Hydrocarbon as PAH	APHA 6440 B	mg/l	--	<0.001	<0.001
33	*Pesticide	APHA 6630 B,C	mg/l	Absent	Absent	Absent
34	*Ecoli	APHA 9221 E	MPN/ 100 ml	Shall not be detectable in any 100 ml sample	Absent	Absent

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 issue of this report unless specified 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.

Authorised Signatory

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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-7941

Format No.: VCSPL/QP/TR/06

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT- MAY-2019)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	Env/0.5/19/W-06/6	Report Release Date	23-06-19
Sample Code	GW-3, GW-4	Sampled By	VCSPL Representative
Sample Name	Ground Water	Sampled On	10.05.2019
Sample Condition	Sealed	Sampling Location	GW-3: Guruo Substation GW-4: OMC Colony
Test Started On	11.05.2019	Sample Received On	11.05.2019
		Test Completed On	17.05.2019

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS:10500, 2012	Analysis Results	
					GW-3	GW-4
Essential Characteristics						
1	*Colour	APHA 2120 B,C	Hazen	5	CL	CL
2	*Odour	APHA 2150 B	--	Agreeable	Agreeable	Agreeable
3	*Taste	APHA 2160 C	--	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	1	<1.0	<1.0
5	pH Value	APHA 4500 H B	--	6.5-8.5	7.48	7.35
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	200	154.2	148.2
7	Iron (as Fe)	APHA 3111 B	mg/l	0.3	0.35	0.31
8	Chloride (as Cl)	APHA 4500 Cl B	mg/l	250	31.2	46.8
9	*Residual, free Chlorine	APHA 4500Cl B	mg/l	0.2	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	500	240.0	248.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	75	41.2	44.0
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	30	12.6	18.0
13	Copper (as Cu)	APHA 3111 Cu B	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	APHA 3111 B	mg/l	0.1	0.018	0.041
15	*Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	200	4.9	5.2
16	*Nitrate (as NO_3)	APHA 4500 NO_3 E	mg/l	45	4.1	3.6
17	*Fluoride (as F)	APHA 4500F C	mg/l	1	0.022	0.041
18	*Phenolic Compounds (as C_6H_5OH)	APHA 5530 B,D	mg/l	0.001	<0.001	<0.001
19	Mercury (as Hg)	APHA 3112 B	mg/l	0.001	<0.001	<0.001
20	Cadmium (as Cd)	APHA 3111 B	mg/l	0.003	<0.001	<0.001
21	*Selenium (as Se)	APHA 3114 B	mg/l	0.01	<0.001	<0.001
22	*Arsenic (as As)	APHA 3114 B	mg/l	0.01	<0.001	<0.001
23	*Cyanide (as CN)	APHA 4500 CN C,D	mg/l	0.05	ND	ND
24	Lead (as Pb)	APHA 3111 B	mg/l	0.01	<0.001	<0.001
25	Zinc (as Zn)	APHA 3111 B	mg/l	5	<0.05	<0.05
26	*Anionic Detergents (as MBAS)	APHA 5540 C	mg/l	0.2	<0.2	<0.2
27	*Chromium (as Cr^{6+})	APHA 3500Cr B	mg/l	--	<0.05	<0.05
28	*Mineral Oil	APHA 5520 B	mg/l	0.5	<0.01	<0.01
29	Alkalinity	APHA 2320 B	mg/l	200	144.0	138.0
30	*Aluminium as Al	APHA 3500Al B	mg/l	0.03	<0.001	<0.001
31	*Boron (as B)	APHA 4500B, B	mg/l	0.05	<0.01	<0.01
32	*Poly Aromatic Hydrocarbon as PAH	APHA 6440 B	µg/l	--	<0.001	<0.001
33	*Pesticide	APHA 6630 B,C	mg/l	Absent	Absent	Absent
34	*Lead	APHA 9221 E	MPN/ 100 ml	Shall not be detectable in any 100 ml sample	Absent	Absent

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 issue 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.

Authorised Signatory

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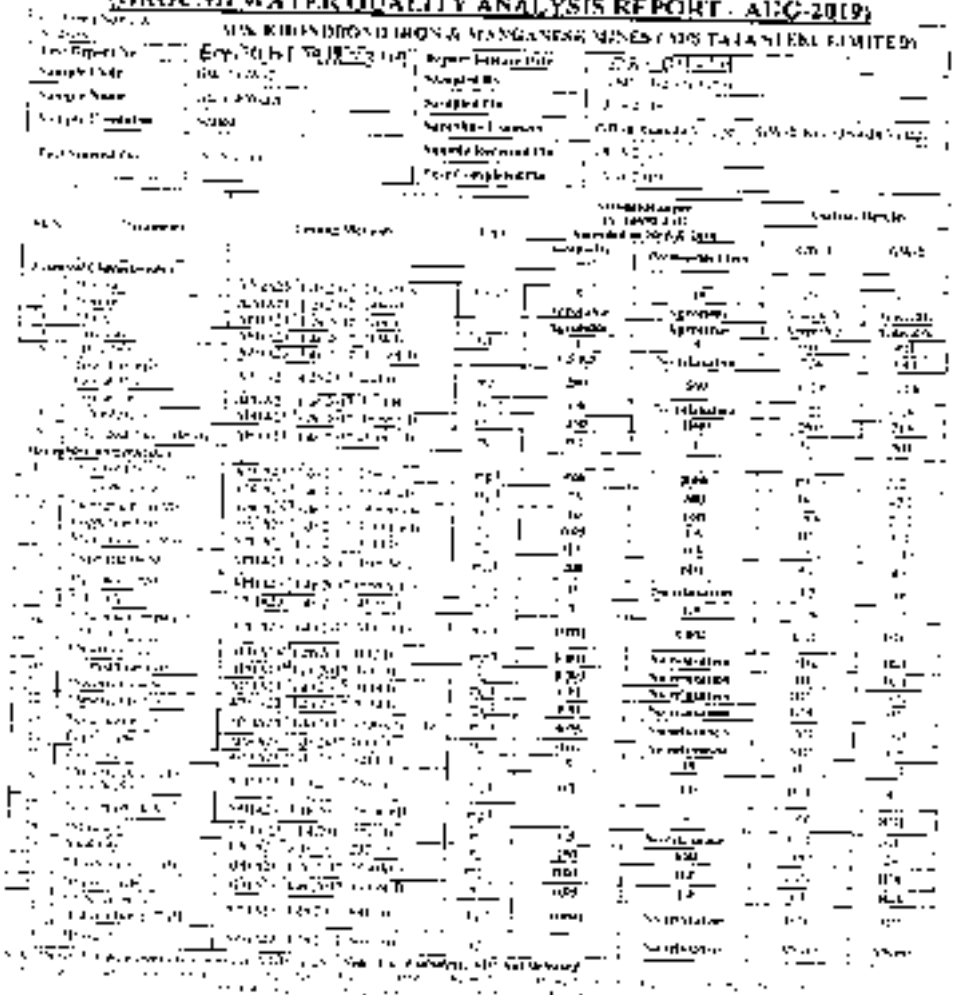
Ground water Quality

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT - AUG-2019)



Ground water Quality

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

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

Certificate No.: TC-7542

Format No.: VCS/FRT/TR/06

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT - AUG-2019)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	[illegible]	Report Release Date	[illegible]
Sample Code	[illegible]	**Sampled By**	[illegible]
Sample Name	Ground Water	**Sampled On**	[illegible]
Sample Condition	Normal	**Sampling Location**	GW-3: [illegible] GW-4: OMC Colony
Test Started On	[illegible]	**Sample Received On**	[illegible]
		Test Completed On	[illegible]

Sl. No.	Parameter	Testing Methods	Unit	Standards as per Sc. 10500, 2012 Amended on 2018 & 2018		Analysis Results	
				Acceptable Limits	Permissible Limits	GW-3	GW-4
Essential Characteristics							
1	*Colour	APHA 23rd Edn.2017 2120 B, C	Hazen	5	15	CL	CL
2	*Odour	APHA 23rd Edn.2017 2150 B	-	Agreeable	Agreeable	Agreeable	Agreeable
3	*Taste	APHA 23rd Edn.2017 2160 C	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA 23rd Edn.2017 2130 B	NTU	1	5	BDL	BDL
5	pH at 25°C	APHA 23rd Edn.2017 4500-H+ B	-	6.5-8.5	No relaxation	7.71	7.82
6	Total Hardness (as CaCO3)	APHA 23rd Edn.2017 2340 C	mg/l	200	600	190.6	188.2
7	Iron (as Fe)	APHA 23rd Edn.2017 3111 B	mg/l	1.0	No relaxation	0.10	0.28
8	Chlorides (as Cl)	APHA 23rd Edn.2017 4500-Cl- B	mg/l	250	1000	21.3	21.3
9	*Residual Free Chlorine	APHA 23rd Edn.2017 4500-Cl B	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Aluminium (as Al)	APHA 23rd Edn.2017 3500-Al	mg/l	0.03	2.00	27.8	30.2
11	Calcium (as Ca)	APHA 23rd Edn.2017 3500-Ca B	mg/l	75	200	43.5	42.6
12	Magnesium (as Mg)	APHA 23rd Edn.2017 3500-Mg B	mg/l	30	100	17.8	20.1
13	Copper (as Cu)	APHA 23rd Edn.2017 3111 B/3500	mg/l	0.05	1.5	BDL	BDL
14	Manganese (as Mn)	APHA 23rd Edn.2017 3111 B	mg/l	0.1	0.3	BDL	BDL
15	*Sulphate (as SO4)	APHA 23rd Edn.2017 4500-SO4 E	mg/l	200	400	3.6	3.4
16	*Nitrate (as NO3)	APHA 23rd Edn.2017 4500-NO3 E	mg/l	45	No relaxation	3.9	3.2
17	*Fluoride (as F)	APHA 23rd Edn.2017 4500-F C	mg/l	1	1.5	0.24	0.09
18	*Mineral Oil (as MOH)	APHA 23rd Edn.2017 5520 B	mg/l	0.001	0.002	BDL	BDL
19	Mercury (as Hg)	APHA 23rd Edn.2017 3112 B	mg/l	0.001	No relaxation	BDL	BDL
20	Cadmium (as Cd)	APHA 23rd Edn.2017 3111 B	mg/l	0.003	No relaxation	BDL	BDL
21	*Selenium (as Se)	APHA 23rd Edn.2017 3114 B	mg/l	0.01	No relaxation	BDL	BDL
22	*Arsenic (as As)	APHA 23rd Edn.2017 3114 B	mg/l	0.01	No relaxation	BDL	BDL
23	*Cyanide (as CN)	APHA 23rd Edn.2017 4500-CN- C,D	mg/l	0.05	No relaxation	ND	ND
24	Lead (as Pb)	APHA 23rd Edn.2017 3111 B	mg/l	0.01	No relaxation	BDL	BDL
25	Zinc (as Zn)	APHA 23rd Edn.2017 3111 B	mg/l	5	15	BDL	BDL
26	Anionic Detergents (as MBAS)	APHA 23rd Edn.2017 5540 C	mg/l	0.2	1.0	BDL	BDL
27	*Chromium (as Cr+6)	APHA 23rd Edn.2017 3500-Cr B	mg/l	-	-	BDL	BDL
28	*Boron (as B)	APHA 23rd Edn.2017 4500-B	mg/l	0.5	No relaxation	BDL	BDL
29	Antimony	APHA 23rd Edn.2017 3125 B	mg/l	200	600	1.21	1.14
30	*Aluminium (as Al)	APHA 23rd Edn.2017 3500-Al B	mg/l	0.03	0.2	BDL	BDL
31	*Boron (as B)	APHA 23rd Edn.2017 4500-B	mg/l	0.05	2.4	BDL	BDL
32	*Poly Aromatic Hydrocarbon (as PAH)	APHA 23rd Edn.2017 6440 B	mg/l	0.0001	No relaxation	BDL	BDL
33	*Pesticide	APHA 23rd Edn.2017 6630 B/C	mg/l	-	No relaxation	Absent	Absent

Note: LC: Colourless, NS: Non Detectable

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.

Authorised Signatory

[illegible]

Annexure – II

Surface Water Analysis Report

(April'19 – September'19)

Khondbond Iron & Manganese Mine

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

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

TEST REPORT

(SURFACE WATER QUALITY ANALYSIS REPORT- MAY-2019)

Customer Name & Address	M/S. KHONDBOND IRON & MANGANESE MINES (M/S TATA STEEL LIMITED)		
Test Report No	[illegible]	Report Release Date	09-06-19
Sample Code	SW-1, SW-2	Sampled By	VCSPL Representative
Sample Name	Surface Water	Sampled On	10.05.2019
Sample Condition	Sealed	Sampling Location	SW-1: Sona River Upstream SW-2: Sona River Downstream
Test Started On	11.05.2019	Sample Received On	11.05.2019
		Test Completed On	17.05.2019

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS:2296:1982 Class-C	Analysis Results	
					SW-1	SW-2
1	Dissolved Oxygen (minimum)	APHA 2540 C	Hours	4	6.3	7.1
2	Total Suspended Solids as TSS	APHA 2540 D	–	--	42.0	40.0
3	BOD (3) days at 27°C (max)	APHA 5210 B	–	3	3.1	4.2
4	Chemical Oxygen Demand as COD	APHA 5220 C	NTU	--	28.0	30.0
5	*Total Coli form	APHA 9221 B	–	5000	2800	3600
6	pH Value	APHA 4500H B	mg/l	6.0-9.0	7.34	7.44
7	Colour (max)	APHA 2120 B,C	mg/l	300	0.28	0.16
8	Total Dissolved Solids	APHA 2540 C	mg/l	1500	32.0	18.0
9	Copper as Cu (max)	APHA 3111 B&	mg/l	1.5	ND	ND
10	Iron as Fe (max)	APHA 3500 Fe B	mg/l	0.5	84.0	62.0
11	Chloride (max)	APHA 4500 Cl D	mg/l	600	7.6	4.8
12	*Sulphate (SO_4) (max)	APHA 4500 SO_4^{2-} E	mg/l	400	3.2	2.1
13	*Nitrate as NO_3 (max)	APHA 4500 NO_3^- E	mg/l	50	<0.001	<0.001
14	*Fluoride as F (max)	APHA 4500F-C	mg/l	1.5	<0.001	<0.001
15	*Phenolic Compounds as C_6H_5OH (max)	APHA 5530 B,D	mg/l	0.005	0.28	<0.05
16	Cadmium as Cd (max)	APHA 3111 B,C	mg/l	0.01	0.15	<0.02
17	*Selenium as Se (max)	APHA 3114 B	mg/l	0.05	0.022	0.016
18	*Arsenic as As	APHA 3114 B	mg/l	0.2	<0.001	<0.001
19	*Cyanide as CN (max)	APHA 4500-CN C,D	mg/l	0.05	<0.001	<0.001
20	Lead as Pb(max)	APHA 3111 B,C	mg/l	0.1	<0.001	<0.001
21	Zinc as Zn(max)	APHA 3111 B,C	mg/l	15	<0.001	<0.001
22	*Hexa Chromium as Cr^{+6}	APHA 3500Cr B	mg/l	0.05	<0.001	<0.001
23	*Anionic Detergents (max)	APHA 5540 C	mg/l	1	ND	ND
24	Mercury as Hg	APHA 3500 Hg	mg/l	--	<0.01	<0.01
25	*Manganese as Mn	APHA 3500Mn B	mg/l	--	<0.05	<0.05

Note : CL: Colourless, ND: Not Detected

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.

VISIONTEK CONSULTANCY SERVICES PVT. LTD. CUTTACK

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Surface Water Analysis Report

TEST REPORT

(SURFACE WATER QUALITY ANALYSIS REPORT- AUG-2019)

Customer Name & Address:	M/S. RHONE BRUNO IRON & MANGANESE (INDIA) PRIVATE LIMITED		
Sample Description:	Surface Water	Sample Quantity:	1 Ltr
Sample Code No.:	[illegible]	Sample Condition:	Satisfactory
Date of Sampling:	03.08.2019	Date of Receipt:	04.08.2019
Date of Analysis:	04.08.2019 to 13.08.2019	Date of Report:	14.08.2019

Sl. No.	Parameters	Testing Method	Unit	Standard as per IS:2296-1982 Class 'C'	Analysis Results SW-1	SW-2
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	Odour	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

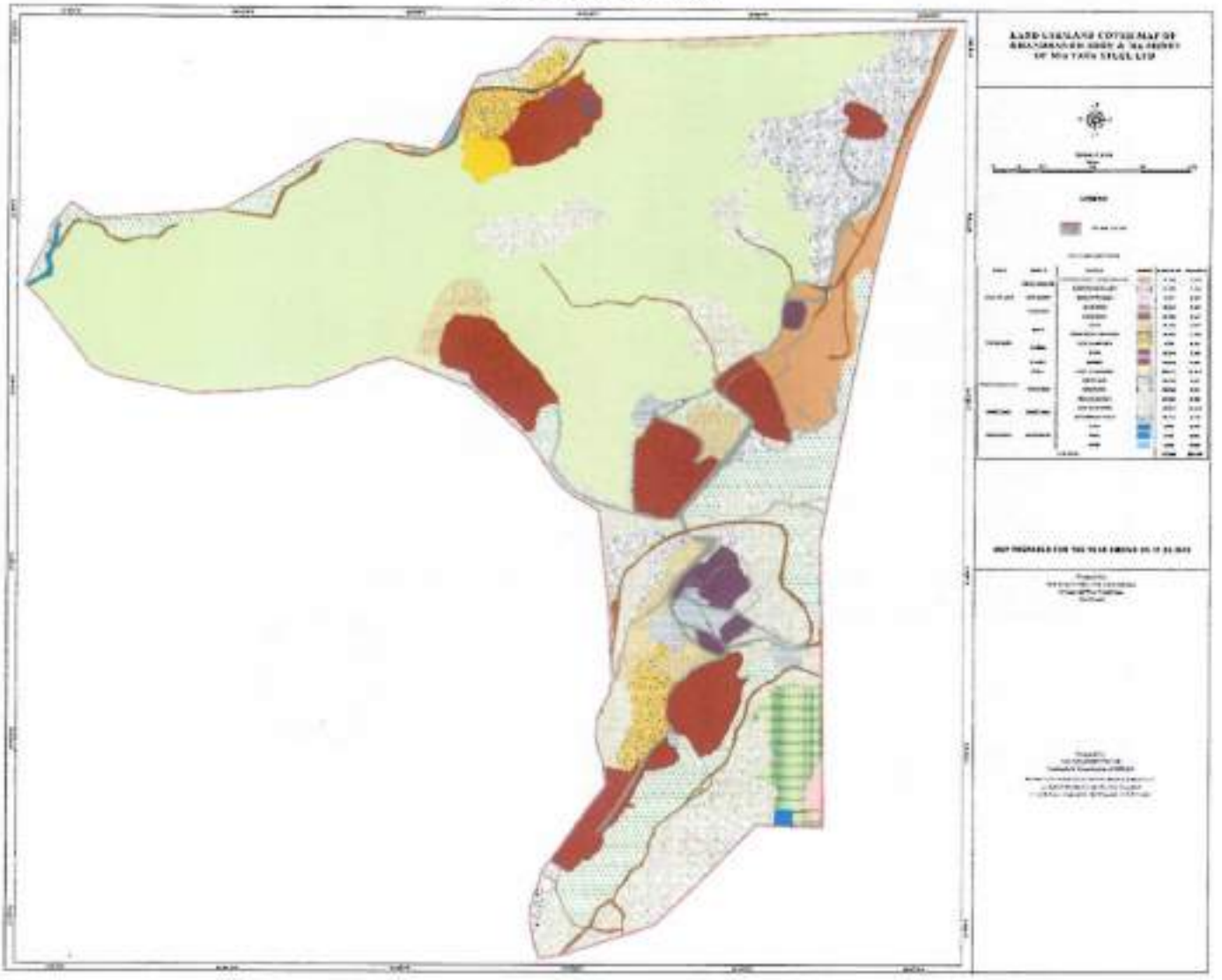
1. [illegible]
2. [illegible]
3. [illegible]

Annexure-III

Digital Processing of Lease Area

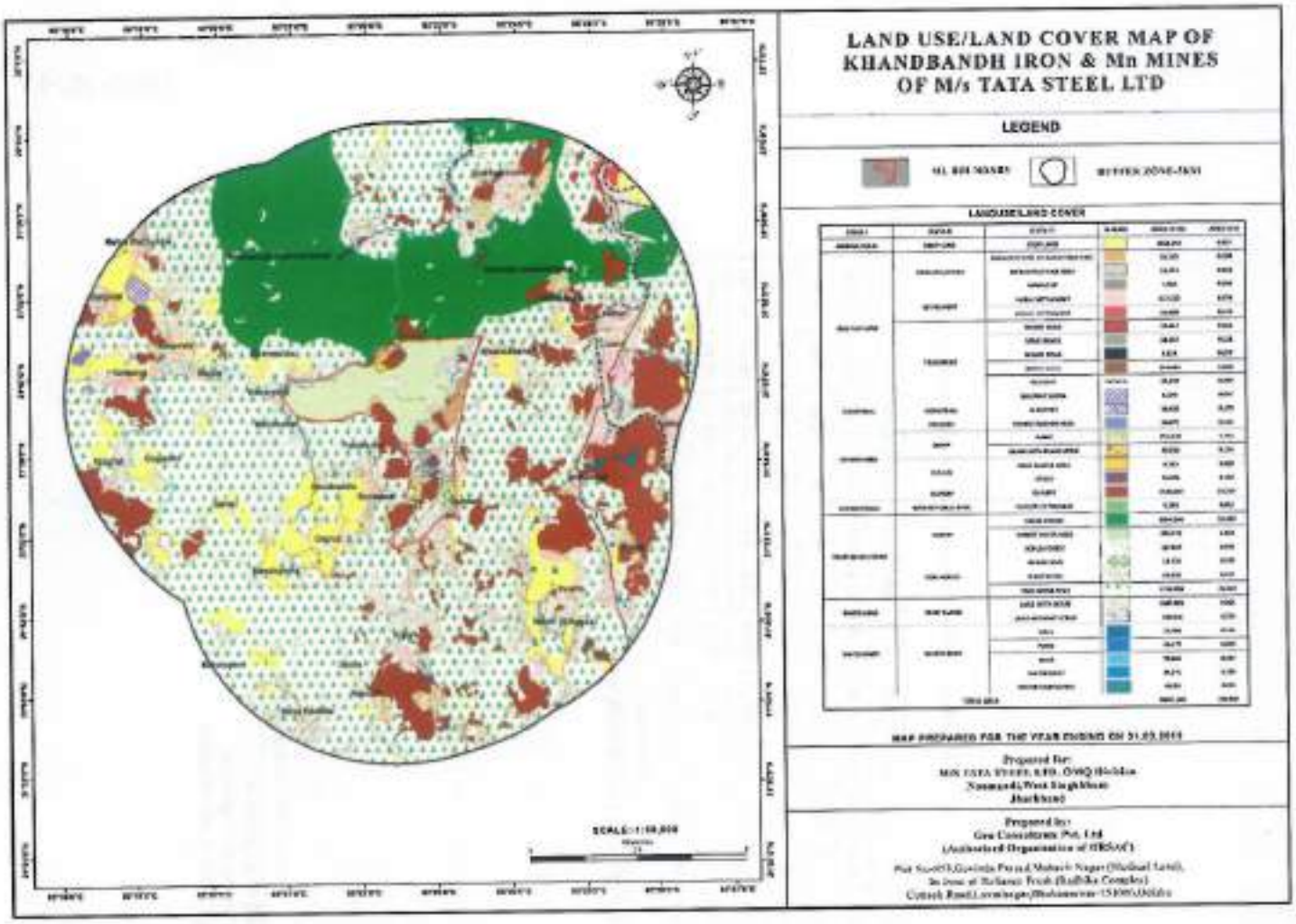
Land use & Land Cover
Of
Khondbond Iron and Mn Mine Tata Steel ltd.
(March-2019)

Mine Lease (Core Zone)



Annexure-III

Mine Lease (Buffer Zone)



Annexure-IV

Average Air Quality Report (CORE ZONE)
Khandbond Iron & Manganese Mine
April 2019 to September 2019

Month	Near Helipad					Near Manganese Mines					Near 18-D					Near Labour Colony				
	$PM_{2.5}$	PM_{10}	SO_2	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
Apr 19	76.14	50.80	11.95	26.62	0.75	87.27	39.05	9.51	21.20	0.62	86.52	45.24	9.31	15.61	0.46	91.19	48.62	8.02	12.03	0.57
May 19	84.09	49.72	10.14	18.62	0.41	84.90	51.66	4.86	15.40	0.30	81.67	39.79	6.56	15.24	0.33	80.85	35.20	6.38	13.38	0.46
Jun 19	84.83	52.13	13.15	29.40	0.79	87.78	40.13	5.16	17.84	0.29	88.22	51.40	10.2	17.45	0.62	94.31	42.01	9.25	11.58	0.63
Jul 19	82.29	39.51	10.58	14.30	0.51	42.44	25.61	0.48	15.27	0.29	47.76	40.44	9.73	14.84	0.48	70.40	45.93	6.47	13.21	0.38
Aug 19	63.02	30.38	6.97	15.72	0.36	44.18	30.60	5.10	15.30	0.30	44.39	31.62	6.11	14.70	0.33	60.87	30.75	5.57	12.03	0.39
Sep 19	34.09	19.10	5.40	12.40	0.32	38.2	21.40	4.99	14.40	0.29	31.60	17.70	6.60	15.40	0.30	41.10	23.02	7.60	13.60	0.43

AVERAGE AIR QUALITY REPORT (BUFFER ZONE)

Month	Rajgoshi					Chamuda					Guruda Village					Khandbund village				
	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO
Apr 19	54.20	31.70	5.15	11.1	0.50	57.40	33.03	5.96	11.3	0.45	50.05	40.00	5.90	10.4	0.44	63.50	38.50	5.70	10.80	0.60
May 19	45.30	22.80	<4.0	<9.0	0.31	<4.0	27.40	<4.0	<9.0	0.23	42.70	21.70	<4.0	<9.0	0.37	51.00	26.30	<4.0	<9.0	0.33
Jun 19	47.80	26.00	<4.0	<9.0	0.43	47.00	32.00	<4.0	<9.0	0.28	45.40	23.70	<4.0	<9.0	0.41	54.50	30.10	<4.0	<9.0	0.40
Jul 19	36.70	16.00	4.55	8.70	0.39	41.00	21.00	5.25	9.30	0.37	33.20	16.50	5.65	<9.0	0.38	42.00	23.00	6.05	9.00	0.35
Aug 19	41.20	21.10	<4.0	<9.0	0.33	40.20	28.10	<4.0	<9.0	0.20	35.50	21.20	<4.0	<9.0	0.33	45.53	24.50	<4.0	<9.0	0.29
Sep 19	42.10	22.40	4.40	<9.0	0.29	28.70	30.03	<4.0	<9.0	0.14	31.60	17.70	<4.0	<9.0	0.29	35.70	18.90	<4.0	<9.0	0.22

Unit of measurement for all parameters except CO is $\mu g/m^3$ Co is in mg/m^3

Dy-in-charge

Annexure-V

Annual Expenditure on Environment Safeguards

(2018-2019)

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)	5.03	Recurring
7	Operation and maintenance of mobile water sprinkler	85.50	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	1.50	Recurring
15	Water Flow meters	2.50	Recurring
16	Colormatting 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	8.50	Recurring
25	Fixed water sprinklers	35.00	Recurring
26	Scientific Technology to mining operations (Fleet management system)	400.00	Capital
27	Installation of bio toilet	10.00	Recurring
28	Hazardous Waste Audit	2.00	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	5.00	Recurring
	Total	1106.44	

Annexure-VI

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 Penlaghat, 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 DEDS worth Rs 3.55 Cr has been allocated to reduce the emmission of fugitive dust. Additionally, Rs 2 Cr has been earmarked for STP ETP within Mine Premises
3	Slime dam	102	75	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)

Annexure-VII

KHONDBOND IRON & MANGANESE MINE
AMBIENT NOISE QUALITY
AVERAGE APRIL 2019 TO SEPTEMBER 2019

	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 (Joda)	51.70	55.00	39.53	45.00
	Training Centre (Joda)	51.03		40.05	
	Township (Joda)	49.92		45.08	
Industrial area	Mining area	65.35	75.00	62.28	70.00
	Plant area	64.12		63.73	