The Addnl. PCCF (C)
Eastern 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/ 422 /110/2019
Date: 27.11.2019

Ref: Environmental Clearance letter no. J-11015/63/2008.IA.II(M) dated: 26.11.2010 & EC Letter No. J-11015/63/2008-IA.II (M) 18/01/2019.

Sub: Half-yearly compliance status report of Environmental Clearance conditions for the period April'19 - September'19 in respect of Katamati Iron Mine, Tata Steel Ltd.

Dear Sir,

Kindly find attached herewith submitting the six monthly compliance report as on date in respect of the stipulated Environmental Clearance conditions of Katamati Iron Mine, Tata Steel Ltd. for the period from **April'19 - September'19** as per EIA Notification, 2006. Also 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 -1. The same has been mailed in soft copy of the report to your good office on email: 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, Southern Conclave, Block 502, 5th & 6th Floors, 1582 Rajdanga Main Road, Kolkata - 700107 (W. B.)
: The Member Secretary, State Pollution Control Board, Parivesh 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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Corporate Identity Number L27100MH1907PLC000260 Website www.tatasteel.com

TATA

TATA STEEL

Compliance

to

Environmental Clearance Conditions

of

Katamati Iron Mine
M/s. Tata Steel Limited

For the period: April 2019 – September -2019

**(EC Letter No. J-11015/63/2008-IA.II (M) 26/11/2010 &
EC Letter No. J-11015/63/2008-IA.II (M) 18/01/2019)**

25th Sept. 2019

ENVIRONMENTAL CLEARANCE
OF
KATAMATI IRON MINE OF TATA STEEL LIMITED

(Apr 2019 to Sept. 2019)

(MoEF & CC Letter No. J-11015/63/2008.IA.II(M) DATED: 26/11/2010)
FOR PRODUCTION OF 8 MTPA (ROM)

Sl. No.	EC Conditions	Compliance
Specific Conditions		
1	The project proponent shall obtain Consent to Establish and Consent to Operate from the State Pollution Control Board, Odisha and effectively implement all the conditions stipulated therein.	Being complied with. Consent to Establish has been obtained from the Odisha State Pollution Control Board vide letter no. 12850, dated: 04.08.2010 & no. 11818, dated 18.7.2011 for mobile crushing & screening plant. Consent to Operate has also been obtained from State Pollution Control Board, Odisha vide letter No. 481/IND/I-CON-185, dated: 18.03.2016, which is valid till 31.03.2021. All the conditions are being effectively implemented.
2	Environment clearance is subject to grant of Forestry clearance. Necessary Forestry clearance under the Forest (Conservation) Act, 1980 for an area of 199.172 ha forestland involved in the project shall be obtained before starting mining operation in that area. No mining shall be undertaken in the forest area without obtaining requisite prior forestry clearance.	Being complied with. Katamati Iron Mine of TATA Steel has 403.3238 ha lease area, out of which 360.01 ha forest land & rest is non-forest. Katamati Iron Mine has already received the Stage -I approval for 360.01 ha (including Sabik, RF & PF) vide F No. 8-01/2018-FC dated 28th August 2018.
3	Environmental Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No. 460 of 2004, as may be applicable to this project.	Noted down. However, there is no National Park, Sanctuaries, Elephant corridor and tiger reserves within 10 Km radius of lease in the core zone & buffer zone.
4.	Environmental clearance is subject to obtaining clearance under the Wildlife (Protection) Act, 1972 from the Competent authority, as may be applicable to this project.	Site specific wildlife plan has been approved by Office of Principal Chief Conservator of Forest (Wildlife) and Chief Wildlife Warden: Odisha, Bhubaneswar vide letter no. 5842/IWL (C) SSP-306/2011, dated 29th August 2011 On compliance of this, various fund Rs. 1.22 Cr for implementation of the Item of Work prescribed for Project Impact Area in the Site Specific Wild Life Conservation Plan and Rs. 80.66 lakhs for Implementation of Regional Wildlife Management Plan. Rs 20 lakhs to Forest Department towards construction of Anti-Depression camp building' barracks were also made. of Rs 10 lakhs in CORPUS fund, Rs. 2 lakhs in SSWLCP have also been deposited Apart from above an employment of 10 local youth of nearby villages have also been provided for patrolling the jungle – forest area and fire protection incidents.
5.	The mining operations shall be restricted to above ground water table and it should not intersect the	Currently, the mining operation is restricted above the

Sl. No.	EC Conditions	Compliance
Specific Conditions		
	ground water table. In case of working below the ground water table, prior approval of the Ministry of Environment and Forests and the Central Ground Water Authority shall be obtained, for which a detailed hydro- geological study shall be carried out.	ground water table. For domestic and other purposes the unit has received a permission for 460m3/day for ground water abstraction / withdrawal from Central Ground Water Authority.
6.	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.	Being complied with. No natural watercourse or water resources are obstructed due to mining operations. Further, no first order and the second order streams are emanating from the mine lease area.
7.	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.	Generation of top soil is very minimal because no fresh area is being broken for mining and whatever top soil is generated, is being kept at the earmarked site(s) only inside the Mining Lease area and is being subsequently used for plantation.
8.	The sub grade material, if any shall be stacked at the earmarked sites.	Sub grade material is being stacked at the earmarked sites as per the approved mining plan.
9.	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. Partial backfilling proposed after cessation of mining. The maximum height of the OB dump (s) shall not exceed 30m having three terraces of 10m each and the overall slope of the dumps shall not exceed 27°. It shall be ensured that the OB dump(s) should be scientifically vegetated with suitable native species to prevent erosion and surface run off. In critical areas, use of geo textiles shall be undertaken for stabilization of the dumps. Monitoring and Management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on six monthly basis.	Over burden is stacked at the earmarked places only. The slopes of the OB dumps are terraced, and the overall slope angle is maintained and not exceeding 27°. The inactive dump slopes are vegetated with native species and grass and vetiver grass for better slope stabilization. The compliance status is being regularly sent to the Regional office, MoEF&CC, Bhubaneswar and SPCB, Odisha half yearly.  *OB Dump Plantation* In Katamati Iron Mine, geo-jute & local grass is used for slime dump covering & planation for stabilization. 

Sl. No.	EC Conditions	Compliance
Specific Conditions		
10.	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, sub-grade, overburden and mineral dump(s) to prevent run off of water and flow of sediments directly into the Mahadev Nallah, Betlata Nallah, Baitarani River and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly de-silted particularly after monsoon maintained properly. Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed around the mine pit, overburden dumps and sub-grade and mineral dump(s) to prevent run off of water and flow of sediments into the Mahadev Nallah, Betlata Nallah, Baitarani River and other water bodies and slump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals	Garland drains with settling pits, have been made all along the OB dumps. Three settling ponds of adequate sizes have been constructed at the end of the garland drains to take care of run-off water even during peak rain fall and they are being de-silted regularly before, during and after the monsoon. There is no outside discharge of any industrial effluent. All the garland drains, settling pits and check dams of appropriate size, gradient and length been constructed both around the mine pit and over burden dump(s) to prevent run off of water and flow of sediments directly into water bodies. Photographs of toe wall, garland drain and settling pits are attached.  *Toe wall, Check dam, garland drain siltation pond*
11.	Dimension of retaining wall at the toe of the OB dump(s) and the OB benches within the mine to check run-off and siltation should be based on the rainfall data.	Complied with Toe wall and Garland drains have been constructed around the OB dumps to check mine run-off.
12.	Trace Metals such as Ni, Co, As and Hg should be analysed in dust fall and soil samples for at least one year during summer, monsoon and winter seasons. If concentrations of these metals are found below the standards then with prior approval of MoEF&CC this specific monitoring could be discontinued.	We are monitoring trace metals in dust fall and soil samples. All the results of soil and dust fall monitoring are attached herewith as annexure- I.
13.	Plantation shall be raised in an area of 370.155 ha including a 7.5m wide green belt in the safety zone around the mining lease, overburden dump(s), backfilled and reclaimed area, mine benches, around water body, 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 over an area of 370.155 ha shall be done at the end of mine life through progressive mine closure plan. However, both fencing and plantation over 7.5m wide area around the mining lease is in progress. Besides the above, concurrent reclamation and rehabilitation program have been proposed in the mining plan. In this year about 2727 no of sapling have been planted in Katamati area. In addition to that a plot of 150 sq feet local & lemon grass has also been planted. 

Sl. No.	EC Conditions	Compliance
Specific Conditions		
		Plantation in the Katamati area In this year the slime has been collected and stored in designated place with coir matting for plantation purpose.  *Plantation in the Katamati area*
14.	The void left unfilled in an area of 11.2 ha shall be converted into water body. The higher benches of excavated void/mining pit shall be terraced and plantation done to stabilized the slopes. The slope 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.	Being complied with. This being the activity at the end of mine life shall be taken up only after the exhaustion of e Iron ore as per mine plan.
15.	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 done on the haul roads, loading & unloading points for effective dust suppression by mobile and fixed water sprinklers. Dry fog system has also been provided at all transfer point of crushing and screening unit. Photographs of Water Sprinkling and dry fog system are attached. Ambient Air Quality is being monitored regularly as per the norms stipulated in EC granted and the results are well within the prescribed limits. Apart from above four continuous ambient air quality monitoring stations are also installed and are working smoothly.  *Dust suppression system at Katamati*  *CAAQMS station of Katamati*
16.	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.	Regular monitoring of the flow rate of Balijhor Nallah which is flowing outside of the mining lease area is carried out and record maintained regularly.
17.	The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional	Complied with. Suitable ground water augmentation measure in & around Katamati iron Mine has been implemented by

Sl. No.	EC Conditions	Compliance
Specific Conditions		
	Director, Central Ground Water Board.	check dams, toe wall, contours bunds etc On 15th Nov 2018, NOC for ground water withdrawal for 460 m^3/day & 1,23,250 m^3/yr was accorded to mine from CGWA vide no. letter no CGWA /NOC/MIN /ORIG/2018/ 4244. Based on hydro-geology study at suitable locations new piezometers have been installed in mines. In this year 2018-19, eight (08) number of new ponds constructed in and around mine lease in surrounding village to augment the ground water. A details report is attached as annexure-II.
18.	Regular monitoring of ground water level and quality should be carried out in and around the mine lease by establishing a network of existing wells and constructing new piezometers during the mining operation. The 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 Office Bhubaneswar, the Central Ground Water Authority and the 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.	Ground water quality and Ground water level are being monitored periodically in and around the lease areas. All the monitoring results are being submitted to regulatory agencies. The monitoring details are attached as annexure-II.
19.	Appropriate mitigative measures should be taken to prevent pollution of the Baitarani River in consultation with State Pollution Control Board.	Being complied with
20.	The Project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water required for the project. The ground water shall not be used for mining operations. Prior approval of Central Ground Water Authority shall be obtained for using ground water.	Complied with For domestic purpose only ground water withdrawal permission as obtained from Central Ground Water Authority.
21.	Suitable rain water harvesting measures on long term basis shall be planned and implemented in consultation with the Regional Director, Central Ground Water Board.	Being complied with Due to hilly topography and land constraints rain water harvesting structure are made combinedly for Noamundi & Katamati Iron Mine in Noamundi colony area as per hydrogeology study.
22.	Vehicular emission shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The mineral transportation shall be carried out through the covered trucks only and the vehicles carrying the mineral shall not be overloaded.	Complied with Mineral is being transported to Noamundi Processing Plant, which is adjacent to Katamati by mining dumpers. Over loading of trucks is restricted to prevent spillage of material. Emission checks for all the vehicles are carried out half yearly. Effective water sprinkling is done on haul roads to control fugitive dust.

Sl. No.	EC Conditions	Compliance
Specific Conditions		
		In this year a wheel washing facility has been installed at exit gate of mine to arrest and control the fugitive emission from mineral transportation.  *Wheel washing facility at Katamati Mines*
23.	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.	Complied with Blasting is carried out during day time only. Controlled Blasting is carried out for control of ground vibrations and to arrest fly rocks, as per the recommendations of CIMFR, Dhanbad.
24.	Drills shall either be operated with Dust extractors or equipped with water injection system.	Drills have been provided with dust suppression system.  *Wet drilling at Katamati Mines*
25.	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.	The mineral handling plants at Noamundi area is equipped with high efficiency dust suppression systems..  *Mist type dust suppression measures in process plant*  *Water jet with mist water spray in Katamati* Moreover, loading and unloading areas including transfer points have been provided with dust suppression facilities. However, in mobile screening & crushing adequate dust control measure are made

Sl. No.	EC Conditions	Compliance
Specific Conditions		
		 *Dust suppression system at Katamati*
26.	Sewage treatment plant shall be installed for the colony. ETP shall also be provided for workshop and wastewater generated during mining operation.	Being complied with. Two Sewage Treatment Plant (STP) of 50 KLD & 10 KLD and an Effluent Treatment Plant (ETP) of 10 KLD are already installed in common colony area at Noamundi which are working smoothly. One more STP of 50KLD is installed at combined colony area at Noamundi. For the common workshops and all other areas and oil trap is installed with collection system. No wastewater is being generated from mining operations.  *Sewage Treatment Plant at Noamundi*
27.	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.	Initial 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.
28.	Effective safeguard measure shall be taken to ensure that the RSPM levels in the area are well below the prescribed standards.	Effective safeguard measure like Mobile & Stationary water sprinkling, dust suppression systems at loading & unloading point etc. have been provided to minimize fugitive dust emission.
29.	The height of stack shall be as per the prescribed standards/ guidelines.	Katamati Iron Mine has small capacity DG sets used for area illumination. The height of the stack is as per standards. The DG sets are used for area illumination 7 emergency power backups.
30.	Trace metals such as Fe, Cr+6, Cu, Se, As, Cd, Hg, Pb, Zn and Mn shall be periodically monitored at specific locations in both surface water downstream and in ground water at lower elevations from mine area, in consultation with the SPCB, Odisha and State Ground Water Board. Suitable treatment measures shall be undertaken in case levels are found to be higher than permissible limits.	Trace metals are being monitored periodically both of surface water and ground water and the monitoring reports are being sent to pollution control board regularly. The monitoring details are attached as annexure-III.
31.	Occupational health programme encompassing	The mine is certified to both ISO 14001 & OHSAS

Sl. No.	EC Conditions	Compliance
Specific Conditions		
	identification of hazardous, ranking of the risks, plan to handle such risk should be prepared and implemented effectively.	18001.Under OHSAS 18001 & DGMS guidelines, hazard identification, risk assessment and measures to minimise risk have been established and are implemented for all activities.
32.	The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered flora and fauna namely elephant, sloth bear etc Found in the study area. Action plan for conservation of flora and fauna prepared shall be implemented in consultation with the state forest and Wildlife Department. All the safeguard measures brought out in the Wildlife Conservation plan prepared specific to this project site shall be effectively implemented. Necessary allocation of funds for implementation of the conservation plan shall be made and the funds for implementation of the conservation plan shall be made and the funds so allocated shall be included in the project cost. A copy of action plan shall be submitted to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar.	Complied with Site specific wildlife plan has been approved by Office of Principal Chief Conservator of Forest (Wildlife) and Chief Wildlife Warden: Odisha, Bhubaneswar vide letter no. 5842/1WL (C) SSP-396/2011, dated 29th August 2011. On compliance of this, various fund Rs. 1.22 Cr for Implementation of the Item of Work prescribed for Project Impact Area in the Site Specific Wild Life Conservation Plan and Rs. 80.66 lakhs for Implementation of Regional Wildlife Management Plan, Rs. 20 lakhs to Forest Department towards construction of Anti-Depression camp building, barracks were also made, of Rs 10 lakhs in CORPUS fund, Rs 2 lakhs in SSWLCP have also been deposited Apart from above an employment of 10 local youth of nearby villages have also been provided for patrolling the jungle – forest area and fire protection incidents.
33.	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.	Currently it's been not applicable.
34.	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.	The digital processing of entire lease area is being carried out regularly. The current land use pattern is made by M/s Geo Consultants Pvt. Ltd. the authorized agency by ORSAC, Bhubaneshwar. The Resource SAT-II with multispectral bands LISS IV & Carto SAT –I with monochromatic band of date 03.01.2018 (LISS-IV), 03.02.2018 & 02.12.2017 respectively used based on clear vision. The land use land cover change map as on date is attached as annexure-IV.
35.	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 500m 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-	All the critical parameters mentioned are being monitored internally and from third party. All the six monthly compliance data along with Environmental monitoring parameter is being uploaded in the company's website as part of this report, all the monitoring data is being displayed on the display board at the main entrance gate of the mine. Apart from above four continuous ambient air quality monitoring stations are also installed and working smoothly. Various parameters such as PM_{10}, $PM_{2.5}$, SOx, NOx is being monitored for every 15 minutes and the date of same is continuously uploaded in Pollution

Sl. No.	EC Conditions	Compliance
Specific Conditions		
	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.	Control Board server. The data is same is also been displayed using electronic display board in public domain  *CAAQMS station of Katamati*  *Env monitoring data display in public domain at Katamati*
36.	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 once approved.

General Conditions		
1.	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	Being complied with. 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 change in the calendar plan including excavation, quantum of iron ore and waste produced should be made.	Being complied with.
3.	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 10micron i.e., PM_{10}) 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. .	Ambient Air Quality monitoring is regularly being carried out at four different stations within the core zone, which were located in consultation with the visiting officers of State Pollution control Board, Bhubaneswar. The ambient air quality reports are being submitted to Regional office, MoEF&CC, Bhubaneswar half yearly and to SPCB, Bhubaneswar monthly. Various parameters such as PM_{10}, $PM_{2.5}$, SOx, NOx is being monitored for every 15 minutes and the date of same is continuously uploaded in Pollution Control Board server. The data is same is also been displayed using electronic display board in public domain

General Conditions		
		 *CAAQMS station of Katamati*
4.	Data on ambient air quality [RSPM (Particulate matter with size less than 10micron i.e., PM_{10}) and, NOx] should be regularly submitted to the Ministry including its Regional Office at Bhubaneswar and to the State Pollution Control Board/ Central Pollution Control Board once in six months.	RSPM (Particulate matter with size less than 10 micron i.e., PM_{10}) and, NOx in ambient air are being monitored as per standard guidelines and the reports are submitted to Regional office, MoEF&CC, Bhubaneswar half yearly and SPCB, Odisha monthly. Ambient Air Quality Report is attached as Annexure-V.
5.	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangements on haul roads, loading and unloading and at transfer points should be provided and properly maintained.	Effective water sprinkling is being done on haul roads and at loading and unloading points. Dust suppression systems in the drills have been provided for functioning effectively.  *Water jet with mist water spray in Katamati*  *Dust suppression arrangements at Katamati*
6.	Measures should be taken for control of noise levels below 85dBA in the work environment. Workers engaged in operations of HEMM etc. should be provided with ear plugs/ muffs.	High noise areas are earmarked and people working there are provided with ear protection equipment. All the HEMM's cabin is air conditioned so that there won't be any noise pollution. Regular noise monitoring is being done.
7.	Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap and retention ponds should be installed before discharge of workshop effluents.	Oil & Grease separation pits have been provided to take care of effluents from the workshop. Its water quality is being monitored regularly and the parameters meet the prescribed standard. There is no waste water discharge from the mine.

General Conditions		
		 *Oil trap Workshop*
8.	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. PME of company and contractor employees are organized regularly to observe any contractions due to exposure to dust and other occupational hazards. Employees also undergo Lung Function Tests during the Periodical Medical Examination. The employees are also given regular awareness training on safety and health aspects as part of implementation process of OHSAS-18001 systems.
9.	A separate Environment 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 Organisation	Complied with. A separate environmental management cell is in place with people having relevant qualification on environmental science. Organization has adequate environmental reporting system for adequate decision making.
10.	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. Expenditure details of environmental protection measures during 2018-19 at Katamati Iron Mine are attached as annexure-VI.
11.	The Project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	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 necessary information.
12.	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The Project authorities should extend full co-operation 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.
13.	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	Six monthly compliance reports are being submitted regularly on the status of implementation of the stipulated environmental safeguards to the MoEF&CC, its Regional Office Bhubaneswar, Central Pollution Control Board Kolkata and State Pollution Control Board, Bhubaneswar. Further, the six monthly compliance reports along

General Conditions		
	Pollution Control Board. The proponent shall upload the status of compliance of the environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar, the respective zonal officer of Central Pollution Control Board and the State Pollution Control Board.	with the monitoring results is being uploaded on Tata Steel's website www.tatasteelindia.com and updated periodically.
14.	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad/ Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	Complied with
15.	The State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office/ Tehsildar's Office for 30 days.	Complied with
16.	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Office of the Ministry of Environment and Forests, Bhubaneswar by email	The environmental statement for financial year 2018-19 has been submitted to the State Pollution Control Board on vide letter no. MD/ENV/384/12/2019 dated: 25.09.2019 and the same had been hosted on Company's website www.tatasteelindia.com. Further, compliance status on environmental clearance conditions was also sent to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar by e-mail on 29.09.2019.Further, compliance status on environmental clearance conditions was also sent to the Regional Office of the MoEF&CC regularly.
17.	The project authorities should advertise at least in two local newspapers of the District or State in which the project is located and widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at http://envfor.nic.in and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar	Details of Environment Clearance with regard to Katamati Iron Mine were published both in English and Hindi in local newspapers. The copy of the newspaper advertisement was sent to the Regional Office, MoEF&CC, Bhubaneswar..

ENVIRONMENTAL CLEARANCE
OF
KATAMATI IRON MINE OF TATA STEEL LIMITED

(Apr 2019 to Sept. 2019)

(MoEF & CC Letter No. J-11015/63/2008.IA.II(M) DATED: 18/01/2019)
FOR PRODUCTION OF 08 MTPA (ROM)

Sl. No.	EC Conditions	Compliance
Specific Conditions		
1.	This Environmental Clearance will not be operation till such time the project proponent complies with all the statutory requirements and judgements of Hon. Supreme Court dated the 2nd August 2017 in writ petition (civil) no. 114 of 2014 in the matter of common cause vs union of India and Ors.	Complied.
2.	Department of Mining & Geology, State Government 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 judgment 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.	Complied with.
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.	Complied. Ambient Air Quality monitoring is regularly being carried out at core & buffer zone, which were located in consultation with the visiting officers of State Pollution Control Board, Bhubaneswar. The monthly monitoring report of same is been submitted regularly. The data of PM_{10}, $PM_{2.5}$, SOx, NOx, CO etc is been submitted online. The data of monitoring by using electronic board displayed in public domain.
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 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. Effective water sprinkling is being done on haul roads and at loading and unloading points. Dust suppression systems in the drills have been provided for functioning effectively.  *Water jet with mist water spray in Katamati* This year high pressure mobile water sprinkler of 50kL procured & used for water sprinkling in haul roads.

Sl. No.	EC Conditions	Compliance
Specific Conditions		
		 *Water jet with mist water spray in Katamati mine* In this year a wheel washing facility has been installed at exit gate of mine to arrest and control the fugitive emission from mineral transportation.  *Wheel washing facility at Katamati Mines*
5.	The activities and budget earmarked for Corporate 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.	Being complied.

Compliance status
on
Impact of Mining on Habitations-Issue ..related

Katamati Iron Mine, TATA Steel Ltd.

(Apr 2019 to Sept. 2019)

Conditions based on OM dated 29th Oct., 2014 vide no. Z-11013/57/2014-IA.II(M)

S. No.	Condition	Compliance Status
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.	Being complied. Adequate no. of check dams, retaining walls / structures, garland drains and settling ponds are made in mine to arrest the rain water. In addition to that various rain water harvesting structures are also made in and around mine.  *Check dams constructed for run off management*
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.	Complied with. The water level in open dug well are regularly been monitored at desired frequency of various villages in & around mine of Katamati. Various rain water harvesting structures are also made in and around mine.
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.	Being complied. The mine is being operated in hill top of iron ore deposit & the habitation is far away from mining operations. However, various technologies are used to reduce the noise level from mining & processing operations. Thick green vegetation cover is also being maintained to absorb noise from the area apart from various other measures.
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	Complied with.

S. No.	Condition	Compliance Status
	abandon the grazing ground or return home by noon.	
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.	Vibration study for scientific blasting is regularly been done from CSIR recognized agency. And as per recommendations the blasting is been done only in day time with electronic delay detonators for adequate blast and fragmentation. The data for each blast is been maintained and no mining is being done within 50m of public works.
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 logging system. Belt- conveyors should be fully covered to avoid air borne dust.	The main haulage road in the mine is provided with permanent water sprinklers. Apart from above, mobile and spray mist type sprinklers are also used in mine.  *Mobile & Fixed water sprinklers in Katamati mines*
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 Crop Liability Policy.	Not applicable Katamati Iron mine is an operational mine since last several decades, and scientific & sustainable mining practices are being adopted.
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. However, no village is located within mine lease area and all mining lease area are mineralized.
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	The minerals are being transported by railways by using public and private sidings only. However, at small portion; road transportation is being used till public sidings. The road is adequately maintained by mine as per requirement and only PUC complied vehicle are

S. No.	Condition	Compliance Status
	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.	allowed for transportation. All the vehicle are optimally loaded and covered with tarpaulin sheet. At exit gate of mine to arrest the dust wheel washing facility is also installed
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.	Not applicable
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 neighborhood 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 the 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."	Complied. As Kutamati Iron Mine is an operational mine from several decades the PAP is not applicable. However, various surveys are been done as per requirement for social benefits.

Annexure-I

Soil Quality Monitoring Report

(Apr'19 - Sep'19)

Katamati Iron Mine

Visiontek Consultancy Services Pvt. Ltd.
(An Envire Engineering Consulting Cell)
(ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified)

TEST REPORT
(SOIL QUALITY ANALYSIS REPORT- MAY-2019)

M/S. KATAMATI IRON MINES (M/S TATA Steel Limited)

Sl.No	Parameters	Analysis Result
1	*Color	Dull Brown
2	*Type of Soil	Acidic
3	*pH	7.48
4	*Soil Texture	Sandy Loam
5	*Bulk Density (gm/cc)	1.6
6	*Elec. Cond.	158.2
7	*Moisture Content	12.3
8	*Chloride (mg/kg)	2160
9	*Sulphate (mg/kg)	2020
10	*Potassium as K (mg/kg)	638
11	*Phosphorus as P (mg/kg)	436
12	*Nitrogen as N (mg/kg)	436
13	*Organic Matter (%)	2.6
14	*Organic Carbon (%)	1.51
15	*Iron as Fe (%)	1..
16	*Nickel as Ni(%)	<0.001
17	*Mercury as Hg(%)	<0.00.
18	*Cobalt as Co (%)	<0.00.
19	*Arsenic as As (%)	<0.001

Note: *Test Parameters are not in scope of NABL accreditation.
1. The results of the tested sample only. 2. Sample will be disposed after 7 days from date of issue of test report unless otherwise requested in writing. 3. Sample description as per declaration given by customer. 4. Reproduction of this report is not permitted without written approval of the laboratory.

Annexure-I

Soil Quality Monitoring Report

(Apr'19 - Sep'19)

Katamati Iron Mine

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

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

Certificate No.: TC-[illegible]

Format No.: [illegible]

[illegible] 3874 03.09.19

TEST REPORT

(SOIL ANALYSIS ANALYSIS REPORT- AUG-2019)

Customer Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No		Report Release Date	
Sample Code	S1	Sampled By	VCSPL Representative
Sample Name	SOIL	Sampled On	19.08.2019
Sample Condition	Sealed & Ice Preserved	Sampling Location	KI Mines Area
Test Started On	20.08.2019	Sample Received On	20.08.2019
		Test Completed On	26.08.2019

SL.No.	Parameters	Unit	Analysis Result
1	*Colour	--	Light Brown
2	*Type of Soil	--	Acidic
3	*pH	--	6.38
4	*Soil Texture	--	Sandy Loam
5	*Bulk Density	gm/cc	1.8
6	*Electrical Conductivity	µs/cm	158.8
7	*Moisture Content	mg/kg	11.8
8	*Chloride as Cl	mg/kg	7214.8
9	*Sulphate as SO_4	mg/kg	2166.2
10	*Potassium as K	mg/kg	684
11	*Phosphorus as P	mg/kg	428
12	*Nitrogen as N	mg/kg	532
13	*Organic Matter	%	2.42
14	*Organic Carbon	%	1.61
15	*Iron as Fe	%	3.4
16	*Nickel as Ni	%	BDL
17	*Mercury as Hg	%	BDL
18	*Cobalt as Co	%	BDL
19	*Arsenic as As	%	BDL

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 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.

Authorized Signatory

Annexure-I

Dust Fall Monitoring Report

(Apr'19 - Sep'19)

Katamati Iron Mine

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

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

TEST REPORT

(DUST FALL ANALYSIS REPORT- MAY-2019)

Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)
Test Report No	[illegible]
Sample Code	DF-I
Sample Type	Dust Fall
Sample Condition	Solid
Test Started On	17.05.2019
Report Date	03.06.19
Received On	VCSPL Representative
Sampled On	16.05.2019
Sampling Location	At Mines Site
Sample Received On	16.05.2019
Test Completed On	27.05.2019

S.r.	Monitoring Date	Analysis Result					
Parameters		DF (ton/sq.km/mnth)	Pb(%)	Cu (%)	Hg(%)	As (%)	Fe (%)
DF & M	16.05.2019	2.4	0.003	0.058	<0.001	<0.001	1.34

- Unit: Above DF parameters are in ton/sq.km/month.
- The test results are reported basis on the sample received. Sample will be destroyed after 7 days from date of issue of test report.
- Upon subjective nature of photography, samples will be preserved at 4°C standard method.
- The test report shall not be reproduced, without written approval of laboratory.

Annexure-I

Dust Fall Monitoring Report

(Apr'19 - Sep'19)

Katamati Iron Mine

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

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

Certificate No.: [illegible]

[illegible]/19/R-3374 03-09-19

TEST REPORT

(DUSTFALL ANALYSIS ANALYSIS REPORT- AUG-2019)

Customer Name & Address	M/S KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No.		Report Release Date	
Sample Code	DF-1	Sampled By	VCSPL Representative
Sample Name	Dust Fall	Sample Date	[illegible] 2019
Sample Condition	[illegible]	Sampling Location	Dust Fall [illegible]
Test Started On		Sample Received On	[illegible] 2019
		Test Completed On	

DF-1	Analysis Result					
Coordinates	DF (t/km²/month)	Ni(%)	Cu (%)	Hg(%)	As (%)	Fe (%)
[illegible]	2.24	0.078	0.052	<0.001	<0.001	1.[illegible]

[illegible]

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

Authorized Signatory

[illegible]

Annexure-II

Ground Water Level

(Apr'19 - Sep'19)

Katamati Iron Mine

Katamati Iron 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 Katamati Iron Mine has received NOC from CGWA for ground water withdrawal of 460m^3/day vide no. CGWA /NOC /MIN/ ORIG /2018/ 4244, dated 10th Oct 2018.

As per recent hydro-geological study & regulatory approval, 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	MAHADEVNASA Village, Near Pond	3 m 72 cm	1 m 45 cm
2	DALAFIRI SAHI (well-2) Near Road	3 m 51 cm	1 m 98 cm
3	TATA SPONGE – Galuri Sahi	6 m 92 cm	2 m 68 cm
4	MURGA, Near Temple	2 m 35 cm	1 m 52 cm
5	DALAGIRI-1, Near Road	6 m 54 cm	3 m 78 cm
	Piezometer Locations:		
6	Murga Village, Near Security Gate	17m 33cm	15m 02cm
7	Near pit office, Katamati Iron Mine	No water	No water
8.	Near METSO office, Katamati Mine	No water	No water
9.	Katamati Mine entrance gate	No water	No water

In Katamati Iron Mine, about ~2475m garland drain are made which recharges about 309.37m3/yr. All the rainwater is channelized to mine pits, which acts as recharge structures and can recharge rain water about 18.92 Lakhs m3/yr. However, due to forest clearance, proposed rain water harvesting structure are made in surrounding village in place of mine area, which stores about 76.752 m3/yr water for recharge of about 20.000m3/yr.

Annexure-II

Piezometer Locations at Katamati Iron Mine, TATA Steel Ltd.

Piezometric borewell installed at Mine Office site, Katamati Mine

Piezometric borewell installed at METSO Office site, Katamati Mine

Piezometric borewell installed at Katamati entrance gate, Katamati Mine

Annexure-II

Rain Water Harvesting Structure Developed
Katamati Iron Mine, Tata Steel Ltd

In the year 2018-19, total 08 ponds of various sizes are made in and around Katamati area in villages. The details are as follows:

Sl No.	Name of Pond owner	Village	Size	Depth	Area (m^3)
1.	Akhil Laguri	Kolahundala	38 m X 37 m	3 m	4218
2.	Bijoy Kr. Nayek	Narayanpur	35 m X 23 m	3 m	2415
3.	Saraj kr. Behera	Sana Barbil	42.50 m X 30 m	3 m	3825
4.	Sonaram Laguri	Jamkundia	35 m X 30 m	3 m	3150
5.	Babula Mahakuda	Jamkundia	40 m X 26 m	3 m	3120
6.	Jugal Munda	Jamkundia	38 m X25 m	3 m	2850
7.	Bhaiga Munda	Panchananpur	46 m X 26 m	3 m	3588
8.	Somnath Munda	DandaGutu	31 m X 26 m	3 m	2418

Water harvesting Pond at Kolahundala & Narayanpur *village, Katamati Area*

Water harvesting Pond at Sana Barbil & Jamkundia *village, Katamati Area*

Water harvesting Pond at Panchananpur & DandaGutu *village, Katamati Area*

Annexure-II

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.: TRD/FMT/TR/06

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT- MAY-2019)

Customer Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No	Enviab/19IR-079	Report Release Date	03.06.19
Sample Code	GW-1, GW-2	Sampled By	VCSPL Representative
Sample Name	Ground Water	Sampled On	09.05.2019
Sample Condition	Sealed	Sampling Location	GW-1: Gidari Sahi GW-2: Munga Mahadeva
Test Started On	10.05.2019	Sample Received On	10.05.2019
		Test Completed On	17.05.2019

Sl. No	Parameter	Testing Methods	Units	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 2160 C	--	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	1	<1	<1
5	pH Value	APHA 4500H+ B	--	6.5-8.5	7.42	7.31
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	200	171.0	148.0
7	Iron (as Fe)	APHA 3111 B	mg/l	0.3	0.24	0.18
8	Chloride (as Cl-)	APHA 4500Cl- B	mg/l	250	28.0	34.0
9	*Residual, free Chlorine	APHA 4500Cl- B	mg/l	0.2	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	500	155.0	260.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	75	30.8	41.2
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	30	12.6	12.8
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	0.021	0.029
15	*Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	200	5.1	4.8
16	*Nitrate (as NO_3)	APHA 4500 NO_3^- E	mg/l	45	3.2	2.9
17	*Fluoride (as F)	APHA 4500F- C	mg/l	1	0.038	0.054
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 5220 B	mg/l	0.5	<0.01	<0.01
29	Alkalinity	APHA 2320 B	mg/l	200	126.0	132.0
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	ug/l	--	<0.001	<0.001
33	*Pesticide	APHA 6630 B,C	mg/l	Absent	Absent	Absent
34	*Coli	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 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-M-52&53, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha. Contact No: 7752[illegible]
Fax | E-mail: [illegible] | Visit us at: www.vcspl.org

Annexure-II

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.: 7.6.2/EMD/TR/06

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT- MAY-2019)

Customer Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No	Env/46/2019R – 0715	Report Release Date	03.06.19
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: Dalafer-2 GW-4: Mhasitoria
Test Started On	11.05.2019	Sample Received On	10.05.2019
		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	<1
5	pH Value	APHA 4500H+ B	–	6.5-8.5	7.34	7.32
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	200	139.0	144.0
7	Iron (as Fe)	APHA 3111 B	mg/l	0.3	0.16	0.21
8	Chloride (as Cl-)	APHA 4500Cl- B	mg/l	250	32.2	18.0
9	*Residual, free Chlorine	APHA 4500Cl- B	mg/l	0.2	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	500	292.0	271.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	75	39.0	41.8
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	30	12.4	13.2
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	0.031	0.012
15	*Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	200	9.9	4.3
16	*Nitrate (as NO_3)	APHA 4500 NO_3^- E	mg/l	45	3	5.2
17	*Fluoride (as F)	APHA 4500F C	mg/l	1	0.041	0.046
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	146.0	148.0
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	*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 issuance 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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Accredited Test Testing Laboratory

Annexure-II

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-7682

Format No.: 7.6.2 FMT TR 06

Env/06/19 R - 5320 — 03-09-19

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT - AUG-2019)

Customer Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No.		Report Release Date	
Sample Code	608/8,GW-2	Sampled By	VCSPL Representative
Sample Name	Ground Water	Sampled On	12.08.2019
Sample Condition	Sealed	Sampling Location	GW-1: Odisa Side GW-2: Mega Mahadev
Test Started On	13.08.2019	Sample Received On	12.08.2019
		Test Completed On	20.08.2019

Sl. No	Parameter	Testing Methods	Unit	Standards as per IS: 10500, 2012 Amended on 2015 & 2018		Analysis Results	
				Acceptable Limit	Permissible Limit	GW-1	GW-2
Essential Characteristics							
1	*Odour	APHA23rd Edn.2017 2150 A,C	Odour	0	10	Cf	Cf
2	*Taste	APHA23rd Edn.2017 2160 B	-	Agreeable	Agreeable	Agreeable	Agreeable
3	*Turbidity	APHA23rd Edn.2017 2130 B	-	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA23rd Edn.2017 2130 B	NTU	1	5	BDL	BDL
5	pH at 25°C	APHA23rd Edn.2017 4500-H+ B	-	6.5-8.5	No relaxation	7.58	7.44
6	Total Hardness (as CaCO3)	APHA23rd Edn.2017 2340 C	mg/l	200	600	1040	1024
7	Iron (as Fe)	APHA23rd Edn.2017 3111 B	mg/l	1.0	No relaxation	0.22	0.16
8	Chlorides (as Cl)	APHA23rd Edn.2017 4500-Cl- B	mg/l	250	1000	320	320
9	*Residual Free Chlorine	APHA23rd Edn.2017 4500-Cl- B	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Dissolved Solids	APHA23rd Edn.2017 2540 C	mg/l	500	2000	1440	1424
11	Chlorides (as Cl)	APHA23rd Edn.2017 4500-Cl- B	mg/l	75	600	20.2	43.6
12	Magnesium (as Mg)	APHA23rd Edn.2017 3500-Mg B	mg/l	30	100	13.2	13.6
13	Copper (as Cu)	APHA23rd Edn.2017 3111 C or B	mg/l	0.05	1.5	BDL	BDL
14	Manganese (as Mn)	APHA23rd Edn.2017 3111 B	mg/l	0.1	0.3	0.072	0.071
15	*Sulphates (as SO4)	APHA23rd Edn.2017 4500-SO4 2- E	mg/l	200	400	5.2	5.1
16	*Nitrate (as NO3)	APHA23rd Edn.2017 4500-NO3- E	mg/l	45	No relaxation	3.0	3.2
17	*Fluoride (as F)	APHA23rd Edn.2017 4500-F- C	mg/l	1	1.5	0.135	0.160
18	*Phenolic Compounds (as C6H5OH)	APHA23rd Edn.2017 5530 B,D	mg/l	0.001	0.002	BDL	BDL
19	Mercury (as Hg)	APHA23rd Edn.2017 3112 B	mg/l	0.001	No relaxation	BDL	BDL
20	Cadmium (as Cd)	APHA23rd Edn.2017 3111 B	mg/l	0.003	No relaxation	BDL	BDL
21	*Selenium (as Se)	APHA23rd Edn.2017 3114 B	mg/l	0.01	No relaxation	BDL	BDL
22	*Arsenic (as As)	APHA23rd Edn.2017 3114 B	mg/l	0.01	No relaxation	BDL	BDL
23	*Cyanide (as CN)	APHA23rd Edn.2017 4500-CN C,D	mg/l	0.05	No relaxation	BDL	BDL
24	Lead (as Pb)	APHA23rd Edn.2017 3111 B	mg/l	0.01	No relaxation	BDL	BDL
25	Zinc (as Zn)	APHA23rd Edn.2017 3111 B	mg/l	5	15	BDL	BDL
26	*Anionic Detergents (as MBAS)	APHA23rd Edn.2017 5540 C	mg/l	0.2	1.0	BDL	BDL
27	*Chromium (as Cr+6)	APHA23rd Edn.2017 3500-Cr B	mg/l	-	-	BDL	BDL
28	*Mineral Oil	APHA 23rd Ed.2017 5520 B	mg/l	0.5	No relaxation	BDL	BDL
29	Sulphide	APHA23rd Edn.2017 4500-S2- D	mg/l	0.05	0.1	BDL	BDL
30	*Aluminium (as Al)	APHA23rd Edn.2017 3500-Al B	mg/l	0.03	0.2	BDL	BDL
31	Boron (as B)	APHA23rd Edn.2017 4500-B B	mg/l	0.05	2.4	BDL	BDL
32	*Poly Aromatic Hydrocarbons (as PAH)	APHA23rd Edn.2017 6440 B	mg/l	0.0001	No relaxation	BDL	BDL
33	*Pesticide	APHA23rd Edn.2017 6630 B,C	mg/l	-	No relaxation	Absent	Absent

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

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.

Annexure-II

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-5944

Format No.: 7.8.2-FMT/TR/06

Env/08/19/TR-3319 03.09.19

TEST REPORT

(GROUND WATER QUALITY ANALYSIS REPORT - AUG-2019)

Customer Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No.		Report Release Date	
Sample Code	GW-3,GW-4	Sampled By	VCSPL Representative
Sample Name	Ground Water	Sampled On	12.08.2019
Sample Condition	Sealed	Sampling Location	GW-3: Dalafer-2 GW-4: Mahadevnasi
Test Started On	13.08.2019	Sample Received On	13.08.2019
		Test Completed On	20.08.2019

Sl. No	Parameter	Testing Methods	Unit	Standards as per IS 10500, 2012 (Amended on 2015 & 2018) Acceptable Limit	Permissible Limit	Analysis Results GW-3	GW-4
Essential Characteristics							
1	*Colour	APHA23rd Edn.2017: 2120B C	Hazen	5	15	CL	CL
2	*Odour	APHA23rd Edn.2017: 2150B	–	Agreeable	Agreeable	Agreeable	Agreeable
3	*Taste	APHA23rd Edn.2017: 2160C	–	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA23rd Edn.2017: 2130B	NTU	1	5	BDL	BDL
5	pH at 25°C	APHA23rd Edn.2017: 4500-H+ B	–	6.5-8.5	No relaxation	7.21	7.48
6	Total Hardness (as CaCO3)	APHA23rd Edn.2017: 2340C	mg/l	200	600	132.8	140.6
7	Iron (as Fe)	APHA23rd Edn.2017: 3111B	mg/l	1.0	No relaxation	0.24	0.18
8	Chloride (as Cl)	APHA23rd Edn.2017: 4500Cl- B	mg/l	250	1000	36.6	36.6
9	*Residual, free Chlorine	APHA23rd Edn.2017: 4500Cl B	mg/l	0.2	1	ND	ND
Desirable Characteristics							
10	Dissolved Solids	APHA23rd Edn.2017: 2540C	mg/l	500	2000	280	290
11	Calcium (as Ca)	APHA23rd Edn.2017: 3500Ca B	mg/l	75	200	30.8	31.2
12	Magnesium (as Mg)	APHA23rd Edn.2017: 3500Mg B	mg/l	30	100	13.4	14.1
13	Copper (as Cu)	APHA23rd Edn.2017: 3111 C&B	mg/l	0.05	1.5	BDL	BDL
14	Manganese (as Mn)	APHA23rd Edn.2017: 3111B	mg/l	0.1	0.3	0.020	0.028
15	*Sulphate (as SO4)	APHA23rd Edn.2017: 4500-SO4 2- E	mg/l	200	400	8.7	4.8
16	*Nitrate (as NO3)	APHA23rd Edn.2017: 4500 NO3-	mg/l	45	No relaxation	3.9	4.4
17	*Fluoride (as F)	APHA23rd Edn.2017: 4500F- C	mg/l	1	1.5	0.018	0.027
18	*Phenolic Compounds (as C6H5OH)	APHA23rd Edn.2017: 5530 B,D	mg/l	0.001	0.002	BDL	BDL
19	Mercury (as Hg)	APHA23rd Edn.2017: 3112B	mg/l	0.001	No relaxation	BDL	BDL
20	Cadmium (as Cd)	APHA23rd Edn.2017: 3111B	mg/l	0.003	No relaxation	BDL	BDL
21	*Selenium (as Se)	APHA23rd Edn.2017: 3114B	mg/l	0.01	No relaxation	BDL	BDL
22	*Arsenic (as As)	APHA23rd Edn.2017: 3114B	mg/l	0.01	No relaxation	BDL	BDL
23	*Cyanide (as CN)	APHA23rd Edn.2017: 4500 CN- C,E	mg/l	0.05	No relaxation	ND	ND
24	Lead (as Pb)	APHA23rd Edn.2017: 3111B	mg/l	0.01	No relaxation	BDL	BDL
25	Zinc (as Zn)	APHA23rd Edn.2017: 3111B	mg/l	5	15	BDL	BDL
26	*Anionic Detergents (as MBAS)	APHA23rd Edn.2017: 5540C	mg/l	0.2	1.0	BDL	BDL
27	*Chromium (as Cr6+)	APHA23rd Edn.2017: 3500Cr B	mg/l	--	--	BDL	BDL
28	*Mineral Oil	APHA23rd Edn.2017: 5520B	mg/l	0.5	No relaxation	BDL	BDL
29	Alkalinity	APHA23rd Edn.2017: 2320B	mg/l	200	600	[illegible]	[illegible]
30	*Aluminium (as Al)	APHA23rd Edn.2017: 3500Al B	mg/l	0.03	0.2	BDL	BDL
31	*Boron (as B)	APHA23rd Edn.2017: 4500B B	mg/l	0.05	1.0	BDL	BDL
32	*Poly Aromatic Hydrocarbons as PAH	APHA23rd Edn.2017: 6440B	mg/l	0.0001	No relaxation	BDL	BDL
33	*Pesticides	APHA23rd Edn.2017: 6630B,C	µg/l	–	No relaxation	Absent	Absent

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

BDL: Below Detectable Limit [illegible]

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.

Authorized Signatory

Annexure-III

Surface Water Analysis Report

(Apr'19 - Sep'19)

Katamati Iron Mine

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.: 7.8.2/EMT/739/06

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

Customer Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No	Env/Lab/19/R-0716	Report Release Date	03.06.19
Sample Code	SW-1, SW-2	Sampled By	VCSPL Representative
Sample Name	Surface Water	Sampled On	16.05.2019
Sample Condition	Sealed	Sampling Location	SW-1: Joja Spring Upstream SW-2: Joja Spring Downstream
Test Started On	17.05.2019	Sample Received On	17.05.2019
		Test Completed On	24.05.2019

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	6.2	6.0
2	Total Suspended Solids as TSS	APHA 2540 D	--	--	38	42
3	BOD (3) days at 27°C (max)	APHA 5210 B	--	3	2.8	3.4
4	Chemical Oxygen Demand as COD	APHA 5220 C	NTU	--	24	28
5	*Total Coli form	APHA 9221 B	--	5000	230	360
6	pH Value	APHA 4500H*B	mg/l	6.0-9.0	7.06	7.51
7	Colour (max)	APHA 2120 B,C	mg/l	300	Colorless	C
8	Total Dissolved Solids	APHA 2540 C	mg/l	1500	148.0	136.0
9	Copper as Cu (max)	APHA 3111 B,C	mg/l	1.5	<0.05	<0.05
10	Iron as Fe (max)	APHA 3500 Fe B	mg/l	0.5	0.48	0.53
11	Chloride (max)	APHA 4500 Cl B	mg/l	600	30A	32.8
12	*Sulphates (SO_4) (max)	APHA 4500 SO_4^{2-} E	mg/l	400	5.4	6.3
13	*Nitrate as NO_3 (max)	APHA 4500 NO_3^- E	mg/l	50	1.84	1.91
14	*Fluoride as F (max)	APHA 4500F C	mg/l	1.5	0.028	0.031
15	*Phenolic Compounds as C_6H_5OH (max)	APHA 5530 B,D	mg/l	0.005	<0.001	<0.001
16	Cadmium as Cd (max)	APHA 3111 B,C	mg/l	0.01	<0.001	<0.001
17	*Selenium as Se (max)	APHA 3114 B	mg/l	0.05	<0.001	<0.001
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	KD	ND
20	Lead as Pb(max)	APHA 3111 B,C	mg/l	0.1	<0.01	<0.01
21	Zinc as Zn(max)	APHA 3111 B,C	mg/l	15	<0.05	<0.05
22	*Hexa Chromium as Cr^{+6}	APHA 3500Cr B	mg/l	0.05	<0.05	<0.05
23	*Anionic Detergents (max)	APHA 5540 C	mg/l	1	<0.1	<0.2
24	Mercury as Hg	APHA 3500 Hg	mg/l	--	<0.001	<0.001
25	*Manganese as Mn	APHA 3500Mn B	mg/l	--	<0.005	<0.005

Note : CU- 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 issue of the test report subject to nature of preservation. Samples 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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Annexure-III

Surface Water Analysis Report

(Apr'19 - Sep'19)

Katamati Iron Mine

Visiontek Consultancy Services Pvt. Ltd.

(An Eastern Engineering Consulting Cell)

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

Certificate No.: TC-7566
Reg. No.: 7.82/FMT/TR/06

Envlab/19/JR-3521

05-09-19

TEST REPORT
(SURFACE WATER QUALITY ANALYSI REPORT- AUG-2019)

Customer Name & Address	M/S. KATAMATI IRON MINES (M/s TATA Steel Limited)		
Test Report No.		Report Release Date	
Sample Code	SW-1 TO SW-2	Sampled By	VCSPL Representative
Sample Name	Surface Water	Sampling On	23.08.2019
Sample Condition	Sealed, Ice Preservation	Sampling Location	SW-1: Agu Spring Upstream SW-2: Agu Spring Downstream
Test Started On	23.08.2019	Sample Received On	23.08.2019
		Test Completed On	30.08.2019

Sl. No	Parameter	Testing Method	Unit	Standards as per IS-2296:1982 Class-'C'	Analysis Results	
					SW-1	SW-2
1	Dissolved Oxygen (minimum)	APHA 23rd Ed.2017, 2017 : 2540 C	mg/l	4	5.6	6.2
2	Total Suspended Solids as TSS	APHA 23rd Ed.2017, 2017: 2540 D	mg/l	–	40	44
3	BOD (3) days at 27°C (max)	IS 3025(Pt 44) : 1993 RA 2003	mg/l	3	3	3.8
4	Chemical Oxygen Demand as COD	APHA 23rd Ed.2017: 5220 C	mg/l	–	28	34
5	Total Coli form	APHA 23rd Ed.2017 9221 B	MPN/ 100Ml	5000	180	220
6	pH Value	APHA 23rd Ed.2017 4500- H+ B	–	6.0-9.0	7.46	7.34
7	Colour (max)	APHA 23rd Ed.2017, 2120 B,C	Hazen	300	Colorless	5
8	Total Dissolved Solids	APHA 23rd Ed.2017: 2540 C	mg/l	1500	132.0	148.0
9	Copper as Cu (max)	APHA 23rd Ed.2017: 3111 B	mg/l	1.5	BDL	BDL
10	Iron as Fe (max)	APHA 23rd Ed.2017: 3500Fe B	mg/l	0.5	0.01	0.44
11	Chloride (max)	APHA 23rd Ed.2017: 4500Cl- B	mg/l	600	32.6	34.2
12	Sulphates (SO_4) (max)	APHA 23rd Ed.2017: 4500-SO4-2- E	mg/l	400	5.8	6.4
13	Nitrate as NO_3 (max)	APHA 23rd Ed.2017: 4500-NO3- E	mg/l	50	1.92	2.10
14	Fluoride as F (max)	APHA 23rd Ed.2017: 4500-F- C	mg/l	1.5	0.021	0.024
15	Phenolic Compounds as C_6H_5OH (max)	APHA 23rd Ed.2017: 5530 B,D	mg/l	0.005	BDL	BDL
16	Cadmium as Cd (max)	APHA 23rd Ed.2017: 3111 B	mg/l	0.01	BDL	BDL
17	Selenium as Se (max)	APHA 23rd Ed.2017: 3500 Se C	mg/l	0.05	BDL	BDL
18	Arsenic as As	APHA 23rd Ed.2017: 3114 B	mg/l	0.2	BDL	BDL
19	Cyanide as CN (max)	APHA 23rd Ed.2017: 4500-CN- C,D	mg/l	0.05	ND	ND
20	Lead as Pb (max)	APHA 23rd Ed.2017 3111 B	mg/l	0.1	BDL	BDL
21	Zinc as Zn (max)	APHA 23rd Ed.2017: 3111 B	mg/l	15	BDL	BDL
22	Hexa Chromium as Cr^{+6}	APHA 23rd Ed.2017: 3500 Cr B	mg/l	0.05	BDL	BDL
23	Anionic Detergents (max)	APHA 23rd Ed.2017: 5540 C	mg/l	1	BDL	BDL
24	Mercury as Hg	APHA 23rd Ed.2017: 3112 B	mg/l	–	BDL	BDL
25	Manganese as Mn	APHA 23rd Ed.2017: 3500Mn B	mg/l		BDL	BDL

Note: Above (*) parameters are out of our NABL scope. Note: CU: Colorless, NDs: Not Detected.

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.

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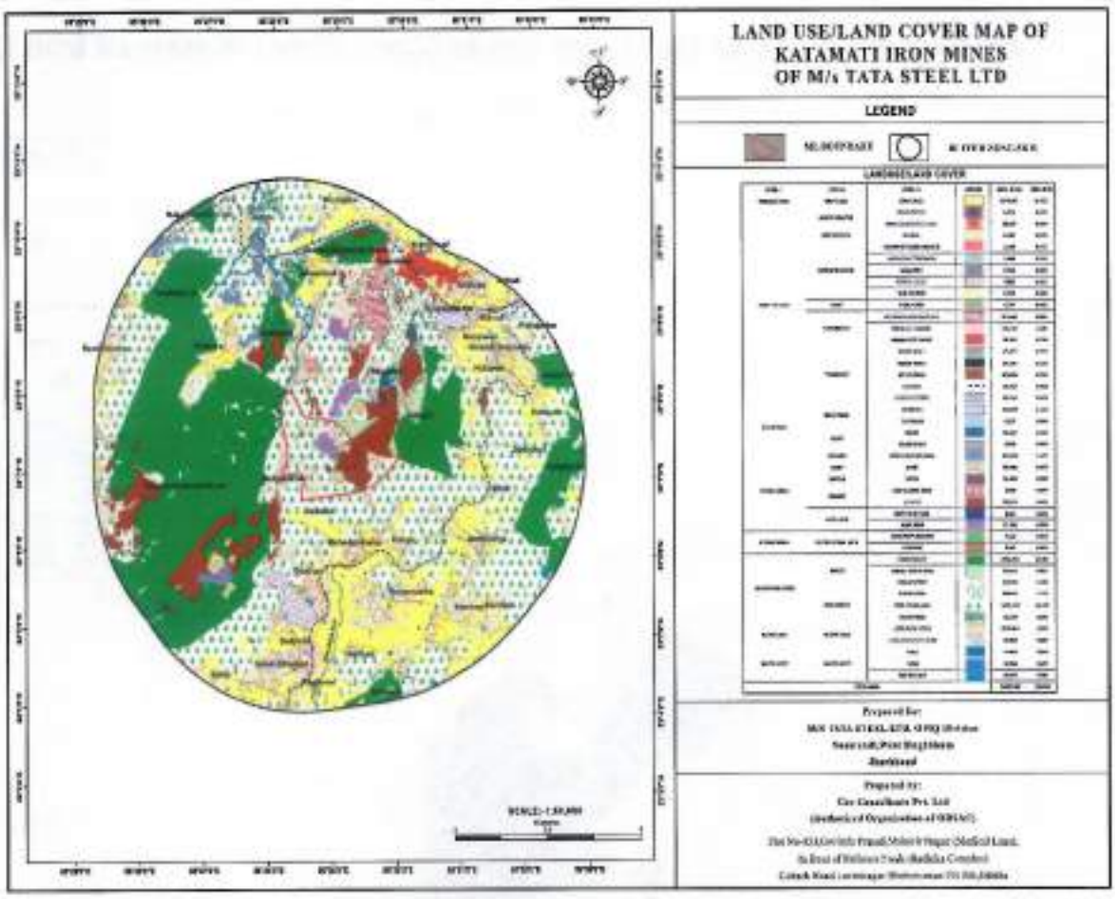
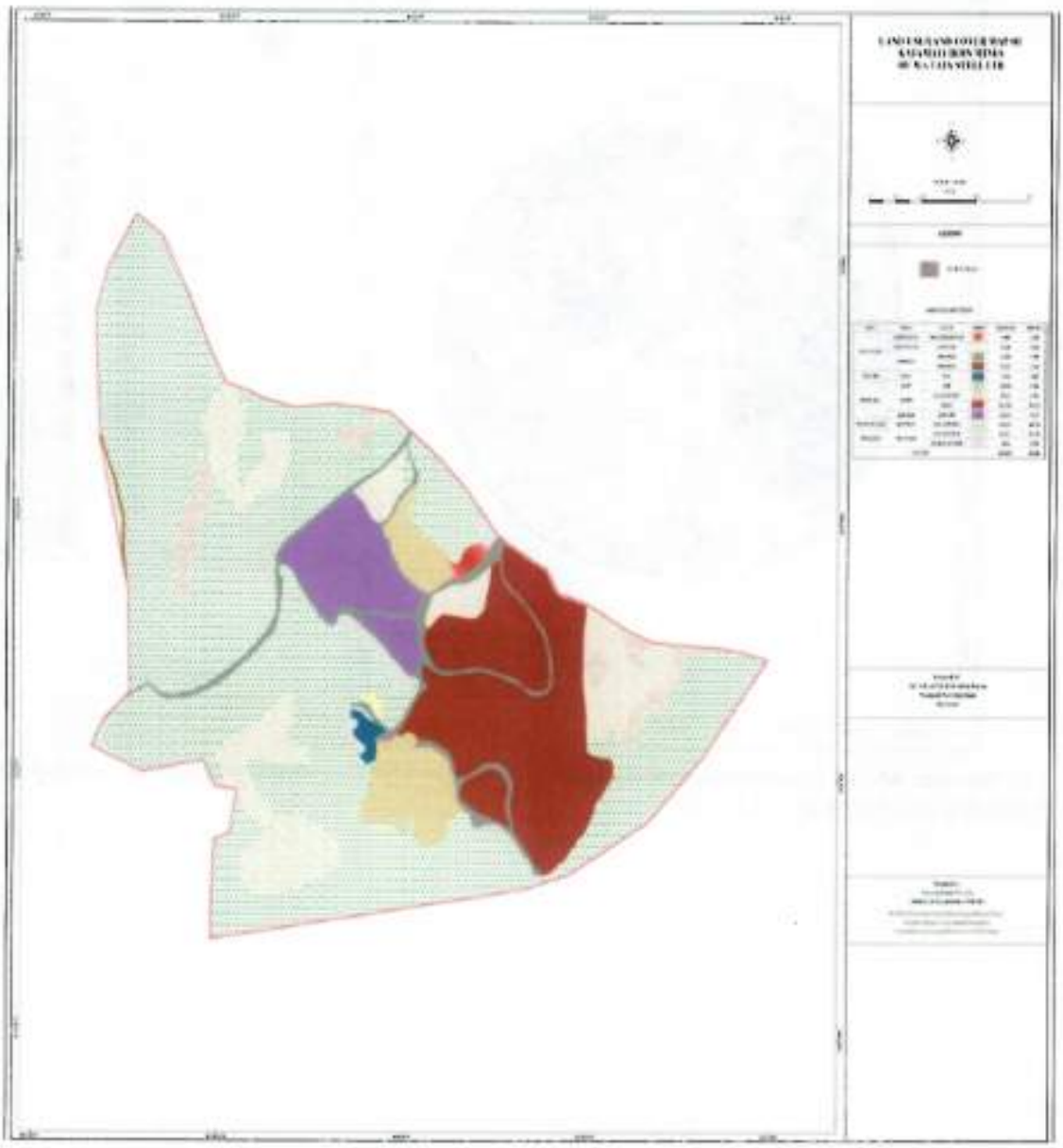
Email: visiontek.mail@yahoo.co.in, Website: www.visiontek.org.in

Annexure–IV : Land Use/Land Cover (Buffer Zone)–Katamati Iron Mine



The Resource SAT-II with multispectral bands LISS IV & Carto SAT –I with monochromatic band of date 13.01.2018 (LISS-IV), 03.02.2018 & 02.12.2017

Annexure–IV : Land Use/Land Cover (Core Zone)–Katamati Iron Mine



The Resource SAT-II with multispectral bands LISS IV & Carto SAT –I with monochromatic band of date 13.01.2018 (LISS-IV), 03.02.2018 & 02.12.2017

Annexure - V

KATAMATI IRON MINE
AVERAGE AIR QUALITY REPORT (CORE ZONE)

Month	Near Office					Near Plant Site					Near Mining Site					Near Slime Dam				
	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Apr 19	78.08	32.07	5.36	12.34	0.08	81.97	43.42	7.48	16.05	0.07	52.41	35.27	7.71	<8.06	0.67	73.98	44.47	5.18	23.58	0.78
May 19	47.82	22.70	<4.0	<8.0	<0.01	55.31	30.32	5.10	16.90	0.42	61.34	31.73	8.07	<8.87	0.39	90.93	43.62	7.32	18.72	0.44
Jun 19	80.38	33.40	<4.0	<8.0	<0.01	81.18	32.70	7.15	17.88	0.50	60.30	40.08	8.94	<8.05	0.49	78.76	42.08	8.29	19.40	0.50
Jul 19	69.51	29.91	<4.0	<8.0	<0.01	71.47	35.28	7.46	18.84	0.57	65.95	32.48	8.91	<8.03	0.47	80.82	39.76	8.38	22.14	0.53
Aug 19	41.27	21.49	<4.0	<8.0	<0.01	43.07	30.89	4.73	12.74	0.26	48.42	26.80	5.54	14.85	0.36	62.27	35.73	6.97	16.80	0.42
Sep 19	34.10	19.10	BDL	BDL	BDL	40.60	22.00	5.30	12.40	0.28	36.60	24.70	5.10	14.30	0.25	40.20	22.50	5.10	17.10	0.30

AVERAGE AIR QUALITY REPORT (BUFFER ZONE)

Month	Mahudi village					Noamundi village					Mirabera village					Bada Baijori village				
	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Apr 19	31.70	30.20	5.35	11.9	0.35	58.50	34.00	8.00	11.9	0.40	51.20	29.50	6.57	11.8	0.45	52.90	24.80	5.05	11.05	0.41
May 19	34.00	17.80	<4.0	<8.0	0.18	32.70	16.75	<4.0	<8.0	0.07	30.60	20.20	<4.0	<8.0	0.20	37.90	19.95	<4.0	<8.0	0.25
Jun 19	34.70	18.50	<4.0	<8.0	0.21	34.40	18.20	<4.0	<8.0	0.07	29.40	22.50	<4.0	<8.0	0.25	43.50	19.70	<4.0	<8.0	0.31
Jul 19	37.50	18.60	<4.0	<8.0	0.20	35.60	18.80	<4.0	<8.0	0.07	41.70	20.60	<4.0	<8.0	0.29	42.20	20.20	<4.0	<8.0	0.35
Aug 19	32.20	15.80	<4.0	<8.0	0.15	28.80	15.60	<4.0	<8.0	0.05	32.70	19.20	<4.0	<8.0	0.22	38.50	18.85	<4.0	<8.0	0.20
Sep 19	25.00	14.58	<4.0	<8.0	0.12	27.20	15.23	<4.0	<8.0	0.11	30.65	17.18	<4.0	<8.0	0.19	30.50	17.38	<4.0	<8.0	0.13

Month	Kharera					Mahadev Nasha village					Kudsum village					Hindula village				
	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Apr 19	31.70	31.60	5.85	11.6	0.37	46.50	31.75	6.00	12.1	0.24	65.80	30.30	5.15	10.9	0.33	50.60	28.50	8.00	12.85	0.40
May 19	53.50	32.70	6.10	12.4	0.34	51.50	30.90	7.00	13.0	0.32	48.30	31.50	5.95	11.4	0.30	55.40	30.30	6.25	13.00	0.46
Jun 19	57.15	35.20	6.50	12.9	0.38	53.60	35.40	7.05	13.2	0.37	54.70	33.70	6.45	12.8	0.34	55.00	32.00	5.80	13.70	0.52
Jul 19	37.50	21.80	6.10	12.0	0.38	41.20	29.50	7.50	13.8	0.34	40.70	28.80	7.90	12.0	0.39	38.50	29.40	7.10	13.05	0.37
Aug 19	30.50	22.20	5.50	11.5	0.26	44.30	31.20	6.55	13.4	0.26	46.20	25.20	5.70	10.8	0.25	36.00	29.10	5.80	12.75	0.40
Sep 19	34.60	19.30	4.35	9.40	0.22	35.00	19.60	5.90	10.9	0.19	36.35	18.80	5.15	11.0	0.20	34.50	19.32	5.15	11.80	0.35

Unit of mass related data is in micrograms except CO is in mg/m³. Co is in mg/g.

Lab In charge

Annexure-VI

Environmental Expenditure (2018-19)

Katamati Iron Mine, TATA Steel Ltd

Sl. No.	Heads / Item	Expenditure (Lakhs)	
		Capital	Recurring
1	Development & maintenance of Gardens at Mines	00	06.42
2.	Tree Plantation & maintenance	00	06.96
3.	Special studies at Katamati Mines (carbons Sequestration, Energy audit, Water budgeting, Occupational health study etc)	00	18.60
4.	Environmental monitoring	00	02.84
5	CAAQMS maintenance & operation	00	03.54
6	Installation of new piezometers	25.00	00.00
7	Wheel Washing facility	30.00	00
8	Operation of Mobile Water Sprinkling system	00	45.00
9.	Operation Permanent Water Sprinkling	00	14.39
10	Cleaning of Garland Drain & Settling pits	00	06.30
11.	Annual Maintenance of Drying system	00	09.60
12.	Coir matting at slime dams area	55.00	00
13.	Katamati Toe Wall extension	00	02.00
14	New solar lights installations	00	09.00
15	Construction of new ponds in villages	00	15.00
	Total	105.00	139.55
Environmental Expenditure for the year 2018-19 at Katamati Iron Mine = ~2.44 Cr			