Regd Post with A/D

Ref.No.: MGM/P&E/408 /19 Date: 30/05/2019

To,

The Additional Director,
Ministry of Environment and Forest & Climate Change
Eastern Region Office,
A/3, Chandrasekharpur,
Bhubaneswar-751023

Sub: Submission of Six-monthly EC compliance report on implementation of safeguards in respect of Bamebari Iron and Manganese Mine, M/s TATA Steel Ltd. for the period October 2018 to March 2019.

Dear Sir,

We are submitting herewith six-monthly EC compliance report on implementation of safeguards in respect of Bamebari Iron and Manganese Mine, M/s TATA Steel Ltd. for the period October 2018 to March 2019 as per EIA notification 2006. The same is also attached in Soft copy to your good office on e-mail to roez.bsr-mef@nic.in for your ready reference.

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

This is for your kind perusal.

Thanking you,
Yours faithfully,
F: TATA STEEL LTD.

Agent, Bamebari Iron and Manganese Mine &
Head, Manganese Gr. of Mines
Ferro Alloys & Minerals Division,
Joda.

Encl: as above.

Copy to :

1. Zonal Office Kolkata, Central Pollution Control Board, Southernd Conclave, Block 502, 5th and 6th Floors, 1582 Rajdanga Main Road, Kolkata, West Bengal 700107.
2. The Member Secretary, State Pollution Control Board, A/118, Nilakantha Nagar, Bhubaneswar, Odisha-751012.
3. The Regional Officer, State Pollution Control Board, Baniapat, DD College Road, Keonjhar, Odisha-758001

COMPLIANCE REPORT PERIOD: Oct'18 to March'19

ENVIRONMENTAL CLEARANCE TO BAMEBARI IRON AND MANGANESE MINE OF TATA STEEL LIMITED VIDE MoEF's LETTER NO. J-11015/85/2003-IA. II(M) DATED 17.11.2005 COMMENTS SUBMITTED TO THE MINISTRY OF ENVIRONMENT & FORESTS, GOVERNMENT OF INDIA

Present Status of the Project: -

The Scheme of Mining and Progressive Mine Closure Plan for Bamebari Iron and Manganese Mine over an area 1150.55 ha. (RML – 464 ha & ML – 686.550 ha.) was submitted under Rule No.12, MCDR 1988 for the period 2018-19 to 2019-20 and has been approved by IBM vide letter no. MSM/FM/05-ORI/BHU/2018-19/347, dated 04/05/2018.

Sl. no	A: Specific conditions	Compliance status
1	Mining shall not be undertaken in areas of forestland within the lease without the necessary approvals / forestry clearance.	We have obtained Forest Clearance vide MoEF's letter No 8-72/2004-FC dt 25.01.2007 over an area of 145.329 ha of forest land for Bamebari Iron & Mn. Mines. Further, as per MoEF & CC Circular dated F.No.8-78/1996-FC, dated.10.03.2015, an area of 66.126 ha. of non-forest land was recorded as forest in Govt. records as on 25.10.1980. As such forest diversion proposal over an area of 303.066 ha (Sabik forest & Balance forest) has been applied on 19.06.2016, the same is under process. The mining operation and allied activities are confined within the approved diverted area only.
2	Topsoil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area.	No top soil generated during the period Oct'18 to March' 19.
3	OB and other wastes should be stacked at earmarked sites only and should not be kept active for long periods of time. Plantation should be taken up for soil stabilization along the slopes of the dump and terraced after every 5-6 m of height and overall slope angle shall be maintained not exceeding 28°. Sedimentation pits shall be constructed at the corners of the	OB and other wastes are being dumped as per approved Scheme of Mining. The dump is terraced at every 10m and overall slope is maintained well within 28° as per approved Scheme of Mining. The inactive portion of OB dumps area being stabilized by plantation of native species. In the year 2018-19, we have planted about 5556 Nos. of native species and 27657 vetiver slips.

	garland drains. Retention/toe walls shall be provided at the base of the dumps.	Local forest species like Gambhari, Chakunda, Mahanimba, Kala Sirs, Sisu etc were used for carrying out plantation in passive dumps. The retaining wall and garland drain with sedimentation pit has been provided in all dumps. Their dimensions are matching the requirements to arrest the run off effectively.
4	Minerals rejects shall be stacked separately at earmarked site/dump only.	The mineral rejects generated during manual processing of manganese ore (i.e. sorting, dressing and sizing) has been stacked separately at earmarked site.
5	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The drains should be regularly desilted and maintained properly. Garland drains (size, gradient & length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall 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. Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall/super cyclone period. A separate storm water sump for this purpose should be created.	Existing catch drains and garland drains are covering the entire dump slope at low lying part. Size, gradient and length of the drains are adequate to take care of the peak flow. A series of check dams and settling pits have been provided for proper settlement of suspended solid in surface runoff. The garland drain, catch drains and sedimentation pits are periodically de-silted and maintained properly.
6	Dimension of retaining wall at the toe of OB dumps and benches within the mine to check run-off and siltation should be based on the rainfall data.	Retaining wall and garland drain with the dimension as specified below, are provided to prevent the siltation and check the run-off. <u>Dimension of the Retaining Wall</u>: Height – 1 to 1.2 mtr. Width – 1 mtr. <u>Dimension of the Garland Drain</u>: Depth – 1.20 to 1.5 mtr. Width – 1 to 1.2 mtr.
7	Trace Metals such as Ni, Co, As and Hg should be analyzed 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	Samples have been analyzed in dust fall & soil for trace metal in the month of Oct'18 and March'19. The detail analysis result is enclosed as **Annexure-VIII (Dust Fall) & IX (Soil)**

	then with prior approval of MOEF this specific monitoring could be discontinued.	
8	Mineral and OB transportation shall be in trucks/dumpers covered with tarpaulins. Vehicular emissions should be kept under control and regularly monitored. Suitable measures should be taken to check fugitive emissions from haulage roads & transfer points, etc.	The trucks are being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding at Joda. OB is being transported by shovel – dumper combination from mine face to dump yard. All the trucks meant for transportation of mineral from mine to our captive plant & Railway Siding at Joda is bearing the "Pollution under Control' certificate. The emissions are under control. Haul road and other areas having potential for producing air borne dust are sprinkled regularly with help of mobile sprinklers. Beside this fixed sprinkler has also been provided in main haul road in Joribar block of Bamebari Iron and Manganese Mine. The processed manganese ore is being transferred manually; hence there is less fugitive emission during transfer of ore. The report of ambient air quality monitoring done in core zone (quarry, camp and weighbridge) and buffer zone during the period Oct'18 to March'19 are enclosed as **Annexure-V & VI** respectively.
9	A green belt of adequate width should be raised by planting the native species around ML area. Plantation should also be carried out along roads, OB dump sites etc. in consultation with the local DFO *I* Agriculture Department. The density of the trees should be not less than 2500 plants per ha.	• Reclamation and plantation programs have been drawn. We have planted around 4.42 lakh nos. of sapling over an area of around 70.37 ha till 2018-19. • We have planted about 5556 numbers of saplings and 27657 vetiver slips in the year 2018-19. • The plantation includes the local species forest species like Gambhari, Chakunda, Mahanimba, Kala Sirs, Sisu etc. • Tree density is maintained more than 2500 plants per ha.
10	Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.	Ground water use permission has been obtained from CGWA NOC No. CGWA/NOC/MlN/ORIG/2018/3899,

		Dated.09.08.2018 @ 130cum/day and not exceeding 47450 cum in a year.
11	Mining will not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table.	Mining is not intersecting the ground water as the Ground water being at lower level in comparison to existing maximum quarry depth.
12	Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers. The monitoring should be done for quantity four times a year in pre-monsoon (April / May), monsoon (August). Post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the MoEF & CGWA quarterly.	Ground water table is much below the existing mine workings because of mining operations are confined at hilly topography only. However, ground water level & quality at existing well at nearby villages are being monitored. The ground water quality monitoring results and level recorded during the month Oct'18 and March'19 are enclosed as **Annexure IV & VII** respectively
13	Trace metals such as Fe, Cr+6, Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water downstream and in ground water at lower elevations from mine area, shall be periodically monitored in consultation with the OSPCB and State Ground Water Board. Suitable treatment measures shall be undertaken in case levels are found to be higher than permissible limits.	Trace metals such as Fe, Cr^{6+}, Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water (downstream & upstream) and ground water at lower elevation is being periodically monitored by referring to the standards as per BIS: 10500. The details of analysis result for ground water and surface water with standards are enclosed as **Annexure – IV & I respectively.**
14	"Consent to Operate" should be obtained from SPCB before expanding mining activities.	"Consent to operate" order no.117 vide letter no. 1486/ IND-I-CON-189 dated 19.01.2016 & valid up to 31.03.2021.
15	A Conservation Plan for conservation of endangered fauna including the Indian Elephant found in and around the mine area shall be prepared and implemented in consultation with identified agencies/institutions and with the State Forest Department. The Plan should be dovetailed with that prepared / under implementation / proposed for the endangered fauna found in the Reserve Forest in the buffer zone of the project site. The costs for the specific activities/taslcs should be earmarked in the Conservation Plan and shall not be	We have deposited Rs. 45,05,554/- on 14.12.2005 vide SBI DD no. 062995 being the contribution towards implementation of Wild Life Management Plan prepared for Bonai & Keonjhar division. Further, as per subsequent demand raised by the forest department, additional amount of Rs. 47,74,446 on dated 27.03.2013 vide SBI DD No657487 and Rs. 10672000.00 through RTGS bearing UTR No. HDFCR52015022403309396 on dated 24.02.2015 towards differential payment for implementation of Regional Wildlife Management Plan prepared for Bonai & Keonjhar division and the same has been intimated to the DFO, Keonjhar.

<table>
<tr><td></td><td>diverted for any other purpose. Year.wise status of the implementation of the Plan and the expenditure thereon should be reported to the Ministry of Environment & forests, RO, Bhubaneshwar.</td><td>Site Specific wildlife management plan has been approved by PCCF, Bhubaneswar, Odisha and Chief Wildlife Warden Odisha vide memo no. 7743 / 1 WL-SSP -01/2015 Bhubaneswar, the dated 01.09.2015.

Further, we have deposited an amount of Rs. Rs. 4,69,81,000/- dated 15.02.2018 towards SSWLCP in respect of Bamebari Iron & Mn. Mines through NEFT mode towards SSWLCP in Odisha CAMPA vide Ref. No. SBINR52018021500055096.</td></tr>
<tr><td>16</td><td>A Final Mine Closure Plan along with details of Corpus Fund should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.</td><td>Progressive Mine Closure Plan for the period 2018-19 to 2019-20 has been approved by IBM.
The final mine closure plan along with details of Corpus fund will be submitted to the Ministry of Environment & Forests in advance of final mine closure for approval.</td></tr>
<tr><td>Sl.No</td><td>B: General Conditions</td><td>Compliance Status</td></tr>
<tr><td>1</td><td>No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.</td><td>No change in mining technology and scope of working has been made at the mine. If any changes proposed in technology and scope of workings, prior approval shall be sought from Ministry of Environment & Forests.</td></tr>
<tr><td>2</td><td>No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.</td><td>Plan for production of Manganese Ore and excavation of waste has been prepared and is being strictly adhered to;
Plan Vs. Actual (2018-19)
<table>
<tr><td></td><td>Plan (2018-19)</td><td>Actual (2018-19)</td></tr>
<tr><td>OB (cum)</td><td>1,37,347</td><td>137240</td></tr>
<tr><td>Production (MT)</td><td>83,200</td><td>79619</td></tr>
<tr><td>Total Excavation (cum)</td><td>1,76,500</td><td>177587</td></tr>
</table></td></tr>
<tr><td>3</td><td>Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM. SPM, SO2, NOx. monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.</td><td>Six ambient air quality monitoring stations have been established out of which 3 nos. in core zone (Near Manager’s Office close proximity to residential, near weigh bridge and near mining area) and 3 nos. in buffer zone at Jagannathpur, Bandhuabeda and Raikera.

Samples are drawn twice in a week in core zone and once in a quarter in buffer zone to ascertain</td></tr>
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	Data on ambient air quality (RPM, SPM, SO2 & NOx.) should be regularly submitted to the Ministry including its Regional office at Bhubaneshwar and the State Pollution Control Board *I* Central Pollution Control Board once in six. Months.	the 24hour monitoring average for $PM_{10,}$ $PM_{2.5}$, So_2 & NOx, CO & Mn. It was observed that the environmental monitoring parameters are within the prescribed limits. Ambient air quality monitoring report is being submitted to State Pollution Control Board on monthly basis. Abstract of the monthly monitoring report of ambient air quality for period from Oct'18 to March'19 is enclosed as **Annexure-V & VI.**
4	Drills should be wet operated or with dust extractors and controlled blasting should be practiced.	Wet drilling concept is already in place. Controlled blasting technique with NONEL is in practice. Beside this green belt has been developed along mining.
5	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul roads, wagon loading, dumpers/ trucks, loading & unloading points should be provided and properly maintained.	Effective water sprinkling by mobile water tanker is being done on haul roads. The Ambient Air Quality monitoring done during the period Oct'18 to March'19 is enclosed as **Annexure-V & VI.**
6	Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operations of HEMM, etc should be provided with ear plugs/ muffs.	Ear plugs & Ear muffs are provided to the workers working in drilling operations & DG operations. Rests of operations are below the noise levels of 85 dBA. The details of noise monitoring for the period Oct'18 to March'19 are enclosed as **Annexure-X.**
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 31 st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	The oil separation system has been provided at workshop and working effectively. This is being centrally used for maintenance of all the Equipment's running at Bamebari & Tiringpahar Mn. Mine.
8	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	It is being done by M/s Visiontek Consultancy Service Pvt. Ltd. (Recognized as "A" category consultant as by State Pollution Control Board, Orissa).

		The type of pollution monitoring and analysis equipment used by M/s Visiontek Consultancy Service Pvt. Ltd.is enclosed as A**nnexure – XI.**
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.	Suitable dust masks are being provided to employees (departmental & contractual) engaged in dusty operations. It is also ensured that they use the same. Employees are undergoing Periodical Medical Examination which is inclusive of lungs function test and audiometry. All the personnel are trained on safety in work place and continuous awareness program are being conducted for all employees to avert manganese poisoning. Periodical Medical Examination of employees (departmental & contractual) are conducted as per prescribed norms of Mines Rule, 1955. The initial and periodical examination includes blood hematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. All chest radiographs are being classified for detection of pneumoconiosis, diagnosis and documentation made in accordance to ILO Classifications. Total 98 contractual employees and 03 departmental employees have undergone PME during FY 2018-19. There are no findings of pneumoconiosis and manganese poisoning which is classified as occupational disease.
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.	The department is in place and the Head of the department is reporting to General Manager of the division. The organizational structure in place is enclosed as **Annexure-XII**.
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 Bhubaneshwar.	Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose. Rs 1,13,125 was kept for the purpose of afforestation on dumps out of which Rs. 1,00,564 was used. Rs 1,68,000 was kept for Retaining wall and Garland drain & against which we spent Rs. 1,74,000. Rs. For Environmental monitoring Rs. 6,94,695 was spent.

12	The Regional Office of this Ministry located at Bhubaneshwar 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 *I* information *I* monitoring reports	We are extending full co-operation to the officers of the Regional Office by furnishing the requisite data / information / monitoring reports.
13	A copy of clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom suggestion/ representation has been received while processing the proposal.	Copy of the clearance letter marked to Sarpanch, Gram Panchayat, Palasa on 12.01.2006.
14	The State Pollution Control Board should display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.	This is applicable to State Pollution Control Board, Orissa.
15	The project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular of the locality concerned within seven 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 may also be seen at Web Site of the Ministry of Environment & 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.	A detail of Environmental Clearance with regard to Bamebari Manganese Mine was published in Oriya News Papers Anupam Bharat & Aam Khabar dated 10.01.2006.
16	The Ministry or any other competent authority may stipulate any further condition for environmental protection.	Noted
17	Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance.	Noted
18	The above conditions will be enforced, inter alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of	Noted

	Pollution) Act, 1991 along with their amendments and rules.	

Additional Conditions as per MoEFCC Letter No. 106-9/11/EPE dt. 02.12.2014 issued to all Non-Coal Mining Projects.

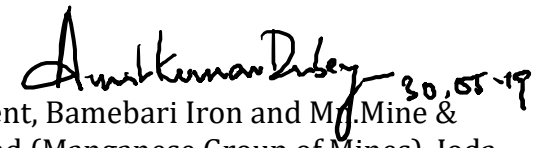
S.No.	Stipulated Condition	Compliance Status
1.	The project authority shall adopt best mining practices for given conditions in the mining area, adequate number of check dam, retaining wall/ structure, garland drains and settling ponds should be provided to arrest the wash off with rain water in catchment area.	The best scientific method of mining is in practice at Bamebari Iron and Manganese Mine like all OB generated were back filled in old pits. Garland grain and Retaining wall are provided at the toe of the overburden dumps. Settling ponds are done at intervals along the garland drain.
2.	The natural water bodies and or stream which are flowing in and around the village should not be disturbed. The water table should be nurtured so as not 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.	Agreed. No water bodies disturbed due to mining activities. The ground water table is being monitored regularly from the open well and tube well of nearby villages. Drinking water is provided to the villagers.
3.	The illumination and sound at night at project sites disturb the village in respect of both human and animal population. Consequent sleeping disorder and stress may affect the health in the village located close to mining operation. Habitations have a right to darkness and minimal noise level at night. The Project Proponents must ensure that the biological clock of the village is not disturbed by orienting the floodlights mask way from the village and keeping the noise levels well within prescribed limits for day/ night hours.	The operation of the mine is restricted to the day hours only. Hence, there is no disturbance to the habitats located close to the mining operation. The biological clock of the village is not disturbed.
4.	The project Authority shall make necessary alternative arrangement, where required, in consultation with state Government to provide alternative areas for livestock grazing. In this case context, the Project Authority should implement the direction of Hon'ble Supreme Court	Not Applicable. There is no grazing land within the M.L. area.

	with regard to acquiring grazing land. The sparse tress on such grazing ground, which provides mid-day shelter from the scorching sun, should be scrupulously guarded felling lest the cattle abandon the grazing ground or return home by noon.	
5.	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 building to evaluate the zone of influence and impact of blasting on neighbourhood. Within 500 meters of such sites vulnerable to blasting vibration, avoidance of use of explosives and adoption of alternative means of mineral extraction such as ripper/dozer combination/ rock breakers/ surface mineral etc should be seriously considered and practiced wherever practicable. A provision for monitoring of each blast should be made so that impact of blasting on nearby habitation and dwelling unit could be ascertained. The covenant of lease deed under rule 31 of MCR 1960 provided that no mining operation shall be carried out within 50 meters of public works such as public roads and building or inhabited sites except with prior permission from the competent Authority.	Deep hole drilling and controlled blasting technique has been adopted in the mine. Vibration study has been done with the help of CIMFR and vibration limit (ppv) found within the limit. Provision for monitoring each blast has been established to ascertain the blast induced vibration (ppv) limit at different distances from the centre of blasting. Rock breakers were used to avoid secondary blasting.
6.	Main haulage road in the mines should be provided with permanent water sprinkler and other road should be regularly wetted water tanker fitted with sprinkler. Crusher and material transfer points should be invariably be provided with bag filter and or dry fogging system. Belt conveyor fully covered to avoid air borne dust.	The main haulage road, mineral stacking area overburden dumping areas are regularly sprinkled with water by using water tankers and Fixed sprinklers.
7.	The project Authority shall ensure that productivity of agriculture crops is not affected due to the mining operation. Crop Liability Insurance Policy has to be taken by PP as a precaution to compensate for the crop	Not Applicable. There is no crop land nearby the M.L. area.

	loss. The impact zone shall be 5 Km from the boundary of mine lease area for insurance policy. In case, several mines are located in cluster mines, formed inter – alia, to sub serve such and objective shall be responsibility for securing such Crop Liability Policy.	
8.	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 also accordingly revised and required stipulation under the MMDR Act 1957 and MCR 1969 met.	Not Applicable
9.	Transportation of 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 m) for the purpose of transportation of 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 same is proposed to be used for the project. No road movement should be allowed on existing village road network without appropriately increasing carrying capacity of such road	There is no transportation road passing through any village.
10.	Likewise, alteration or re-routing of foot paths, pagdandies, cart road and village infrastructure/ public utilities or roads (for purpose of land acquisition for mining) shall be avoided to extent possible and in such case acquisition is inevitable, alternative arrangements shall be made first and the only the area can be acquired. In these types of cases Inspection reports by site visit by expert may be insisted upon which	Not Applicable

	should be done through reputed Institutes.	
11.	The CSR activates by companies including mining establishment has become mandatory up to 2% their financial turn over, socio Economic Development of neighbourhood. Habitats could also be planned and executed by the PPs more systemically based on need based door to door survey by established Social Institute/ Workers on the lines as required under TOR. "R&R Plan// compensation details for 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 SCs and STs and weaker section of society in study, a need bashed sample survey, family-wise, should be undertaken to assess their requirement, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line department of State Government. It may be clearly brought out whether the village including their R&R and socio-economics aspect should be discussed in EIA report.	Tata Steel has taken up many social initiatives for the upliftment of the education, health and other socio-economic development of the neighbouring villages. TSRDS (Tata Steel Rural Development Society) has been pioneering the initiatives through CSR activities. R&R policy has not been applicable for the PP till now.

Yours faithfully
F: TATA STEEL LTD



Agent, Bamebari Iron and Mn.Mine &
Head (Manganese Group of Mines), Joda

TATA STEEL LIMITED

BAMEBARI IRON AND MANGANESE MINE

ANNEXURE-I: SURFACE WATER QUALITY ANALYSIS REPORT OCTOBER'18 to MARCH'19

Sampling Location:SW-1: Confluence Point at Kassia Nallah
SW-2:Intake Point at Tindharia

Sl. No	Parameter	Unit	Standard as per IS:2296:1992, Class'C'	Oct-18		Nov-18		Dec-18		Jan-19		Feb-19		Mar-19	
				SW-1	SW-2	SW-1	SW-2	SW-1	SW-2	SW1	SW2	SW1	SW2	SW1	SW2
1	Dissolved Oxygen (minimum)	mg/l	**4**	7.6	7.4	7.4	6.8	5.4	5.7	5.8	5.4	5.1	5.3	6.1	6.6
2	BOD (3) days at 270C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
3	Total Coli form	MPN/100 ml	**5000**	320	350	310	280	224	261	265	243	260	220	220	280
4	pH Value		**6.0-9.0**	7.6	7.32	7.5	7.26	7.38	7.45	7.78	7.59	7.81	7.62	7.44	7.58
5	Colour (max)	Hazen	**300**	5	5	2	5	CL	CL	CL	CL	CL	CL	CL	CL
6	Total Dissolved Solids	mg/l	**1500**	228	238	198	212	132	145	126	157	132	148	144	156
7	Copper as Cu (max)	mg/l	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	**0.5**	0.2	0.35	0.18	0.26	0.45	0.49	0.65	0.51	0.61	0.58	0.52	0.66
9	Chloride (max)	mg/l	**600**	28.2	28.9	28.2	30	26	34	26	36	28	34	30	36
10	Sulphates (SO4) (max)	mg/l	**400**	3.1	3.8	3.1	4.2	4.1	4.9	4.6	4.9	4.2	4.6	4.2	5.4
11	Nitrate as NO3 (max)	mg/l	**50**	1.2	1.6	1.2	1.8	1.8	2.3	1.7	2.9	1.61	2.2	2.2	2.8
12	Fluoride as F (max)	mg/l	**1.5**	0.015	0.018	0.012	0.021	0.012	0.045	0.056	0.035	0.052	0.041	0.024	0.054
13	Phenolic Compounds as C6H5OH (max)	mg/l	**0.005**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Cadmium as Cd (max)	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Selenium as Se (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
16	Arsenic as As	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Cyanide as CN (max)	mg/l	**0.05**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
19	Zinc as Zn(max)	mg/l	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Hexa Chromium as Cr +6	mg/l	**0.05**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Anionic Detergents (max)	mg/l	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ANNEXURE-II : BAMEBARI MINE DOMESTIC EFFLUENT WATER QUALITY ANALYSIS REPORT OCTOBER-2018 to MARCH-2019

Sampling Location:STPW-1:STP (Inlet)
STPW-2: STP (Outlet)

Sl. No	Parameter	Unit	Standards (In land Surface water)	October 2018		November 2018		December 2018		Jan-19		Feb-19		Mar-19	
				STPW-1	STPW-2	STPW-1	STPW-2	STPW-1	STPW-2	STPW-1	STPW-2	STPW-1	STPW-2	STPW-1	STPW-2
1	Colour & Odour	Hazen	**Colourless/Odourless as far as practicable**	04& pungent smell	CL & U/O	04& pungent smell	CL & U/O	06 & pungent smell	CL & U/O	06 & pungent smell	CL & U/O	05 & pungent smell	CL & U/O	04 & pungent smell	CL & U/O
2	Suspended Solids	mg/l	**100**	156	23	168	28	89	19	87	16	82	18	96	26
3	Particulate size of SS		**Shall pass 850 micron IS Sieve**	< 850	< 850	< 850	< 850	< 850	< 850	< 850	< 850	< 850	< 850	< 850	< 850
4	pH Value	--	**5.5-9.0**	6.53	7.5	6.86	7.36	6.35	7.23	6.78	6.69	6.81	6.74	6.48	7.31
5	Temperature	ºC	**Shall not exceed 50C above the receiving water**	24	25	24	24	22	23	22	23	25	25	22	22
6	Oil & Grease(max)	mg/l	**10**	ND	ND	ND	ND	1.8	ND	1.7	ND	1.8	ND	2.6	ND
7	Total Residual Chlorine	mg/l	**1**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	Ammonical Nitrogen (as N)	mg/l	**50**	3.1	ND	3.8	ND	4.8	0.49	4.6	0.56	4.8	0.61	5.8	0.56
9	Total Kjeldahl nitrogen (as NH3)	mg/l	**100**	9.5	9.5	9.4	8.2	11.2	1.2	10.2	1.3	9.6	1.8	13.2	1.8
10	Free ammonia (as NH3)	mg/l	**5**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	BOD(3 days at 270C (max)	mg/l	**30**	28.7	4.3	29.6	5.6	39	4.2	21	4.3	32.2	3.8	32.2	4.9
12	Chemical Oxygen Demand as COD	mg/l	**250**	127	30	140	32	182	16	182	12	180	10	190	28
13	Arsenic as As	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Mercury (Hg)	mg/l	**0.01**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Lead as Pb(max)	mg/l	**0.1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
16	Cadmium as Cd (max)	mg/l	**2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Hexavalent Chromium as Cr+6	mg/l	**0.1**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
18	Total Chromium (Cr)	mg/l	**2**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
19	Copper as Cu (max)	mg/l	**3**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Zinc as Zn(max)	mg/l	**5**	0.23	<0.05	0.34	0.11	0.14	<0.05	0.12	<0.05	0.18	<0.05	0.26	<0.05
21	Selenium (Se) (max)	mg/l	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Nickel (Ni)	mg/l	**3**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
23	Cyanide as CN (max)	mg/l	**0.2**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
24	Fluoride as F (max)	mg/l	**2**	0.05	0.02	0.084	0.011	0.2	0.012	0.3	0.023	0.22	0.021	0.24	0.016
25	Dissolved Phosphates (P)	mg/l	**5**	0.2	<0.05	0.5	<0.05	0.23	<0.05	0.25	<0.05	0.21	<0.05	0.28	<0.05
26	Sulphide (S)	mg/l	**2**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
27	Phenolic Compounds as C6H5OH (max)	mg/l	**1**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
28	Bio-assay test		**90% survival of fish after 96 hours in 100% effluent**	92% survival of fishes	96% survival of fishes	87% survival of fishes	96% survival of fishes	79% survival of fishes	98% survival of fishes	79% survival of fishes	98% survival of fishes	84% survival of fishes	99% survival of fishes	84% survival of fishes	100% survival of fishes
29	Manganese (Mn)	mg/l	**2**	0.021	<0.005	0.034	<0.005	0.024	<0.005	0.056	<0.005	0.051	<0.005	0.031	<0.005
30	Iron as Fe (max)	mg/l	**3**	0.78	0.19	0.58	0.12	1.21	0.17	1.23	0.25	1.18	0.28	1.46	0.28
31	Vanadium (V)	mg/l	**0.2**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
32	Nitrate Nitrogen	mg/l	**10**	2.3	0.45	2.8	0.41	2.1	0.56	2.3	0.65	2.1	0.74	3.2	0.49

ANNEXURE-III-DRINKING WATER QUALITY ANALYSIS REPORT OCTOBER-2018 to March-2019

Sampling Location: Near Office

MICROBIOLOGICAL ANALYSIS OF WATER AS PER IS: 10500 - 2012

Sl No.	Test Parameters	Norms as per IS:10500-2012	Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
1	Total Coliform Organism MPN/100ml	**Shall not be dectable in any 100ml sample**	<2	<1.8	<1.8	<1.8	<1.8	<1.8
2	Faecal Coliforms	**Shall not be dectable in any 100ml sample**	Absent	<1.8	<1.8	<1.8	<1.8	<1.8
3	E. Coli	**Shall not be dectable in any 100ml sample**	Absent	Absent	Absent	Absent	Absent	Absent

CHEMICAL ANALYSIS OF WATER AS PER IS: 10500 - 2012

Sl No.	Test Parameters	Norms as per IS: 10500-2012		Oct-18	Nov-18	Dec-18	Jan-19	Feb-19	Mar-19
		Desirable Limit	Permissible Limit						
1	Colour (Hazen Unit)	**5**	**15**	CL	CL	CL	CL	CL	CL
2	Odour	**Agreeable**	**Agreeable**	U/O	Agreeable	Agreeable	U/O	U/O	Agreeable
3	Taste	**Agreeable**	**Agreeable**	AL	Agreeable	Agreeable	AL	AL	Agreeable
4	pH value (250C)	**6.5 - 8.5**	**No Relaxation**	7.43	7.72	7.12	7.56	7.49	7.21
5	Turbidity in NTU	**1**	**5**	<2.0	<1.0	<1.0	< 2.0	< 2.0	<1.0
6	Total Dissolved Solids in mg/l	**500**	**2000**	51	156	60	54	58	66
7	Aluminium (as Al) in mg/l	**0.03**	**0.2**	<0.001	0.21	<0.001	<0.001	<0.001	<0.001
8	Anionic Detergents (as MBAS) in mg/l	**0.2**	**1**	ND	<0.2	<0.2	<0.2	<0.2	<0.2
9	Boron (as B) in mg/l	**0.5**	**1**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
10	Calcium (as Ca) in mg/l	**75**	**200**	10.9	15.6	8.9	8.7	9.2	10.8
11	Chloride (as Cl) in mg/l	**250**	**1000**	12.6	24	11	10	12.2	16
12	Copper (asCu) in mg/l	**0.05**	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
13	Fluoride (as F) in mg/l	**1**	**1.5**	<0.01	0.018	<0.01	<0.01	<0.01	<0.01
14	Residual Free Chlorine in mg/l	**0.2(Min.)**	**---**	ND	ND	ND	ND	ND	ND
15	Iron (as Fe) in mg/l	**0.3**	**1**	0.12	0.12	0.12	0.32	0.36	0.21
16	Magnesium (as Mg) in mg/l	**30**	**100**	3.31	9.2	1.8	1.5	2.8	2.4
17	Manganese (as Mn) in mg/l	**0.1**	**0.3**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
18	Mineral Oil mg/l	**0.01**	**0.03**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
19	Nitrate (as NO3) in mg/l	**45**	**No Relaxation**	0.41	0.12	0.35	0.23	0.21	0.42
20	Phenolic Compounds (as C6H5OH) in mg/l	**0.001**	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
21	Selenium (as Se) in mg/l	**0.01**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Sulphate (as SO4) in mg/l	**200**	**400**	1.35	6.8	1.8	1.4	1.6	2.4
23	Alkalinity (as CaCO3) in mg/l	**200**	**600**	26.4	40	29	20	26	36
24	Total Hardness(as CaCO3) in mg/l	**300**	**600**	29	68	32	36	32.8	48
25	Cadmium (as Cd) in mg/l	**0.003**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
26	Cyanide (as CN) in mg/l	**0.05**	**No Relaxation**	ND	ND	ND	ND	ND	ND
27	Lead (as Pb) in mg/l	**0.01**	**No Relaxation**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
28	Mercury (as Hg) in mg/l	**0.001**	**No Relaxation**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
29	Arsenic (as As) in mg/l	**0.01**	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30	Zinc (as Zn) in mg/l	**5**	**15**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
31	Chromium (as Cr+6) in mg/l			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
32	Poly Aromatic Hydrocarbon as PAH	**<0.0001**	**--**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
33	Pesticide	**Absent**		Absent	Absent	Absent	Absent	Absent	Absent

ANNEXURE-IV: Ground Water Analysis

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Envlab/19/R-145 Date: 02/01/19

GROUND WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF DECEMBER-2018

1.	Name of Industry	:	**Bamebari Manganese Mines (M/s TATA Steel Limited)**
2.	Sampling Location	:	**GW-1:Panchyat Office BW** **GW-2: Nimera Village OW**
3.	Date of sampling	:	21.12.2018
4.	Date of analysis	:	22.12.2018 To 28.12.2018
5.	Sample collected by	:	VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Unit	Standards as per IS: 10500, 2012	Analysis Results 21.12.2018	
				GW-1	GW-2
Essential Characteristics					
1	Colour	Hazen	5	CL	CL
2	Odour	--	Agreeable	Agreeable	Agreeable
3	Taste	--	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	1	<1	<1
5	pH Value	--	6.5-8.5	7.54	7.41
6	Total Hardness (as $CaCO_3$)	mg/l	200	184.0	162.0
7	Iron (as Fe)	mg/l	0.3	0.32	0.46
8	Chloride (as Cl)	mg/l	250	26.8	41.8
9	Residual, free Chlorine	mg/l	0.2	ND	ND
Desirable Characteristics					
10	Dissolved Solids	mg/l	500	188.0	252.0
11	Calcium (as Ca)	mg/l	75	36.0	42.8
12	Magnesium (as Mg)	mg/l	30	11.2	12.6
13	Copper (as Cu)	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	0.1	0.021	0.049
15	Sulphate (as SO_4)	mg/l	200	4.3	5.7
16	Nitrate (as NO_3)	mg/l	45	3.5	2.8
17	Fluoride (as F)	mg/l	1	0.023	0.036
18	Phenolic Compounds (as C_6H_5OH)	mg/l	0.001	<0.001	<0.001
19	Mercury (as Hg)	mg/l	0.001	<0.001	<0.001
20	Cadmium (as Cd)	mg/l	0.003	<0.001	<0.001
21	Selenium (as Se)	mg/l	0.01	<0.001	<0.001
22	Arsenic (as As)	mg/l	0.01	<0.001	<0.001
23	Cyanide (as CN)	mg/l	0.05	ND	ND
24	Lead (as Pb)	mg/l	0.01	<0.001	<0.001
25	Zinc (as Zn)	mg/l	5	<0.05	<0.05
26	Anionic Detergents (as MBAS)	mg/l	0.2	<0.2	<0.2
27	Chromium (as Cr^{+6})	mg/l		<0.05	<0.05
28	Mineral Oil	mg/l	0.5	<0.01	<0.01
29	Alkalinity	mg/l	200	154.0	148.0
30	Aluminium as(Al)	mg/l	0.03	<0.001	<0.001
31	Boron (as B)	mg/l	0.05	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	µg/l	--	<0.001	<0.001
33	Pesticide	mg/l	Absent	Absent	Absent

For Visiontek Consultancy Services Pvt. Ltd.

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Committed For Better Environment

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Envlab/19/R-1803(I)

Date: 03/04/19

GROUND WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF MARCH-2019

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling location : **GW-1: Panchayat Office**
   GW-2: Nimera Village OW
3. Date of sampling : 06.03.2019
4. Date of analysis : 07.03.2019 TO 13.03.2019
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as Per IS 10500:2012	Analysis Results	
					GW-1	GW-2
1	Color	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	1.2	1.4
5	pH Value	APHA 4500H+ B	--	6.5-8.5	7.51	7.42
6	Total Hardness (as $CaCO_3$)	APHA 2540 C	mg/l	300	132.0	140.0
7	Iron (as Fe)	APHA 3500Al B	mg/l	0.3	0.32	0.41
8	Chloride (as Cl)	APHA 5540 C	mg/l	250	34.0	40.6
9	Residual, free Chlorine	APHA 4500B, B	mg/l	0.2	ND	ND
10	Dissolved Solids	APHA 3500Ca B	mg/l	500	194.0	232.0
11	Calcium (as Ca)	APHA 4500Cl- B	mg/l	75	40.2	46.0
12	Magnesium (as Mg)	APHA 3111 B,C	mg/l	30	18.2	20.8
13	Copper (as Cu)	APHA 4500F- C	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	APHA 4500Cl, B	mg/l	0.1	0.024	0.031
15	Sulphate (as SO_4)	APHA 3500Fe, B	mg/l	200	4.8	6.2
16	Nitrate (as NO_3)	APHA 3500Mg B	mg/l	45	3.8	3.2
17	Fluoride (as F)	APHA 3500Mn B	mg/l	1	0.026	0.038
18	Phenolic Compounds (as C_6H_5OH)	APHA 5220 B	mg/l	0.001	<0.001	<0.001
19	Mercury (as Hg)	APHA 4500 NO_3^- E	mg/l	0.001	<0.001	<0.001
20	Cadmium (as Cd)	APHA 5530 B,D	mg/l	0.003	<0.001	<0.001
21	Selenium (as Se)	APHA 3114 B	mg/l	0.01	<0.01	<0.001
22	Arsenic (as As)	APHA 4500 SO_4^{2-} E	mg/l	0.01	<0.01	<0.001
23	Cyanide (as CN)	APHA 2320 B	mg/l	0.05	ND	ND
24	Lead (as Pb)	APHA 2340 C	mg/l	0.01	<0.01	<0.001
25	Zinc (as Zn)	APHA 3111 B,C	mg/l	5	1.8	2.6
26	Anionic Detergents (as MBAS)	APHA 4500 CN- C,D	mg/l	0.2	<0.2	<0.2
27	Chromium (as Cr^{+6})	APHA 3111 B,C	mg/l		<0.05	<0.05
28	Mineral Oil	APHA 3500 Hg	mg/l	0.01	<0.01	<0.01
29	Alkalinity	APHA 3114 B	mg/l	200	68.0	112.0
30	Aluminium as(Al)	APHA 3111 B,C	mg/l	0.03	<0.01	<0.01
31	Boron (as B)	APHA 3500Cr B	mg/l	0.5	<0.5	<0.5
32	Poly Aromatic Hydrocarbon (as PAH)	APHA 6440 B	µg/l	<0.0001	<0.0001	<0.0001
33	Pesticide	APHA 6630 B,C	mg/l	Absent	Absent	Absent

Note: CL: Colourless, ND: Not Detected.

For Visiontek Consultancy Services Pvt. Ltd.

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ANNEXURE-V : Ambient Air Quality (Core Zone) (Bamebari Iron and Manganese Mines Quarterly Report Oct'18 to March'19)

Month	Location	Concentration of Pollutants												
		PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	O_3 ($\mu g/m^3$)	CO (mg/m^3)	NH_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Ni (ng/m^3)	As (ng/m^3)	Benzene ($\mu g/m^3$)	Benzo(a) pyrene (ng/m^3)	Mn ($\mu g/m3$)
Oct-18	Office Buliding	41.89	17.94	4.10	10.00	5.34	0.21	23.50	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
	Mines Pit	41.43	18.09	4.14	9.84	4.93	0.22	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
	Weigh Bridge	46.47	23.73	4.18	11.33	8.35	0.27	22.50	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Nov-18	Office Buliding	51.24	22.94	4.23	10.09	5.13	0.30	21.60	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
	Mines Pit	49.55	26.04	4.22	15.94	5.23	0.34	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
	Weigh Bridge	49.75	28.51	4.53	12.39	8.50	0.37	23.60	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Dec-18	Office Buliding	52.04	24.18	4.28	9.91	4.53	0.35	22.33	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
	Mines Pit	55.37	26.24	13.14	10.50	4.73	0.47	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
	Weigh Bridge	49.75	26.62	4.38	12.29	4.64	6.55	23.70	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Jan-19	Office Buliding	54.18	25.51	4.45	10.55	4.83	0.42	24.73	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
	Mines Pit	57.11	28.57	18.50	11.30	5.02	0.55	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
	Weigh Bridge	49.75	27.59	4.62	12.95	5.00	0.56	24.92	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Feb-19	Office Buliding	51.65	26.64	4.53	10.73	5.00	0.41	27.47	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
	Mines Pit	53.19	27.96	8.22	10.88	4.83	0.52	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
	Weigh Bridge	53.76	27.81	4.62	12.55	5.14	0.62	24.76	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Mar-19	Office Buliding	43.04	24.62	4.58	10.90	4.69	0.41	22.98	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
	Mines Pit	67.26	31.59	9.17	11.70	5.17	0.57	21.99	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
	Weigh Bridge	76.38	38.32	5.37	12.43	5.02	0.50	22.70	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

Bamebari Iron & Manganese Mines

ANNEXURE-VI: AMBIENT AIR QUALITY MONITORING REPORT (BUFFER ZONE)

Month	Location	Parameters					
		PM10	PM2.5	SO2	NOx	CO	HC
Dec-18	JaganathPur	51.20	23.50	<4	<9	0.45	<0.001
	Bandhubaria	46.70	24.50	<4	<9	0.24	<0.001
	Raikara	50.20	22.30	<4.0	<9.0	0.90	<0.001
Mar-19	JaganathPur	54.20	32.80	6.40	9.20	0.59	<0.001
	Bandhubaria	50.80	31.20	6.80	10.10	0.62	<0.001
	Raikara	56.00	34.20	7.40	10.60	0.66	<0.001

ANNEXURE-VII: Ground Water Level Analysis

Visiontek Consultancy Services Pvt. Ltd.
(An Enviro Engineering Consulting Cell)
ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Env Lab/19/R-1144 Date: 02/01/19

GROUND WATER LEVEL MONITORING REPORT FOR DECEMBER-2018

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Date of Recording : 21.12.2018
3. Monitored by : VCSPL Representative in presence of TATA Representative

		DEC	DOS		21.12.2018	
SL.NO	**Monitoring Date**	Analysis Result (MT/BGL)				
1	Nimera Village	6.5 m				
2	Bamebari BW	3.4 m				

For *Visiontek Consultancy Services Pvt. Ltd.*

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ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Envlab/19/R-1804(I) Date: 03/04/19

GROUND WATER LEVEL ANALYSIS REPORT FOR THE MONTH OF MARCH-2019

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling location : **GWL-1: Panchayat Office BW**
   GWL-2: Nimera Village OW
3. Date of sampling : 06.03.2019
4. Sample collected by : VCSPL Representative in presence of TATA Representative

SL.NO	Sample Location	Analysis Result (m/bgl)
1	GWL1:Panchayat Office BW	3.8
2	GWL2: Nimera Village OW	6.2

For Visiontek Consultancy Services Pvt. Ltd.

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ANNEXURE-VIII & IX: Trace Metal Dust Fall or Soil Testing Report

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Envlab/19/R-146 Date: 02/01/19

TRACE METAL DUST FALL ANALYSIS REPORT FOR THE MONTH OF DECEMBER-2018

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **F-1: Bamebari**
3. Date of sampling : 18.12.2018
4. Sample collected by : VCSPL Representative in presence of TATA Representative

	Parameters	18.12.2018	
		UNIT	RESULT
F-1	Ni	(%)	<0.001
	Co	(%)	<0.001
	Hg	(%)	<0.001
	As	(%)	<0.001

VISIONTEK CONSULTANCY SERVICES PVT LTD

For Visiontek Consultancy Services Pvt. Ltd.

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Envlab/19./R-1567 Date: 03.04.19

DUST FALL MONITORING REPORT FOR THE MONTH OF MARCH-2019

Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
Sample collected by : VCSPL representative in presence of TATA representative.

SL.No.	Sample Type	Parameters	MARCH-2019	
			Unit	Analysis Result
1	F-1	Ni	(%)	<0.001
2		Co	(%)	<0.001
3		Hg	(%)	<0.001
4		As	(%)	<0.001

VISIONTEK CONSULTANCY SERVICES PVT LTD

For Visiontek Consultancy Services Pvt. Ltd.

Plot No.-M-22&23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha Tel. : 7752017905
E-mail : visiontekin@yahoo.co.in, visiontekin@gmail.com, Visit us at: www.vcspl.org

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ANNEXURE-X: Noise Monitoring

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: EnvLab/19/R-147 Date: 02/01/19

NOISE MONITORING REPORT FOR DECEMBER-2018

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Date of Recording : 18.12.2018
3. Monitored by : VCSPL Representative in presence of TATA Representative

Sl. No	Date	Name of Location	Unit	Day time Equivalent	Night time Equivalent
				Result	
1	18.12.2018	Township	db	59.8	45.2
2		Hospital		67.1	43.5
3		Mines Area		68.9	46.5
CPCB Standard				75	70

For Visiontek Consultancy Services Pvt. Ltd.

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E-mail : visiontekin@yahoo.co.in, visiontekin@gmail.com, Visit us at: www.vcspl.org

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Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: EnvLab/19/R-148 Date: 02/01/19

NOISE EQUIPMENT MONITORING REPORT FOR DECEMBER-2018

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Date of Recording : 18.12.2018
3. Monitored by : VCSPL Representative in presence of TATA Representative

Sl. No	Date	Name of Location	Unit	Day Time
				Result
1	18.12.2018	Near WTP	db	54.7
2		Near Workshop		66.9
3		Near STP		54.7
4		Office DG		86.7
5		OD-09A-6541(Truck)		85.7
6		OD-09N-9468(Truck)		77.2
7		Volvo EC 210 (Sovel-1)		89.6
8		Komatsu D-65E(Droger)		90.5
CPCB Standard				75

For Visiontek Consultancy Services Pvt. Ltd.

Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)

ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Envlab-19/R- 1565 Date: 03.04.19

NOISE MONITORING REPORT FOR MARCH-2019

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Date of Recording : 18.12.2018
3. Monitored by : VCSPL Representative in presence of TATA Representative

Sl. No	Date	Name of Location	Unit	Day time Equivalent Result	Standard As per CPCB	Night time Equivalent Result	Standard As per CPCB
1	29.03.2019	Township	dB	66.2	75	50.8	70
2		Hospital		44.4	50	30.8	40
3		Mines Area		72.8	75	50.4	70

For Visiontek Consultancy Services Pvt. Ltd.

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E-mail : visiontekin@yahoo.co.in, visiontekin@gmail.com, Visit us at: www.vcspl.org
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Visiontek Consultancy Services Pvt. Ltd.
(An Enviro Engineering Consulting Cell)
ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Enmlab/19/R-2017 Date: 03/04/19

EQUIPMENT NOISE MONITORING REPORT- MARCH 19

1. Name of the Industry : M/s Bamebari Manganese Mines (M/s TATA Steel Limited)
2. Date of Recording : 29.03.2019
3. Monitoring By : VCSPL Representative in presence of Client's representative

SL.No.	Date	Name of Location	Unit	Day Time
				Result
1	29.03.2019	Prafulla Pradhan Vehicle No- OR09P9977	dB	82.2
2		Pabitra Pradhan Vehicle No-OR09K7335		82.05
3		Sanjay Kumar Sethy Vehicle No-OR09N9468		80.75
4		Srikanta Karua Vehicle No- OR09F2105		83.23
5		Bijay Kumar Mahakud		79.15

For Visiontek Consultancy Services Pvt.Ltd.

ANNEXURE-XI

LIST OF ENVIRONMENTAL MONITORING EQUIPMENT

Bamebari Iron and Manganese Mine, M/S TATA STEEL LIMITED

LIST OF ENVIRONMENTAL MONITORING EQUIPMENT		
Ambient Air Quality		
Sl.No.	Name of the Instrument	Parameter
1	Respirable Dust sampler	PM_{10}
2	Fine Particulate Sampler	$PM_{2.5}$
3	Spectrophotometer UV-Visible range	SO_2,NO_x
4	NDIR	CO
5	AAS	Manganese
Other Paraphernalia for analysis of air quality are also available in the laboratory.		
Water Quality		
Sl.No.	Name of the Instrument	Parameter
1	Analytical weighing Balance	Used for weighing the chemicals
2	Micro Balance	Used for weighing CRMs
3	AAS with VGA and Hallow cathode lamps	All Heavy metals (Arsenic, Mercury, Selenium, Cadmium, Chromium, Cobalt, Iron, Lead, Manganese, Zinc, Aluminium, etc..)
4	Spectrophotometer UV-Visible range	Nitrate, Nitrite, Sulphate, Chromium(VI),Fluoride, Cyanide, Phenolic compounds
5	Flame Photometer	Sodium ,Potassium
6	Ion Analyzer	Fluoride
7	BOD Incubator	BOD
8	COD Digester	COD
9	Furnace	Total volatile solids, Fixed solids
10	Hot Air Oven	Total Suspended Solids, Total Dissolved Solids
11	pH meter	pH
12	Conductivity meter	Conductivity
13	Turbidity Meter	Turbidity
14	Bacteriological Incubator	Total coli form and fecal coli form
15	Autoclave	sterilization
16	Microscope	Bacteriological colony count
17	Magnetic stirrer	Stirring purpose
18	Vacuum filtration unit	Rapid filtration
19	Water Bath	Boiling and evaporation purpose
20	Cadmium reduction column	Nitrate
21	Fluoride distillation unit	Fluoride
22	Kjeldal flask	Ammonia and Organic Nitrogen
23	Hot Plate	Digestion
24	Pizometer	Water level monitoring
25	Aquarium	Bio assay test

ANNEXURE-XII

ORGANIZATION STRUCTURE

Bamebari Iron and Manganese Mine, M/S TATA STEEL LIMITED