



Regd Post with A/D

Ref.No.: MGM/P&E/862/19

Date: 29/11/2019

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 April 2019 to September 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 April 2019 to September 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, Southern 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

TATA STEEL LTD.

Ferro Alloys & Minerals Division, Manganese Group of Mines, At/P.O.: Bichhakundi, Via: Joda,
Dist: Keonjhar Odisha – 758 034 Tel.: 9238101370, e-mail : mnminesadmin@tatasteel.com
Regd.Office : Bombay House, 24 Homi Modi Street, Mumbai – 400 001 Tel 912266658282, Fax 912266657724
Corporate Identity Number L27100MH1907PLC000260 website : www.tatasteel.com



M/s Tata Steel Limited

**Compliance report of Environmental Clearance for Bamebari Iron and Manganese Mine
(For the period from- April 2019 to September 2019)**

Reference letter from MoEF&CC, New Delhi- J-11015/85/2003-IA. II(M) DATED 17.11.2005

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.	<p>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.</p> <p>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.</p> <p>The mining operation and allied activities are confined within the approved diverted area only.</p>
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 April'19 to September' 19.
3	<p>OB and other wastes should be stacked at earmarked sites only and should not be kept active for long periods of time.</p> <p>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 garland drains. Retention/toe walls shall be provided at the base of the dumps.</p>	<p>OB and other wastes are being dumped as per approved Scheme of Mining.</p> <p>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.</p> <p>During April'19 to September'19, we have planted about 7150 Nos. of native species.</p> <p>Local forest species like Gambhari, Chakunda, Mahanimba, Sisu, Summerglow, Karanj etc were used for carrying out plantation in passive dumps.</p> <p>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.</p>

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	<p>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.</p> <p>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.</p>	<p>Existing catch drains and garland drains are covering the entire dump slope at low lying part.</p> <p>Size, gradient and length of the drains are adequate to take care of the peak flow.</p> <p>A series of check dams and settling pits have been provided for proper settlement of suspended solid in surface runoff.</p> <p>The garland drain, catch drains and sedimentation pits are periodically de-silted and maintained properly.</p>
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.	<p>Retaining wall and garland drain with the dimension as specified below, are provided to prevent the siltation and check the run-off.</p> <p><u>Dimension of the Retaining Wall:</u> Height - 1 to 1.2 mtr. Width - 1 mtr.</p> <p><u>Dimension of the Garland Drain:</u> Depth - 1.20 to 1.5 mtr. Width - 1 to 1.2 mtr.</p>
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 then with prior approval of MOEF this specific monitoring could be discontinued.	Samples have been analyzed in dust fall & soil for trace metal and the detail analysis result is enclosed as Annexure-I
8	Mineral and OB transportation shall be in trucks/dumpers covered with tarpaulins.	<p>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.</p> <p>All the trucks meant for transportation of mineral from mine to our captive plant & Railway Siding at</p>

	<p>Vehicular emissions should be kept under control and regularly monitored.</p> <p>Suitable measures should be taken to check fugitive emissions from haulage roads & transfer points, etc.</p>	<p>Joda is bearing the "Pollution under Control" certificate. The emissions are under control.</p> <p>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.</p> <p>The processed manganese ore is being transferred manually; hence there is less fugitive emission during transfer of ore.</p> <p>The report of Fugitive Dust emission during the period April'19 to September'19 are enclosed as Annexure-II.</p>
9	<p>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 / Agriculture Department. The density of the trees should be not less than 2500 plants per ha.</p>	<ul style="list-style-type: none"> • 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 7150 numbers of saplings and 16000 vetiver slips in the year 2019-20 upto September 2019. • The plantation includes the local species forest species like Gambhari, Chakunda, Mahanimba, Sisu, Summerglow, Karanj etc etc. • Tree density is maintained more than 2500 plants per ha.
10	<p>Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.</p>	<p>Ground water use permission has been obtained from CGWA NOC No. CGWA/NOC/MIN/ORIG/2018/3899, Dated.09.08.2018 @ 130cum/day and not exceeding 47450 cum in a year.</p>
11	<p>Mining will not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table.</p>	<p>Mining is not intersecting the ground water as the Ground water being at lower level in comparison to existing maximum quarry depth.</p>
12	<p>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</p>	<p>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.</p> <p>The ground water quality monitoring results and level recorded during the Pre-monsoon and</p>

	(November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the MoEF & CGWA quarterly.	monsoon seasons are enclosed as Annexure III & IV 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 - V & VI respectively.
14	"Consent to Operate" should be obtained from SPCB before expanding mining activities.	"Consent to operate" order no.117 vide letter no. 8917/ IND-I-CON-189 dated 29.08.2019 & 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/tasks should be earmarked in the Conservation Plan and shall not be 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.	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. 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. 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.
16	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.	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.

Sl.No	B: General Conditions	Compliance Status												
1	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	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.												
2	No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.	<p>Plan for production of Manganese Ore and excavation of waste has been prepared and is being strictly adhered to;</p> <p style="text-align: center;">Plan Vs. Actual (2019-20)</p> <table border="1" data-bbox="791 472 1382 837"> <thead> <tr> <th data-bbox="791 472 983 584"></th> <th data-bbox="983 472 1174 584">Plan (2019-20)</th> <th data-bbox="1174 472 1382 584">Actual (2019-20) upto Sept'19</th> </tr> </thead> <tbody> <tr> <td data-bbox="791 584 983 647">OB (cum)</td> <td data-bbox="983 584 1174 647">64347</td> <td data-bbox="1174 584 1382 647">57564.485</td> </tr> <tr> <td data-bbox="791 647 983 723">Production (MT)</td> <td data-bbox="983 647 1174 723">83,200</td> <td data-bbox="1174 647 1382 723">48004</td> </tr> <tr> <td data-bbox="791 723 983 837">Total Excavation (cum)</td> <td data-bbox="983 723 1174 837">103500</td> <td data-bbox="1174 723 1382 837">76766.085</td> </tr> </tbody> </table>		Plan (2019-20)	Actual (2019-20) upto Sept'19	OB (cum)	64347	57564.485	Production (MT)	83,200	48004	Total Excavation (cum)	103500	76766.085
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3	<p>Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM, SPM, SO₂, NO_x. monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.</p> <p>Data on ambient air quality (RPM, SPM, SO₂ & NO_x.) should be regularly submitted to the Ministry including its Regional office at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six. Months.</p>	<p>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.</p> <p>Samples are drawn twice in a week in core zone and once in a quarter in buffer zone to ascertain the 24hour monitoring average for PM₁₀, PM_{2.5}, SO₂ & NO_x, CO & Mn.</p> <p>It was observed that the environmental monitoring parameters are within the prescribed limits.</p> <p>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 April'19 to September '19 is enclosed as Annexure-VII.</p>												
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 &	<p>Effective water sprinkling by mobile water tanker is being done on haul roads.</p> <p>The Fugitive dust emissions monitoring done during the period April'19 to September'19 is enclosed as Annexure-II.</p>												

	unloading points should be provided and properly maintained.	
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.	<p>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.</p> <p>The details of noise monitoring for the period April'19 to September'19 are enclosed as Annexure-VIII.</p>
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 19 th May, 1993 and 31 st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	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. The details of wastewater analysis report for the period April'19 to September'19 are enclosed as Annexure-IX .
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.	<p>It is being done by M/s Visiontek Consultancy Service Pvt. Ltd. (Recognized as "A" category consultant as by State Pollution Control Board, Orissa).</p> <p>The type of pollution monitoring and analysis equipment used by M/s Visiontek Consultancy Service Pvt. Ltd. is enclosed as Annexure - X.</p>
9	<p>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.</p> <p>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.</p>	<p>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.</p> <p>Total 51 contractual employees and 03 departmental employees have undergone PME during April'19 to September'19.</p>

		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-XI .																		
11	The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.	Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose. The details of Proposed Expenditure for FY 2019-20 as per below: <table border="1" data-bbox="794 696 1481 1227"> <thead> <tr> <th>S.No.</th> <th>Activity</th> <th>Expenditure proposed for FY 2019-20</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Afforestation on Dump slopes</td> <td>182500</td> </tr> <tr> <td>2</td> <td>Construction of retaining wall</td> <td>93600</td> </tr> <tr> <td>3</td> <td>Construction of Garland drain, settling pits with check dam</td> <td>31200</td> </tr> <tr> <td>4</td> <td>Environmental monitoring</td> <td>1500000</td> </tr> <tr> <td></td> <td>Total</td> <td>1807300</td> </tr> </tbody> </table> <p>The cost incurring towards environmental monitoring and different environmental protection measures during the period 2019-20 shall be given in the next half yearly EC compliance report.</p>	S.No.	Activity	Expenditure proposed for FY 2019-20	1	Afforestation on Dump slopes	182500	2	Construction of retaining wall	93600	3	Construction of Garland drain, settling pits with check dam	31200	4	Environmental monitoring	1500000		Total	1807300
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12	The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports	We 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	This is applicable to State Pollution Control Board, Orissa.																		

	letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.	
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 Pollution) Act, 1991 along with their amendments and rules.	Noted

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

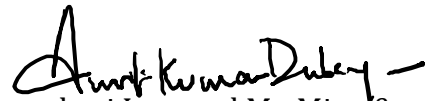
S.No.	Stipulated Condition	Compliance Status
1.	The project authority shall adopt best mining practices for given conditions in the mining area, adequate number of check dam, retaining wall/structure, garland drains and settling ponds should be provided to arrest the wash off with rain water in catchment 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 drain 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 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	Not Applicable. There is no grazing land within the M.L. area.

	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 conveyer 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 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.	Not Applicable. There is no crop land nearby the M.L. area.

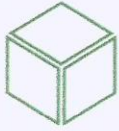
8.	In case any village is located within the mining leasehold which is not likely to be affected due to mining activities during the life of mine, the Expert Appraisal Committee (EAC) should consider the proposal of Environmental Clearance (EC) for reduced mining area. The mining lease may be executed 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 should be done through reputed Institutes.	Not Applicable
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/	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.

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 based 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.

Yours faithfully
F: TATA STEEL LTD



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



Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001:2008

ISO 14001:2004

OHSAS 18001:2007

Env/lab/19/R-4852

05.10.19

SOIL ANALYSIS REPORT

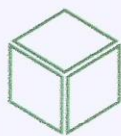
Sampling Location S-1:Near Bamebari Quarry

Sl No.	Parameters	Unit	Analysis Results	
			JUNE-19	SEPT-19
1	Cobalt as Co	%	0.0031	0.0038
2	Nickel as Ni	%	0.052	0.046
3	Mercury as Hg	%	<0.000002	<0.000002
4	Arsenic as As	%	<0.000002	<0.000002

DUST FALL MONITORING- JUNE & SEPT 2019

Date of Sampling	Total Dust Fall (t/km ² /month)	Analysis Result			
		Co (%)	Ni(%)	Hg(%)	As (%)
01.06.2019 to 30.06.2019	0.54	<0.001	<0.001	<0.001	<0.001
01.09.2019 TO 30.09.2019	0.48	<0.001	<0.001	<0.001	<0.001





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ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref.: Koulab/19/R-4850

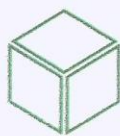
Date: 05.10.19

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FUGITIVE EMISSION MONITORING

L-1	Sampling Location Near Sorting Yard (Joribar Block)	NAAQ Standard 1200µg/m ³	Monitoring Date	Aug-19	Sept -19
	Method of Measurement Gravimetric Method				
L-2	Sampling Location Near Stack Yard (Joribar Block)	NAAQ Standard 1200µg/m ³	Monitoring Date	Aug-19	Sept -19
	Method of Measurement Gravimetric Method				
L-2	Sampling Location Near Haul Road (Joribar Block)	NAAQ Standard 1200µg/m ³	Monitoring Date	Aug-19	Sept -19
	Method of Measurement Gravimetric Method				





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

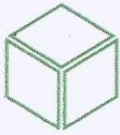
Ref.: Enn/lab/19/R-4846

Date: 05.10.19

GROUND WATER

Sampling Location: GW1: Palsa Village OW

Sl. No	Parameter	Unit	Standards as per IS: 10500, 2012	Analysis Result	
				June -19	Aug-19
Essential Characteristics					
1	Colour	Hazen	5	CL	CL
2	Odour	--	Agreeable	Agreeable	Agreeable
3	Taste	--	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	1	1.6	1.8
5	pH Value	--	6.5-8.5	7.44	7.51
6	Total Hardness (as CaCO ₃)	mg/l	300	112.0	136.0
7	Iron (as Fe)	mg/l	0.3	0.28	0.31
8	Chloride (as Cl)	mg/l	250	40.8	44.0
9	Residual, free Chlorine	mg/l	0.2	ND	ND
Desirable Characteristics					
10	Dissolved Solids	mg/l	500	188.0	210.0
11	Calcium (as Ca)	mg/l	75	41.2	40.8
12	Magnesium (as Mg)	mg/l	30	19.2	12.6
13	Copper (as Cu)	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	0.1	0.018	0.021
15	Sulphate (as SO ₄)	mg/l	200	5.2	5.6
16	Nitrate (as NO ₃)	mg/l	45	3.2	3.8
17	Fluoride (as F)	mg/l	1	0.021	0.026
18	Phenolic Compounds (as C ₆ H ₅ OH)	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	<0.01	<0.01
22	Arsenic (as As)	mg/l	0.01	<0.01	<0.01
23	Cyanide (as CN)	mg/l	0.05	ND	ND



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ISO 9001 : 2008
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Ref.:

Date:

24	Lead (as Pb)	mg/l	0.01	<0.01	<0.01
25	Zinc (as Zn)	mg/l	5	2.6	3.2
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	0.01	<0.01	<0.01
29	Alkalinity	mg/l	200	72.0	84.0
30	Aluminium as (Al)	mg/l	0.03	<0.01	<0.01
31	Boron (as B)	mg/l	0.5	<0.5	<0.5
32	Poly Aromatic Hydrocarbon as PAH	µg/l	<0.0001	<0.0001	<0.0001
33	Pesticide	mg/l	Absent	Absent	Absent





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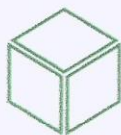
ISO 9001 : 2008
ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Env/ab/19/R-4247

Date: 05.10.19

GW2: Sandhy Guta BW

Sl. No	Parameter	Unit	Standards as per IS: 10500, 2012	Analysis Result	
				June-19	Aug-18
1	Colour	Hazen	5	CL	CL
2	Odour	--	U/O	Agreeable	Agreeable
3	Taste	--	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	1.2	1.6
5	pH Value	--	6.5-8.5	7.38	7.41
6	Total Hardness (as CaCO ₃)	mg/l	300	124.0	132.0
7	Iron (as Fe)	mg/l	0.3	0.29	0.34
8	Chloride (as Cl)	mg/l	250	51.2	60.2
9	Residual, free Chlorine	mg/l	0.2	ND	ND
Desirable Characteristics					
10	Dissolved Solids	mg/l	500	216.0	228.0
11	Calcium (as Ca)	mg/l	75	51.6	44.6
12	Magnesium (as Mg)	mg/l	30	24.6	26.2
13	Copper (as Cu)	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	0.1	0.021	0.026
15	Sulphate (as SO ₄)	mg/l	200	6.1	6.6
16	Nitrate (as NO ₃)	mg/l	45	2.6	2.8
17	Fluoride (as F)	mg/l	1	0.034	0.042
18	Phenolic Compounds (as C ₆ H ₅ OH)	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	0.01	<0.001	<0.001
21	Selenium (as Se)	mg/l	0.01	<0.001	<0.001
22	Arsenic (as As)	mg/l	0.05	<0.001	<0.001
23	Cyanide (as CN)	mg/l	0.05	ND	ND



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ISO 9001 : 2008

ISO 14001 : 2004

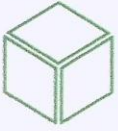
OHSAS 18001 : 2007

Ref.:

Date:

Sl. No.	Lead (as Pb)	mg/l	0.05	<0.001	<0.001
25	Zinc (as Zn)	mg/l	5	3.4	4.6
26	Anionic Detergents (as MBAS)	mg/l	0.2	<0.2	<0.2
27	Chromium (as Cr ⁺⁶)	mg/l	0.05	<0.05	<0.05
28	Mineral Oil	mg/l	0.01	<0.01	<0.01
29	Alkalinity	mg/l	200	86.6	94.2
30	Aluminium as(Al)	mg/l	0.03	<0.01	<0.01
31	Boron (as B)	mg/l	1	<0.5	<0.5
32	Poly Aromatic Hydrocarbon as PAH	µg/l	--	<0.0001	<0.0001
33	Pesticide	mg/l	Absent	Absent	Absent





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ISO 9001:2008
ISO 14001:2004
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Konulab/19/R-4853

05.10.19

GROUND WATER LEVEL ANALYSIS REPORT

GROUND WATER LEVEL ANALYSIS REPORT		
	Jun-19	Aug-19
SL.NO	Monitoring Date	Analysis Result (m/bgl)
1	Nimera Village	6.1
2	Bamebari BW	4.4





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ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref: Enufab/19/R-1205

Date: 03/07/19

GROUND WATER TRACE METALS ANALYSIS REPORT FOR THE MONTH OF JUNE-2019

1. Name of Industry : Bamebari Manganese Mines (M/s TATA Steel Limited)
2. Date of sampling : 17.06.2019
3. 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:B/W at Panchayat Office
1	Iron (as Fe)	APHA 3500Fe, B	mg/l	0.3	0.28
2	Copper (as Cu)	APHA 3111 B,C	mg/l	0.05	< 0.05
3	Manganese (as Mn)	APHA 3500Mn B	mg/l	0.1	0.018
4	Chromium (as Cr ⁺⁶)	APHA 3500Cr B	mg/l		< 0.05
5	Mercury (as Hg)	APHA 3500 Hg	mg/l	0.001	< 0.001
6	Cadmium (as Cd)	APHA 3111 B,C	mg/l	0.003	< 0.01
7	Selenium (as Se)	APHA 3114 B	mg/l	0.01	< 0.001
8	Arsenic (as As)	APHA 3114 B	mg/l	0.01	< 0.001
9	Lead (as Pb)	APHA 3111 B,C	mg/l	0.01	< 0.01
10	Zinc (as Zn)	APHA 3111 B,C	mg/l	5	2.6



For Visiontek Consultancy Services Pvt. Ltd



Ref.: Ennlab/19/R-3035

Date: 30.08.19

HEAVY METALS (GROUND WATER) ANALYSIS REPORT FOR THE MONTH OF AUGUST-2019

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW1: Bore Well at Panchayat Office**
3. Date of Sampling : **11.08.2019**
4. Date of Analysis : **12.08.2019 to 19.08.2019**
5. Sample Collected by : **VCSPL Representative in presence of TATA Representative**

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:2012 Amended on 2015 & 2018		Analysis Results
				Acceptable Limit	Permissible Limit	GW-1
1	Iron (as Fe)	By AAS Method APHA 23 RD Ed,2017: 3111, B	mg/l	1	No Relaxation	0.34
2	Copper (as Cu)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.05	1.5	< 0.05
3	Manganese (as Mn)	Persulfate Method APHA 23 RD Ed,2017: 3500Mn B	mg/l	0.1	0.3	0.012
4	Chromium (as Cr ⁺⁶)	Partition-Gravimetric Method APHA 23 RD Ed,2017: 5520 B	mg/l	---	---	< 0.05
5	Mercury (as Hg)	AAS Method APHA 23 RD Ed,2017: 3112 B	mg/l	0.001	No Relaxation	< 0.001
6	Cadmium (as Cd)	AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.003	No Relaxation	< 0.01
7	Selenium (as Se)	By AAS Method APHA 23 RD Ed,2017: 3500 Se C	mg/l	0.01	No Relaxation	< 0.001
8	Arsenic (as As)	By AAS Method APHA 23 RD Ed,2017: 3114 B	mg/l	0.01	No Relaxation	< 0.001
9	Lead (as Pb)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.01	No Relaxation	< 0.01
10	Zinc (as Zn)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	5	15	3.8





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ISO 9001 : 2008

ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Envilab/19/R-4843

05.10.19

Annexure – I : Surface Water Quality Monitoring at Bamebari Mn Mine (W1 : Confluence Point at Kasia Nallah and W2 : Intake Point at Tindharia)

Parameters	Unit	Standard	Bamebari (Confluence Point at Kasia Nallah)						
			April'19	May'19	June'19	July'19	Aug-19	Sept-19	
Dissolved Oxygen (minimum)	mg/l	4	5.9	5.6	5.53	5.4	5.3	5.1	
BOD (3) days at 27°C (max)	mg/l	3	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	
Total Coli form	MPN/100 ml	5000	260.0	220.0	173.33	180.0	120.0	110.0	
pH Value	--	6.0-9.0	7.52	7.46	7.57	7.56	7.51	7.46	
Colour (max)	Hazen	300	CL	CL	CL	4.0	CL	CL	
Total Dissolved Solids	mg/l	1500	156.0	158.0	157.33	151.8	154	148.0	
Copper as Cu (max)	mg/l	1.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Iron as Fe (max)	mg/l	0.5	0.58	0.61	0.48	0.39	0.32	0.21	
Chloride (max)	mg/l	600	38.0	33	58.07	61.2	61.2	60.6	
Sulphates (SO ₄) (max)	mg/l	400	4.6	5.1	3.03	3.8	3.2	3.0	
Nitrate as NO ₃ (max)	mg/l	50	2.1	2.04	2.53	2.6	2.2	2.1	
Fluoride as F (max)	mg/l	1.5	0.028	0.017	0.02	0.021	0.021	0.018	
Phenolic Compounds as C ₆ H ₅ OH (max)	mg/l	0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Cadmium as Cd (max)	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Selenium as Se (max)	mg/l	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
Arsenic as As	mg/l	0.2	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND	
Lead as Pb(max)	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Zinc as Zn(max)	mg/l	15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Hexa Chromium as Cr ⁺⁶	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	





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ISO 9001:2008

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Annex 19 R-4844

05.10.19

Bamebari (Intake Point at Tindharia)		Standards	April'19	May'19	June'19	July'19	Aug-19	Sept-19
Parameters	Unit		1st Report	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	4	6.2	6.03	6.03	6.1	6.2	5.6
BOD (3) days at 27°C (max)	mg/l	3	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Total Coli form	MPN/100 ml	5000	320.0	217.0	216.67	110	150	120
pH-Value	--	6.0-9.0	7.61	7.65	7.65	7.61	7.56	7.22
Colour (max)	Hazen	300	CL	CL	CL	2	CL	CL
Total Dissolved Solids	mg/l	1500	168	174.67	174.67	162.9	160.2	132
Copper as Cu (max)	mg/l	1.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron as Fe (max)	mg/l	0.5	0.62	0.42	0.42	0.36	0.34	0.56
Chloride (max)	mg/l	600	42.0	51.53	51.53	66.0	62.8	31
Sulphates (SO ₄) (max)	mg/l	400	5.8	3.33	3.33	4.2	3.6	5.1
Nitrate as NO ₃ (max)	mg/l	50	3.2	2.60	2.60	3.2	2.8	2.2
Fluoride as F (max)	mg/l	1.5	0.051	0.03	0.03	0.036	0.029	0.018
Phenolic Compounds as C ₆ H ₅ OH (max)	mg/l	0.005	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium as Cd (max)	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium as Se (max)	mg/l	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic as As	mg/l	0.2	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc as Zn(max)	mg/l	15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Hexa Chromium as Cr ¹⁶	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2





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ISO 9001 : 2008

ISO 14001 : 2004
OHSAS 18001 : 2007

Ref: *Envalab/19/R-484r*

Annexure – II AAQ Monitoring Name of the Mines : BAMEBARI MN.MINE, M/S TATA STEEL LTD.

Monthly Average	Office Building												
	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NOx ($\mu\text{g}/\text{m}^3$)	O ₃ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)	NH ₃ ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Mn ($\mu\text{g}/\text{m}^3$)
Apr-19	49.89	28.11	6.98	13.24	6.83	0.47	22.93	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
May-19	53.02	28.03	7.43	14.39	7.24	0.59	27.90	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jun-19	54.47	31.41	8.40	16.96	8.13	0.57	30.62	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-19	54.37	24.56	8.10	16.92	8.32	0.42	27.64	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-19	44.07	23.11	7.98	12.84	8.14	0.39	25.08	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-19	28.31	15.86	4.86	11.68	6.16	0.25	21.00	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

Mines Pit

Monthly Average	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NOx ($\mu\text{g}/\text{m}^3$)	O ₃ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)	NH ₃ ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Mn ($\mu\text{g}/\text{m}^3$)
Apr-19	67.60	35.75	10.91	14.45	6.68	0.65	22.83	<0.001	<0.01	<	<	<0.002	<0.001
May-19	77.09	35.26	11.72	16.52	7.02	0.64	24.48	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jun-19	82.09	33.28	12.13	16.16	7.66	0.76	24.20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-19	51.71	24.31	13.77	17.96	8.62	0.76	28.78	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-19	49.86	27.81	8.13	13.12	8.58	0.59	26.04	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-19	31.88	17.85	6.30	11.41	6.31	0.49	21.73	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

Weigh Bridge

Monthly Average	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	PM _{2.5} ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NOx ($\mu\text{g}/\text{m}^3$)	O ₃ ($\mu\text{g}/\text{m}^3$)	CO (mg/m^3)	NH ₃ ($\mu\text{g}/\text{m}^3$)	Pb ($\mu\text{g}/\text{m}^3$)	Ni (ng/m^3)	As (ng/m^3)	C ₆ H ₆ ($\mu\text{g}/\text{m}^3$)	BaP (ng/m^3)	Mn ($\mu\text{g}/\text{m}^3$)
Apr-19	67.46	41.94	6.68	15.35	5.0	0.58	23.94	<0.001	<0.01	<0.001	<0.001	<0.002	0.012
May-19	78.27	42.93	7.44	18.01	5.31	0.64	27.12	<0.001	<0.01	<0.001	<0.001	<0.002	0.014
Jun-19	70.57	35.41	6.94	17.08	6.54	0.68	24.08	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-19	46.0	20.09	8.70	20.36	8.19	0.83	26.90	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-19	46.59	26.14	8.50	11.84	8.03	0.64	27.07	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-19	34.8	19.5	4.6	9.2	8.4	0.41	21.2	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

Date: 05.10.19





Enulab/19/R-4849

AAQ (BUFFER ZONE) MONITORING REPORT

Jaganathpur

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn (µg/m ³)
Jun-19	58.8	36.2	7.4	10.2	<4	0.61	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-19	51.8	30.2	8.2	11.6	<4	0.66	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-19	45.8	22.6	8.1	10.8	<4	0.64	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-19	30.6	17.14	4.8	10.2	<4	0.44	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

Bandhubaria

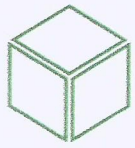
Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn (µg/m ³)
Jun-19	51.2	30.6	7.26	11.4	<4	0.66	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-19	52.6	30.8	8.6	10.8	<4	0.72	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-19	45.8	22.46	8.1	13.6	<4	0.64	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-19	38.2	21.39	5.2	10.6	<4	0.48	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

Raikara

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn (µg/m ³)
Jun-19	60.2	38.8	8.4	11.2	<4	0.71	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-19	51.6	30.8	9.2	10.6	<4	0.74	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-19	50.2	29.4	8.6	13.8	<4	0.59	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-19	26.6	14.90	4.8	9.8	<4	0.41	<20	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

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10.10.19





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Annexure-viii



ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

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5.10.2019

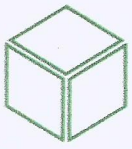
Complab/19/R-4857

AMBIENT NOISE REPORT

Location ID	Location Name	BAMEBARI MANGANESE MINES- JUNE 2019										CPCB Standard
		Day time Equivalent					Night time Equivalent					
		Noise Level in dB(A) leq					Noise Level in dB(A) leq					
		June-19	July-19	Aug-19	Sept-19	June-19	July-19	Aug-19	Sept-19			
N-1	Town ship	66.2	64.8	68.0	66.4	62.8	50.8	51.2	48.0	48.1	49.2	70
N-2	Hospital	44.4	46.2	48.0	44.9	46.0	38.8	39.2	34.2	36.8	39.0	40
N-3	Mines Area	72.8	70.8	66.2	65.4	61.9	50.4	50.6	49.6	48.6	42.6	70



For Visiontek Consultancy Services Pvt.Ltd



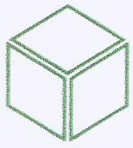
Enwlab/19/R-4858

05.10.2019

EQUIPMENT NOISE

Sl. No	Date	Name of Location	Unit	Day Time Result
1	28.06.2019	Near WTP	dB (A)	55.6
2		Near Workshop		61.2
3		Near STP		55.1
4		Office DG		88.4
5		OD-09A-6541(Truck)		84.1
6		OD-09N-9468(Truck)		82.9
7		Volvo EC 210 (Sovel-I)		85.2
8		Komatsu D-65E(Droger)		90.1
9		OD-09F-2105(Truck)		54.8
10		L&T Komastuk 260		60.2
11		Volvo EC 210BLC		56.2
12		OD09A56666		84.8
13		JH-05B9458		85.2
14		Volvo EC 212 BLC		84.2
15		OD-09F-2108(Truck)		84.6
16		STP		68.2
17	DG Set D-Quarry	82.6		
18	30.06.2019	Volvo -EC 300 DL-1	78.2	
19		Volvo-EC 360DL-2	79.2	
20		L&T Komstu	80.3	
21		Droger SD-13	83.2	
22		Water Tank	78.2	
23		Dumphper-OD-09C-1371	76.4	
24		Dumphper-OD-09C-1373	74.8	
25		Pump House	81.6	
26		L&T Komstu-(PC-200)	79.8	
27		Dumphper-OR-09P-9508	76.4	

EQUIPMENT NOISE

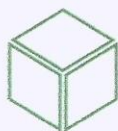


28	Dumpther-OR-09N-9463	78.2
29	Portable Pump House	64.8
30	Scene Big Machine	62.8
31	Komatsu (PC-200) L& T	75.6
32	Loader (TL 340 H)	71.8
33	Truck Running Near Plant	78.2
34	kobelco-01	78
35	Volvo-01	81
36	Truck TATA OR-09-A 6059	79
37	Truck TATA OR-09-C 1374	80

EQUIPMENT NOISE			
Sl. No	Date	Name of Location	Unit
1	21.09.2019	Near WTP	Day Time Result
2		Near Workshop	56.8
3		Near STP	69.6
4		Office DG	52.8
5		OD-09A-6541(Truck)	68.4 64.6



For Visiontek Consultancy Services Pvt.Ltd



Visiontek Consultancy Services Pvt. Ltd.

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ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref: Env/ab/19/R-4856Date: 05.10.19

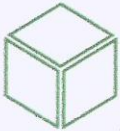
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OIL SEPARATION PIT ANALYSIS REPORT

WW1: Workshop Water

Sl.	Parameters	Unit	General Standards for discharge of Environmental Pollutants Part A-Effluents	Analysis Report		
				July-19	Aug-19	Sept-19
1	Colour	Hazen	5	CL	CL	CL
2	Odour	-	Unobjectionable	U/O	U/O	U/O
3	pH at 25 degree C	-	5.5-9.0	7.48	7.42	7.48
4	Total Dissolved Solids	mg/l	-	148	152	166
5	Copper as Cu	mg/l	3.0	<0.02	<0.02	<0.02
6	Fluoride as F	mg/l	2.0	0.026	0.028	0.031
7	Total Residual Chlorine	mg/l	1.0	ND	ND	ND
8	Iron as Fe	mg/l	3.0	0.66	0.58	0.66
9	Manganese as Mn	mg/l	2.0	1.26	1.18	1.12
10	Nitrate as NO ₃	mg/l	10.0	1.4	3.64	4.1
11	Phenolic Compounds as C ₆ H ₅ OH	mg/l	1.0	<0.05	<0.05	<0.05
12	Selenium as Se	mg/l	0.05	<0.001	<0.001	<0.001
13	Cadmium as Cd	mg/l	2.0	<0.001	<0.001	<0.001
14	Cyanide as CN	mg/l	0.2	ND	ND	ND
15	Lead as Pb	mg/l	0.1	<0.01	<0.01	<0.01
16	Mercury as Hg	mg/l	0.01	<0.001	<0.001	<0.001
17	Nickel as Ni	mg/l	3.0	<0.05	<0.05	<0.05
18	Arsenic as As	mg/l	0.2	<0.004	<0.004	<0.004
19	Total Chromium as Cr	mg/l	2.0	<0.05	<0.05	<0.05
20	Zinc as Zn	mg/l	5.0	<0.05	<0.05	<0.05
21	Hexavalent Chromium as Cr+6	mg/l	0.1	<0.01	<0.01	<0.01
22	Vanadium as V	mg/l	0.2	<0.001	<0.001	<0.001
23	Total Suspended Solids	mg/l	100	52.8	44.2	48.0
24	Temperature	0C	shall not exceed 50C above the receiving water temperature	28	28	26





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ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref.: Enwlab/19/R-4856

Date: 05.10.19

25	Dissolved Oxygen	mg/l	-	5.8	5.2	5.6
26	BOD	mg/l	30	<1.8	<1.8	<1.8
27	COD	mg/l	250	28	22	26
28	Oil & Grease	mg/l	10	ND	ND	ND
29	Ammonical Nitrogen as N	mg/l	50	ND	ND	ND
30	Total Kjeldahl Nitrogen as N	mg/l	100	1.8	1.7	1.8
31	Sulphide as S	mg/l	2.0	ND	ND	ND
32	Free Ammonia as NH3	mg/l	5.0	ND	ND	ND
33	Particulate Size of Suspended Solids	mg/l	850 µm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve	Passes through 850 mm IS Sieve
34	Bio-assay	mg/l	90% survival in 100% effluent	90% survival in 100% effluent	90% survival in 100% effluent	90% survival in 100% effluent
35	Dissolved Phosphates as PO4	mg/l	5.0	<0.05	<0.05	<0.05



ANNEXURE-X
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-XI
ORGANIZATION STRUCTURE
Bamebari Iron and Manganese Mine, M/S TATA STEEL LIMITED

