To,
The Additional Director
Ministry of Environment and Forests
Eastern Regional Office,
A/3, Chandrasekharpur
Bhubaneswar- 751023

Ref No: MGM/P&E/989 /2018
Date: 28.05.2018

Sub: Submission of Six monthly compliance report on implementation of environmental safeguards of Bamebari Manganese Mine, for the period from October' 17 to March'18.

Ref: Ministry of Environment and Forests Letter No: J-11015/85/2003-IA.II(M) dated 17.11.2005

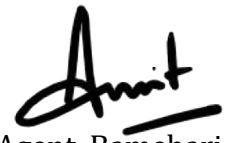
Dear Sir,

We are herewith submitting the six-monthly compliance report in respect of the stipulated environmental clearance conditions of Bamebari Manganese Mine for the period from October' 17 to March'18 as per EIA Notification, 2006.

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

Thanking you,

Yours faithfully
F: TATA STEEL LTD.



Agent, Bamebari Mn.Mine &

Head (Manganese Group of Mines), Joda

CC: Zonal Office Kolkata, Central Pollution Control Board
Encl: As above

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

COMPLIANCE REPORT PERIOD : Oct'17 to Mar'18

ENVIRONMENTAL CLEARANCE TO BAMEBARI 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 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 2015-16 to 2019-20 and has been approved by IBM vide letter no. MS/OTFM/32 -ORI/BHU/2014-15, dated 26.03.2015

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.	The mine has obtained the 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. Further, in accordance to the MoEF & CC Circular dated F.No.8-78/1996-FC, dated.10.03.2015, the forest area as on 25.10.1980 (i.e. Sabik Settlement) 66.126ha within the mining lease of 464 ha is now termed as forest land. Hence, fresh forest diversion proposal over an area of 303.066 ha (Sabik forest+ Balance forest) has been applied on 19.06.2016 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 was generated during the period of October'17 to March' 18. Most of the top soil generated earlier has been used for development of park and nursery within the lease-hold area and plantation in the inactive dump slopes within the mine. Some of top soil which is unused has been stacked at earmarked site. Proper step like grass spreading has been taken for preservation of soil.
3	OB and other wastes should be stacked at earmarked sites only and	OB and other wastes are being dumped as per approved Scheme of Mining.

	should not be kept active for long periods of time. Plantation should be taken up for soil stabilisation 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.	 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 2017-18, we have planted we have panted 8000 nos. of saplings in passive dumps over an area of 1.2 ha. Beside this 60,000 nos. of vetiver sapling were also planted in 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	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.

	rainfall/super cyclone period. A separate storm water sump for this purpose should be created.	
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.	In order to prevent the siltation and check the run-off, retaining wall and garland drain are provided with the dimension as; Dimension of the Retaining Wall : Height – 1 to 1.2 mtr. Width – 1 mtr. Dimension of the Garland Drain : 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 then with prior approval of MOEF this specific monitoring could be discontinued.	Samples have been analyzed in dust fall & soil for trace metal in the month of Oct'17 and Mar'18. The detail analysis result is enclosed as **Annexure-I (Dust Fall) & II (Soil)**
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 dumps located near the quarry itself within 1.5 Km. So, it is not in practice to cover the OB transportation trucks with tarpaulin. 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 Mn 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 around quarry, camp and

		weighbridge during the period Oct'17 to Mar'18 is enclosed as **Annexure-III**.
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 4.36 lakh nos. of sapling over an area of around 69.7 ha till 2017-18. • During the year 2017-18, 8000 nos. of saplings were planted in passive dump. Beside this around 40,000 nos. vetiver saplings were also planted in inactive dumps of Bamebari and Joribar pit during the year 2017-18. • 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 vide letter no. 21-4(297)/CGWA/SER/2010-168, Dt.15.02.2011 for 500 m^3 per day. However, after the notice from CGWA, we have applied for NOC for use of ground water vides our application no. 21-4/1194/OR/MIN/2017. Right now, it is under process. The ground water is not being used for mining and its allied activities.
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 level and quality monitoring results of the month Oct'17 and Mar'18 are enclosed as **Annexure IV & V** respectively
13	Trace metals such as Fe, Cr+6, Cu, Se,	Trace metals such as Fe, Cr^{6+}, Cu, Se, As,

	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.	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 – VI & VII 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 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 15.12.2005 with DFO, Keonjhar, Orissa being the contribution towards implementation of Wild Life Management Plan prepared for Bonai & Keonjhar division. We have also paid additional amount of Rs. 47,74,446 and Rs 1,06,72,000 with DFO, Keonjhar, Orissa towards differential payment for implementation of regional Wildlife Management Plan prepared for Bonai & Keonjhar division. Further, Site Specific wildlife management plan has been approved by PCCF, Bhubaneswar, Odisha and Chief Wildlife Warden Odisha.
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 2015-16 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	No change in mining technology and scope of working has been made at the mine. If

<table>
<tr><td></td><td>without prior approval of the Ministry of Environment & Forests.</td><td>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 (2017-18)<table><tr><td></td><td>Plan (2017-18)</td><td>Actual (Till Sept'17)</td></tr><tr><td>OB (cum)</td><td>3,90,044</td><td>99,900</td></tr><tr><td>Production (MT)</td><td>83,200</td><td>66,644</td></tr><tr><td>Total Excavation (cum)</td><td>4,30,000</td><td>1,31,262</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.

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.</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, Raikera

Samples are drawn twice in a week in core zone and once in a quarter in buffer zone to ascertain the 24 hour monitoring average for $PM_{10,}$ $PM_{2.5}$, So_2 & NOx, CO & Mn.
It was observed that,
a) PM_{10} varies from 56 µg/m^3 (Oct'17) to 80.3 µg/m^3 (Jan'18) near weighbridge area against the standard 100 µg/m^3.
b) PM_{10} varies from 51.1 µg/m^3 (Oct'17) to 75.8 µg/m^3 (Jan'18) near quarry area against the standard 100 µg/m^3.
c) PM_{10} varies from 47.4 µg/m^3 (Oct'17) to 67.17 µg/m^3 (Dec'17) in the camp against the standard 100 µg/m^3.
d) $PM_{2.5}$ varies from 25 µg/m^3 (Oct'17) to 38.5 µg/m^3 (Jan'18) near pit area against the standard 60 µg/m^3.
e) $PM_{2.5}$ varies from 22.9 µg/m^3 (Oct'17) to 33.7 µg/m^3 (Dec'17) near camp area against the standard 60 µg/m^3.
f) $PM_{2.5}$ varies from 28.1 µg/m^3 (Oct'17) to 40.9 µg/m^3 (Mar'18) near</td></tr>
</table>

		weighbridge against the standard 60 µg/m^3. g) SO_2 varies from 4.3 µg/m^3 (Oct'17) to 5.38 µg/m^3 (Dec'17) pit area against the standard 80 µg/m^3. h) SO_2 varies from 4.1 µg/m^3 (Oct'17) to 4.7 µg/m^3 (Jan'18 and Feb'18) near camp area against the standard 80 µg/m^3 i) SO_2 varies from 4.5 µg/m^3 (Oct'17) to 6 µg/m^3 (Feb'18 and Mar'18) in weighbridge against the standard 80 µg/m^3. j) NO_2 varies from 10.2 µg/m^3 (Oct'17) to 16.4 µg/m^3 (Mar'18) near pit area against the standard 80 µg/m^3. k) NO_2 varies from 10.02 µg/m^3 (Oct '17) to 14.8 µg/m^3 (Mar'18) near camp area against the standard 80 µg/m^3. l) NO2 varies from 12.3 µg/m3 (Oct '17) to 17.3 µg/m3 (Mar'18) in weighbridge against the standard 80 µg/m^3 m) CO varies from 0.26 mg/m^3 (Oct'17) to 0.44 mg/m^3 (Mar'18) near pit area against the standard 2 mg/m^3. n) CO varies from 0.22 µg/m^3 (Oct'17) to 0.39 µg/m^3 (Mar'18) in camp area against the standard 2 mg/m^3 o) CO varies from 0.3 µg/m^3 (Oct'17) to 0.47 µg/m^3 (Mar'18) in weighbridge against the standard 2 mg/m^3 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'17 to Mar'18 is enclosed as **Annexure – III**.
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	Effective water sprinkling by mobile water tanker is being done on haul roads. The Ambient air Quality monitoring done during the period Oct'17 to Mar'17 is enclosed as **Annexure – III.**

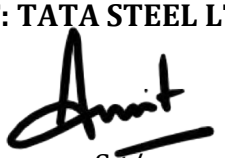
	and properly maintained.	
6	Adequate measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operations of HEMM, etc should be provided with ear plugs/ muffs.	Ear plugs & Ear muffs are provided to the workers working in drilling operations & DG operations. Rests of operations are below the noise levels of 80 dBA. The details of noise monitoring for the period Oct'17 to Mar'18 are enclosed as **Annexure-VIII.**
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 191b May, 1993 and 31 II 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 Equipments 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 **Annexure – IX.**
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 programmes 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. During the calendar year 2017, 59 number of employee (Contractual -59, Departmental- 0) went under IME and 45 employees underwent PME (Departmental-9, Contractual-36). 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-X**.
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. For the year 2017-18 Rs 5,68,750 was kept for the purpose of construction of parapet wall/ retaining wall at toe of dumps out of which Rs 9,91,107 was used. Rs 1,68,750 was kept for the purpose of construction of Garland drains, settling pits with check dam out of which 1,06,909 was used. Rs 1,25,000 was kept for the purpose of afforestation on dumps out of which Rs. 8,74,221 was used. The cost for construction of structural measures is more than expected as new areas were identified for the construction which was not envisaged during the preparation of budget. The cost for plantation is high as there was a significant increase in the wage of the labors. Rs. 15,00,000 was kept for the purpose of Environmental monitoring out of which 9,91,625 was used. The cost incurred in environment monitoring is less as rise in the price of environment monitoring was less than expected. We are doing the environment monitoring as per guidelines. Besides this measures are also being taken for dust suppression for which a cost Rs 4,51,669

		has been incurred.
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	Noted

	provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1991 along with their amendments and rules.	

Yours faithfully
F: TATA STEEL LTD



Sd/-
Agent, Bamebari Mn.Mine &
Head (Manganese Group of Mines), Joda

Annexure- I

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

Ref.: VCSPL/17/R-3115 Date: 04.12.2017

DUST FALL MONITORING REPORT FOR THE MONTH OF NOV-2017

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

Sl No.	Parameters	Unit	Analysis Results
			DF-1
1.	Cobalt as Co	%	<0.001
2.	Nickel as Ni	%	<0.001
3.	Mercury as Hg	%	<0.001
4.	Arsenic as As	%	<0.001

Total Dust fall for the month of Nov-2017=0.564 t/km^2/month

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744594, 3250790
Email:visiontekin@gmail.com,visiontekin@yahoo.co.in,visiontek@vcspl.org, Visit us at: www.vcspl.org
"Committed For The Better Environment"

Ref.: Env lab/18/R - 484 *Date:* 03.03.2018

DUST FALL MONITORING REPORT FOR THE MONTH OF FEB-2018

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

Sl No.	Parameters	Unit	Analysis Results
			DF-1
1.	Cobalt as Co	%	<0.001
2.	Nickel as Ni	%	<0.001
3.	Mercury as Hg	%	<0.001
4.	Arsenic as As	%	<0.001

Total Dust fall for the month of Feb-2018=1.196 t/km^2/month

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

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

Ref.: VCSPL/17/K-3118 *Date.:* 04.12.2017

SOIL QUALITY ANALYSIS REPORT FOR THE MONTH OF NOV-2017

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **S-1:** Near Bamebari Quarry
3. Date of Sampling : 27.11.2017
4. Date of Analysis : 28.11.2017 to 02.12.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl No.	Parameters	Unit	Analysis Results
			S-1
1.	Cobalt as Co	%	0.0020
2.	Nickel as Ni	%	0.045
3.	Mercury as Hg	%	<0.000002
4.	Arsenic as As	%	<0.000002

For ***Visiontek Consultancy Services Pvt. Ltd.***

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744594, 3250790
Email:visiontekin@gmail.com,visiontekin@yahoo.co.in,visiontek@vcspl.org, Visit us at: www.vcspl.org

Annexure –III

1.Bamebari Camp													
Monthly Average	**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-17	47.4	22.9	<4.1	<10.02	<4.0	0.22	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Nov-17	52.3	26.2	<4.3	11.6	<4.2	0.3	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Dec-17	67.17	33.78	4.61	13.69	6.64	0.36	22.59	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Jan-18	66.9	33.4	4.7	14	7.1	0.33	23	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Feb-18	67.1	33.5	4.7	14.7	7.5	0.35	23.8	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Mar-18	67.7	33.9	4.6	14.8	7.4	0.39	23	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Apr-18	54.11	26.59	4.65	13.76	7.16	0.30	23.10	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
AVERAGE	**60.38**	**30.04**	**4.65**	**13.76**	**7.16**	**0.32**	**23.10**	**< 0.001**	**< 0.01**	**< 0.001**	**< 0.001**	**< 0.002**	**<0.001**

2.Bamebari Mine Pit													
Monthly Average	**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-17	51.1	25	<4.3	<11.2	<4.0	0.26	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Nov-17	56.3	28.3	4.7	13.7	<4.6	0.35	<21.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Dec-17	71.51	36.11	5.38	15.51	7.68	0.42	24.77	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Jan-18	75.8	38.5	5.3	15.3	8.3	0.4	25.5	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Feb-18	74.4	37.4	5.4	16	10	0.41	27.1	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Mar-18	73.3	37	5.3	16.4	9.5	0.44	25.7	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
AVERAGE	**67.07**	**33.72**	**5.22**	**15.38**	**8.87**	**0.38**	**25.77**	**< 0.001**	**< 0.01**	**< 0.001**	**< 0.001**	**< 0.002**	**<0.001**

3.Bamebari Weigh Bridge													
Monthly Average	**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-17	56	28.1	4.5	12.3	<4.0	0.3	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Nov-17	61.5	31.1	5	14.4	<5.2	0.39	<22.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Dec-17	74.7	37.72	5.71	16.04	7.93	0.45	26.58	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Jan-18	80.3	40.8	5.7	16.1	9.2	0.43	27.4	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Feb-18	79.2	41	6	16.8	11.3	0.44	29.6	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
Mar-18	79.3	40.9	6	17.3	10.9	0.47	28.9	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	**<0.001**
AVERAGE	**71.83**	**36.60**	**5.49**	**15.49**	**9.83**	**0.41**	**28.12**	**< 0.001**	**< 0.01**	**< 0.001**	**< 0.001**	**< 0.002**	**<0.001**

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(An Enviro Engineering Consulting Cell)
ISO 14001:2004
ISO 9001: 2008
OHSAS 18001:2007

Ref.: VCSPL/17/R - 3114 Date: 04.12.2017

GROUND WATER (LEVEL) QUALITY ANALYSIS REPORT FOR THE MONTH OF NOV-2017

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1:** Nimera Village **GW-2:** Bababari
3. Label measured by : VCSPL Representative in presence of TATA Representative

Sl. No	Date of Sampling	Name of Village	Unit	Result
1	17.11.2017	Nimera Village	Mt./bgl	3.3
2	17.11.2017	Bababari	Mt./bgl	3.6

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For Visiontek Consultancy Services Pvt. Ltd.

Ref.: Env lab/18/R-485

Date: 03.03.2018

GROUND WATER (LEVEL) QUALITY ANALYSIS REPORT FOR THE MONTH OF FEB-2018

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1:** Nimera Village **GW-2:** Bababari
3. Label measured by : VCSPL Representative in presence of TATA Representative

Sl. No	Date of Sampling	Name of Village	Unit	Result
1	14.02.2018	Nimera Village	Mt./bgl	9.5
2	14.02.2018	Bababari	Mt./bgl	11.2

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For Visiontek Consultancy Services Pvt. Ltd.

Annexure-V

Visiontek Consultancy Services Pvt.Ltd.

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

Ref.: VCSPL/171R-3236 Date.: 04:12:2017

GROUND WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF NOV-2017

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Borewell at Panchayat Office**
   GW-2: Open Well at Nimera Village
3. Date of sampling : 18.11.2017
4. Date of analysis : 20.11.2017 to 25.11.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results	
					GW-1	GW-2
Essential Characteristics						
1	Colour	APHA 2120 B, C	Hazen	**5**	CL	CL
2	Odour	APHA 2150 B	--	**U/O**	U/O	U/O
3	Taste	APHA 2160 C	--	**Agreeable**	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	**5**	<0.2	<0.2
5	pH Value	APHA 4500H^+ B	--	**6.5-8.5**	7.26	7.18
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	**300**	150.0	138.0
7	Iron (as Fe)	APHA 3500Fe, B	mg/l	**0.3**	0.22	0.24
8	Chloride (as Cl)	APHA 4500Cl^- B	mg/l	**250**	38.0	34.0
9	Residual, free Chlorine	APHA 4500Cl, B	mg/l	**0.2**	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	**500**	229.0	211.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	**75**	40.9	38.1
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	**30**	11.7	10.4
13	Copper (as Cu)	APHA 3111 B,C	mg/l	**0.05**	<0.05	<0.05
14	Manganese (as Mn)	APHA 3500Mn B	mg/l	**0.1**	0.011	0.09
15	Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	**200**	4.8	5.4
16	Nitrate (as NO_3)	APHA 4500 NO_3^- E	mg/l	**45**	1.78	2.2
17	Fluoride (as F)	APHA 4500F^- C	mg/l	**1.0**	0.014	0.018
18	Phenolic Compounds (as C_6H_5OH)	APHA 5530 B,D	mg/l	**0.001**	<0.001	<0.001
19	Mercury (as Hg)	APHA 3500 Hg	mg/l	**0.001**	<0.001	<0.001
20	Cadmium (as Cd)	APHA 3111 B,C	mg/l	**0.01**	<0.001	<0.001
21	Selenium (as Se)	APHA 3114 B	mg/l	**0.01**	<0.001	<0.001
22	Arsenic (as As)	APHA 3114 B	mg/l	**0.05**	<0.001	<0.001
23	Cyanide (as CN)	APHA 4500 CN^- C,D	mg/l	**0.05**	ND	ND
24	Lead (as Pb)	APHA 3111 B,C	mg/l	**0.05**	<0.001	<0.001
25	Zinc (as Zn)	APHA 3111 B,C	mg/l	**5**	<0.05	<0.05
26	Anionic Detergents (as MBAS)	APHA 5540 C	mg/l	**0.2**	<0.2	<0.2
27	Chromium (as Cr^{+6})	APHA 3500Cr B	mg/l	**0.05**	<0.05	<0.05
28	Mineral Oil	APHA 5220 B	mg/l	**0.01**	<0.01	<0.01
29	Alkalinity	APHA 2320 B	mg/l	**200**	135.0	126.0
30	Aluminium as(Al)	APHA 3500Al B	mg/l	**0.03**	<0.001	<0.001
31	Boron (as B)	APHA 4500B, B	mg/l	**1**	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	APHA 6440 B	µg/l	--	<0.001	<0.001
33	Pesticide	APHA 6630 B,C	mg/l	**Absent**	Absent	Absent

Note: CL : Colourless, AL: Agreeable, U/O : Unobjectionable, ND:Not Detected.

*For **Visiontek Consultancy Services Pvt. Ltd.***

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744594, 3250790
Email:visiontekin@gmail.com,visiontekin@yahoo.co.in,visiontek@vcspl.org, Visit us at: www.vcspl.org

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Ref.: Env lab/18/R - 477 Date: 03.03.2018

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

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Borewell at Panchayat Office**
   GW-2: Open Well at Nimera Village
3. Date of sampling : 14.02.2018
4. Date of analysis : 15.02.2017 to 21.02.2018
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results	
					GW-1	GW-2
Essential Characteristics						
1	Colour	APHA 2120 B, C	Hazen	**5**	CL	CL
2	Odour	APHA 2150 B	--	**U/O**	U/O	U/O
3	Taste	APHA 2160 C	--	**Agreeable**	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	**5**	<0.2	<0.2
5	pH Value	APHA 4500H^+ B	--	**6.5-8.5**	7.34	7.28
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	**300**	155.0	144.0
7	Iron (as Fe)	APHA 3500Fe, B	mg/l	**0.3**	0.24	0.23
8	Chloride (as Cl)	APHA 4500Cl^- B	mg/l	**250**	41.0	36.0
9	Residual, free Chlorine	APHA 4500Cl, B	mg/l	**0.2**	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	**500**	240.0	220.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	**75**	42.9	39.7
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	**30**	11.7	10.9
13	Copper (as Cu)	APHA 3111 B,C	mg/l	**0.05**	<0.05	<0.05
14	Manganese (as Mn)	APHA 3500Mn B	mg/l	**0.1**	0.013	0.011
15	Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	**200**	5.1	5.2
16	Nitrate (as NO_3)	APHA 4500 NO_3^- E	mg/l	**45**	1.84	1.98
17	Fluoride (as F)	APHA 4500F^- C	mg/l	**1.0**	0.016	0.017
18	Phenolic Compounds (as C_6H_5OH)	APHA 5530 B,D	mg/l	**0.001**	<0.001	<0.001
19	Mercury (as Hg)	APHA 3500 Hg	mg/l	**0.001**	<0.001	<0.001
20	Cadmium (as Cd)	APHA 3111 B,C	mg/l	**0.01**	<0.001	<0.001
21	Selenium (as Se)	APHA 3114 B	mg/l	**0.01**	<0.001	<0.001
22	Arsenic (as As)	APHA 3114 B	mg/l	**0.05**	<0.001	<0.001
23	Cyanide (as CN)	APHA 4500 CN^- C,D	mg/l	**0.05**	ND	ND
24	Lead (as Pb)	APHA 3111 B,C	mg/l	**0.05**	<0.001	<0.001
25	Zinc (as Zn)	APHA 3111 B,C	mg/l	**5**	<0.05	<0.05
26	Anionic Detergents (as MBAS)	APHA 5540 C	mg/l	**0.2**	<0.2	<0.2
27	Chromium (as Cr^{+6})	APHA 3500Cr B	mg/l	**0.05**	<0.05	<0.05
28	Mineral Oil	APHA 5220 B	mg/l	**0.01**	<0.01	<0.01
29	Alkalinity	APHA 2320 B	mg/l	**200**	144.0	134.0
30	Aluminium as(Al)	APHA 3500Al B	mg/l	**0.03**	<0.001	<0.001
31	Boron (as B)	APHA 4500B, B	mg/l	**1**	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	APHA 6440 B	µg/l	--	<0.001	<0.001
33	Pesticide	APHA 6630 B,C	mg/l	**Absent**	Absent	Absent

Note: CL : Colourless, AL: Agreeable, U/O : Unobjectionable, ND:Not Detected.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

For Visiontek Consultancy Services Pvt. Ltd.

Annexure VI

Visiontek Consultancy Services Pvt.Ltd.
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ISO 14001:2004
ISO 9001: 2008
OHSAS 18001:2007

Ref: VCSPL/17/R-3237 Date: 04.12.2017

GROUND WATER (TRACE METAL) QUALITY ANALYSIS REPORT FOR THE MONTH OF NOV-2017

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Borewell at Panchayat Office**
3. Date of sampling : 18.11.2017
4. Date of analysis : 20.11.2017 to 25.11.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results
					GW-1
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**	0.009
4	Chromium (as Cr^{+6})	APHA 3500Cr B	mg/l	**0.05**	< 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	**0.01**	< 0.01
7	Selenium (as Se)	APHA 3114 B	mg/l	**0.01**	< 0.001
8	Arsenic (as As)	APHA 3114 B	mg/l	**0.05**	< 0.001
9	Lead (as Pb)	APHA 3111 B,C	mg/l	**0.05**	< 0.01
10	Zinc (as Zn)	APHA 3111 B,C	mg/l	**5**	<0.05

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744594, 3250790
Email:visiontekin@gmail.com,visiontekin@yahoo.co.in,visiontek@vcspl.org, Visit us at: www.vcspl.org
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Ref.: Env lab/18/R - 478 *Date:* 03.03.2018

GROUND WATER (TRACE METAL) QUALITY ANALYSIS REPORT FOR THE MONTH OF FEB-2018

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Borewell at Panchayat Office**
3. Date of sampling : 14.02.2018
4. Date of analysis : 15.02.2018 to 20.02.2018
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results
					GW-1
1	Iron (as Fe)	APHA 3500Fe, B	mg/l	**0.3**	0.27
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**	0.014
4	Chromium (as Cr^{+6})	APHA 3500Cr B	mg/l	**0.05**	< 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	**0.01**	< 0.01
7	Selenium (as Se)	APHA 3114 B	mg/l	**0.01**	< 0.001
8	Arsenic (as As)	APHA 3114 B	mg/l	**0.05**	< 0.001
9	Lead (as Pb)	APHA 3111 B,C	mg/l	**0.05**	< 0.01
10	Zinc (as Zn)	APHA 3111 B,C	mg/l	**5**	<0.05

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Annexure VII

SURFACE WATER QUALITY ANALYSIS REPORT OCT 17 TO MARCH 18										
Sampling Location:SW-1: Confluence Point at Kassia Nallah										
Sl. No	**Parameter**	**Unit**	**Standard as per IS:2296:1992, Class'C'**	Oct		Nov	Dec	Jan	Feb	March
1	Dissolved Oxygen (minimum)	mg/l	**4**	5.8	6.2	5.8	5.5	5.2	5.7	5.2
2	BOD (3) days at 270C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
3	Total Coli form	MPN/100 ml	**5000**	410	370	450	410	210	210	310
4	pH Value		**6.0-9.0**	7.19	7.28	7.24	7.32	7.35	7.39	7.28
5	Colour (max)	Hazen	**300**	5	3	1	CL	CL	CL	CL
6	Total Dissolved Solids	mg/l	**1500**	114	116	122	127	134	130	135.0
7	Copper as Cu (max)	mg/l	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	**0.5**	0.46	0.5	0.46	0.48	0.5	0.46	0.42
9	Chloride (max)	mg/l	**600**	22	23	24	23	26	27	31.0
10	Sulphates (SO4) (max)	mg/l	**400**	4.1	4.3	4.5	4.1	4.4	4.2	5.1
11	Nitrate as NO3 (max)	mg/l	**50**	1.5	1.6	1.7	1.6	1.8	1.6	1.84
12	Fluoride as F (max)	mg/l	**1.5**	0.016	0.014	0.016	0.018	0.021	0.019	0.022
13	Phenolic Compounds as C6H5OH (max)	mg/l	**0.005**	<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
15	Selenium as Se (max)	mg/l	**0.05**	<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
17	Cyanide as CN (max)	mg/l	**0.05**	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
19	Zinc as Zn(max)	mg/l	**15**	<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
21	Anionic Detergents (max)	mg/l	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

SURFACE WATER QUALITY ANALYSIS REPORT OCT 17 TO MARCH 18										
Sampling Location:SW-2 : Intake point at Tindharia										
Sl. No	**Parameter**	**Unit**	**Standard as per IS:2296:1992, Class'C'**	Oct		Nov	Dec	Jan	Feb	March
1	Dissolved Oxygen (minimum)	mg/l	**4**	6.1	6.3	5.9	5.4	5.6	5.5	5.4
2	BOD (3) days at 270C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
3	Total Coli form	MPN/100 ml	**5000**	450	450	510	470	220	270	450
4	pH Value		**6.0-9.0**	7.24	7.26	7.28	7.36	7.4	7.45	7.22
5	Colour (max)	Hazen	**300**	5	3	1	CL	CL	CL	CL
6	Total Dissolved Solids	mg/l	**1500**	112	119	125	129	138	140	138.0
7	Copper as Cu (max)	mg/l	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	**0.5**	0.52	0.47	0.44	0.48	0.52	0.49	0.45
9	Chloride (max)	mg/l	**600**	20	22	26	25	29	32	33.0
10	Sulphates (SO4) (max)	mg/l	**400**	4.2	4.3	4.4	4.5	5.6	4.9	5.2
11	Nitrate as NO3 (max)	mg/l	**50**	1.4	1.5	1.6	1.7	2.1	2.2	1.92
12	Fluoride as F (max)	mg/l	**1.5**	0.015	0.016	0.018	0.017	0.022	0.023	0.024
13	Phenolic Compounds as C6H5OH (max)	mg/l	**0.005**	<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
15	Selenium as Se (max)	mg/l	**0.05**	<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
17	Cyanide as CN (max)	mg/l	**0.05**	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
19	Zinc as Zn(max)	mg/l	**15**	<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
21	Anionic Detergents (max)	mg/l	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

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

Ref: VC&PL/17/R-3117 Date: 04.12.2017

NOISE MONITORING REPORT FOR THE MONTH OF NOV-2017

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Recorded By : VCSPL Representative in presence of TATA Representative.

AAQ				Day Time	Night Time
Sl. No	Date	Name of Location	Unit	Result	
1	27.11.2017	Township	db	54.8	45.1
2		Hospital		48.0	31.2
3		Mines Area		60.6	32.9
CPCB Standard				**75**	**70**

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

*For **Visiontek Consultancy Services Pvt. Ltd.***

Ref.: Env lab/18/R-482 *Date:* 03.03.2018

NOISE MONITORING REPORT FOR THE MONTH OF FEB-2018

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Recorded By : VCSPL Representative in presence of TATA Representative

AAQ				Day Time	Night Time
Sl. No	**Date**	**Name of Location**	**Unit**	**Result**	
1	**15.02.2018**	Township	**db**	52.7	40.3
2		Hospital		44.5	32.2
3		Mines Area		61.3	43.6
CPCB Standard				**75**	**70**

For Visiontek Consultancy Services Pvt. Ltd.

Annexure - IX

LIST OF ENVIRONMENTAL MONITORING EQUIPMENT

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 – X
Organizational Structure