



Regd Post with A/D

Ref.No.: MGM/P&E/ 863 /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 Tiringpahar 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 Tiringpahar 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](mailto: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, Tiringpahar Iron and Manganese Mine &  
Head, Manganese Gr. of Mines  
Ferro Alloys & Minerals Division, Joda.

Encl: as above.

Copy to :

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

**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](mailto: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](http://www.tatasteel.com)



## **M/s Tata Steel Limited**

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

**Reference letter from MoEF&CC, New Delhi- J-11015/87/2004-IA. II (M) DATED 17.11.2005**

<b>Sl. No</b>	<b>A: Specific conditions</b>	<b>Compliance status</b>
1	Mining shall not be undertaken in areas of forestland within the lease without the necessary approvals / forestry clearance.	<p>The mine has obtained forest clearance over 52.348 ha vide MoEF's letter No 8-80/2004-FC dt 28.03.2007.</p> <p>Further, as per MoEF &amp; CC Circular dated F.No.8-78/1996-FC, dated 10.03.2015, an area of 64.260 ha. of non-forest land was recorded as forest in Govt. records as on 25.10.1980. Hence, forest diversion proposal over an area of 80.826 ha (Sabik forest + Balance forest) has been applied on 19.06.2016 and on dated 02.08.2019 the Government of India, Ministry of Environment, Forest and Climate Change (FC division) vide F.No.8-01/2019-FC accorded In-Principle approval / Stage-I Clearance with conditions. The compliance to the Stage-I conditions are 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.	Agreed. Topsoil stacked properly at earmarked site whenever generated and in need used for plantation in mines.
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 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.</p>	<p>OB and other waste 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 local species.</p> <p>The inactive portion of OB dumps area being stabilized by plantation of fast growing species.</p>

		<p>Total 6000 Nos of saplings and 49400 nos of vetiver slips have been planted during FY 2019-20 upto September.</p> <p>The local forest species like Gambhari, Chakunda, Mahanimba, Sisu, etc) were planted.</p> <p>The retaining wall and garland drain with sedimentation pit at corners near toe of OB dump at maximum places has been constructed. Their dimensions are matching the requirements to arrest effectively the run off.</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. Garland drains (size, gradient &amp; 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.</p> <p>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. The catch drains and sedimentation pits are periodically de-silted and maintained properly.</p> <p>Size, gradient and length of the drains will be adequate to take care of the peak flow.</p> <p>The retaining wall and garland drain with sedimentation pit at corners near toe of OB dump at maximum places has been constructed. Their dimensions are matching the requirements to arrest effectively the run off.</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>In order to prevent the siltation and check the run-off, retaining wall and garland drain are provided with the dimension as;</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.	<p>Samples have been analyzed in dust fall &amp; soil for trace metal.</p> <p>The detail analysis result is enclosed as <b>Annexure-I.</b></p>

8	<p>Mine Mineral and OB transportation shall be in trucks/dumpers covered with tarpaulins.</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 &amp; transfer points, etc.</p>	<p>The trucks are 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.</p> <p>All the trucks meant for transportation of mineral from mine to our captive plant &amp; Railway Siding at Joda is bearing the “Pollution under Control” certificate. The emissions are under control.</p> <p>Provision of water sprinkling by mobile water sprinklers to suppress fugitive emission from haul roads and other potential area like OB dump and stack yard has been made.</p> <p>The processed manganese ore is being transferred manually; hence there is no fugitive emission during transfer of ore.</p> <p>The Fugitive dust emissions monitoring Report of Tiringpahar Mine is attached in <b>Annexure II.</b></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>	<p>Total 6000 Nos of saplings over OB dump and 1080 nos of saplings as green belt development around the ML area. Also, 49400 vetiver slips have been planted during FY 2019-20 upto September.</p> <p>Tree density is maintained at the rate of 2500 saplings per ha.</p> <p>The plantation includes the local species like Gambhari, Chakunda, Mahanimba, Sisu, etc.</p>
10	<p>Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.</p>	<p>The ground water is not being used for mining and its allied activities.</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</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 &amp;</p>

	<p>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 Ministry of Environment &amp; Forests and the Central Ground Water Authority quarterly.</p>	<p>quality at existing well at nearby villages is being monitored.</p> <p>The ground water level and quality monitoring results are enclosed as <b>Annexure III &amp; IV</b> respectively.</p>
13	<p>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.</p>	<p>Trace metals such as Fe, Cr+6, Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water (downstream &amp; upstream) and ground water at lower elevation is being periodically monitored by referring to the standards as per BIS: 10500.</p> <p>The details of analysis result for surface water and ground water with standards are enclosed as <b>Annexure-V &amp; VI</b> respectively.</p>
14	<p>"Consent to Operate" should be obtained from SPCB before expanding mining activities.</p>	<p>"Consent to operate" has been obtained from State Pollution Control Board, Orissa vide Order no.115 issued by letter no. 8915 / IND-I-CON-190 dated 29.08.2019 &amp; it is valid up to 31.03.2021.</p>
15	<p>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 &amp; forests, RO, Bhubaneswar.</p>	<p>We have deposited Rs.25,20,385/- on 14.12.2005 vide SBI DD No -062994 being the contribution towards implementation of Wild Life Management Plan prepared for Bonai &amp; Keonjhar division.</p> <p>Further, as per subsequent demand raised by the forest department, additional amount of Rs. 859615.00 on 27.03.2013 vide SBI DD No.657488 and Rs 38,87,000.00 through RTGS bearing UTR No. HDFCR52015073005436903 on dated 30.07.2015 towards differential payment for implementation of regional Wildlife Management Plan prepared for Bonai &amp; Keonjhar division and the same has been intimated to the DFO, Keonjhar.</p> <p>Further, Site Specific Wildlife Management Plan has been approved as per the new guidelines vide Memo No. 7724 /1 WL-SSP-94/2015 dated 03.08.2015.</p> <p>Further, we have deposited an amount of Rs. 2,40,47,000/- dated 09.03.2018 in respect of Tiringpahar Iron &amp; Mn. Mine through NEFT mode towards SSWLCP in Odisha CAMPA vide Ref. No. SBINR5201803900004322.</p>

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.	Scheme of Mining along with progressive mine closure plan for the period from 2014-15 to 2019-20 has been approved by Indian Bureau of Mine (IBM) and modified Mining plan for period 2018-19 to 2019-20 approved by IBM vide letter no. MSM/FM/11-ORI/BHU/2018-19/720 Dt. 03/07/2018.  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.												
<b>Sl.No.</b>	<b>B : General Conditions</b>	<b>Compliance Status</b>												
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.	Plan for production of Manganese Ore and excavation of waste has been prepared and is being strictly adhered. The actual figures achieved during FY 2019-20 upto September against plan for the year 2019-20 is given below. <table border="1" data-bbox="874 1093 1465 1473"> <thead> <tr> <th data-bbox="874 1093 1066 1249">Year 2019-20</th> <th data-bbox="1066 1093 1257 1249">Plan (2019-20)</th> <th data-bbox="1257 1093 1465 1249">Actual upto September' 19</th> </tr> </thead> <tbody> <tr> <td data-bbox="874 1249 1066 1361">Total Excavation (cum)</td> <td data-bbox="1066 1249 1257 1361">466931</td> <td data-bbox="1257 1249 1465 1361">121149.673</td> </tr> <tr> <td data-bbox="874 1361 1066 1406">OB (cum)</td> <td data-bbox="1066 1361 1257 1406">426931</td> <td data-bbox="1257 1361 1465 1406">103504.073</td> </tr> <tr> <td data-bbox="874 1406 1066 1473">Production (MT)</td> <td data-bbox="1066 1406 1257 1473">85000</td> <td data-bbox="1257 1406 1465 1473">44114</td> </tr> </tbody> </table>	Year 2019-20	Plan (2019-20)	Actual upto September' 19	Total Excavation (cum)	466931	121149.673	OB (cum)	426931	103504.073	Production (MT)	85000	44114
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3	Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM. SPM, SO <sub>2</sub> , NO <sub>x</sub> . 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, SO <sub>2</sub> & NO <sub>x</sub> .) should be regularly submitted to the Ministry including its Regional office at Bhubaneshwar and the State Pollution	Five ambient air quality monitoring stations have been established out of which 2 nos. in core zone (Near Purnapani Quarry and Near Guruda mining area) & 3 nos. in buffer zone (at Jaribahal, Palasa & Balda).  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 PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> & NO <sub>x</sub> , CO & Mn.  It was observed that the environmental parameters are within the prescribed limit.												

	Control Board / Central Pollution Control Board once in six months.	The report of ambient air quality monitoring for every month is submitted to State Pollution Control Board on monthly basis. Abstract of the monthly monitoring data on ambient air quality is enclosed as <b>Annexure - VII.</b>
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 being practiced where ever required.
5	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul roads, wagon loading, dumpers/ trucks, loading & unloading points should be provided and properly maintained.	Effective water sprinkling by mobile water tanker is being done on haul roads.  The Fugitive dust emissions monitoring Report of Tiringpahar Mine is attached in <b>Annexure II.</b>
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.  Noise monitoring done during the period April'19 to September'19 is attached in <b>Annexure VIII.</b>
7	In 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.	No infrastructural facility has been installed for equipment/ vehicle within the lease hold area. The equipment and vehicles deployed in the mine are maintained at Bamebari Mn. Mines which is under same management control. The oil separation system has been provided at workshop at Bamebari and working effectively.
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 <b>Annexure - IX.</b>
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.	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.

	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>Periodical Medical Examination of employees (departmental &amp; contractual) are conducted as per prescribed norms of Mines Rule, 1955. The initial and periodical examination includes blood haematology, 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>During FY 2019-20 upto September, PME was conducted for 27 contractual employees and 02 departmental employees.</p> <p>There are no findings of pneumoconiosis and manganese poisoning which is classified as occupational disease.</p>																					
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.	<p>The department is in place and the Head of the department is reporting to General Manager of the division.</p> <p>The organizational structure in place is enclosed as <b>Annexure-X</b>.</p>																					
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.	<p>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:</p> <table border="1"> <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>Construction of parapet wall/ retaining wall at toe of dumps</td> <td>715500</td> </tr> <tr> <td>2</td> <td>Construction of check dams long the slope of valleys etc.</td> <td>110530</td> </tr> <tr> <td>3</td> <td>Construction of settling ponds (Garland drains etc.).</td> <td>30300</td> </tr> <tr> <td>4</td> <td>Environmental monitoring</td> <td>1500000</td> </tr> <tr> <td>5.</td> <td>Afforestation</td> <td>93125</td> </tr> <tr> <td></td> <td>Total</td> <td>2449455</td> </tr> </tbody> </table>	S.No.	Activity	Expenditure proposed for FY 2019-20	1	Construction of parapet wall/ retaining wall at toe of dumps	715500	2	Construction of check dams long the slope of valleys etc.	110530	3	Construction of settling ponds (Garland drains etc.).	30300	4	Environmental monitoring	1500000	5.	Afforestation	93125		Total	2449455
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		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.
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 shall extend to full co-operation to the officers of the Regional Office by furnishing the requisite date/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, Jajang 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 <a href="http://envfor.nic.in">http://envfor.nic.in</a> 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 Tiringpahar 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

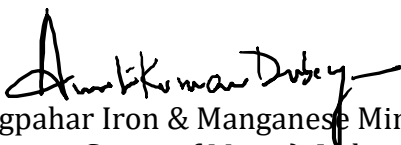
**Additional Conditions as per MoEFCC Letter No. 106-9/11/EPE dt. 02.12.2014 issued to all Non-Coal Mining Projects.**

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 Tiringpahar Iron and Manganese Mine. Garland grain and Retaining wall are provided at the toe of the overburden dumps. Settling ponds are done at intervals along the garland drain.
2.	The natural water bodies and or stream which are flowing in and around the village should not be disturbed. The water table should be nurtured so as not go down below the pre-mining period. In case of any water scarcity in the area, the project authorities have to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug well.	Agreed. No water bodies disturbed due to mining activities. The ground water table is being monitored regularly from the open well and tube well of nearby villages.
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 the cattle abandon the grazing ground or return home by noon.	Not Applicable. There is no grazing land within the M.L. area.
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	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

	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.	the blast induced vibration (ppv) limit at different distances from the centre of blasting.
6.	Main haulage road in the mines should be provided with permanent water sprinkler and other road should be regularly wetted water tanker fitted with sprinkler. Crusher and material transfer points should be invariably be provided with bag filter and or dry fogging system. Belt conveyor fully covered to avoid air borne dust.	The main haulage road, mineral stacking area overburden dumping areas are regularly sprinkled with water by using water tankers and Fixed sprinklers.
7.	The project Authority shall ensure that productivity of agriculture crops is not affected due to the mining operation. Crop Liability Insurance Policy has to be taken by PP as a precaution to compensate for the crop 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	There is no transportation road passing through any village.

	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	
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/ Workers on the lines as required under TOR. "R&R Plan// compensation details for Project Affected People (PAP) should be furnished. While preparing the R&R plan, the relevant State/ national Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs and STs and weaker section of society in study, a need bashed sample survey, family-wise, should be undertaken to assess their requirement, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line department of State Government. It may be clearly brought out whether the village including their R&R and socio-economics aspect should be discussed in EIA report.	Tata Steel has taken up many social initiatives for the upliftment of the education, health and other socio-economic development of the neighbouring villages. TSRDS (Tata Steel Rural Development Society) has been pioneering the initiatives through CSR activities.  R&R policy has not been applicable for the PP till now.

Yours faithfully  
F: TATA STEEL LTD.

  
Agent, Tiringpahar Iron & Manganese 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

Ref: *Saujab/19/R - 5427*

Date:

## DUST FALL MONITORING

Tiringpabar Iron and Manganese Mine, M/S TATA STEEL LTD.

Date of Sampling	Total Dust Fall (t/km <sup>2</sup> /month)	Analysis Result			
		Co (%)	Ni (%)	Hg (%)	As (%)
June-19	0.56	<0.001	<0.001	<0.001	<0.001
September-19	0.36	<0.001	<0.001	<0.001	<0.001





Ref: Env/ab/19/R-5486

Date:

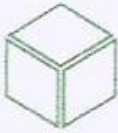
**SOIL MONITORING**  
Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.

Month	Co (%)	Ni (%)	Hg (%)	As (%)
June-19	0.019	0.056	<0.000002	<0.000002
September-19	0.0021	0.0042	<0.000002	<0.000002



For Visiontek Consultancy Services Pvt. Ltd.





# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref. Enu/ab/19/R-5484

## FUGITIVE DUST MONITORING

### Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.

L-1	Sampling Location		NAAQ Standard	Apr-19	May-19	Jun-19	July-19	Aug-19	Sept-19
	Near Sorting Yard (Garuda Block)	Method of Measurement							
Parameters			1200( $\mu\text{g}/\text{m}^3$ )	--	--	--	--	320.4	318.2
SPM		Gravimetric method							
L-2	Near Stack Yard (Garuda Block)		NAAQ Standard	Apr-19	May-19	Jun-19	July-19	Aug-19	Sept-19
Parameters		Method of Measurement	1200( $\mu\text{g}/\text{m}^3$ )					356.8	372.2
SPM		Gravimetric method							
L-3	Near Haul Yard (Near Garuda Block-Mine Pit)		NAAQ Standard	Apr-19	May-19	Jun-19	July-19	Aug-19	Sept-19
Parameters		Method of Measurement	1200( $\mu\text{g}/\text{m}^3$ )					408.2	412.8
SPM		Gravimetric method							

Date:



For Visiontek Consultancy Services Pvt. Ltd.



# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004  
OHSAS 18001 : 2007

Ref: *Ganpak/19/R-5421*

Date:

## GROUND WATER LEVEL

Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.

SL.No.	Sample Location	June-19		Aug-19	
		Analysis Result (mt/bg)		Analysis Result (mt/bg)	
1	GWL1: Palsa Village OW	10.6		11.2	
2	GWL2: Sandhya Guta BW	10.2		10.8	



For Visiontek Consultancy Services Pvt. Ltd.





# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004  
OHSAS 18001 : 2007

Ref: Emfacb/19/R-5417

Date:

## GROUND WATER Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.

Sampling Location: GW1: Patna Village O/W

Sl. No	Parameter	Unit	Standards as per IS: 10500:2012	Analysis Results	
				June-19	Aug-19
<b>Essential Characteristics</b>					
1	Colour	Hazen	5	Cl.	<5.0
2	Odour	--	U/O	Agreeable	Agreeable
3	Taste	--	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	1.2	1.4
5	pH Value	--	6.5-8.5	7.56	7.64
6	Total Hardness (as CaCO <sub>3</sub> )	mg/l	300	110.0	112.0
7	Iron (as Fe)	mg/l	0.3	0.28	0.21
8	Chloride (as Cl)	mg/l	250	48.0	56.2
9	Residual, free Chlorine	mg/l	0.2	ND	ND
<b>Desirable Characteristics</b>					
10	Dissolved Solids	mg/l	500	146.0	130
11	Calcium (as Ca)	mg/l	75	38.8	30.8
12	Magnesium (as Mg)	mg/l	30	16.6	14.2
13	Copper (as Cu)	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	0.1	0.032	0.026
15	Sulphate (as SO <sub>4</sub> )	mg/l	200	4.6	4.8
16	Nitrate (as NO <sub>3</sub> )	mg/l	45	0.26	0.31
17	Fluoride (as F)	mg/l	1	0.018	0.016
18	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> 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
24	Lead (as Pb)	mg/l	0.05	<0.001	<0.001
25	Zinc (as Zn)	mg/l	5	<0.001	<0.001
26	Anionic Detergents (as MBAS)	mg/l	0.2	<0.05	<0.05
27	Chromium (as Cr <sup>VI</sup> )	mg/l	0.05	<0.2	<0.2
28	Mineral Oil	mg/l	0.01	<0.05	<0.05
29	Alkalinity	mg/l	200	<0.01	<0.01
30	Aluminum (as Al)	mg/l	0.03	120	126.0
31	Boron (as B)	mg/l	1	<0.001	<0.001
32	Poly Aromatic Hydrocarbon as PAH	µg/l	--	<0.01	<0.01
33	Pesticide	mg/l	Absent	Absent	Absent



# Visiontek Consultancy Services Pvt. Ltd.

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ISO 9001 : 2008

ISO 14001 : 2004

OHS 18001 : 2007

Ref: Enu/ab/19/A - 5419

Date:

Sl. No	Parameter	Unit	Standards as per IS: 10500, 2012	Analysis Results	
				June 19	Aug-19
<b>Essential Characteristics</b>					
1	Colour	Hazen	5	CL	<5.0
2	Odour	--	U/O	Agreeable	Agreeable
3	Taste	--	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	2.1	1.8
5	pH Value	--	6.5-8.5	7.64	7.70
6	Total Hardness (as CaCO <sub>3</sub> )	mg/l	300	116.0	114.0
7	Iron (as Fe)	mg/l	0.3	0.26	0.24
8	Chloride (as Cl)	mg/l	250	38.2	42.8
9	Residual, free Chlorine	mg/l	0.2	ND	ND
<b>Desirable Characteristics</b>					
10	Dissolved Solids	mg/l	500	152.0	142
11	Calcium (as Ca)	mg/l	75	44.2	41.6
12	Magnesium (as Mg)	mg/l	30	18.2	17.4
13	Copper (as Cu)	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	0.1	0.036	0.031
15	Sulphate (as SO <sub>4</sub> )	mg/l	200	4.2	5.1
16	Nitrate (as NO <sub>3</sub> )	mg/l	45	0.21	0.26
17	Fluoride (as F)	mg/l	1	0.022	0.021
18	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> 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
24	Lead (as Pb)	mg/l	0.05	<0.001	<0.001
25	Zinc (as Zn)	mg/l	5	1.72	1.62
26	Anionic Detergents (as MBAS)	mg/l	0.2	<0.2	<0.2
27	Chromium (as Cr <sup>6+</sup> )	mg/l	0.05	<0.05	<0.05
28	Mineral Oil	mg/l	0.01	<0.01	<0.01
29	Alkalinity	mg/l	200	132.0	130.8
30	Aluminium as (Al)	mg/l	0.03	<0.001	<0.001
31	Boron (as B)	mg/l	1	<0.01	<0.5
32	Poly Aromatic Hydrocarbon as PAH	µg/l	--	<0.001	<0.001
33	Pesticide	mg/l	Absent	Absent	Absent







# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref:  
Env/lab/119/R-  
5351

Surface Water Quality Report (FY 2019-20)  
Tiringpahar Iron and Manganese Mine, TATA STEEL LIMITED

Tiringpahar (Kundra Nallah entering Tiringpahar)		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	5.2	6.1	5.4	5.2	5.8	5.3
BOD (3) days at 27°C (max)	mg/l	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coll form	MPN/100 ml	180	220	120	160	210	140
pH Value	--	7.48	7.56	7.51	7.58	7.66	7.49
Colour (max)	Hazen	CL	CL	CL	2	1	CL
Total Dissolved Solids	mg/l	118	126	108	124.2	138	126
Copper as Cu (max)	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.02
Iron as Fe (max)	mg/l	0.48	0.66	0.42	0.42	0.44	0.4
Chloride (max)	mg/l	30	48	46	36.9	51.8	35.8
Sulphates (SO <sub>4</sub> ) (max)	mg/l	5.6	6.8	6.1	4.6	6.1	4.7
Nitrate as NO <sub>3</sub> (max)	mg/l	2.8	0.86	3.1	3.2	2.88	3.1
Fluoride as F (max)	mg/l	0.052	0.068	0.056	0.056	0.062	0.053
Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH (max)	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Cadmium as Cd (max)	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01
Selenium as Se (max)	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic as As	mg/l	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.004
Cyanide as CN (max)	mg/l	ND	ND	ND	ND	ND	ND
Lead as Pb (max)	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Zinc as Zn (max)	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexa Chromium as Cr +6	mg/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.01
Anionic Detergents (max)	mg/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2

Date:   
For Visiontek Consultancy Services Pvt. Ltd.



# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004  
OHSAS 18001 : 2007

Ref: Envlab/19/R-5352

Date:

Tiringipahar (Kundra Nallah leaving Tiringipahar)		April'19	May'19	June'19	July'19	Aug-19	Sept-19
Parameters	Unit	Standards	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	4	6.1	5.4	6.2	5.8	5.3
BOD (3) days at 27°C (max)	mg/l	3	<1.8	<1.8	<1.8	<1.8	<1.8
Total Coli form	MPN/100 ml	5000					
pH Value	--	6.0-9.0	7.56	7.51	7.66	7.66	7.49
Colour (max)	Hazen	300	CL	CL	1	CL	CL
Total Dissolved Solids	mg/l	1500	126	108	118	138	126
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.02
Iron as Fe (max)	mg/l	0.5	0.66	0.42	0.61	0.44	0.4
Chloride (max)	mg/l	600	48	46	56	51.8	35.8
Sulphates (SO <sub>4</sub> ) (max)	mg/l	400	6.8	6.1	7.2	6.1	4.7
Nitrate as NO <sub>3</sub> (max)	mg/l	50	0.86	3.1	1.2	2.88	3.1
Fluoride as F (max)	mg/l	1.5	0.068	0.056	0.072	0.062	0.053
Phenolic Compounds as C <sub>6</sub> H <sub>5</sub> OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.01
Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.004
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr <sup>16</sup>	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.01
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2



For Visiontek Consultancy Services Pvt. Ltd.





Ref.:  
Enufak/19/R-5480

Date:

## GROUND WATER (Heavy Metals)

### Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS - 10500:2012	Analysis Results		
					GW-1: B/W Sandhya Gata		
					June-19	Aug-19	
1	Iron (as Fe)	APHA 3500Fe, B	mg/l	0.3	0.28	0.26	
2	Copper (as Cu)	APHA 3111 B,C	mg/l	0.05	< 0.05	< 0.05	
3	Manganese (as Mn)	APHA 3500Mn B	mg/l	0.1	0.032	0.028	
4	Chromium (as Cr <sup>VI</sup> )	APHA 3500Cr B	mg/l		< 0.05	< 0.05	
5	Mercury (as Hg)	APHA 3500 Hg	mg/l	0.001	< 0.001	< 0.001	
6	Cadmium (as Cd)	APHA 3111 B,C	mg/l	0.003	< 0.01	< 0.01	
7	Selenium (as Se)	APHA 3114 B	mg/l	0.01	< 0.001	< 0.001	
8	Arsenic (as As)	APHA 3114 B	mg/l	0.01	< 0.001	< 0.001	
9	Lead (as Pb)	APHA 3111 B,C	mg/l	0.01	< 0.01	< 0.01	
10	Zinc (as Zn)	APHA 3111 B,C	mg/l		< 0.05	1.1	



For Visiontek Consultancy Services Pvt. Ltd.



# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004

IS AS 18001 : 2007

Ref:  
Em/lab/19/R-5353

Ambient Air Quality (AAQ) Monitoring Report  
CORE ZONE  
Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.  
Purunapanani

Monthly Average	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NOx ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	CO mg/ $\text{m}^3$	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	Ni (ng/ $\text{m}^3$ )	As (ng/ $\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	BaP (ng/ $\text{m}^3$ )	Mn $\mu\text{g}/\text{m}^3$
Apr-19	50.7	24.0	6.1	10.9	8.4	0.4	29.9	BDL	BDL	BDL	BDL	BDL	BDL
May-19	52.3	26.7	6.5	11.0	9.1	0.6	35.6	BDL	BDL	BDL	BDL	BDL	BDL
Jun-19	52.43	24.53	6.71	11.83	10.33	0.62	34.30	BDL	BDL	BDL	BDL	BDL	BDL
Jul-19	43.4	18.9	7.5	11.9	9.3	0.6	27.4	BDL	BDL	BDL	BDL	BDL	BDL
Aug-19	43.2	28.1	7.4	11.9	9.3	0.6	27.0	BDL	BDL	BDL	BDL	BDL	BDL
Sep-19	26.7	15.3	4.7	9.6	8.5	0.3	21.3	BDL	BDL	BDL	BDL	BDL	BDL

Garuda Pit

Monthly Average	PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )	PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ )	SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	NOx ( $\mu\text{g}/\text{m}^3$ )	O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	CO mg/ $\text{m}^3$	NH <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )	Pb ( $\mu\text{g}/\text{m}^3$ )	Ni (ng/ $\text{m}^3$ )	As (ng/ $\text{m}^3$ )	C <sub>6</sub> H <sub>6</sub> ( $\mu\text{g}/\text{m}^3$ )	BaP (ng/ $\text{m}^3$ )	Mn $\mu\text{g}/\text{m}^3$
Apr-19	72.7	30.1	8.2	10.6	7.1	0.5	25.1	BDL	BDL	BDL	BDL	BDL	BDL
May-19	75.3	33.1	8.2	11.9	7.9	0.5	27.2	BDL	BDL	BDL	BDL	BDL	BDL
Jun-19	53.20	30.59	7.61	15.23	8.69	0.59	30.00	BDL	BDL	BDL	BDL	BDL	BDL
Jul-19	47.2	21.9	7.4	13.8	9.3	0.6	25.0	BDL	BDL	BDL	BDL	BDL	BDL
Aug-19	46.6	20.5	7.3	11.4	9.0	0.6	24.9	BDL	BDL	BDL	BDL	BDL	BDL
Sep-19	29.9	16.8	5.1	10.4	8.4	0.5	20.9	BDL	BDL	BDL	BDL	BDL	BDL

Date



For Visiontek Consultancy Services Pvt.Ltd.





# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004  
OHS AS 18001 : 2007

Ref:

Envlab/191R-  
5354

Date:

Ambient Air Quality (AAQ) Monitoring Report  
BUFFER ZONE  
Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.  
BZ-1 : Joribahal

Monthly Average	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NOx (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )
June-19	54.20	30.60	5.60	10.20	0.66	BDL	BDL	BDL	BDL	BDL	BDL	BDL
July-19	50.6	29.2	6.2	10.4	0.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL
August-19	41.2	28.6	6.1	10.7	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL
September-19	20.6	11.5	5.1	9.6	0.4	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BZ-2 : Balada

Monthly Average	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NOx (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )
June-19	56.20	36.20	6.20	9.80	0.62	BDL	BDL	BDL	BDL	BDL	BDL	BDL
July-19	51.6	30.8	5.6	9.2	0.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL
August-19	40.7	22.8	5.2	9.6	0.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL
September-19	22.6	12.7	4.6	9.8	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BZ-3 : Palsala

Monthly Average	PM <sub>10</sub> (µg/m <sup>3</sup> )	PM <sub>2.5</sub> (µg/m <sup>3</sup> )	SO <sub>2</sub> (µg/m <sup>3</sup> )	NOx (µg/m <sup>3</sup> )	CO (mg/m <sup>3</sup> )	O <sub>3</sub> (µg/m <sup>3</sup> )	NH <sub>3</sub> (µg/m <sup>3</sup> )	BaP (ng/m <sup>3</sup> )	C <sub>6</sub> H <sub>6</sub> (µg/m <sup>3</sup> )	As (ng/m <sup>3</sup> )	Ni (ng/m <sup>3</sup> )	Pb (µg/m <sup>3</sup> )
June-19	62.20	41.80	5.90	10.20	0.64	BDL	BDL	BDL	BDL	BDL	BDL	BDL
July-19	52.0	32.8	6.2	9.8	0.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL
August-19	43.2	23.2	6.1	9.5	0.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL
September-19	25.4	14.2	5.2	10.1	0.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL



For Visiontek Consultancy Services Pvt.Ltd.



# Visiontek Consultancy Services Pvt. Ltd.

(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref.: Kowlab/19/R-5427 (L)

Date:

Noise Monitoring Report  
Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.

Sl. No	Noise Monitoring: Ambient			Day Time Result
	Date	Name of Location	Unit	
1	June-19	Mines Area	db	69.7
2	July-19	Mines Area	db	62.8
3.	August-19	Mines Area	db	63.5
4.	September-19	Mines Area	db	61.8



For Visiontek Consultancy Services Pvt. Ltd.





Ref.: Enyfab/19/R-5419

Date:

## Noise Monitoring Report Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LTD.

### EQUIPMENT NOISE REPORT

Sl. No	Date	Name of Location	Unit	Result
1	June-19	Volvo Shovel No-1 ( CC 300 DL)	dB	74.8
2		JCB-OD-096-5300		79.4
3		JCB Breaker -OD-09A-0436		81.2
4		Hindustan JCB-OR-19A-0660		78.4
5		Dumphur-OD-09A-6054		72.1
6		Dumphur-OD-09C-5267		72.6
7		DG Set (Puruna Pains pH)		79.8
8		Truck TATA OR 09 N9467		81.2
9		Truck TATA OR 09 A-4693		78.8
10		DG Set		78.2
11		H-Quarry Water Treatment		76.8
1	Sept-19	JCB Breaker-OD-09A-0436	dB	74.4
2		Hindustan JCB-OR-19A-0660		72.8
3		Dumphur-OD-09A-6054		70.6
4		Dumphur-OD-09C-5267		66.7
5		DG Set (Puruna Pains pH)		62.8
6		Truck TATA OR 09 N9467		62.5
7		Truck TATA OR 09 A-4693		61.2



ANNEXURE-IX  
LIST OF ENVIRONMENTAL MONITORING EQUIPMENT  
Tiringpahar 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 <sub>10</sub>
2	Fine Particulate Sampler	PM <sub>2.5</sub>
3	Spectrophotometer UV-Visible range	SO <sub>2</sub> ,NO <sub>x</sub>
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  
 ORGANIZATION STRUCTURE  
 Tiringpahar Iron and Manganese Mine, M/S TATA STEEL LIMITED

