



Regd Post with A/D

Ref.No.: MGM/P&E/861/19

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 Joda West 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 Joda West Iron and Manganese Mine, M/s TATA Steel Ltd. for the period April 2019 to September 2019 as per EIA notification 2006. The same is also attached in Soft copy to your good office on e-mail to roez.bsr-mef@nic.in for your ready reference.

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

This is for your kind perusal.

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

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

Encl: as above.

Copy to:

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

TATA STEEL LTD.

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



M/s Tata Steel Limited

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

Reference letter from MoEF&CC, New Delhi- J-11015/86/2004-1A. II (M) DATED 13.09.2005

Sl. no	A: Specific conditions	Compliance status
1	Mining shall not be undertaken in areas of forestland within the lease without the necessary approvals / forestry clearance.	<p>We have obtained the Forest Clearance vide MoEF's letter no. F.No.8-89/2004-FC, dt.10.08.2007 over an area of 436.678 ha of forest land within Joda West Iron and Mn. Mine.</p> <p>We have applied for forest diversion over an area of 730.635 ha on 25.11.2015, which is under process.</p> <p>Further, as per MoEF & CC Circular dated F.No.8-78/1996-FC, dated 10.03.2015, an area of 79.239 ha. of non-forest land was recorded as forest in Govt. records as on 25.10.1980. Hence, fresh forest diversion proposal over an area of 79.239 ha has been applied on 20.06.2016 and the same is under process.</p> <p>The mining operation and allied activities are confined within the approved diverted area only.</p>
2	Topsoil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area.	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 stabilization along the slopes of the dump and terraced after every 5-6 m of height and overall slope angle shall be maintained not exceeding 28°. Sedimentation pits shall be constructed at the corners of the garland drains. Retention/toe walls shall be provided at the base of the dumps.</p>	<p>OB and other wastes are being dumped as per approved Scheme of Mine of Joda West Iron and Manganese Mine.</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>During the year 2019-20 up to September, 13800 nos. of saplings were planted. Beside this we also planted around 1,22,300 nos. of vetiver slips.</p> <p>The retaining wall and garland drain with sedimentation pit at corners near toe at low lying area and uplift portion of OB dump has</p>

		been constructed. 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	<p>Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The drains should be regularly desilted and maintained properly.</p> <p>Garland drains (size, gradient & length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material.</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 bottom part. The run off from garland drains are collected in settling/sedimentation pits. The catch drains and sedimentation pits are periodically de-silted and maintained properly.</p> <p>Size, gradient and length of the drains are adequate to take care of the peak flow.</p> <p>A series of check dams and settling pits have been provided for proper settlement of suspended solid in surface runoff.</p>
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>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> <p>A multi-stage sedimentation basin with check dam had been provided at H' Quarry to prevent direct flow of surface run off to Kundra Nallah, a perennial source of water flowing along the western lease boundary.</p>
7	Trace Metals such as Ni, Co, As and Hg should be analyzed in dust fall and soil samples for at least one year during summer, monsoon and winter seasons. If concentrations of these metals are found below the standards then with prior approval of MOEF this specific monitoring could be discontinued.	Samples have been analyzed in dust fall & soil and the detailed analysis result is enclosed as Annexure-I .
8	Mine Mineral and OB transportation shall be in trucks/dumpers covered with tarpaulins.	The trucks are being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding located at Joda. OB is being transported by shovel – dumper combination from mine face

	<p>Vehicular emissions should be kept under control and regularly monitored.</p> <p>Suitable measures should be taken to check fugitive emissions from haulage roads & transfer points, etc.</p>	<p>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 & railway siding at Joda is bearing the "Pollution under Control" certificate. The emissions are under control.</p> <p>There is provision of water sprinkling by mobile water sprinklers to suppress fugitive emission from haul roads and other area having potential of producing air borne dust. We have also installed fixed-type water sprinklers along haul road in D-Quarry. The processed manganese ore is being transferred manually; hence there less fugitive emission during transfer of ore.</p> <p>The results of Fugitive Emission Monitoring done during the period April'19 to September'19 is enclosed as Annexure-II.</p>
9	<p>A green belt of adequate width should be raised by planting the native species around ML area. Plantation should also be carried out along roads, OB dump sites etc. in consultation with the local DFO / Agriculture Department. The density of the trees should be not less than 2500 plants per ha.</p>	<p>Reclamation and plantation program have been drawn. We have planted around 11.54 lakh nos. of trees over an area around 225.9 ha till 2018-19 at safety zone, OB dump and as avenue plantation. The tree density is maintained at the rate of more than 2500 saplings per ha.</p> <ul style="list-style-type: none"> • During the year 2019-20 upto September, 13800 nos. of saplings were planted on OB dump and 3520 nos of saplings in Green belt around ML area. Beside this we also planted around 1,22,300 nos. of vetiver slips & 98 fruit bearing plants planted.
10	<p>Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater.</p>	<p>We have obtained NOC from CGWA vide NOC No. CGWA/NOC/MIN/ORIG/2018/3888, Dated 09.08.2018 for a quantity of 146 cum/day.</p>
11	<p>Mining will not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table.</p>	<p>Mining is not intersecting the ground water as the Ground water being at lower level in comparison to existing maximum quarry depth.</p>
12	<p>Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers. The monitoring should be done for quantity four times a year in pre-monsoon (April / May), monsoon (August). Post-monsoon (November) and winter (January) seasons and for quality in May.</p>	<p>Ground water table is much below the existing mine workings because of mining operations are confined at hilly topography only. However, ground water level & quality at existing well at separate location is being monitored.</p>

	Data thus collected should be submitted to the MoEF & CGWA quarterly.	The ground water quality monitoring results and level are enclosed as Annexure III & IV respectively.
13	Trace metals such as Fe, Cr ⁺⁶ , Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water downstream and in ground water at lower elevations from mine area, shall be periodically monitored in consultation with the OSPCB and State Ground Water Board. Suitable treatment measures shall be undertaken in case levels are found to be higher than permissible limits.	Trace metals such as Fe, Cr ⁺⁶ , Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water (downstream & upstream) and ground water at lower elevation is being periodically monitored by referring to the standards as per BIS: 10500. The details of analysis result for ground water and surface water with standards are enclosed as Annexure -V & VI respectively.
14	"Consent to Operate" should be obtained from SPCB before expanding mining activities.	"Consent to operate" has been obtained from State Pollution Control Board, Orissa vide letter no. 5095/IND-I-CON-186 dated 25.05.2019 and Consent order no. 67 valid 31.03.2021.
15	Conservation Plan for conservation of endangered fauna including the Indian Elephant found in and around the mine area shall be prepared and implemented in consultation with identified agencies/institutions and with the State Forest Department. The Plan should be dovetailed with that prepared/under implementation/proposed for the endangered fauna found in the Reserve Forest in the buffer zone of the project site. The costs for the specific activities/tasks should be earmarked in the Conservation Plan and shall not be diverted for any other purpose. Year-wise status of the implementation of the Plan and the expenditure thereon should be reported to the Ministry of Environment & forests, RO, Bhubaneswar.	We have deposited Rs.56,30,000/- on 05.07.2006 through Canara Bank D.D. No.481301 to 481307 being the contribution towards implementation of Wild Life Management Plan prepared for Bonai & Keonjhar division. Further, as per subsequent demand of forest department, additional amount of Rs. 2,31,24,380 on 07.09.2011 and Rs 3,30,67,537 on 19.05.2015 have been deposited through RTGS towards differential payment for implementation of Regional Wildlife Management Plan prepared for Bonai & Keonjhar division and the DFO, Keonjhar, Orissa was intimated accordingly. Site Specific Wildlife Management Plan has been approved vide memo no. 7726/1WL-SSP-93/2015 dated 31 st Aug 2015. Further, we have deposited an amount of Rs. 9,79,48,000/- 12.12.2017 towards SSWLCP in respect of Joda West Iron & Mn. Mine through NEFT mode in Odisha CAMPA vide Ref. No.N346170430504053.
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.	A progressive mine closure plan for the period 2013-14 to 2017-18 has been approved by IBM along with the Scheme of Mining. Further, Progressive mine closure plan for the period of 2018-19 to 2022-23 has been submitted under the Rule No. 23, MCDR 2017.

		The final mine closure plan along with details of Corpus fund will be submitted to the Ministry of Environment & Forests in advance of final mine closure for approval.												
Sl. no	B: General Conditions	Compliance Status												
1	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	No change in mining technology and scope of working has been made at the mine. If any changes proposed in technology and scope of workings, prior approval shall be sought from Ministry of Environment & Forests.												
2	No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.	Excavation plan for total excavation, Manganese ore and waste has been prepared and is being strictly adhered. The actual figure for total excavation, manganese ore and waste for the year 2019-20 is given in table below. Table: Plan vs. Actual for year 2019-20 <table border="1" data-bbox="842 779 1449 1133"> <thead> <tr> <th>Year- 2019-20</th> <th>Plan</th> <th>Actual upto Sept'19</th> </tr> </thead> <tbody> <tr> <td>Total Excavation (cum)</td> <td>865783</td> <td>491686.687</td> </tr> <tr> <td>Production (MT)</td> <td>95998</td> <td>41362</td> </tr> <tr> <td>OB Removal (cum)</td> <td>826413</td> <td>475141.887</td> </tr> </tbody> </table>	Year- 2019-20	Plan	Actual upto Sept'19	Total Excavation (cum)	865783	491686.687	Production (MT)	95998	41362	OB Removal (cum)	826413	475141.887
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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 ₂ , NO _x . Monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Data on ambient air quality (RPM, SPM, SO ₂ & NO _x .) should be regularly submitted to the Ministry including its Regional office at Bhubaneshwar and the State Pollution Control Board / Central Pollution Control Board once in six months.	Five ambient air quality monitoring stations have been established out of which 2 nos. in core zone (Near Office close proximity to residential and mining area near to H-Quarry) and 3 nos. in buffer zone (at Khandbondh, Bonaikela, Banspani) 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 , NO _x , CO, Mn NH ₃ , BaP, benzene, As, Ni and Pb .and reports are being submitted to OSPCB every month. It was observed that the environmental parameters are within the prescribed limit. Abstract of the monthly monitoring data on ambient air quality is enclosed as Annexure - VII.												
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.												
5	Fugitive dust emissions from all the sources should be controlled regularly monitored and data recorded properly. Water spraying arrangements on haul	Effective water sprinkling by mobile water tanker is being done on haul roads and other area having potential of producing air borne dust. Additionally, we have also installed fixed-												

	roads, wagon loading, dumpers/ trucks, loading & unloading points should be provided and properly maintained.	type water sprinklers along haul road at D-Quarry. The results of Ambient Air Quality done during the period April'19 to September'19 is enclosed as Annexure-II .
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 mining operation & DG operations. Rests of operations are below the noise levels of 80 dBA. The details of noise monitoring for the period April'19 to September'19 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 st December 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents.	The oil separation system has been provided at workshop and working effectively. This is being centrally used for maintenance of all the Equipment running at Joda West Iron & Mn Mine. The details of Waste Water for the period April'19 to September'19 are enclosed as Annexure-IX .
8	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	It is being done by M/s Visiontek Consultancy Service Pvt. Ltd (Recognized as "A" category consultant as by State Pollution Control Board, Odisha). The type of pollution monitoring and analysis equipment used by M/s Visiontek Consultancy Service Pvt. Ltd is enclosed as Annexure - X .
9.	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	Suitable dust masks are being provided to employees (departmental & contractual) engaged in dusty operations. It is also ensured that they use the same. Employees are undergoing Periodical Medical Examination which is inclusive of lungs function test and audiometry. All the personnel are trained on safety in work place and continuous awareness program are being conducted for all employees to avert manganese poisoning. Periodical Medical Examination of employees (departmental & contractual) are conducted as per prescribed norms of Mines Rule, 1955. The initial and periodical examination includes blood hematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. All chest radiographs are being classified for detection of pneumoconiosis, diagnosis and documentation made in accordance to ILO classifications.

		<p>Total 537 contractual employees and 19 departmental employees have undergone PME during Period.</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 Annexure-XI.</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 Bhubaneswar.	<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>547528</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>85995</td> </tr> <tr> <td>4</td> <td>Environmental monitoring</td> <td>1000000</td> </tr> <tr> <td>5.</td> <td>Afforestation</td> <td>1125000</td> </tr> <tr> <td></td> <td>Total</td> <td>2869052</td> </tr> </tbody> </table> <p>The cost incurring towards environmental monitoring and different environmental protection measures during the period 2019-20 shall be given in the next half yearly EC compliance report.</p>	S.No.	Activity	Expenditure proposed for FY 2019-20	1	Construction of parapet wall/ retaining wall at toe of dumps	547528	2	Construction of check dams long the slope of valleys etc.	110530	3	Construction of settling ponds (Garland drains etc.).	85995	4	Environmental monitoring	1000000	5.	Afforestation	1125000		Total	2869052
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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 / information / monitoring reports	<p>We are providing full co-operation to the officers of the Regional Office by furnishing the requisite data / information / monitoring reports.</p>																					

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 Chairman, Municipal Council, Joda 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 Joda West Manganese Mine was published in Oriya News Papers Dharitri & Sambad 17.10.2005.
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.

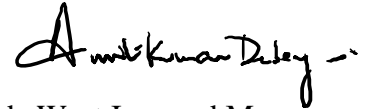
S.No.	Stipulated Condition	Compliance Status
1.	The project authority shall adopt best mining practices for given conditions in the mining area, adequate number of check dam, retaining wall/ structure, garland drains and settling ponds should be provided to arrest the wash off with rain water in catchment area.	The best scientific method of mining is in practice at Joda West 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. A five-stage check dam has been provided at H Quarry of the mine to arrest the surface run off with rain water.
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.	The natural water bodies which are flowing around the nearby villages are not disturbed by mining activity. The ground water table is being monitored regularly from the open well and tube well of nearby villages. Drinking water is provided to the villagers through pipe line and overhead tanks.
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 light 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 to blasting vibration, avoidance of use of explosives and adoption of alternative means of mineral extraction such as ripper/dozer combination/ rock breakers/ surface mineral etc should be seriously considered and practiced wherever practicable. A provision for monitoring of each blast should be made so that impact of blasting on nearby habitation and dwelling unit could be ascertained. The covenant of lease deed under rule 31 of MCR 1960 provided that no mining operation shall be carried out within 50 meters of public works such as public roads and building or inhabited sites except with prior permission from the competent Authority.	Deep hole drilling and controlled blasting technique has been adopted in the mine. Vibration study has been done with the help of CIMFR and vibration limit (ppv) found within the limit. Provision for monitoring each blast has been established to ascertain the blast induced vibration (ppv) limit at different distances from the center 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. There is a plan to cover part of the main haulage road with automatic water sprinkling arrangements in future.
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	Not Applicable

	(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.	
9.	Transportation of minerals by road passing through the village shall not be allowed. A "bypass" road should be constructed (say leaving a gap of at least 200 m) for the purpose of transportation of minerals so that the impact of sound, dust and accidents could be mitigated. The PP shall bear the cost towards the widening and strengthening of existing public road network in case same is proposed to be used for the project. No road movement should be allowed on existing village road network without appropriately increasing carrying capacity of such road	There is no transportation road passing through any village.
10.	Likewise, alteration or re-routing of foot paths, pagdandies, cart road and village infrastructure/ public utilities or roads (for purpose of land acquisition for mining) shall be avoided to extent possible and in such case acquisition is inevitable, alternative arrangements shall be made first and the only the area can be acquired. In these types of cases Inspection reports by site visit by expert may be insisted upon which should be done through reputed Institutes.	Not Applicable
11.	The CSR activates by companies including mining establishment has become mandatory up to 2% their financial turn over, socio Economic Development of neighborhood. 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	Tata Steel has taken up many social initiatives for the upliftment of the education, health and other socio-economic development of the neighboring 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.

	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.	
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Yours Faithfully
F: Tata Steel Limited



Agent, Joda West Iron and Manganese Mines
& 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: Env/ab/19/R-1226

Date: 03/07/19

DUST FALL ANALYSIS REPORT FOR THE MONTH OF JUNE-2019

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

Date of Sampling	Total Dust Fall (t/km ² /month)	Analysis Result			
		Co (%)	Ni(%)	Hg(%)	As (%)
01.06.2019 to 30.06.2019	0.56	<0.001	<0.001	<0.001	<0.001


 For Visiontek Consultancy Services Pvt. Ltd



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ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref.: Env/ab/19/R-1227

Date: 03/07/19

SOIL (DUST FALL) ANALYSIS REPORT FOR THE MONTH OF JUNE-2019

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

Date of Sampling	Co (%)	Ni(%)	Hg(%)	As (%)
29.06.2019	0.019	0.056	<0.000002	<0.000002



For Visiontek Consultancy Services Pvt. Ltd.



Ref.: ENV/lab/19/R-4608

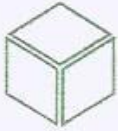
Date: 3. 10. 19

SOIL QUALITY ANALYSIS REPORT-SEPTEMBER 2019

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
2. Sampling location : S-1: Near H-Quarry
3. Date of sampling : 20.09.2019
4. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl No.	Parameters	Unit	Analysis Results
			S-1
1	Cobalt as Co	%	0.0029
2	Nickel as Ni	%	0.068
3	Mercury as Hg	%	<0.000002
4	Arsenic as As	%	<0.000002





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ISO 9001 : 2008

ISO 14001 : 2015

OHSAS 18001 : 2007

Ref.: Env/ab/19/R-3199

Date: 03.09.19

FUGITIVE EMISSION REPORT FOR THE MONTH OF AUG-2019

- 1.Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
 2.Sample collected By : VCSPL representative in presence of TATA representative.

	Sampling Location			Aug-19
L-1	Near Screening Plant (D-Quarry)	NAAQ Standard	Monitoring Date	25.08.2019
Parameters	Method of Measurement			
SPM	Gravimetric method	1200($\mu\text{g}/\text{m}^3$)		342.6
L-2	Near Stack Yard (D-Quarry)	NAAQ Standard	Monitoring Date	25.08.2019
Parameters	Method of Measurement			
SPM	Gravimetric method	1200($\mu\text{g}/\text{m}^3$)		408.8
L-3	Near Sorting Yard (H-Quarry)	NAAQ Standard	Monitoring Date	24.08.2019
Parameters	Method of Measurement			
SPM	Gravimetric method	1200($\mu\text{g}/\text{m}^3$)		412.6





Ref: ENV/ab/19/R-4375

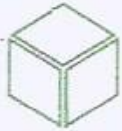
Date: 03.10.19

FUGITIVE DUST ANALYSIS REPORT FOR THE MONTH OF SEPTEMBER-2019

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

L-1	Sampling Location	NAAQ Standard	Monitoring Date	Analysis Result
	Near Screening Plant (D- Quarry)			
Parameters	Method of Measurement			
SPM	Gravimetric method	1200($\mu\text{g}/\text{m}^3$)	21.09.2019	318.6
L-2	Sampling Location	NAAQ Standard	Monitoring Date	Analysis Result
	Near Stack Yard (D-Quarry)			
Parameters	Method of Measurement			
SPM	Gravimetric method	1200($\mu\text{g}/\text{m}^3$)	21.09.2019	402.6
L-3	Sampling Location	NAAQ Standard	Monitoring Date	Analysis Result
	Near Sorting Yard (H- Quarry)			
Parameters	Method of Measurement			
SPM	Gravimetric method	1200($\mu\text{g}/\text{m}^3$)	22.09.2019	406.8





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ISO 9001:2008

ISO 14001:2004

OHSAS 18001:2007

Page No.

Ref.: Envlab/191R-5347

Date:

GROUND WATER

Sampling Location: GW1; Prembasti

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS-10500:2012	Analysis Results	
					June-19	Aug-19
Essential Characteristics						
1	Colour	APHA 2120 B, C	Hazen	5	CL	CL
2	Odour	APHA 2150 B	--	Agreeable	Agreeable	Agreeable
3	Taste	APHA 2160 C	--	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	1	1.2	1.8
5	pH Value	APHA 4500H ⁺ B	--	6.5-8.5	7.48	7.56
6	Total Hardness (as CaCO ₃)	APHA 2340 C	mg/l	300	110.0	116.0
7	Iron (as Fe)	APHA 3500Fe, B	mg/l	0.3	0.21	0.26
8	Chloride (as Cl)	APHA 4500Cl ⁻ B	mg/l	250	42.6	48.0
9	Residual, free Chlorine	APHA 4500Cl ₂ B	mg/l	0.2	ND	ND
Desirable Characteristics						
10	Dissoved Solids	APHA 2540 C	mg/l	500	148.0	152.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	75	30.8	34.0
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	30	12.6	18.0
13	Copper (as Cu)	APHA 3111 B,C	mg/l	0.05	<0.02	<0.02
14	Manganese (as Mn)	APHA 3500Mn B	mg/l	0.1	0.012	0.018
15	Sulphate (as SO ₄)	APHA 4500 SO4 ²⁻ E	mg/l	200	5.6	6.2
16	Nitrate (as NO ₃)	APHA 4500 NO3 ⁻ E	mg/l	45	2.6	3.1
17	Fluoride (as F)	APHA 4500F- C	mg/l	1	0.058	0.041
18	Phenolic Compounds (as C ₆ H ₅ OH)	APHA 5530 B,D	mg/l	0.001	<0.001	<0.001
19	Mercury (as Hg)	APHA 3500 Hg	mg/l	0.001	<0.004	<0.004
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	<0.004	<0.004
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	<0.01	<0.01
25	Zinc (as Zn)	APHA 3111 B,C	mg/l	5	2.8	3.2
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	--	<0.01	<0.01
28	Mineral Oil	APHA 5220 B	mg/l	0.01	<0.01	<0.01
29	Alkalinity	APHA 2320 B	mg/l	200	34.0	36.0
30	Aluminium (as Al)	APHA 3500Al B	mg/l	0.03	<0.01	<0.01
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





Ref: Envlab/19/R-5348

Date:

Sampling Location: GW2: Kamarjoda

CHEMICAL ANALYSIS OF WATER AS PER IS: 10500 - 2012

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results	
					June-19	Aug-19
Essential Characteristics						
1	Colour	APHA 2120 B, C	Hazen	5	CL	CL
2	Odour	APHA 2150 B	--	Agreeable	Agreeable	U/O
3	Taste	APHA 2160 C	--	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	1	1.6	<0.2
5	pH Value	APHA 4500H ⁺ B	--	6.5-8.5	7.41	7.16
6	Total Hardness (as CaCO ₃)	APHA 2340 C	mg/l	300	118.0	132.0
7	Iron (as Fe)	APHA 3500Fe, B	mg/l	0.3	0.16	0.26
8	Chloride (as Cl ⁻)	APHA 4500Cl ⁻ B	mg/l	250	31.4	30.0
9	Residual, free Chlorine	APHA 4500Cl ⁻ B	mg/l	0.2	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	500	136.0	182.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	75	26.8	32.0
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	30	10.8	11.6
13	Copper (as Cu)	APHA 3111 B,C	mg/l	0.05	<0.02	<0.05
14	Manganese (as Mn)	APHA 3500Mn B	mg/l	0.1	0.018	0.014
15	Sulphate (as SO ₄)	APHA 4500 SO4 ²⁻ E	mg/l	200	4.2	5.1
16	Nitrate (as NO ₃)	APHA 4500 NO ₃ ⁻ E	mg/l	45	3.2	2.6
17	Fluoride (as F)	APHA 4500F ⁻ C	mg/l	1	0.046	0.021
18	Phenolic Compounds (as C ₆ H ₅ OH)	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	0.003	<0.001	<0.001
21	Selenium (as Se)	APHA 3114 B	mg/l	0.01	<0.001	<0.001
22	Arsenic (as As)	APHA 3114 B	mg/l	0.05	<0.004	<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	0.01	<0.01	<0.001
25	Zinc (as Zn)	APHA 3111 B,C	mg/l	5	2.6	<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	--	<0.01	<0.05
28	Mineral Oil	APHA 5220 B	mg/l	0.01	<0.01	<0.01
29	Alkalinity	APHA 2320 B	mg/l	200	68.2	111.0
30	Aluminium (as Al)	APHA 3500Al B	mg/l	0.03	<0.01	<0.001
31	Boron (as B)	APHA 4500B, B	mg/l	0.5	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	APHA 6440 B	mg/l	0.0001	<0.001	<0.001
33	Pesticide	APHA 6630 B,C	µg/l	Absent	Absent	Absent





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ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref.: Env/cab/19/R-1223

Date: 03/07/19

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

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
2. Sampling location : GWL-1: Kamarjoda OW
GWL-2: Baneikala OW
3. Date of sampling : 13.06.2019
4. Sample collected by : VCSPL Representative in presence of TATA Representative

SL.NO	Sample Location	Analysis Result (m/bgl)
1	GWL1: Kamarjoda OW	6.8
2	GWL2: Baneikala OW	4.2

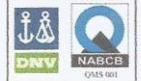
For Visiontek Consultancy Services Pvt. Ltd.





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ISO 9001 : 2008

ISO 14001 : 2004
OHSAS 18001 : 2007

Ref.: Env/lab/19/R-3031

Date: 20.08.19

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

1. Name of Industry : **Joda West Manganese Mines (M/s TATA Steel Limited)**
2. Date of Sampling : 09.08.2019
3. Date of Analysis : 10.08.2019 to 12.08.2019
4. Sample Collected by : VCSPL Representative in presence of TATA Representative

SL.No.	Sample Location	Unit	Analysis Result
1	GWL-1: Kamar Joda OW	m/bgl	7.1
2	GWL-2: Banaikala OW		5.2





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ISO 9001 : 2008

ISO 14001 : 2004

OHSAS 18001 : 2007

Ref.: envfab/19/R-1225

Date: 03/07/19

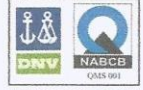
GROUND WATER TRACE METALS ANALYSIS REPORT FOR THE MONTH OF JUNE-2019

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
2. Date of sampling : 13.06.2019
3. Sample collected by : VCSPL, Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS - 10500:2012	Analysis Results
					GW-I:Premabasti
1	Iron (as Fe)	APHA 3500Fe, B	mg/l	0.3	0.21
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	0.012
4	Chromium (as Cr ¹⁶)	APHA 3500Cr B	mg/l		< 0.05
5	Mercury (as Hg)	APHA 3500 Hg	mg/l	0.001	< 0.001
6	Cadmium (as Cd)	APHA 3111 B,C	mg/l	0.003	< 0.01
7	Selenium (as Se)	APHA 3114 B	mg/l	0.01	< 0.001
8	Arsenic (as As)	APHA 3114 B	mg/l	0.01	< 0.001
9	Lead (as Pb)	APHA 3111 B,C	mg/l	0.01	< 0.01
10	Zinc (as Zn)	APHA 3111 B,C	mg/l	5	2.8



For Visiontek Consultancy Services Pvt. Ltd



Ref.: Env/Lab/19/R-3034

Date: 20.08.19

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

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
 2. Sampling Location : GW1: Bore Well Near Vegetable Garden
 3. Date of Sampling : 09.08.2019
 4. Date of Analysis : 10.08.2019 to 14.08.2019
 5. Sample Collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:2012 Amended on 2015 & 2018		Analysis Results
				Acceptable Limit	Permissible Limit	GW-1
1	Iron (as Fe)	By AAS Method APHA 23 RD Ed,2017: 3111, B	mg/l	1	No Relaxation	0.24
2	Copper (as Cu)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.05	1.5	< 0.05
3	Manganese (as Mn)	Persulfate Method APHA 23 RD Ed,2017: 3500Mn B	mg/l	0.1	0.3	0.016
4	Chromium (as Cr ⁺⁶)	Partition-Gravimetric Method APHA 23 RD Ed,2017: 5520 B	mg/l	---	---	< 0.05
5	Mercury (as Hg)	AAS Method APHA 23 RD Ed,2017: 3112 B	mg/l	0.001	No Relaxation	< 0.001
6	Cadmium (as Cd)	AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	0.003	No Relaxation	< 0.01
7	Selenium (as Se)	By AAS Method APHA 23 RD Ed,2017: 3500 Se C	mg/l	0.01	No Relaxation	< 0.001
8	Arsenic (as As)	By AAS Method APHA 23 RD Ed,2017: 3114 B	mg/l	0.01	No Relaxation	< 0.001
9	Lead (as Pb)	By AAS Method APHA 23 RD Ed,2017 3111 B	mg/l	0.01	No Relaxation	< 0.01
10	Zinc (as Zn)	By AAS Method APHA 23 RD Ed,2017: 3111 B	mg/l	5	15	3.1



Prepared By



For VCSPL

Verified By



Visiontek Consultancy Services Pvt. Ltd.

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ISO 9001 : 2006

ISO 14001 : 2004

OHSAS 18001 : 2007

Page 01 of 18

Ref:
Envlab/19/
R-5342

Annexure - I : Surface Water Quality Monitoring at Joda West Mn Mine (W1: Kundra Nala Entering H Quarry and W2: Kundra Nala Leaving H Quarry)

Joda West (Kundra Nala Entering H Quarry)		April-19	May'19	June'19	July-19	Aug-19	Sept-19
Parameters	Unit	Standard	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	4	6.1	4.8	5.8	6.2	5.1
BOD (3) days at 27°C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coll form	MPN/100 ml	5000	310	7.46	240	228	220
pH Value	--	6.0-9.0	7.58	7.22	7.28	7.12	7.22
Colour (max)	Hazen	300	CL	CL	1	1.8	CL
Total Dissolved Solids	mg/l	1500	160	172	137	142	129
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.48	0.46	0.36	0.31	0.42
Chloride (max)	mg/l	600	40	48	36	32	26
Sulphates (SO ₄) (max)	mg/l	400	6.2	5.9	5.6	4.8	4.5
Nitrate as NO ₃ (max)	mg/l	50	2.1	2.6	1.82	1.12	1.9
Fluoride as F (max)	mg/l	1.5	0.019	0.026	0.021	0.02	0.02
Phenolic Compounds as C ₆ H ₅ 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	<0.001
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	<0.001
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 ⁺⁶	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2



For Visiontek Consultancy Services Pvt. Ltd.

Date:



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Page 3 of 8

Ref.:
Env/lab/19/R-
5343

JODA-WEST (DOWN STREAM) (Kundra Nata Leaving H Quarry)		Standards	May'19	June '19	July'19	Aug-19	Sept-19
Parameters	Unit	1st Report	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	4	6.6	6.1	6	6	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	420	310	220	220	170
pH Value	-	6.0-9.0	7.54	7.16	7.18	7.18	7.18
Colour (max)	Hazen	300	CL	2	2	2	CL
Total Dissolved Solids	mg/l	1500	171	142	138	138	134
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.42	0.42	0.36	0.36	0.47
Chloride (max)	mg/l	600	46	40	36	36	30
Sulphates (SO ₄) (max)	mg/l	400	6.8	5.6	4.2	4.2	4.8
Nitrate as NO ₃ (max)	mg/l	50	2.44	1.88	1.18	1.18	2.1
Fluoride as F (max)	mg/l	1.5	0.026	0.022	0.018	0.018	0.018
Phenolic Compounds as C ₆ H ₅ 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	<0.001
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	<0.001
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 ⁺⁶	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2



Date:

Visiontek Consultancy Services Pvt. Ltd.



Ref:
Emvlab/19/R-
5344

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

JW (Time office)

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn (µg/m ³)
Apr-19	67.18	44.23	8.64	14.26	7.28	0.65	23.20	BDL	BDL	BDL	BDL	BDL	BDL
May-19	73.71	42.87	9.08	14.37	7.30	0.72	26.50	BDL	BDL	BDL	BDL	BDL	BDL
Jun-19	59.75	29.85	11.0	16.56	8.74	0.51	26.13	BDL	BDL	BDL	BDL	BDL	BDL
Jul-19	51.70	24.46	9.76	17.72	9.16	0.62	25.06	BDL	BDL	BDL	BDL	BDL	BDL
Aug-19	47.53	28.38	7.63	12.99	9.07	0.53	24.93	BDL	BDL	BDL	BDL	BDL	BDL
Sep-19	32.60	18.26	6.70	10.68	7.16	0.26	20.95	BDL	BDL	BDL	BDL	BDL	BDL

JW (Near JW Quarry)

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn (µg/m ³)
Apr-19	69.51	39.23	6.39	16.34	6.44	0.56	27.02	BDL	BDL	BDL	BDL	BDL	BDL
May-19	75.93	46.09	6.49	13.03	7.03	0.61	28.24	BDL	BDL	BDL	BDL	BDL	BDL
Jun-19	61.90	35.11	8.38	12.45	7.36	0.61	27.84	BDL	BDL	BDL	BDL	BDL	BDL
Jul-19	46.89	24.83	9.0	10.21	9.10	0.55	26.49	BDL	BDL	BDL	BDL	BDL	BDL
Aug-19	43.04	22.93	8.68	11.70	9.02	0.54	26.37	BDL	BDL	BDL	BDL	BDL	BDL
Sep-19	30.98	17.35	6.90	9.99	7.19	0.23	20.87	BDL	BDL	BDL	BDL	BDL	BDL

Date:


 For Visiontek Consultancy Services Pvt. Ltd.



Ref: Em11ab/119/R-5345

Date:

AAQ Monitoring (BUFFER ZONE)

BZ-1 : Khondbondh

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	C ₆ H ₆ (µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
June -19	48.8	31.2	5.9	10.2	0.71	BDL	BDL	BDL	BDL	BDL	BDL	BDL
July-19	53.2	34.8	6.6	11.2	0.72	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Aug-19	42.6	21.8	5.8	10.92	0.71	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sept-19	26.6	14.9	4.6	9.8	0.34	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BZ-2 : Bounspani

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	C ₆ H ₆ (µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
June -19	52.4	30.6	5.4	10.6	0.74	BDL	BDL	BDL	BDL	BDL	BDL	BDL
July-19	50.8	31.4	6.8	11.2	0.68	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Aug-19	41.8	22.8	5.6	10.2	0.61	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sept-19	28.8	16.13	4.8	9.6	0.32	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BZ-3 : Baneikela

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NOx (µg/m ³)	CO (mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	C ₆ H ₆ (µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
June -19	50.2	28.8	7.1	9.8	0.71	BDL	BDL	BDL	BDL	BDL	BDL	BDL
July-19	48.8	26.8	7.4	10.6	0.66	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Aug-19	46.3	27.1	7.3	10.5	0.65	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Sept-19	30.2	16.91	5.1	8.92	0.28	BDL	BDL	BDL	BDL	BDL	BDL	BDL



For Visiontek Consultancy Services Pvt.Ltd.



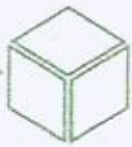
Ref.: Envlab/19/R - 5349

Date:

NOISE QUALITY

AAQ						
Sl. No	Date	Name of Location	Unit	Day Time Result	CPCB Standard	CPCB Standard
1	June -19	Township	dB	66.8	75	70
2		Hospital		69.2	50	40
3		Mines Area		71.4	75	70
4		Railway Siding		62.8	75	70
AAQ						
Sl. No	Date	Name of Location	Unit	Day Time Result	CPCB Standard	CPCB Standard
1	July -19	Township	dB	68.8	75	70
2		Hospital		38.2	50	40
3		Mines Area		64.6	75	70
4		Railway Siding		60.8	75	70
AAQ						
Sl. No	Date	Name of Location	Unit	Day Time Result	CPCB Standard	CPCB Standard
1	Aug -19	Township	dB	67.5	75	70
2		Hospital		45.8	50	40
3		Mines Area		63.5	75	70
4		Railway Siding		60.5	75	70
AAQ						
Sl. No	Date	Name of Location	Unit	Day Time Result	CPCB Standard	CPCB Standard
1	Sept -19	Township	dB	62.6	75	70
2		Hospital		41.8	50	40
3		Mines Area		60.8	75	70
4		Railway Siding		61.2	75	70





Ref: Envlab/19/R-5350

Date:

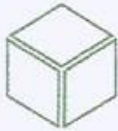
EQUIPMENT-NOISE QUALITY

Sl. No	Date	Name of Location	Unit	Result
1	June-2019	OD-09A-4623(Truck)	dB	81.2
2		D-80A (Loader)		80.6
3		OD-09A-4691(Truck)		82.2
4		SD-13(Drojer)		78.8
5		OD-09N-9454(Truck)		76.4
6		Volvo-EC300 DL(Sovel-1)		78.2
7		Volvo-EC300BLC(Sovel-2)		61.2
8		OR-14N-5243(Water Tank)		66.6
9		OR-09L-9552(Truck)		64.2
10		OD-09A-4125(Truck)		79.0
11		OD-09A-4128(Truck)		82.0
12		OD-09A-4692(Truck)		80.0

Sl. No	Date	Name of Location	Unit	Result
1	Sept-19	OD-09A-4623(Truck)	dB	76.4
2		D-80A (Loader)		78.2
3		OD-09A-4691(Truck)		80.4
4		SD-13(Drojer)		72.6
5		OD-09N-9454(Truck)		78.8



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: Em/lab/19 IR-1824

Date: 02.08.2019

OIL SEPARATION PIT WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF JULY-2019

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
2. Sampling location : WW-1:Workshop Water
3. Sampling Date : 11.07.2019
4. Date of Analysis : 12.07.2019 to 18.07.2019
5. Sample collected by : VCSPL Representative in presence of TATA Representative

SLNo.	Parameters	Unit	Testing Methods	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Report
					WW1
1	Colour	Hazen	APHA 2120 B, C	5	CL
2	Odour	--	APHA 2150 B	Unobjectionable	U/O
3	pH at 25°C	--	APHA 4500H ⁺ B -	5.5-9.0	7.18
4	Total Dissolved Solids	mg/l	APHA 2540 C	-	152.0
5	Copper as Cu	mg/l	APHA 3111 B,C	3.0	<0.05
6	Fluoride as F	mg/l	APHA 4500F- C	2.0	0.026
7	Total Residual Chlorine	mg/l	APHA 4500CL B	1.0	ND
8	Iron as Fe	mg/l	APHA 3500Fe, B	3.0	0.58
9	Manganese as Mn	mg/l	APHA 3500Mn B	2.0	0.018
10	Nitrate as NO ₃	mg/l	APHA 4500 NO ₃ E	10.0	3.8
11	Phenolic Compounds as C ₆ H ₅ OH	mg/l	APHA 5530 B,D	1.0	<0.001
12	Selenium as Se	mg/l	APHA 3114 B	0.05	<0.001
13	Cadmium as Cd	mg/l	APHA 3111 B,C	2.0	<0.001
14	Cyanide as CN	mg/l	APHA 4500 CN- C,D	0.2	ND
15	Lead as Pb	mg/l	APHA 3111 B,C	0.1	<0.01
16	Mercury as Hg	mg/l	APHA 3500 Hg	0.01	<0.001
17	Nickel as Ni	mg/l	APHA 3500-Ni	3.0	<0.001
18	Arsenic as As	mg/l	APHA 3114 B	0.2	<0.001
19	Total Chromium as Cr	mg/l	APHA 3500Cr B	2.0	<0.05
20	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	<0.05
21	Hexavalent Chromium as Cr ^{VI}	mg/l	APHA 3500Cr B	0.1	<0.05
22	Vanadium as V	mg/l	APHA 3500-V	0.2	<0.001
23	Total Suspended Solids	mg/l	APHA 2540 D	100	40.0
24	Temperature	°C	APHA 2550-B	shall not exceed 5°C above the receiving water temperature	28.0
25	Dissolved Oxygen	mg/l	APHA 2540 C	-	5.2
26	Biochemical Oxygen Demand as BOD	mg/l	APHA 5210 B	30	<1.8
27	Chemical Oxygen Demand as COD	mg/l	APHA 5220-C	250	16.8
28	Oil & Grease	mg/l	APHA 5520 B	10	ND
29	Ammonical Nitrogen as N	mg/l	APHA 4500-NH ₃ ,G	50	ND
30	Total Kjeldahl Nitrogen as N	mg/l	APHA 4500-Norg C	100	3.2
31	Sulphide as S	mg/l	APHA 4500-S ₂ -D	2.0	ND
32	Free Ammonia as NH ₃	mg/l	APHA 4500-NH ₃ ,F	5.0	ND
33	Particulate Size of Suspended Solids	mg/l	APHA 2540 D	850 µm IS Sieve	Passes through 850 mm IS Sieve
34	Bio-assay	mg/l	APHA 8910-C	90% survival in 100% effluent	Yes
35	Dissolved Phosphates as PO ₄	mg/l	APHA4500-P D	5.0	<0.05

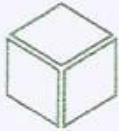
Note: ND = Not Detected



Plot No.-M-22&23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha Tel. : 7752017905

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(An Enviro Engineering Consulting Cell)



ISO 9001 : 2008

ISO 14001 : 2015

OHSAS 18001 : 2007

Ref: Env/lab/1912 - 3201

Date: 03.09.19

OIL SEPARATION PIT WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF AUG-2019

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
2. Sampling location : WW-1:Workshop Water
3. Sampling Date : 20.08.2019
4. Date of Analysis : 21.08.2019 to 28.08.2019
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl.No.	Parameters	Unit	Testing Methods	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Report
1	Colour	Hazen	APHA 2120 B, C	5	WW1
2	Odour	--	APHA 2150 B	Unobjectionable	Analysis Report
3	pH at 25°C	--	APHA 4500H ⁺ B	5.5-9.0	CL
4	Total Dissolved Solids	mg/l	APHA 2540 C	-	U/O
5	Copper as Cu	mg/l	APHA 3111 B,C	3.0	7.15
6	Fluoride as F	mg/l	APHA 4500F- C	2.0	142
7	Total Residual Chlorine	mg/l	APHA 4500Cl, B	1.0	<0.02
8	Iron as Fe	mg/l	APHA 3500Fe, B	3.0	0.031
9	Manganese as Mn	mg/l	APHA 3500Mn B	2.0	ND
10	Nitrate as NO ₃	mg/l	APHA 4500 NO ₃ E	10.0	0.61
11	Phenolic Compounds as C ₆ H ₅ OH	mg/l	APHA 5530 B,D	1.0	1.21
12	Selenium as Se	mg/l	APHA 3114 B	0.05	3.82
13	Cadmium as Cd	mg/l	APHA 3111 B,C	2.0	<0.05
14	Cyanide as CN	mg/l	APHA 4500 CN- C,D	0.2	<0.001
15	Lead as Pb	mg/l	APHA 3111 B,C	0.1	<0.001
16	Mercury as Hg	mg/l	APHA 3500 Hg	0.01	ND
17	Nickel as Ni	mg/l	APHA 3500-Ni	3.0	<0.01
18	Arsenic as As	mg/l	APHA 3114 B	0.2	<0.001
19	Total Chromium as Cr	mg/l	APHA 3500Cr B	2.0	<0.05
20	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	<0.004
21	Hexavalent Chromium as Cr ⁶⁺	mg/l	APHA 3500Cr B	0.1	<0.05
22	Vanadium as V	mg/l	APHA 3500-V	0.2	<0.01
23	Total Suspended Solids	mg/l	APHA 2540 D	100	<0.01
24	Temperature	°C	APHA 2550-B	shall not exceed 5°C above the receiving water temperature	38
25	Dissolved Oxygen	mg/l	APHA 2540 C	-	28
26	Biochemical Oxygen Demand as BOD	mg/l	APHA 5210 B	30	5.6
27	Chemical Oxygen Demand as COD	mg/l	APHA 5220-C	250	<1.8
28	Oil & Grease	mg/l	APHA 5520 B	10	16.4
29	Ammonical Nitrogen as N	mg/l	APHA 4500-NH ₃ -C	50	ND
30	Total Kjeldahl Nitrogen as N	mg/l	APHA 4500-Norg C	100	ND
31	Sulphide as S	mg/l	APHA 4500-S ₂ -D	2.0	2.6
32	Free Ammonia as NH ₃	mg/l	APHA 4500-NH ₃ -F	5.0	ND
33	Particulate Size of Suspended Solids	mg/l	APHA 2540 D	850 µm IS Sieve	ND
34	Bio-assay	mg/l	APHA 8910-C	90% survival in 100% effluent	Passes through 850 mm IS Sieve
35	Dissolved Phosphates as PO ₄	mg/l	APHA4500-P D	5.0	90% survival in 100% effluent

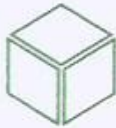
Note: ND: Not Detected.



Plot No.-M-22&23, Chandaka Industrial Estate, Patia, Bhubaneswar-751024, Dist-Khurda, Odisha Tel.: 7752017905

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Ref.: ENV/lab/19/1R-4473

Date: 03.10.19

OIL SEPARATION PIT WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF SEPTEMBER-2019

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
2. Sampling location : WW-1: Workshop Water
3. Sampling Date : 25.09.2019
4. Date of Analysis : 26.09.2019 TO 01.09.2019
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl.No.	Parameters	Unit	Testing Methods	General Standards for discharge of Environmental Pollutants Part A- Effluents	Analysis Report
					WW1
1	Colour	Hazen	APHA 2120 B, C	5	CL
2	Odour	--	APHA 2150 B	Unobjectionable	U/O
3	pH at 25°C	--	APHA 4500H ⁺ B -	5.5-9.0	7.26
4	Total Dissolved Solids	mg/l	APHA 2540 C	-	146
5	Copper as Cu	mg/l	APHA 3111 B,C	3.0	<0.02
6	Fluoride as F	mg/l	APHA 4500F- C	2.0	0.026
7	Total Residual Chlorine	mg/l	APHA 4500CL B	1.0	ND
8	Iron as Fe	mg/l	APHA 3500Fe, B	3.0	0.51
9	Manganese as Mn	mg/l	APHA 3500Mn B	2.0	1.18
10	Nitrate as NO ₃	mg/l	APHA 4500 NO ₃ ⁻ E	10.0	3.96
11	Phenolic Compounds as C ₆ H ₅ O11	mg/l	APHA 5530 B,D	1.0	<0.05
12	Selenium as Se	mg/l	APHA 3114 B	0.05	<0.005
13	Cadmium as Cd	mg/l	APHA 3111 B,C	2.0	<0.03
14	Cyanide as CN	mg/l	APHA 4500 CN- C,D	0.2	ND
15	Lead as Pb	mg/l	APHA 3111 B,C	0.1	<0.1
16	Mercury as Hg	mg/l	APHA 3500 Hg	0.01	<0.004
17	Nickel as Ni	mg/l	APHA 3500-Ni	3.0	<0.1
18	Arsenic as As	mg/l	APHA 3114 B	0.2	<0.004
19	Total Chromium as Cr	mg/l	APHA 3500Cr B	2.0	<0.05
20	Zinc as Zn	mg/l	APHA 3111 B,C	5.0	<0.03
21	Hexavalent Chromium as Cr ⁶⁺	mg/l	APHA 3500Cr B	0.1	<0.01
22	Vanadium as V	mg/l	APHA 3500-V	0.2	<0.001
23	Total Suspended Solids	mg/l	APHA 2540 D	100	32
24	Temperature	0C	APHA 2550-B	shall not exceed 5°C above the receiving water temperature	25
25	Dissolved Oxygen	mg/l	APHA 2540 C	-	5.2
26	Biochemical Oxygen Demand as BOD	mg/l	APHA 5210 B	30	1.9
27	Chemical Oxygen Demand as COD	mg/l	APHA 5220-C	250	18
28	Oil & Grease	mg/l	APHA 5520 B	10	ND
29	Ammonical Nitrogen as N	mg/l	APHA 4500-NH ₃ ,C	50	ND
30	Total Kjeldahl Nitrogen as N	mg/l	APHA 4500-Norg C	100	3.2
31	Sulphide as S	mg/l	APHA 4500-S ₂ -D	2.0	ND
32	Free Ammonia as NH ₃	mg/l	APHA 4500-NH ₃ ,F	5.0	ND
33	Particulate Size of Suspended Solids	mg/l	APHA 2540 D	850 µm IS Sieve	Passes through 850 mm IS Sieve
34	Bio-assay	mg/l	APHA 8910-C	90% survival in 100% effluent	88%
35	Dissolved Phosphates as PO ₄	mg/l	APHA4500-P D	5.0	<0.05

Note: ND: Not Detected.



ANNEXURE-X
LIST OF ENVIRONMENTAL MONITORING EQUIPMENT
Joda West Iron and Manganese Mine, M/S TATA STEEL LIMITED

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

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

