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

Ref No: MGM/P&E/990 /2018
Date: 28.05.2018

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

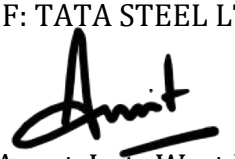
Ref: Ministry of Environment and Forests Letter No: J-11015/86/2004-IA.II(M) dated 13.09.2005

Dear Sir,

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

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

Thanking you,
Yours faithfully
F: TATA STEEL LTD.



Agent, Joda West Mine &
Head (Manganese Group of Mines), Joda

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

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

# COMPLIANCE REPORT PERIOD: October' 17 to March' 17

## ENVIRONMENTAL CLEARANCE TO JODA WEST IRON AND MANGANESE MINE OF TATA STEEL LIMITED VIDE MoEF's LETTER NO. J-11015/86/2004-1A.II (M) DATED 13.09.2005 COMMENTS SUBMITTED TO THE MINISTRY OF ENVIRONMENT & FORESTS, GOVERNMENT OF INDIA

**Present Status of the Project:-**

The Scheme of Mining & Progressive Mine Closure Plan from 2013-14 to 2017-18 over an area of 1437.719 ha. has been approved by Indian Bureau of Mines, Bhubaneswar vide letter no. MS/OTFM/47-ORI/BHU/2012-13, Dt.21.05.2013. The review of Mining plan under Rule no. 17(2) of MCR 2016 and submitted under Rule no. 23 of MCDR 2017 with proposal for the period of 2018-2023 is approved vide letter No. MS/OTFM/18-ORI/BHU/2017-18/2016.

| Sl. no | A : Specific conditions | Compliance status |
|---|---|---|
| 1 | Mining shall not be undertaken in areas of forestland within the lease without the necessary approvals / forestry clearance. | The mine has obtained the Forest Clearance vide MoEF's letter no. F.No.8-89/2004-FC, dt.10.08.2007 over an area of 436.678 ha of forest land.<br><br>We have applied for forest diversion over an area of 730. 635 ha on 25.11.2015.<br><br>Further, in accordance to the MoEF & CC Circular dated F.No.8-78/1996-FC, dated.10.03.2015, the forest area as on 25.10.1980 (i.e. Sabik Settlement) 79.239ha. within the mining lease of 1437.719 ha is now termed as forest land. Hence, fresh forest diversion proposal over an area of 79.239 ha has been applied on 20.06.2016<br><br>The mining operation and allied activities are confined within the approved diverted area only. |
| 2 | Topsoil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area. | 35 cum top soil has been generated during April'17 to September'17. The top soil so generated is used for plantation purposes and the unused top soil is being stacked at the earmarked places. However, the top soil generated earlier is used for development of park and nursery within the lease-hold area and plantation in the inactive dump slopes within the mine. |
| 3 | OB and other wastes should be stacked at eannarked sites only and should not be kept active for long | OB and other wastes are being dumped as per approved Scheme of Mine of Joda West Manganese Mine. |

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| | periods of time.<br><br>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. | 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.<br><br>During the year 2017-18, 24839 nos. of saplings were planted. Beside this we also planted around 80,000 nos. of vetiver slips.<br><br>The retaining wall and garland drain with sedimentation pit at corners near toe at low lying area and uplift portion of OB dump has 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 | 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.<br>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.<br>Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall/super cyclone period. A separate storm water sump for this purpose should be created. | Existing catch drains and garland drains are covering the entire dump slope at bottom part. The run off of garland drains are collected in settling/sedimentation pits. The catch drains and sedimentation pits are periodically de-silted and maintained properly.<br>Size, gradient and length of the drains are adequate to take care of the peak flow.<br><br>A series of check dams and settling pits have been provided for proper settlement of suspended solid in surface runoff. |
| 6 | Dimension of retaining wall at the toe of OB dumps and benches within the mine to check run-off and siltation should be based on the rainfall data. | In order to prevent the siltation and check the run-off, retaining wall and garland drain are provided with the dimension as;<br><u>Dimension of the Retaining Wall</u> :<br>Height – 1 to 1.2 mtr. Width – 1 mtr.<br><u>Dimension of the Garland Drain</u> :<br>Depth – 1.20 to 1.5 mtr. Width – 1 to 1.2 mtr.<br>A multi-stage sedimentation basin with check dam |

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| | | 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. |
| 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 during summer season and monsoon season.<br><br>The detail analysis result is enclosed **as Annexure-I (Dust Fall ) & Annexure -II (Soil)** |
| 8 | Mine Mineral and OB transportation shall be in trucks/dumpers covered with tarpaulins.<br><br>Vehicular emissions should be kept under control and regularly monitored.<br><br>Suitable measures should be taken to check fugitive emissions from haulage roads & transfer points, etc. | The trucks are being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding located 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.<br><br>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.<br><br>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.<br><br>The results of Ambient Air Quality done during the period Oct'17 to March'18 is enclosed as **Annexure-III.** |
| 9 | A green belt of adequate width should be raised by planting the native species around ML area. Plantation should also be carried out along roads, OB dump sites etc. in consultation with the local DFO / Agriculture Department. The density of the trees should be not less than 2500 plants per ha. | Reclamation and plantation programmes have been drawn. We have planted around 11.30 lakh nos. of trees over an area around 224 ha till 2016-17 at safety zone, OB dump and as avenue plantation. The tree density is maintained at the rate of more than 2500 saplings per ha.<br><br>• During the year 2017-18, 24839 nos. of saplings were planted. Beside this we also planted around 80,000 nos. of vetiver slips |

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| | | • Apart from conventional plantation programme we have also planted 3,80,000 of Vetiver slips in inactive dump slopes of D & H quarry till date. |
| 10 | Groundwater shall not be used for mine operations. Prior approval of CGWA shall be obtained for using groundwater. | Ground water use permission has been obtained from CGWA vide letter no. 21-4(250)/CGWA/SER/2010-1798, Dt.25.08.2010 for 504 $m^3$ per day.<br><br>However after the notification from CGWA, we have applied for NOC to use ground water vide our application no. 21-4/1195/OR/MIN/2017. Right now it is under process.<br><br>The ground water is not being used for mining and its allied activities. The mine seepage water is being used for nursery development and water sprinkling at mine. The total usage is well within the permissible limit. |
| 11 | Mining will not intersect groundwater. Prior permission of the MOEF and CGWA shall be taken to mine below water table. | Mining is not intersecting the ground water as the Ground water being at lower level in comparison to existing maximum quarry depth. |
| 12 | Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers. The monitoring should be done for quantity four times a year in pre-monsoon (April / May), monsoon (August). Post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected should be submitted to the MoEF & CGWA quarterly. | Ground water table is much below the existing mine workings because of mining operations are confined at hilly topography only. However, ground water level & quality at existing well at separate location is being monitored.<br><br>The ground water level and quality monitoring results are enclosed as **Annexure IV & V** 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.<br><br>The details of analysis result for ground water and surface water with standards are enclosed as **Annexure –VI & VII** respectively. |
| 14 | "Consent to Operate" should be obtained from SPCB before expanding | "Consent to operate" has been obtained from State Pollution Control Board, Orissa vide Order no. |

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| | mining activities. | 3012/IND-I-CON-186 dated 18.02.16 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, Bhubaneshwar. | We have deposited Rs.56,30,000/- on 05.07.2006 with DFO, Keonjhar, Orissa being the contribution towards implementation of Wild Life Management Plan prepared for Bonai & Keonjhar division. We have also paid additional amount of Rs. 2,31,24,380 and Rs 3,30,67,537 with DFO, Keonjhar, Orissa towards differential payment for implementation of regional Wildlife Management Plan prepared for Bonai & Keonjhar division.<br><br>Further, Site Specific wildlife management plan has been approved by the memo no. 7726/1WL-SSP-93/2015 dated 31 Aug 2015. |
| 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.<br><br>Further, Progressive mine closure plan for the period of 2018-19 to 2022-23 has been submitted under the Rule No. 23, MCDR 2017.<br><br>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 2017-18 is given in table below. |

<table>
<tr><td></td><td></td><td>Table: Plan vs. Actual for year 2017-18<table><tr><th>Year- 2017-18</th><th>Plan</th><th>Actual</th></tr><tr><td>Total Excavation (cum)</td><td>1821118</td><td>745768</td></tr><tr><td>Production (MT)</td><td>180000</td><td>69595</td></tr><tr><td>OB Removal (cum)</td><td>1736412</td><td>713026</td></tr></table></td></tr>
<tr><td>3</td><td>Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM. SPM, $SO_2$, $NO_x$. 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.<br><br>Data on ambient air quality (RPM, SPM, SO2 & NOx.) should be regularly submitted to the Ministry including its Regional office at Bhubaneshwar and the State Pollution Control Board / Central Pollution Control Board once in six. months.</td><td>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 and near H-Quarry) and 3 nos. in buffer zone (at Khandbondh, Bonaikela, Banspani )<br><br>Samples are drawn twice in a week in core zone and once in a quarter in buffer zone to ascertain the 24 hour monitoring average for $PM_{10}$, $PM_{2.5}$, $SO_2$, NOx, CO, Mn NH3, BaP, benzene, As, Ni and Pb .and reports are being submitted to OSPCB every month.<br><br>It was observed that,<br>a) $PM_{10}$ varies from 50 µg/m$^3$ (Oct'17) to 74.31µg/m$^3$ (Dec'18) near Office area (close proximity to quarry and residential colony) against the standard 100 µg/m$^3$.<br>b) $PM_{10}$ varies from 58.4 µg/m$^3$ (Oct'17) to 79.53 µg/m$^3$ (Mar'18) near quarry area against the standard 100 µg/m$^3$.<br>c) $PM_{2.5}$ varies from 24.2 µg/m$^3$ (Oct'17) to 38.34 µg/m$^3$ (Dec'17) near Office (close proximity to quarry and residential colony) against the standard 60 µg/m$^3$.<br>d) $PM_{2.5}$ varies from 29.5 µg/m$^3$ (Oct'17) to 41.47 µg/m$^3$ (Mar'18) near quarry area against the standard 60 µg/m$^3$.<br>e) $SO_2$ varies from 4.41 µg/m$^3$ (Oct'17) to 5.53 µg/m$^3$ (Dec'17) near office (close proximity to quarry and residential colony) against the standard 80 µg/m$^3$.<br>f) $SO_2$ varies from 4.7 µg/m$^3$ (Oct'17) to 5.92 µg/m$^3$ (Dec'17) near quarry area against the standard 80 µg/m$^3$.<br>g) $NO_X$ varies from 11.1 µg/m$^3$ (Oct'17) to 14.39 µg/m$^3$ (Mar'18) near office (close proximity to quarry and residential colony) against the standard 80 µg/m$^3$.</td></tr>
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| | | h) $NO_X$ varies from 12.1 µg/$m^3$ (Oct '17) to 16.2 µg/$m^3$ (Jan'18 and Feb'18) near quarry area against the standard 80 µg/$m^3$.<br>i) CO varies from 0.23 mg/$m^3$ (Oct'17) to 0.44 mg/$m^3$ (Feb'18) near office (close proximity to quarry and residential colony) against the standard 2 mg/$m^3$.<br>j) CO varies from 0.28 µg/$m^3$ (Oct'17) to 0.48 µg/$m^3$ (Feb'18 and Mar'18) near quarry area against the standard 2 mg/$m^3$<br><br>Abstract of the monthly monitoring data on ambient air quality and Water quality are enclosed as **Annexure – III & 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 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 and other area having potential of producing air borne dust. Additionally we have also installed fixed-type water sprinklers along haul road at D-Quarry. The results of Ambient Air Quality done during the period Oct' 17 to Mar' 18 is enclosed as **Annexure-III.** |
| 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.<br>Rests of operations are below the noise levels of 80 dBA.<br><br>The details of noise monitoring for the period Oct' 17 to Mar' 18 are enclosed as **Annexure-VIII**. |
| 7 | Industrial waste water (workshop and waste water from the mine) should be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 191b May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap should be installed before discharge of workshop effluents. | The oil separation system has been provided at workshop and working effectively. This is being centrally used for maintenance of all the Equipments running at Joda West & Service Equipments of Malda Mn.Mine. |
| 8 | Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board. | It is being done by M/s Visiontek Consultancy Service Pvt. Ltd (Recognized as "A" category consultant as by State Pollution Control Board, Orissa).<br><br>The type of pollution monitoring and analysis equipment used by by M/s Visiontek Consultancy Service Pvt. Ltd is enclosed as **Annexure – IX**. |

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| 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.<br><br>Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed. | Suitable dust masks are being provided to employees (departmental & contractual) engaged in dusty operations. It is also ensured that they use the same. Employees are undergoing Periodical Medical Examination which is inclusive of lungs function test and audiometry. All the personnel are trained on safety in work place and continuous awareness programmes are being conducted for all employees to avert manganese poisoning.<br>Periodical Medical Examination of employees (departmental & contractual) are conducted as per prescribed norms of Mines Rule, 1955. The initial and periodical examination includes blood hematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. All chest radiographs are being classified for detection of pneumoconiosis, diagnosis and documentation made in accordance to ILO classifications. During the calendar year 2017, 238 nos. of employees (Departmental – 9, Contractual -229) underwent periodical medical examination (PME) and 228(Departmental-0, Contractual-228) went under initial medical examination (IME). There are no findings of pneumoconiosis and manganese poisoning which is classified as occupational disease. |
| 10 | A separate environmental management cell with suitable qualified personnel should be set up under the control of a Senior Executive, who will report directly to the Head of the Organization. | The department is in place and the Head of the department is reporting to General Manager of the division.<br>The organizational structure in place is enclosed as **Annexure-X.** |

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| 11 | The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar. | Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose.<br><br>During the year 2017-18, no fund was allocated for construction of toe wall & garland drain against which we have spent Rs 3,60,756. For plantation activity Rs. 2,18,750 was allocated against which we have spent Rs. 15,02,644. The cost for construction of structural measures is more than expected as new areas were identified for the construction which was not envisaged during the preparation of budget. The cost for plantation is high as there was a significant increase in the wage of the labors Similarly for environment monitoring Rs12,00,000 was allocated against which we have spent Rs.9,25,625. The cost incurred in environment monitoring is less as rise in the price of environment monitoring was less than expected. We are doing the environment monitoring as per guidelines. Besides this we have also spent an additional of Rs 11,39,420 for the purpose of dust suppression with the help of fixed and mobile water sprinkler. |
| 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 | We are providing full co-operation to the officers of the Regional Office by furnishing the requisite data / information / monitoring reports. |
| 13 | A copy of clearance letter will be marked to the concerned Panchayat/local NGO, if any, from whom suggestion/ representation has been received while processing the proposal. | Copy of the clearance letter marked to 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 | A detail of Environmental Clearance with regard to Joda West Manganese Mine was published in Oriya News Papers Dharitri & Sambad 17.10.2005. |

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| | 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. | |
| 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 |

Yours Faithfully
F: Tata Steel Limited

Agent , Joda West Iron and Manganes Mines & Head (Manganese Group of Mines) , Joda

**Annexure I**


# Visiontek Consultancy Services Pvt.Ltd.

*(An Enviro Engineering Consulting Cell)*

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


Ref: VCSPL/17/R-3107 Date: 04.12.2017

## DUST FALL MONITORING REPORT FOR THE MONTH OF NOV-2017

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

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

**Total Dust fall for the month of Nov=0.598/km$^2$/month**

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

VISIONTEK CONSULTANCY SERVICES PVT. LTD.


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


*"Committed For The Better Environment"*

Ref.: Env lab/18/R-462 Date: 03.03.2018

## DUST FALL MONITORING REPORT FOR THE MONTH OF FEB-2018

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

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

**Total Dust fall for the month of Feb=1.218 t/km$^2$/month**

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

*For Visiontek Consultancy Services Pvt. Ltd.*

**Annexure – II**

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

Ref.: VCSPL/17/R-3108 Date.: 04.12.2017

## SOIL QUALITY ANALYSIS REPORT FOR THE MONTH OF NOV-2017

1. Name of Industry : **Joda West Manganese Mines ( M/s TATA Steel Limited)**
2. Sampling Location : **S-1: Near Quarry-H**
3. Date of Sampling : 28.11.2017
4. Date of Analysis : 29.11.2017 to 02.12.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

| Sl No. | Parameters | Unit | Analysis Results |
|---|---|---|---|
| | | | S-1 |
| 1. | Cobalt as Co | % | 0.0021 |
| 2. | Nickel as Ni | % | 0.052 |
| 3. | Mercury as Hg | % | <0.000002 |
| 4. | Arsenic as As | % | <0.000002 |

For *Visiontek Consultancy Services Pvt. Ltd.*

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

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

**Annexure-III**

| 1. JW (Time office) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly Average | **$PM_{10}$ ($\mu g/m^3$)** | **$PM_{2.5}$ ($\mu g/m^3$)** | **$SO_2$ ($\mu g/m^3$)** | **NOx ($\mu g/m^3$)** | **$O_3$ ($\mu g/m^3$)** | **CO ($mg/m^3$)** | **$NH_3$ ($\mu g/m^3$)** | **Pb ($\mu g/m^3$)** | **Ni ($ng/m^3$)** | **As ($ng/m^3$)** | **Benzene ($\mu g/m^3$)** | **Benzo(a) pyrene ($ng/m^3$)** | **Mn ($\mu g/m3$)** |
| Oct-17 | 50 | 24.2 | <4.41 | 11.1 | <4.0 | 0.23 | < 20.0 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | **<0.001** |
| Nov-17 | 62.3 | 31.3 | 4.8 | 13.3 | <4.7 | 0.33 | <21.4 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | **<0.001** |
| Dec-17 | 74.31 | 38.34 | 5.53 | 15.73 | 8.07 | 0.43 | 29.44 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | **<0.001** |
| Jan-18 | 73.4 | 37.2 | 5.4 | 15.3 | 10.3 | 0.4 | 27.1 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | **<0.001** |
| Feb-18 | 70.1 | 35.5 | 5 | 15.2 | 10.5 | 0.44 | 25.9 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | **<0.001** |
| Mar-18 | 73.72 | 37.28 | 4.44 | 14.39 | 8.72 | 0.43 | 23.21 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | **<0.001** |
| **AVERAGE** | **67.31** | **33.97** | **5.03** | **14.17** | **9.40** | **0.38** | **26.41** | **< 0.001** | **< 0.01** | **< 0.001** | **< 0.001** | **< 0.002** | **<0.001** |

| 2. JW (H quaary) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly Average | **$PM_{10}$ ($\mu g/m^3$)** | **$PM_{2.5}$ ($\mu g/m^3$)** | **$SO_2$ ($\mu g/m^3$)** | **NOx ($\mu g/m^3$)** | **$O_3$ ($\mu g/m^3$)** | **CO ($mg/m^3$)** | **$NH_3$ ($\mu g/m^3$)** | **Pb ($\mu g/m^3$)** | **Ni ($ng/m^3$)** | **As ($ng/m^3$)** | **Benzene ($\mu g/m^3$)** | **Benzo(a) pyrene ($ng/m^3$)** | **Mn ($\mu g/m3$)** |
| Oct-17 | 58.4 | 29.5 | <4.7 | 12.1 | <4.0 | 0.28 | <20.0 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | <0.001 |
| Nov-17 | 68.5 | 34.6 | 5.2 | 14 | <5.3 | 0.37 | 23.1 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | <0.001 |
| Dec-17 | 78.26 | 41.02 | 5.92 | 16.19 | 8.77 | 0.45 | 32.11 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | 0.01 |
| Jan-18 | 78.6 | 40.1 | 5.8 | 16.2 | 11.2 | 0.45 | 29.4 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | <0.001 |
| Feb-18 | 76.8 | 39.1 | 5.5 | 16.2 | 11.6 | 0.48 | 28.3 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | <0.011 |
| Mar-18 | 79.53 | 41.47 | 5.17 | 15.8 | 10.09 | 0.48 | 25.77 | < 0.001 | < 0.01 | < 0.001 | < 0.001 | < 0.002 | <0.001 |
| **AVERAGE** | **73.35** | **37.63** | **5.52** | **15.08** | **10.42** | **0.42** | **27.74** | **< 0.001** | **< 0.01** | **< 0.001** | **< 0.001** | **< 0.002** | **<0.001** |

## Annexure – IV: Ground Water Level Monitoring

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

Ref.: VCSPL/17/R-3106 Date.: 04.12.2017

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

1. Name of Industry : **Joda West Manganese Mines ( M/s TATA Steel Limited)**
2. Sampling Location : **GW-1:** Kamar Joda , **GW-2:** Baneikala Basti
3. Label measured by : VCSPL Representative in presence of TATA Representative

| Sl. No | Date of Sampling | Name of Village | Unit | Result |
|---|---|---|---|---|
| 1 | 11.11.2017 | Kamar Joda | Mt./bgl | 2.6 |
| 2 | 11.11.2017 | Baneikala Basti | Mt./bgl | 2.8 |

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

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

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*"Committed For The Better Environment"*

*Ref.:* Env Lab/18/R-461 *Date:* 03.03.2018

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

1. Name of Industry : **Joda West Manganese Mines ( M/s TATA Steel Limited)**
2. Sampling Location : **GW-1:** Kamar Joda , **GW-2:** Baneikala Basti
3. Label measured by : VCSPL Representative in presence of TATA Representative

| Sl. No | Date of Sampling | Name of Village | Unit | Result |
|---|---|---|---|---|
| 1 | **02.02.2018** | Kamar Joda | Mt./bgl | 9.1 |
| 2 | **23.02.2018** | Baneikala Basti | Mt./bgl | 9.7 |

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

*For Visiontek Consultancy Services Pvt. Ltd.*

## Annexure – V: Ground Water Quality Monitoring

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

Ref.: VCSPL/17/R-3248 Date.: 04.12.2017

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

1. Name of Industry : **Joda West Manganese Mines ( M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Pramabasti**
   **GW-2: Kumar Joda (O/W)**
3. Date of sampling : 11.11.2017
4. Date of analysis : 13.11.2017 to 18.11.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

| Sl. No | Parameter | Testing Methods | Unit | Standard as per IS -10500:1991 | Analysis Results | |
|---|---|---|---|---|---|---|
| | | | | | GW-1 | GW-2 |
| ***Essential Characteristics*** | | | | | | |
| 1 | Colour | APHA 2120 B, C | Hazen | **5** | CL | CL |
| 2 | Odour | APHA 2150 B | -- | **U/O** | U/O | U/O |
| 3 | Taste | APHA 2160 C | -- | **Agreeable** | Agreeable | Agreeable |
| 4 | Turbidity | APHA 2130 B | NTU | **5** | <0.2 | <0.2 |
| 5 | pH Value | APHA 4500$H^+$ B | -- | **6.5-8.5** | 7.26 | 7.28 |
| 6 | Total Hardness (as $CaCO_3$) | APHA 2340 C | mg/l | **300** | 138.0 | 135.0 |
| 7 | Iron (as Fe) | APHA 3500Fe, B | mg/l | **0.3** | 0.24 | 0.26 |
| 8 | Chloride (as Cl ) | APHA 4500$Cl^-$ B | mg/l | **250** | 36.0 | 32.0 |
| 9 | Residual, free Chlorine | APHA 4500Cl, B | mg/l | **0.2** | ND | ND |
| ***Desirable Characteristics*** | | | | | | |
| 10 | Dissolved Solids | APHA 2540 C | mg/l | **500** | 213.0 | 204.0 |
| 11 | Calcium (as Ca ) | APHA 3500Ca B | mg/l | **75** | 36.1 | 36.5 |
| 12 | Magnesium (as Mg) | APHA 3500Mg B | mg/l | **30** | 11.7 | 10.7 |
| 13 | Copper (as Cu) | APHA 3111 B,C | mg/l | **0.05** | <0.05 | <0.05 |
| 14 | Manganese (as Mn) | APHA 3500Mn B | mg/l | **0.1** | 0.014 | 0.01 |
| 15 | Sulphate (as $SO_4$) | APHA 4500 $SO_4^{2-}$ E | mg/l | **200** | 4.6 | 4.7 |
| 16 | Nitrate (as $NO_3$) | APHA 4500 $NO_3^-$ E | mg/l | **45** | 1.98 | 1.92 |
| 17 | Fluoride (as F) | APHA 4500$F^-$ C | mg/l | **1.0** | 0.018 | 0.015 |
| 18 | Phenolic Compounds (as $C_6H_5OH$) | APHA 5530 B,D | mg/l | **0.001** | <0.001 | <0.001 |
| 19 | Mercury (as Hg) | APHA 3500 Hg | mg/l | **0.001** | <0.001 | <0.001 |
| 20 | Cadmium (as Cd) | APHA 3111 B,C | mg/l | **0.01** | <0.001 | <0.001 |
| 21 | Selenium (as Se) | APHA 3114 B | mg/l | **0.01** | <0.001 | <0.001 |
| 22 | Arsenic (as As) | APHA 3114 B | mg/l | **0.05** | <0.001 | <0.001 |
| 23 | Cyanide (as CN) | APHA 4500 $CN^-$ C,D | mg/l | **0.05** | ND | ND |
| 24 | Lead (as Pb) | APHA 3111 B,C | mg/l | **0.05** | <0.001 | <0.001 |
| 25 | Zinc (as Zn) | APHA 3111 B,C | mg/l | **5** | <0.05 | <0.05 |
| 26 | Anionic Detergents (as MBAS) | APHA 5540 C | mg/l | **0.2** | <0.2 | <0.2 |
| 27 | Chromium (as $Cr^{+6}$) | APHA 3500Cr B | mg/l | **0.05** | <0.05 | <0.05 |
| 28 | Mineral Oil | APHA 5220 B | mg/l | **0.01** | <0.01 | <0.01 |
| 29 | Alkalinity | APHA 2320 B | mg/l | **200** | 124.0 | 126.0 |
| 30 | Aluminium as( Al) | APHA 3500Al B | mg/l | **0.03** | <0.001 | <0.001 |
| 31 | Boron (as B) | APHA 4500B, B | mg/l | **1** | <0.01 | <0.01 |
| 32 | Poly Aromatic Hydrocarbon as PAH | APHA 6440 B | µg/l | -- | <0.001 | <0.001 |
| 33 | Pesticide | APHA 6630 B,C | mg/l | **Absent** | Absent | Absent |

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

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

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*"Committed For The Better Environment"*

Ref.: Env Lab/18/R-459 Date: 03.03.2018

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

1. Name of Industry : **Joda West Manganese Mines ( M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Pramabasti**
   **GW-2: Kumar Joda (O/W)**
3. Date of sampling : 15.02.2018
4. Date of analysis : 16.02.2018 to 22.02.2018
5. Sample collected by : VCSPL Representative in presence of TATA Representative

| Sl. No | Parameter | Testing Methods | Unit | Standard as per IS -10500:1991 | Analysis Results | |
|---|---|---|---|---|---|---|
| | | | | | GW-1 | GW-2 |
| *Essential Characteristics* | | | | | | |
| 1 | Colour | APHA 2120 B, C | Hazen | **5** | CL | CL |
| 2 | Odour | APHA 2150 B | -- | **U/O** | U/O | U/O |
| 3 | Taste | APHA 2160 C | -- | **Agreeable** | Agreeable | Agreeable |
| 4 | Turbidity | APHA 2130 B | NTU | **5** | <0.2 | <0.2 |
| 5 | pH Value | APHA 4500$H^+$ B | -- | **6.5-8.5** | 7.38 | 7.24 |
| 6 | Total Hardness (as $CaCO_3$) | APHA 2340 C | mg/l | **300** | 145.0 | 140.0 |
| 7 | Iron (as Fe) | APHA 3500Fe, B | mg/l | **0.3** | 0.26 | 0.28 |
| 8 | Chloride (as Cl ) | APHA 4500$Cl^-$ B | mg/l | **250** | 39.0 | 36.0 |
| 9 | Residual, free Chlorine | APHA 4500Cl, B | mg/l | **0.2** | ND | ND |
| *Desirable Characteristics* | | | | | | |
| 10 | Dissolved Solids | APHA 2540 C | mg/l | **500** | 226.0 | 215.0 |
| 11 | Calcium (as Ca ) | APHA 3500Ca B | mg/l | **75** | 40.1 | 38.9 |
| 12 | Magnesium (as Mg) | APHA 3500Mg B | mg/l | **30** | 10.9 | 10.4 |
| 13 | Copper (as Cu) | APHA 3111 B,C | mg/l | **0.05** | <0.05 | <0.05 |
| 14 | Manganese (as Mn) | APHA 3500Mn B | mg/l | **0.1** | 0.016 | 0.013 |
| 15 | Sulphate (as $SO_4$) | APHA 4500 $SO_4^{2-}$ E | mg/l | **200** | 5.1 | 4.8 |
| 16 | Nitrate (as $NO_3$) | APHA 4500 $NO_3^-$ E | mg/l | **45** | 2.12 | 2.04 |
| 17 | Fluoride (as F) | APHA 4500$F^-$ C | mg/l | **1.0** | 0.02 | 0.017 |
| 18 | Phenolic Compounds (as $C_6H_5OH$) | APHA 5530 B,D | mg/l | **0.001** | <0.001 | <0.001 |
| 19 | Mercury (as Hg) | APHA 3500 Hg | mg/l | **0.001** | <0.001 | <0.001 |
| 20 | Cadmium (as Cd) | APHA 3111 B,C | mg/l | **0.01** | <0.001 | <0.001 |
| 21 | Selenium (as Se) | APHA 3114 B | mg/l | **0.01** | <0.001 | <0.001 |
| 22 | Arsenic (as As) | APHA 3114 B | mg/l | **0.05** | <0.001 | <0.001 |
| 23 | Cyanide (as CN) | APHA 4500 $CN^-$ C,D | mg/l | **0.05** | ND | ND |
| 24 | Lead (as Pb) | APHA 3111 B,C | mg/l | **0.05** | <0.001 | <0.001 |
| 25 | Zinc (as Zn) | APHA 3111 B,C | mg/l | **5** | <0.05 | <0.05 |
| 26 | Anionic Detergents (as MBAS) | APHA 5540 C | mg/l | **0.2** | <0.2 | <0.2 |
| 27 | Chromium (as $Cr^{+6}$) | APHA 3500Cr B | mg/l | **0.05** | <0.05 | <0.05 |
| 28 | Mineral Oil | APHA 5220 B | mg/l | **0.01** | <0.01 | <0.01 |
| 29 | Alkalinity | APHA 2320 B | mg/l | **200** | 132.0 | 130.0 |
| 30 | Aluminium as( Al) | APHA 3500Al B | mg/l | **0.03** | <0.001 | <0.001 |
| 31 | Boron (as B) | APHA 4500B, B | mg/l | **1** | <0.01 | <0.01 |
| 32 | Poly Aromatic Hydrocarbon as PAH | APHA 6440 B | µg/l | -- | <0.001 | <0.001 |
| 33 | Pesticide | APHA 6630 B,C | mg/l | **Absent** | Absent | Absent |

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

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

*For Visiontek Consultancy Services Pvt. Ltd.*

## Annexure – VI: Trace Metal Analysis in Ground Water

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

Ref.:...VCSPL/17/R-3249 Date.:...04.12.2017

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

1. Name of Industry : **Joda West Manganese Mines ( M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Pramabasti**
3. Date of sampling : 11.11.2017
4. Date of analysis : 13.11.2017 to 18.11.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

| Sl. No | Parameter | Testing Methods | Unit | Standard as per IS -10500:1991 | Analysis Results |
|---|---|---|---|---|---|
| | | | | | GW-1 |
| 1 | Iron (as Fe) | APHA 3500Fe, B | mg/l | **0.3** | 0.26 |
| 2 | Copper (as Cu) | APHA 3111 B,C | mg/l | **0.05** | < 0.05 |
| 3 | Manganese (as Mn) | APHA 3500Mn B | mg/l | **0.1** | 0.014 |
| 4 | Chromium (as $Cr^{+6}$) | APHA 3500Cr B | mg/l | **0.05** | < 0.05 |
| 5 | Mercury (as Hg) | APHA 3500 Hg | mg/l | **0.001** | < 0.001 |
| 6 | Cadmium (as Cd) | APHA 3111 B,C | mg/l | **0.01** | < 0.01 |
| 7 | Selenium (as Se) | APHA 3114 B | mg/l | **0.01** | < 0.001 |
| 8 | Arsenic (as As) | APHA 3114 B | mg/l | **0.05** | < 0.001 |
| 9 | Lead (as Pb) | APHA 3111 B,C | mg/l | **0.05** | < 0.01 |
| 10 | Zinc (as Zn) | APHA 3111 B,C | mg/l | **5** | <0.05 |

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

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*Ref.:* Envlab/18/R-466 *Date:* 03.03.2018

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

1. Name of Industry : **Joda West Manganese Mines ( M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Pramabasti**
3. Date of sampling : 15.02.2018
4. Date of analysis : 16.02.2018 to 22.02.2018
5. Sample collected by : VCSPL Representative in presence of TATA Representative

| Sl. No | Parameter | Testing Methods | Unit | Standard as per IS -10500:1991 | Analysis Results |
|---|---|---|---|---|---|
| | | | | | GW-1 |
| 1 | Iron (as Fe) | APHA 3500Fe, B | mg/l | **0.3** | 0.26 |
| 2 | Copper (as Cu) | APHA 3111 B,C | mg/l | **0.05** | < 0.05 |
| 3 | Manganese (as Mn) | APHA 3500Mn B | mg/l | **0.1** | 0.018 |
| 4 | Chromium (as $Cr^{+6}$) | APHA 3500Cr B | mg/l | **0.05** | < 0.05 |
| 5 | Mercury (as Hg) | APHA 3500 Hg | mg/l | **0.001** | < 0.001 |
| 6 | Cadmium (as Cd) | APHA 3111 B,C | mg/l | **0.01** | < 0.01 |
| 7 | Selenium (as Se) | APHA 3114 B | mg/l | **0.01** | < 0.001 |
| 8 | Arsenic (as As) | APHA 3114 B | mg/l | **0.05** | < 0.001 |
| 9 | Lead (as Pb) | APHA 3111 B,C | mg/l | **0.05** | < 0.01 |
| 10 | Zinc (as Zn) | APHA 3111 B,C | mg/l | **5** | <0.05 |

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

*For Visiontek Consultancy Services Pvt. Ltd.*

## Annexure – VII ( Water Quality Monitoring)

| SURFACE WATER QUALITY ANALYSIS REPORT OCT 17 TO MARCH 18 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Location:SW-1: Kundra Nallah entering H. Quarry | | | | | | | | | | |
| **Sl. No** | **Parameter** | **Unit** | **Standard as per IS:2296:1992, Class'C'** | Oct | | Nov | Dec | Jan | Feb | March |
| 1 | Dissolved Oxygen (minimum) | mg/l | **4** | 6.2 | 5.9 | 6.1 | 5.7 | 5.5 | 5.2 | 5.3 |
| 2 | BOD (3) days at 270C (max) | mg/l | **3** | < 1.8 | < 1.8 | < 1.8 | < 1.8 | < 1.8 | < 1.8 | < 1.8 |
| 3 | Total Coli form | MPN/100 ml | **5000** | 510 | 900 | 410 | 370 | 220 | 370 | 170 |
| 4 | pH Value | | **6.0-9.0** | 7.24 | 7.28 | 7.34 | 7.38 | 7.36 | 7.32 | 7.2 |
| 5 | Colour (max) | Hazen | **300** | 4 | 5 | 1 | CL | CL | CL | CL |
| 6 | Total Dissolved Solids | mg/l | **1500** | 124 | 122 | 125 | 127 | 132 | 137 | 140.0 |
| 7 | Copper as Cu (max) | mg/l | **1.5** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 8 | Iron as Fe (max) | mg/l | **0.5** | 0.52 | 0.44 | 0.46 | 0.48 | 0.45 | 0.48 | 0.45 |
| 9 | Chloride (max) | mg/l | **600** | 22 | 21 | 22 | 21 | 25 | 28 | 30.0 |
| 10 | Sulphates (SO4) (max) | mg/l | **400** | 4.2 | 4.1 | 4.4 | 4.5 | 4.7 | 4.9 | 5 |
| 11 | Nitrate as NO3 (max) | mg/l | **50** | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 1.8 | 1.94 |
| 12 | Fluoride as F (max) | mg/l | **1.5** | 0.016 | 0.018 | 0.021 | 0.018 | 0.022 | 0.02 | 0.019 |
| 13 | Phenolic Compounds as C6H5OH (max) | mg/l | **0.005** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 14 | Cadmium as Cd (max) | mg/l | **0.01** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 15 | Selenium as Se (max) | mg/l | **0.05** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 16 | Arsenic as As | mg/l | **0.2** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 17 | Cyanide as CN (max) | mg/l | **0.05** | ND | ND | ND | ND | ND | ND | ND |
| 18 | Lead as Pb(max) | mg/l | **0.1** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 19 | Zinc as Zn(max) | mg/l | **15** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 20 | Hexa Chromium as Cr +6 | mg/l | **0.05** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 21 | Anionic Detergents (max) | mg/l | **1** | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |

| SURFACE WATER QUALITY ANALYSIS REPORT OCT-17 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Location:SW-1: Kundra Nallah entering H. Quarry<br>SW-2:Kundra Nallah leaving H.Quarry | | | | | | | | | | |
| **Sl. No** | **Parameter** | **Unit** | **Standard as per IS:2296:1992, Class'C'** | Oct | | Nov | Dec | Jan | Feb | March |
| 1 | Dissolved Oxygen (minimum) | mg/l | **4** | 6.3 | 6.1 | 5.8 | 5.9 | 5.4 | 5.7 | 5.4 |
| 2 | BOD (3) days at 270C (max) | mg/l | **3** | < 1.8 | < 1.8 | < 1.8 | < 1.8 | < 1.8 | < 1.8 | < 1.8 |
| 3 | Total Coli form | MPN/100 ml | **5000** | 900 | 1600 | 510 | 410 | 350 | 310 | 370 |
| 4 | pH Value | | **6.0-9.0** | 7.32 | 7.3 | 7.29 | 7.34 | 7.39 | 7.36 | 7.24 |
| 5 | Colour (max) | Hazen | **300** | 5 | 6 | 1 | CL | CL | CL | CL |
| 6 | Total Dissolved Solids | mg/l | **1500** | 126 | 120 | 128 | 134 | 139 | 136 | 144.0 |
| 7 | Copper as Cu (max) | mg/l | **1.5** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 8 | Iron as Fe (max) | mg/l | **0.5** | 0.5 | 0.46 | 0.48 | 0.45 | 0.47 | 0.45 | 0.47 |
| 9 | Chloride (max) | mg/l | **600** | 22 | 20 | 24 | 22 | 26 | 28 | 31.0 |
| 10 | Sulphates (SO4) (max) | mg/l | **400** | 4.4 | 4.3 | 4.8 | 4.9 | 4.8 | 4.7 | 5.2 |
| 11 | Nitrate as NO3 (max) | mg/l | **50** | 1.6 | 1.5 | 1.8 | 1.9 | 2.1 | 1.7 | 2.06 |
| 12 | Fluoride as F (max) | mg/l | **1.5** | 0.018 | 0.019 | 0.022 | 0.021 | 0.024 | 0.022 | 0.025 |
| 13 | Phenolic Compounds as C6H5OH (max) | mg/l | **0.005** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 14 | Cadmium as Cd (max) | mg/l | **0.01** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 15 | Selenium as Se (max) | mg/l | **0.05** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 16 | Arsenic as As | mg/l | **0.2** | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 17 | Cyanide as CN (max) | mg/l | **0.05** | ND | ND | ND | ND | ND | ND | ND |
| 18 | Lead as Pb(max) | mg/l | **0.1** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 19 | Zinc as Zn(max) | mg/l | **15** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 20 | Hexa Chromium as Cr +6 | mg/l | **0.05** | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 21 | Anionic Detergents (max) | mg/l | **1** | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 | <0.2 |

**Annexure-VIII**

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

Ref: VCSPL/17/K-3109 Date: 04.12.2017

## NOISE MONITORING REPORT FOR THE MONTH OF NOV-2017

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

| AAQ | | | | Day Time | Night Time |
|---|---|---|---|---|---|
| Sl. No | Date | Name of Location | Unit | Result | |
| 1 | 10.11.2017 | Township | db | 60.8 | 40.5 |
| 2 | | Hospital | | 53.2 | 32.6 |
| 3 | | Mines Area | | 67.1 | 45.8 |
| 4 | | Railway Siding | | 62.8 | 41.5 |
| CPCB Standard | | | | 75 | 70 |

*for Visiontek Consultancy Services Pvt. Ltd.*

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744594, 3250790
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*"Committed For The Better Environment"*

*Ref.:* Env lab/18/R-464 *Date:* 03.03.2018

## NOISE MONITORING REPORT FOR THE MONTH OF FEB-2018

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

| AAQ | | | | Day Time | Night Time |
|---|---|---|---|---|---|
| **Sl. No** | **Date** | **Name of Location** | **Unit** | **Result** | |
| 1 | **15.02.2017** | Township | **db** | 62.6 | 42.3 |
| 2 | | Hospital | | 42.9 | 31.8 |
| 3 | | Mines Area | | 60.4 | 48.6 |
| 4 | | Railway Siding | | 58.8 | 37.5 |
| **CPCB Standard** | | | | **75** | **70** |

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

*for Visiontek Consultancy Services Pvt. Ltd.*

**LIST OF ENVIRONMENTAL MONITORING EQUIPMENT**

| LIST OF ENVIRONMENTAL MONITORING EQUIPMENT | | |
|---|---|---|
| **Ambient Air Quality** | | |
| **Sl.No.** | **Name of the Instrument** | **Parameter** |
| 1 | Respirable Dust sampler | $PM_{10}$ |
| 2 | Fine Particulate Sampler | $PM_{2.5}$ |
| 3 | Spectrophotometer UV-Visible range | $SO_2$,$NO_x$,$NH_3$,$O_3$, |
| 4 | NDIR | CO |
| 5 | AAS | As, Ni, Pb ,Mn |
| 6 | GC | $C_6H_6$,Bap |
| 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, Copper,Lead,Zinc, Aluminium, etc..) |
| 4 | Spectrophotometer UV-Visible range | Nitrate,Nitrite,Sulphate, Chromium(VI),Fluoride, Cyanide,Boron,Iron, Phenolic compounds |
| 5 | Gas Chromatography | PAH,Pesticide |
| 6 | Flame Photometer | Sodium ,Potassium |
| 7 | BOD Incubator | BOD |
| 8 | COD Digester | COD |
| 9 | Muffle 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 | Kjeldal Equipment | Ammonia and Organic Nitrogen |
| 22 | Hot Plate | Digestion |
| 23 | Piezometer | Water level monitoring |
| 24 | Aquarium | Bio assay test |
| Other Paraphernalia for analysis of Water quality are also available in the laboratory. | | |

**Annexure – X**
**Organizational Structure**