COMPLIANCE REPORT PERIOD: April' 17 to September' 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.

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. We have applied for forest diversion over an area of 730. 635 ha on 25.11.2015. 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 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.	1050 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 periods of time. Plantation should be taken up for	OB and other wastes are being dumped as per approved Scheme of Mine of Joda West Manganese Mine. The dump is terraced at every 10m and overall slope is maintained well within 28° as per approved

	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.	Scheme of Mining. The inactive portion of OB dumps area being stabilized by plantation of local species. During the 2016-17, 21930 nos. of sapling were planted covering an area of 3.6 ha. Beside this we have also planted 80,000 vetiver slips in inactive dump slopes of quarry H & I during the year 2016-17. During the year 2017-18, 24839 nos. of saplings were planted till September 17. Beside this we also planted around 57,300 nos. of vetiver slips. Apart from this we have distributed fruit bearing saplings free of cost to our surrounding communities including, school children, villagers, clubs and SHGs under guidance of State Pollution Control Board, Odisha during the year 2016-17. 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. Garland drains (size, gradient & length) and sump capacity should be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow proper settling of silt material. Storm water return system should be provided. Storm water should not be allowed to go to the effluent treatment plant during high rainfall/super cyclone period. A separate storm water sump for this	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. Size, gradient and length of the drains are adequate to take care of the peak flow. A series of check dams and settling pits have been provided for proper settlement of suspended solid in surface runoff.

	purpose should be created.	
6	Dimension of retaining wall at the toe of OB dumps and benches within the mine to check run-off and siltation should be based on the rainfall data.	In order to prevent the siltation and check the run-off, retaining wall and garland drain are provided with the dimension as; Dimension of the Retaining Wall : Height – 1 to 1.2 mtr. Width – 1 mtr. Dimension of the Garland Drain : Depth – 1.20 to 1.5 mtr. Width – 1 to 1.2 mtr. 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.
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. 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. Vehicular emissions should be kept under control and regularly monitored. Suitable measures should be taken to check fugitive emissions from haulage roads & transfer points, etc.	The trucks are being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding 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. 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. 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. The results of Ambient Air Quality done during the period April'17 to September'17 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 10.90 lakh nos. of trees over an area around 218 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. • During the 2016-17, 21930 nos. of sapling were planted covering an area of 3.6 ha during the year 2016-17. • During the year 2017-18 (till September 17), 24839 nos. of saplings were planted. Beside this we also planted around 57,300 nos. of vetiver slips • Apart from conventional plantation programme we have also planted 3,57,300 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. 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. 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	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. The ground water level and quality monitoring results are enclosed as **Annexure IV & V** respectively.

	to the MoEF & CGWA quarterly.	
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 –VI & VII** 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 Order no. 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/taslcs should be earmarked in the Conservation Plan and shall not be diverted for any other purpose. Year.wise status of the implementation of the Plan and the expenditure thereon should be reported to the Ministry of Environment & forests, RO, Bhubaneshwar.	We have deposited Rs.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. 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. 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.

<table>
<tr><th>Sl. no</th><th>B : General Conditions</th><th>Compliance Status</th></tr>
<tr><td>1</td><td>No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.</td><td>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.</td></tr>
<tr><td>2</td><td>No change in the calendar plan including excavation, quantum of manganese ore and waste should be made.</td><td>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: Plan vs. Actual for year 2017-18
<table>
<tr><th>Year- 2017-18</th><th>Plan</th><th>Actual (Till Sept'17)</th></tr>
<tr><td>Total Excavation (cum)</td><td>1821118</td><td>326395</td></tr>
<tr><td>Production (MT)</td><td>180000</td><td>31588</td></tr>
<tr><td>OB Removal (cum)</td><td>1736412</td><td>311530</td></tr>
</table></td></tr>
<tr><td>3</td><td>Four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RPM. SPM, SO2, NOx. Monitoring. Location of the stations should be decided based on the meteorological data, topographical features, and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.

Data on ambient air quality (RPM, SPM, SO2 & NOx.) should be regularly submitted to the Ministry including its Regional office at Bhubaneshwar and the State Pollution Control Board / 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)

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.

It was observed that,
a) PM_{10} varies from 30.66 µg/m³ (Aug'17) to 73.28 µg/m³ (May'17) near Office area (close proximity to quarry and residential colony) against the standard 100 µg/m³.
b) PM_{10} varies from 32.83 µg/m³ (Aug'17) to 77.74 µg/m³ (May'17) near quarry area against the standard 100 µg/m³.
c) $PM_{2.5}$ varies from 13.37 µg/m³ (Aug'17) to 36.72 µg/m³ (May'17) near Office (close proximity to quarry and residential colony) against the standard 60 µg/m³.
d) $PM_{2.5}$ varies from 14.46 µg/m³ (Oct'16) to 39.5</td></tr>
</table>

		$\mu g/m^3$ (Feb'17) near quarry area against the standard 60 $\mu g/m^3$. e) SO_2 varies from 4.05 $\mu g/m^3$ (July'17) to 6.04 $\mu g/m^3$ (May'17) near office (close proximity to quarry and residential colony) against the standard 80 $\mu g/m^3$. f) SO_2 varies from 4.06 $\mu g/m^3$ (July'17) to 6.50 $\mu g/m^3$ (May'17) near quarry area against the standard 80 $\mu g/m^3$. g) NO_X varies from 9.29 $\mu g/m^3$ (July'17 and Aug'17) to 15.78 $\mu g/m^3$ (Apr'17) near office (close proximity to quarry and residential colony) against the standard 80 $\mu g/m^3$. h) NO_X varies from 9.21 $\mu g/m^3$ (Oct '17) to 16.61 $\mu g/m^3$ (Feb'17) near quarry area against the standard 80 $\mu g/m^3$. i) CO varies from 0.12 mg/m^3 (July'17 and Aug'17) to 0.40 mg/m^3 (April'17) near office (close proximity to quarry and residential colony) against the standard 2 mg/m^3. j) CO varies from 0.12 $\mu g/m^3$ (July'17) to 0.44 $\mu g/m^3$ (May'17) near quarry area against the standard 2 mg/m^3 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 April' 17 to September' 17 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. Rests of operations are below the noise levels of 80 dBA. The details of noise monitoring for the period April' 17 to September' 17 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	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.

	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.	Mn.Mine.
8	Environmental laboratory should be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	It is being done by M/s Visiontek Consultancy Service Pvt. Ltd (Recognized as "A" category consultant as by State Pollution Control Board, Orissa). The type of pollution monitoring and analysis equipment used by by M/s Visiontek Consultancy Service Pvt. Ltd is enclosed as **Annexure – IX.**
9.	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects. Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	Suitable dust masks are being provided to employees (departmental & contractual) engaged in dusty operations. It is also ensured that they use the same. Employees are undergoing Periodical Medical Examination which is inclusive of lungs function test and audiometry. All the personnel are trained on safety in work place and continuous awareness programmes are being conducted for all employees to avert manganese poisoning. Periodical Medical Examination of employees (departmental & contractual) are conducted as per prescribed norms of Mines Rule, 1955. The initial and periodical examination includes blood hematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. All chest radiographs are being classified for detection of pneumoconiosis, diagnosis and documentation made in accordance to ILO classifications. During the calendar year 2016, 356 nos. of employees (Departmental – 0, Contractual - 356) underwent periodical medical examination (PME) and 13(Departmental-13, Contractual- 0) 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. The organizational structure in place is enclosed as **Annexure-X.**

<table>
<tr><td>11</td><td>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.</td><td>Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose.

During the year 2016-17, Rs. 85,450 was allocated for construction of toewall & garland drain against which we have spent 61,3997. For plantation activity Rs. 2,18,750 was allocated against which we have spent Rs. 15,59,886. Similarly for environment monitoring Rs12,00,000 was allocated against which we have spent Rs. 10,74,827. 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 guidelinse. Besides this we have also spent an additional of Rs 10,98,901 for the purpose of dust suppression with the help of fixed and mobile water sprinkler.

The Budget allotted and the expenses for the year 2017-18 for environment management at Joda West Mn Mine is as follow:

<table><tr><th>Item</th><th>Plan (in Rs.) For the 2017-18</th></tr><tr><td>Desiltation of settling ponds channels</td><td>25000</td></tr><tr><td>Afforestation on dumps</td><td>218750</td></tr><tr><td>Environmental Monitoring</td><td>1200000</td></tr><tr><td>Total</td><td>1443750</td></tr></table></td></tr>
<tr><td>12</td><td>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</td><td>We are providing full co-operation to the officers of the Regional Office by furnishing the requisite data / information / monitoring reports.</td></tr>
<tr><td>13</td><td>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.</td><td>Copy of the clearance letter marked to Chairman, Municipal Council, Joda on 12.01.2006.</td></tr>
<tr><td>14</td><td>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</td><td>This is applicable to State Pollution Control Board, Orissa.</td></tr>
</table>

	for 30 days.	
15	The project authorities should advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular of the locality concerned within seven days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and may also be seen at Web Site of the Ministry of Environment & Forests at http://envfor.nic.in. and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.	A detail of Environmental Clearance with regard to 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

Yours faithfully

F: TATA STEEL LTD.

Amit 28.11.12

Sd/-

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

Annexure I

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

Ref.: VCSPL/17/R-971 *Date.:* 03/06/2017

DUST FALL MONITORING REPORT FOR THE MONTH OF MAY-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 May=1.284t/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"

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

Ref.: VCSPL/17/R-1582 Date.: 05.09.17

DUST FALL MONITORING REPORT FOR THE MONTH OF AUGUST-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 May=0.328/km^2/month

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

For Visiontek Consultancy Services Pvt. Ltd.

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

Ref.: V.C.S.P.L./17/R-972 Date: 03.06.2017

SOIL QUALITY ANALYSIS REPORT FOR THE MONTH OF MAY-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 : 12.05.2017
4. Date of Analysis : 13.05.2017 to 19.05.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl No.	Parameters	Unit	Analysis Results
			S-1
1.	Cobalt as Co	%	0.0024
2.	Nickel as Ni	%	0.051
3.	Mercury as Hg	%	<0.000002
4.	Arsenic as As	%	<0.000002

For Visiontek Consultancy Services Pvt. Ltd.

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-1583

Date.: 05.09.17

SOIL QUALITY ANALYSIS REPORT FOR THE MONTH OF AUGUST-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 : 22.08.2017
4. Date of Analysis : 23.08.2017 to 29.08.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl No.	Parameters	Unit	Analysis Results
			S-1
1.	Cobalt as Co	%	0.0020
2.	Nickel as Ni	%	0.046
3.	Mercury as Hg	%	<0.000002
4.	Arsenic as As	%	<0.000002

VISIONTEK CONSULTANCY SERVICES

For Visiontek Consultancy Services Pvt. Ltd.

Annexure III

Name of the Mines : JODA WEST MN.MINE, M/S TATA STEEL LTD.

Time office

Monthly Average	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NOx (µg/m3)	O3 (µg/m3)	CO (mg/m3)	NH3 (µg/m3)	Pb (µg/m3)	Ni (ng/m3)	As (ng/m3)	Benzene (µg/m3)	Benzo(a) pyrene (ng/m3)	Mn (µg/m3)
April-17	71.19	36.40	5.74	15.78	6.28	0.40	27.55	0.001	0.010	0.001	0.001	0.002	0.020
May-17	73.28	36.72	6.04	17.06	8.7	0.41	26.67	0.001	0.010	0.001	0.001	0.002	0.010
June-17	48.80	23.52	4.19	11.21	4.34	0.26	20.18	0.001	0.01	0.001	0.001	0.002	0.001
July-17	33.13	14.85	4.05	9.29	4.00	0.12	20.00	0.001	0.01	0.001	0.001	0.002	0.001
Aug-17	30.66	13.37	4.07	9.29	4.00	0.12	20.00	0.001	0.01	0.001	0.001	0.002	0.001
Sept-17	41.01	19.96	4.24	10.62	4.00	0.19	20.00	0.001	0.01	0.001	0.001	0.002	0.001

H Quarry

Monthly Average	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NOx (µg/m3)	O3 (µg/m3)	CO (mg/m3)	NH3 (µg/m3)	Pb (µg/m3)	Ni (ng/m3)	As (ng/m3)	Benzene (µg/m3)	Benzo(a) pyrene (ng/m3)	Mn (µg/m3)
April-17	75.00	38.56	6.28	16.61	8.69	0.42	30.16	0.001	0.01	0.001	0.001	0.002	0.011
May-17	77.74	39.50	6.50	17.73	10.57	0.44	29.57	0.001	0.01	0.001	0.001	0.002	0.014
June-17	54.58	26.17	4.70	11.69	4.42	0.29	20.38	0.001	0.01	0.001	0.001	0.002	0.002
July-17	34.20	14.88	4.06	9.21	4.00	0.12	20.00	0.001	0.01	0.001	0.001	0.002	0.001
Aug-17	32.83	14.46	4.13	9.47	4.00	0.13	20.00	0.001	0.01	0.001	0.001	0.002	0.001
Sept-17	43.90	21.37	4.38	11.10	4.00	0.22	20.00	0.001	0.01	0.001	0.001	0.002	0.001

Vegetable Garden

Monthly Average	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NOx (µg/m3)	O3 (µg/m3)	CO (mg/m3)	NH3 (µg/m3)	Pb (µg/m3)	Ni (ng/m3)	As (ng/m3)	Benzene (µg/m3)	Benzo(a) pyrene (ng/m3)	Mn (µg/m3)
Aug-17	33.71	15.43	4.17	9.50	4.00	0.13	20.00	0.001	0.01	0.001	0.001	0.002	0.001
Sept-17	37.46	18.29	4.12	9.90	4.00	0.15	20.00	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-970 Date.:.29.06.2017

GROUND WATER (LEVEL) QUALITY ANALYSIS REPORT FOR THE MONTH OF MAY-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	05.05.2017	Kamar Joda	Mt./bgl	10.8
2	24.05.2017	Baneikala Basti	Mt./bgl	10.4

For Visiontek Consultancy Services Pvt. Ltd.

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

Ref: VCSPL/17/R-1581 Date: 05.09.17

GROUND WATER (LEVEL) QUALITY ANALYSIS REPORT FOR THE MONTH OF AUGUST-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	04.08.2017	Kamar Joda	Mt./bgl	2.4
2	22.08.2017	Baneikala Basti	Mt./bgl	2.3

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For Visiontek Consultancy Services Pvt. Ltd.

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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-968

Date.: 03.06.2017

GROUND WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF MAY-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 : 17.05.2017
4. Date of analysis : 18.05.2017 to 24.05.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results	
					GW-1	GW-2
Essential Characteristics						
1	Colour	APHA 2120 B, C	Hazen	5	CL	CL
2	Odour	APHA 2150 B	--	U/O	U/O	U/O
3	Taste	APHA 2160 C	--	Agreeable	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	5	<0.2	<0.2
5	pH Value	APHA 4500H+ B	--	6.5-8.5	7.36	7.42
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	300	148.0	154.0
7	Iron (as Fe)	APHA 3500Fe, B	mg/l	0.3	0.26	0.27
8	Chloride (as Cl)	APHA 4500Cl- B	mg/l	250	37.0	42.0
9	Residual, free Chlorine	APHA 4500Cl, B	mg/l	0.2	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	500	225.0	242.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	75	40.1	42.1
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	30	11.7	11.9
13	Copper (as Cu)	APHA 3111 B,C	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	APHA 3500Mn B	mg/l	0.1	0.015	0.016
15	Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	200	6.1	6.4
16	Nitrate (as NO_3)	APHA 4500 NO_3^- E	mg/l	45	2.4	2.8
17	Fluoride (as F)	APHA 4500F- C	mg/l	1.0	0.023	0.016
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	130.0	140.0
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

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Visiontek Consultancy Services Pvt.Ltd.

(An Enviro Engineering Consulting Cell)

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

Ref.: VCSPL/17/R-1579 Date.: 05.09.17

GROUND WATER QUALITY ANALYSIS REPORT FOR THE MONTH OFAUGUST-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 : 22.08.2017
4. Date of analysis : 23.08.2017 to 29.08.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results	
					GW-1	GW-2
Essential Characteristics						
1	Colour	APHA 2120 B, C	Hazen	**5**	CL	CL
2	Odour	APHA 2150 B	--	**U/O**	U/O	U/O
3	Taste	APHA 2160 C	--	**Agreeable**	Agreeable	Agreeable
4	Turbidity	APHA 2130 B	NTU	**5**	<0.2	<0.2
5	pH Value	APHA 4500H^+ B	--	**6.5-8.5**	7.20	7.24
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	**300**	132.0	128.0
7	Iron (as Fe)	APHA 3500Fe, B	mg/l	**0.3**	0.28	0.24
8	Chloride (as Cl)	APHA 4500Cl^- B	mg/l	**250**	34.0	27.0
9	Residual, free Chlorine	APHA 4500Cl, B	mg/l	**0.2**	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	**500**	204.0	186.0
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	**75**	34.5	33.7
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	**30**	11.2	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**	0.012	0.008
15	Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	**200**	4.4	3.8
16	Nitrate (as NO_3)	APHA 4500 NO_3^- E	mg/l	**45**	2.1	1.6
17	Fluoride (as F)	APHA 4500F^- C	mg/l	**1.0**	0.016	0.014
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**	122.0	119.0
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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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-969 *Date.:* 03.06.2017

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

1. Name of Industry : **Joda West Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Pramabasti**
3. Date of sampling : 17.05.2017
4. Date of analysis : 18.05.2017 to 24.05.2017
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**	0.29
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

For Visiontek Consultancy Services Pvt. Ltd.

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

Ref.: VCSPL/17/R-1580

Date.: 05.09.17

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

1. Name of Industry : Joda West Manganese Mines (M/s TATA Steel Limited)
2. Sampling Location : GW-1: Pramabasti
3. Date of sampling : 22.08.2017
4. Date of analysis : 23.08.2017 to 29.08.2017
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results
					GW-1
1	Iron (as Fe)	APHA 3500Fe, B	mg/l	0.3	0.28
2	Copper (as Cu)	APHA 3111 B,C	mg/l	0.05	< 0.05
3	Manganese (as Mn)	APHA 3500Mn B	mg/l	0.1	0.009
4	Chromium (as Cr^{+6})	APHA 3500Cr B	mg/l	0.05	< 0.05
5	Mercury (as Hg)	APHA 3500 Hg	mg/l	0.001	< 0.001
6	Cadmium (as Cd)	APHA 3111 B,C	mg/l	0.01	< 0.01
7	Selenium (as Se)	APHA 3114 B	mg/l	0.01	< 0.001
8	Arsenic (as As)	APHA 3114 B	mg/l	0.05	< 0.001
9	Lead (as Pb)	APHA 3111 B,C	mg/l	0.05	< 0.01
10	Zinc (as Zn)	APHA 3111 B,C	mg/l	5	<0.05

For Visiontek Consultancy Services Pvt. Ltd.

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Annexure – VII (Water Quality Monitoring)

SURFACE WATER QUALITY ANALYSIS REPORT														
Sampling Location: SW-1: Kundra Nallah entering H. Quarry														
Sl. No	Parameter	Unit	Standard as per IS:2296:1992, Class'C'	Apr'17	May'17	June'17	July'17		August'17		Sept'17		Oct'17	
							04.07.2017	21.07.2017	21.07.2017	21.07.2017	1.09.2017	15.09.2017	1.09.2017	15.09.2017
1	Dissolved Oxygen (minimum)	mg/l	4	5.1	5.3	5.8	6.1	6.3	6.1	6	6.4	6.2	6.2	5.9
2	BOD (3) days at 270C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
3	Total Coli form	MPN/100 ml	5000	98	120	370	900	470	470	570	900	510	510	900
4	pH Value		6.0-9.0	7.24	7.28	7.20	7.22	7.25	7.16	7.18	7.32	7.3	7.24	7.28
5	Colour (max)	Hazen	300	CL	CL	7	26	24	14	12	16	15	4	5
6	Total Dissolved Solids	mg/l	1500	132	138	126.0	120	116	110	118	128	124	124	122
7	Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	0.5	0.45	0.42	0.48	0.56	0.54	0.42	0.44	0.44	0.42	0.52	0.44
9	Chloride (max)	mg/l	600	29	32	26.0	25	21	19	20	24	22	22	21
10	Sulphates (SO4) (max)	mg/l	400	4.8	4.6	4.8	4.4	4.1	4.1	4.2	3.8	4	4.2	4.1
11	Nitrate as NO3 (max)	mg/l	50	1.9	1.7	2.1	2.1	1.8	1.5	1.6	1.4	1.7	1.5	1.6
12	Fluoride as F (max)	mg/l	1.5	0.021	0.022	0.02	0.022	0.021	0.013	0.012	0.015	0.016	0.016	0.018
13	Phenolic Compounds as C6H5OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<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	<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	<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	<0.001	<0.001	<0.001	<0.001
17	Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	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	<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	<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	<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	<0.2	<0.2	<0.2	<0.2

SURFACE WATER QUALITY ANALYSIS REPORT

Sampling Location: SW-2: Kundra Nallah leaving H. Quarry

Sl. No	Parameter	Unit	Standard as per IS:2296:1992, Class'C'	Apr'17	May'17	June'17	July'17		August'17		Sept'17		Oct'17	
							04.07.2017	21.07.2017	21.07.2017	21.07.2017	1.09.2017	15.09.2017	1.09.2017	15.09.2017
1	Dissolved Oxygen (minimum)	mg/l	4	5.3	5.5	6.1	6.2	6.4	5.9	6.2	6.6	6.1	6.3	6.1
2	BOD (3) days at 270C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
3	Total Coli form	MPN/100 ml	5000	110	150	450	900	540	450	900	1600	900	900	1600
4	pH Value		6.0-9.0	7.32	7.3	7.22	7.24	7.28	7.22	7.24	7.35	7.33	7.32	7.3
5	Colour (max)	Hazen	300	CL	CL	8	28	27	16	14	18	16	5	6
6	Total Dissolved Solids	mg/l	1500	136	140	130.0	122	118	115	122	130	122	126	120
7	Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	0.5	0.48	0.44	0.52	0.6	0.56	0.45	0.48	0.48	0.45	0.5	0.46
9	Chloride (max)	mg/l	600	32	34	25.0	24	22	21	22	23	24	22	20
10	Sulphates (SO4) (max)	mg/l	400	5.2	5.3	5.6	4.5	4.3	4.3	4.5	4.1	3.9	4.4	4.3
11	Nitrate as NO3 (max)	mg/l	50	2.1	2.2	2.4	2.1	1.9	1.7	1.8	1.6	1.5	1.6	1.5
12	Fluoride as F (max)	mg/l	1.5	0.023	0.024	0.022	0.023	0.02	0.014	0.013	0.017	0.018	0.018	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	<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	<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	<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	<0.001	<0.001	<0.001	<0.001
17	Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	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	<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	<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	<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	<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/R-973

Date: 03:06:2017

NOISE MONITORING REPORT FOR THE MONTH OF MAY-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	11.05.2017	Township	db	53.8	46.2
2		Hospital		47.5	30.6
3		Mines Area		68.2	47.0
4		Railway Siding		65.9	48.0
CPCB Standard				75	70

for Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT.LTD.

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

Ref.: VCSPL/17/R - 1584 Date: 05.09.17

NOISE MONITORING REPORT FOR THE MONTH OF AUGUST-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	17.08.2017	Township	db	61.4	43.9
2		Hospital		50.2	34.1
3		Mines Area		65.7	48.4
4		Railway Siding		67.1	42.9
CPCB Standard				75	70

for Visiontek Consultancy Services Pvt. Ltd.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744594, 3250790
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Visiontek Consultancy Services Pvt.Ltd.

(An Enviro Engineering Consulting Cell)

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

Ref: VCSPL/17/R-974

Date: 03.06.2017

NOISE MONITORING REPORT FOR THE MONTH OF MAY-2017

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

EQUIPMENT				
Sl. No	Date	Name of Location	Unit	Result
1	10.05.2017	DG Set	db	73.9
2		Near STP		60.1
3		Water Treatment Plant		62.9
4		DRD CD 360(Drill M/C)		70.8
5		Compressure		80.5
6		OR-09P-81349(Amw Truck)		68.6
7		OR-09C-1371 (Truck)		69.2
8		Sovel EC 300 DL (Volvo)		72.3
9		L&T Komatsu PC 200		73.6
10		Sovel EC 360DL		72.9
11		Sovel EC 300DL(Volvo)		74.6
12		OD-09A-5665(Volvo Truck)		73.2
13		OD-09C-8165(Volvo Truck)		74.9
14		OD-09N-9469(Amw Truck)		74.1
15		OR-09N-9463(Amw Truck)		76.5
16		L&T Komastu PC 200		70.9
17		Near Pump House		71.7
CPCB Standard				75

For Visiontek Consultancy Services

VISIONTEK CONSULTANCY SERVICES PVT.LTD.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744504, 3250790
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ISO 14001:2004
ISO 9001: 2008
OHSAS 18001:2007

Ref: VCSPL/17/R-1585 Date: 05.09.17

NOISE MONITORING REPORT FOR THE MONTH OF AUGUST-2017

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

EQUIPMENT				
Sl. No	Date	Name of Location	Unit	Result
1	17.08.2017	DG Set	db	74.1
2		Near STP		57.8
3		Water Treatment Plant		64.4
4		Sovel EC 300 DL (Volvo)		68.2
5		OR-09P-8134(Truck)		73.2
6		OR-09A-5106(Truck)		74.8
7		Volvo EC360BLC		75.1
8		Volvo EC300DL(Puklin Sovel-2)		73.9
9		OD-09A-4693(Truck)		72.5
10		OD-09C-1372(Truck)		74.5
11		D-Quarry Pump House		70.9
12		Volvo EC300DL(Puklin Sovel-3)		74.3
CPCB Standard				75

For Visiontek Consultancy Services Pvt. Ltd.

Plot No-108,District Centre,Chandrasekharpur,Bhubaneswar-16,Tel-91-674-2744594, 3250790
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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	Pizometer	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