

COMPLIANCE REPORT PERIOD : OCT'13 TO MAR'14

**ENVIRONMENTAL CLEARANCE TO
MALDA MANGANESE MINE OF TATA STEEL LIMITED
VIDE MoEF's LETTER NO. J-11015/103/2006-1A.II(M) DATED 13.04.2007
COMPLIANCES SUBMITTED TO THE
MINISTRY OF ENVIRONMENT & FORESTS,
GOVERNMENT OF INDIA**

Present Status of the Project:-

The Scheme of Mining from 2009-10 to 12.08.2010 (i.e. 3rd lease renewal expiry date) and Mining Plan for next five years from 13.08.2010 along with Progressive Mine Closure Plan over an area of 822 ha. has been approved by IBM vide letter.no. MP/OTF.MECH/33-ORI/BHU/2009-10, dt.08.02.2010. Subsequent modification to the same has also been approved by IBM vide letter no. MP/OTF.MECH/29-ORI/BHU/2010-11, dt.11.11.2010

Sl. No	A : Specific conditions	Compliance status
(i)	The Env. Clearance is subject to grant of forest clearance. The project proponent shall obtain necessary forestry clearance under the forest (Conservation) Act, 1980 for the diversion of 239.408 ha forest land before starting mining operation in that area.	4 th renewal forest diversion proposal was submitted on 17.07.2008 over an area of 555.066 ha. It was scrutinized by CCF, Nodal, O/o PCCF, Orissa. CCF, Nodal asked to comply the deficiencies vide Letter. no.30/9F(MG)-58/2008, dt.02.01.2009. In response, we have re-submitted the 3 rd forest diversion proposal over an area of 541.425 ha and subsequently allotted with State Sl.No.327/09, dt.08.07.2009. We have submitted 4 th renewal forest diversion proposal on 06.08.2009 over an area of 541.425 ha. as per clause no. 4.17 of the Guidelines and clarification issued by MoEF under FC Act & Rules. Presently, the mining operation has been discontinued since 27 th Feb'2011 due to want of Forest Clearance.
(ii)	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.
(iii)	The project proponent shall ensure that no natural watercourse shall be obstructed due to any mining operations.	As per field observation, Sona River passes 715m to west from Block - I, 158m to west from Block-II and 818m east from Block - III. Similarly, a small perennial nallah passes 258m east from Block - V. There are no natural water courses that are passing within or near to the safety zone of the present mine workings. However, development plan till 31.03.2015 as approved in Mining Plan will extend towards 86m & 30m due east at Block - I & II, 60m due

		west at Block-V and 45m due east at Block III which moves further away from the natural water course. Hence, no adverse impact due to present and proposed mining is envisaged.
(iv)	Topsoil should be stacked properly with proper slope at earmarked site(s) with adequate measures and should be used for reclamation and rehabilitation of mined out area.	No Topsoil has been generated during Oct'13 to Mar'14. The top soil generated prior to this period has already been used for plantation in the inactive dump slopes and within lease.
(v)	The OB shall be stacked at earmarked dump sites only and should not be kept active for long periods of time. The Maximum height of the dump should not exceed 30 mtrs having 3 terraces of 10 mtrs. each. The overall slope angle shall not exceed 27°. The OB dumps should be scientifically vegetated with suitable native species to prevent erosion & surface run-off. In critical areas, use of Geo textiles shall be undertaken for the stabilization of the dump. Monitoring & management of rehabilitated areas should continue until the vegetation becomes self-sustaining. Compliance status should be submitted to the MoEF & its regional office located at Bhubaneswar on six monthly basis.	OB and other wastes are being dumped as per plan and within an area of 21.316 ha. The inactive portion of OB dumps area being stabilized by plantation of local species. 14,600 nos. of saplings of local species (Gambhari, Chakunda, Mahanimba, Kala Sirs, Sisu etc) were planted during 2013-14 and the survival rate assessed during May'2014 was found to be 85%. The overall slope angles of OB dumps are maintained within the natural angle of repose of the waste. As such, there are no presences of critical areas at OB dumps, so conventional plantation is being done for stabilization of dumps. Our internal agency, M/s Tata Steel Rural Development Society is taking care for plantation of saplings and maintaining the same for survival of all the multi-species till self-sustaining. The retaining wall and garland drain with sedimentation pit at corners near toe of OB dump. Their dimensions are matching the requirements to arrest effectively the run off.
(vi)	The void left unfilled in an area of 110.045ha shall be converted into water body. The higher benches of excavated void/mining pit shall be terraced and plantation done to stabilize the slopes. The slope of higher benches shall be made gentler for easy accessibility by local people to use the water body. Peripheral fencing shall be carried out along the excavated area.	The proposal for confirmatory exploration has been planned over the broken up area of 77.241 Ha to ensure the area is entirely barren. In case of occurrence of any ore body, the same shall be excavated prior to the reclamation and rehabilitation of the area. Stage –I approval under FC Act, 1980 has been granted over the 77.241 Ha area to carry out the above mentioned activities. Further proposal for development of the water body as a reclamation measure shall be taken up after the completion of the above mentioned planned activities.
(vii)	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from mine working, soil, OB dumps and mineral dumps. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains should be regularly desilted	Existing catch drains and garland drains are covering the entire dump slope at low lying part. The catch drains and sedimentation pits are periodically de-silted and maintained properly.

	<p>particularly after monsoon and maintained properly.</p> <p>Garland drain (size, gradient and length) shall be constructed for both mine pit and OB dumps and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) 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. Sedimentation pits should be constructed at the corners of the garland drains and desilted at regular intervals.</p>	<p>Size, gradient and length of the drains will be adequate to take care of the peak flow.</p>
(viii)	<p>Dimension of the retaining wall at the toe of dumps and OB benches within the mine to check run-off and siltation should be based on the rainfall data.</p>	<p>In order to prevent the siltation and to check the run-off it is proposed that toe walls and garland drains are being provided.</p> <p><u>Dimension of the Retaining Wall :</u> Height – 1 to 1.2 mtr. Width – 1 mtr. <u>Dimension of the Garland Drain :</u> Depth – 1.20 to 1.5 mtr. Width – 1 to 1.2 mtr.</p>
(ix)	<p>Plantation shall be raised in an area of 396.62 ha including a green belt of adequate width by planting the native species around ML area, OB dumps, roads, etc. in consultation with the local DFO / Agriculture Department. The density of the trees should be around 2000 plants per ha.</p>	<p>Plantation programme have been drawn regularly in consultation with the local DFO. We have planted 2,84,119 nos of saplings of local species over an area of 90.02 ha with 84.1% survival rate.</p> <p>Tree density is maintained at the rate of 2679 saplings per ha. by considering the rate of survival.</p>
(x)	<p>The project authority should implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.</p>	<p>Mining is not intersecting the ground water as the Ground water being at lower level in comparison to existing maximum quarry depth, Whenever the ground water will encountered in course of mining activity, there shall be earmarked area available for implementing the conservation measures to augment the ground water resources in consultation with the Regional Director, Central Ground Water Board.</p>
(xi)	<p>Regular monitoring of ground water level and quality should be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring should be carried out four times in a year - pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MoEF and its regional office, CGWA and Regional Director, CGWB.</p>	<p>Ground water table is much below the existing mine workings because of Hilly topography. However, ground water level, trace metals in ground water at lower elevations and ground water quality is being monitored at existing tube well and well. The monitoring results are enclosed as Annexure I, II, III respectively.</p> <p>It was observed that , the level of ground water ,</p> <p>a) During post-monsoon was 2.32 mtr (at 564.68 mRL) to 3.27 mtr (at 615.73 mRL).</p> <p>b) During winter was 3.00 mtr (at 564 mRL) to 3.13 mtr (at 615.87 mRL).</p>

		<p>c) During winter was 6.55 mtr (at 565.45 mRL) for the Piezometric test point at Malda and was 5.50 mtr (at 566.50 mRL) during post-monsoon.</p> <p>d) The quality of ground water monitored with reference to standard of BIS-10500 and the qualities are well within the standard. Similarly, surface water quality is being monitored on monthly basis and abstract of the same is enclosed as Annexure – IV.</p>
(xii)	Appropriate mitigative measures should be taken to prevent pollution of Sona river in consultation with the State Pollution Control Board.	Toe Wall and garland drains have been provided along the waste dump to prevent the pollution of Sona river due to direct flow of wash-off.
(xiii)	Permission from the competent authority should be obtained for drawl of water from Sona river and also ground water, if any, required for the project.	<p>Permission has been obtained for drawl of water from the nearby Sona river only.</p> <p>Ground water use permission has been obtained from CGWA vide letter no. 21-4(301)/CGWA/SER/2011-167, Dt.15.02.2011 for 500 m³ per day.</p> <p>The ground water is not being used for mining and its allied activities.</p>
(xiv)	Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with Regional Director, Central Ground Water Board.	Rainwater harvesting is being affected due to more geological disturbance. However, trials shall be carried out for rainwater harvesting in association with R & D group of company.
(xv)	<p>Vehicular emissions should be kept under control and regularly monitored.</p> <p>Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral.</p> <p>The vehicles should be covered with a tarpaulin and shall not be overloaded.</p>	<p>Presently, the mining operation has been discontinued since 27th Feb'2011 due to want of Forest Clearance. The mining equipments have been shifted to other units for its utilization.</p> <p>Earlier, the trucks were being covered with tarpaulin during dispatch of manganese ore from mine to Ferro Alloys Plant and Railway Siding located at Joda. OB was being transported by dumper from mine face to dumps located near the quarry itself within 1.5 Km. So, it was not in practice to cover the OB transportation trucks with tarpaulin.</p> <p>All the trucks meant for transportation of mineral from mine to our captive plant & Railway Siding at Joda were bearing the "Pollution under Control" certificate. The emissions are under control.</p> <p>Provision of water sprinkling by mobile water sprinklers to suppress fugitive emission from haul roads. The processed manganese ore was being transferred manually; hence there was no fugitive emission during transfer of ore.</p>
(xvi)	Blasting operation should be carried out only	Presently, the mining operation has been

	during the daytime. Controlled blasting should be practiced. The mitigative measures for control of ground vibrations and to arrest fly rocks and boulders should be Implemented.	discontinued since 27 th Feb'2011 due to want of Forest Clearance. But the practice was: Blasting is restricted during day hours only. The blasting is being carried out with the optimum blasting parameters based on the actual geo-mining conditions. This gives the measures to control over the ground vibrations and to arrest fly rocks and boulders. Controlled blasting technique with bottom initiation pattern is being practiced.
(xvii)	Drills shall either be operated with dust extractors or equipped with water Injection system	Wet drilling concept is being practiced.
(xviii)	Digital processing of the entire lease area using remote sensing technique should be done regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment and Forests and its Regional Office, Bhubaneshwar.	In pursuance to the Circular No 02/2010, Dt.06.04.2010 passed by Indian Bureau of Mines, Govt. of Odisha has authorized Orissa Remote Sensing Application Centre (ORSAC) to carry out the DGPS survey work for its compliance. Accordingly, we have requested ORSAC to conduct the survey work of mine lease boundary for super imposition over the vectorised village map & Cartosat-2 and LISS-IV (Scale-1:5,000) satellite image. In the mean time, the DGPS survey of lease boundary has been completed and we had further requested ORSAC for preparation of land use map on 11.10.2011 to comply this condition. The proposed survey work has been completed by ORSAC and the plan has been submitted by 30 th June'13 to Ministry of Environment and Forest and its regional office.
(xix)	Consent to operate should be obtained from SPCB prior to start of enhanced production from the mine.	"Consent to operate" Order No.118 vide letter No. 8006 / IND-I-CON-191 Dt 11.05.2011 valid up to 31.03.2016.
(xx)	Sewage treatment plant should be installed for the colony. ETP should also be provided for workshop and wastewater generated during mining operation.	Sanitary sewage generated from staff quarters, offices & canteen waste water will continue to be discharged to septic tank/ soak pit. The equipment are maintained at workshop of Joda West Mn.Mine where effluents are carried to oil separation pit & the oil free water is being recycled.
(xxi)	The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna such as elephant, leopard, Indian python etc. spotted in the study area. Action plan for conservation of flora and fauna shall be prepared and implemented in consultation with the State Forest and Wildlife Department. Necessary allocation of funds for	3 rd and 4 th renewal forest diversion proposal have been submitted to State Govt. On receipt of demand from DFO, Bonai Divion, we have paid Rs 1,64,40,000 towards implementation of Regional Wild Life Management Plan as prepared for Bonai & Keonjhar division. Further, Site specific wildlife management plan

	implementation of the conservation plan and/or Regional Wildlife Management Plan of the State Government shall be made and the funds so allocated shall be included in the project cost. Copy of action plan may be submitted to the Ministry and its Regional Office within 3 months.	has been prepared and submitted for approval as per the new guidelines.
(xxii)	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 along with Scheme of Mining & Mining Plan has been approved by IBM. Implementation of same is being carried out as per plan. 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
(i)	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 MoEF.
(ii)	No change in the calendar plan including excavation, quantum of mineral manganese ore and waste should be made.	Plan for production of Manganese Ore and excavation of waste has been prepared and is being strictly adhered. Plan 2013-14: Production: 2,05,650 MT OB: 9,53,224CuM Planned (Oct'13 to Mar'14) Production:- 1,02,825 MT OB:- 4,76,612 CuM Actual (Oct'13 to Mar'14)- Nil There was no production as well as quarry development due to discontinuation of mining operation due to want of Forest Clearance since 27.02.2011.
(iii)	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 and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	Six ambient air quality monitoring stations have been established out of which 2 nos. in core zone (Near Dispensary close proximity to residential and mining area at Block-I Pit) and 4 nos. in buffer zone (at Chormalda, Kundrapani, Kolha Roida & Barapada). Ambient Air samples are being drawn at a regular interval for analysis of PM ₁₀ , PM _{2.5} , SO ₂ , NO _x .
(iv)	Data on ambient air quality (RPM, SPM, SO ₂ , NO _x) should be regularly submitted to the Ministry including its Regional office located at Bhubneshwar and the State Pollution Control Board / Central Pollution Control Board once in six months.	Samples are drawn twice in a week in core zone and once in a quarter in buffer zone to ascertain the 24 hour monitoring average for PM ₁₀ , PM _{2.5} , SO ₂ & NO _x , CO & Mn. It was observed that, a) PM ₁₀ varies from 27.13 µg/m ³ (Oct'13) to 38.44 µg/m ³ (Dec'13) near Dispensary (close

		<p>proximity to residential colony) against the standard $100 \mu\text{g}/\text{m}^3$.</p> <p>b) PM_{10} varies from $31.88 \mu\text{g}/\text{m}^3$ (Oct'13) to $47.78 \mu\text{g}/\text{m}^3$ (Dec'13) near Block-I quarry area against the standard $100 \mu\text{g}/\text{m}^3$.</p> <p>c) $\text{PM}_{2.5}$ varies from $16.39 \mu\text{g}/\text{m}^3$ (Oct'13) to $22.44 \mu\text{g}/\text{m}^3$ (Dec'13) near Dispensary (close proximity to residential colony) against the standard $60 \mu\text{g}/\text{m}^3$.</p> <p>d) $\text{PM}_{2.5}$ varies from $19.41 \mu\text{g}/\text{m}^3$ (Oct'13) to $27.91 \mu\text{g}/\text{m}^3$ (Dec'13) near Block-I quarry area against the standard $60 \mu\text{g}/\text{m}^3$.</p> <p>e) SO_2 varies from $4.00 \mu\text{g}/\text{m}^3$ (Oct'13) to $4.07 \mu\text{g}/\text{m}^3$ (Dec'13) near Dispensary (close proximity to residential colony) against the standard $80 \mu\text{g}/\text{m}^3$.</p> <p>f) SO_2 varies from $4.00 \mu\text{g}/\text{m}^3$ (Oct'13) to $4.19 \mu\text{g}/\text{m}^3$ (Dec'13) near Block-I quarry area against the standard $80 \mu\text{g}/\text{m}^3$.</p> <p>g) NoX varies from $9.08 \mu\text{g}/\text{m}^3$ (Oct'13) to $9.78 \mu\text{g}/\text{m}^3$ (Dec'13) near Dispensary (close proximity to residential colony) against the standard $80 \mu\text{g}/\text{m}^3$.</p> <p>h) NoX varies from $9.31 \mu\text{g}/\text{m}^3$ (Oct'13) to $10.88 \mu\text{g}/\text{m}^3$ (Dec'13) near Block-I quarry area against the standard $80\text{-}\mu\text{g}/\text{m}^3$.</p> <p>i) CO varies from $0.10 \mu\text{g}/\text{m}^3$ (Oct'13) to $0.11 \mu\text{g}/\text{m}^3$ (Jan'14) near Dispensary (close proximity to residential colony) against the standard $2 \mu\text{g}/\text{m}^3$.</p> <p>j) CO varies from $0.10 \mu\text{g}/\text{m}^3$ (Oct'13) to $0.15 \mu\text{g}/\text{m}^3$ (Dec'13) near Block-I quarry area against the standard $2 \mu\text{g}/\text{m}^3$.</p> <p>k) Mn varies from $0.30 \mu\text{g}/\text{m}^3$ (Dec'13) to $0.55 \mu\text{g}/\text{m}^3$ (Dec'13) near Dispensary (close proximity to residential colony) against the standard $0.25 \text{mg}/\text{m}^3$.</p> <p>l) Mn varies from $0.35 \mu\text{g}/\text{m}^3$ (Oct'13) to $0.66 \mu\text{g}/\text{m}^3$ (Dec'13) near Block-I quarry area against the standard $0.25 \text{mg}/\text{m}^3$.</p> <p>Data on ambient air quality monitoring for every month is being submitted to State Pollution Control Board. Abstract of the monthly monitoring data on ambient air quality is enclosed as Annexure – V.</p> <p>Similarly, samples have been analyzed for presence of trace metals in dust fall & soil during post monsoon & winter season.</p>
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		<p>It was observed that,</p> <p>a) Presence of Co and Hg was nil. Only Ni & As presence varies from 0.019 to 0.026 & 0.013 to 0.019 respectively in dust-fall samples during winter season.</p> <p>b) Presence of Co and Hg was nil. Only Ni & As presence varies from 0.015 to 0.021 & 0.011 to 0.019 respectively in soil samples during post-monsoon.</p> <p>The detail analysis result is enclosed as Annexure-VI (Dust Fall) & VII (Soil)</p>
(v)	Fugitive dust emissions from all the sources should be controlled regularly. Water spraying arrangement on haul roads, loading and unloading and at transfer points should be provided and properly maintained.	<p>Effective water sprinkling by mobile water tanker is being done on haul roads.</p> <p>No fugitive dust monitoring has been carried out during the period Oct'13 to Mar'14 as the mining operation has been discontinued since 27th Feb'2011 due to want of Forest Clearance.</p>
(vi)	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with earplugs / muffs.	<p>Ear plugs & Ear muffs are provided to the workers working in drilling operations & DG operations.</p> <p>Rests of operations are below the noise levels of 80 dBA.</p> <p>The details of noise monitoring for the period Oct'13 to Mar'14 are enclosed as Annexure-VIII.</p>
(vii)	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 19th 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 equipment and vehicles deployed in the mine are maintained at Joda West Mn.Mines which is under same management control. The oil separation system has been provided at workshop at Joda West and working effectively.
(viii)	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	Suitable dust masks are being provided to employees (departmental & contractual) engaged in dusty operations. It is also ensured that they use the same. Employees are undergoing Periodical Medical Examination which is inclusive of lungs function test and audiometry. All the personnel are trained on safety in work place and continuous awareness programmes are being conducted for all employees to avert manganese poisoning.
	Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	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 2010-11, a total no. of 19 employees were examined. During 2011-12, due to temporary suspension of mining operation, the employees were shifted to other mines under the same management control and are included in their respective Half-Yearly EC compliance. During 2012-13 a total of 11 nos. employees were examined. During 2013-14 a total no. of 5 employees (100%) were examined. There are no findings of pneumoconiosis and manganese poisoning which is classified as occupational disease.
(ix)	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-IX.
(x)	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 Bhubneshwar.	Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose. The utilization of environment management for the period Oct'13 to Mar'14 was Rs. 7,24,660 (Monitoring – Rs 5,72,028/- & Plantation - Rs. 1,52,632/-) against the budget of Rs 5,88,000/- (Monitoring - Rs, 5,70,000/- & Plantation - Rs. 18,000/-) for Malda Manganese Mines.
(xi)	The project authorities should Inform to the Regional Office located at Bhubneshwar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.	The date of financial closure will be intimated to the Regional Office located at Bhubaneswar prior to date of closure of this project.
(xii)	The Regional Office of this Ministry located at Bhubneshwar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information / monitoring reports.	We shall extend to full co-operation to the officers of the Regional Office by furnishing the requisite data / information / monitoring reports.
(xiii)	The project proponent shall submit six monthly report on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Bhubneshwar, Central Pollution Control Board and State Pollution Control Board.	Half yearly compliance status for the specific and general conditions pertaining to the Environment Clearance is being submitted to Regional Office, MoEF, Bhubaneswar within scheduled time.
(xiv)	A copy of clearance letter will be marked to concerned Panchayat /local NGO, if any, from whom suggestion / representation has been received while processing the proposal.	Copy of the clearance letter marked to Sarpanch, Malda gram Panchayat on 12.06.2007.

(xv)	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.
(xvi)	The project authorities should advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 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 also at web site of the Ministry of Environment and Forests at http://envfor.nic.in and a copy of the same should be forwarded to the Regional Office of this Ministry located at Bhubneshwar.	Details of Env. Clearance with regard to Malda Manganese mines published in the below mentioned newspapers <ul style="list-style-type: none"> - New Indian express (Daily English) dated 22nd Apr'07 & - Samaj (Daily Oriya) dated 22nd Apr'07
3	The Ministry or any other competent- authority may alter/modify the above conditions or stipulate any further condition in the interest of environment protection.	Noted.
4	Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Noted.
5	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, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under.	Noted

Yours faithfully
F: TATA STEEL LTD.

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

Annexure – I



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssenvironics.com

Ref No: SSE/13/R-2523

Date: 03.12.2013

GROUND WATER LEVEL MONITORING REPORT

Name of the Mines : Malda Manganese Mines, Tata Steel Ltd.

Monitoring Area & Date	Name of the Location	Top mRL	Water Encountered at mRL	Water Level in mtrs
27.11.2013	W-1: Well at Malda Camp	567	564.68	2.32
27.11.2013	W-2: Well at Ranishal	619	615.73	3.27
27.11.2013	W-3: Peizometric test Point at Malda	572	566.50	5.50

For S.S. Environics (India) Pvt. Ltd



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(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssevironics.com

Ref No: SSE/13/R-3191

Date: 03.02.2014

GROUND WATER LEVEL MONITORING REPORT

Name of the Mines : Malda Manganese Mines, Tata Steel Ltd.

Monitoring Area & Date	Name of the Location	Top mRL	Water Encountered at mRL	Water Level in mtrs
28.01.2014	W-1: Well at Malda Camp	567	564.00	3.00
28.01.2014	W-2: Well at Ranishal	619	615.87	3.13
28.01.2014	W-3: Peizometric test Point at Malda	572	565.45	6.55

For S.S. Environics (India) Pvt. Ltd

Annexure – II



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssevenironics.com

Ref No: SSE/13/R-2551

Date: 04.12.2013

ANALYSIS OF TRACE METALS IN GROUND WATER AT LOWER ELEVATION

Name of the Mines : MALDA Manganese Mines (Tata Steel Ltd)
Location of Sampling : GW1: Bore well at Ranishal (Near Block-III)
Date of Sampling : 27.11.2013
Date of Analysis : 30.11.2013

Sl. No	Parameter	Standard as per BIS: 10500	Analysis Results
1	Iron (as Fe), mg/l, max	0.3	0.15
2	Chromium (as Cr+6), mg/l, max	0.05	BDL
3	Copper (as Cu), mg/l, max	0.05	BDL
4	Selenium (as Se), mg/l, max	0.01	BDL
5	Arsenic (as As), mg/l, max	0.05	BDL
6	Cadmium (as Cd), mg/l, max	0.01	BDL
7	Mercury (as Hg), mg/l, max	0.001	BDL
8	Lead (as Pb), mg/l, max	0.05	BDL
9	Zinc (as Zn), mg/l, max	5	0.21
10	Manganese (as Mn), mg/l, max	0.1	0.046

BDL Values: Copper- 0.001mg/l, Cadmium- 0.001 mg/l, Mercury- 0.0001 mg/l, Arsenic- 0.001 mg/l
Selenium-0.001 mg/l, Cr+6- 0.001 mg/l.

For S.S ENVIRONICS (I) PVT. LTD.



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssevenironics.com

Ref No: SSE/13/R-3190

Date: 03.02.2014

ANALYSIS OF TRACE METALS IN GROUND WATER AT LOWER ELEVATION

Name of the Mines : MALDA Manganese Mines (Tata Steel Ltd)
Location of Sampling : GW1: Bore well at Ranishal (Near Block-III)
Date of Sampling : 25.01.2014
Date of Analysis : 28.01.2014

Sl. No	Parameter	Standard as per BIS: 10500	Analysis Results
1	Iron (as Fe), mg/l, max	0.3	0.17
2	Chromium (as Cr+6), mg/l, max	0.05	BDL
3	Copper (as Cu), mg/l, max	0.05	BDL
4	Selenium (as Se), mg/l, max	0.01	BDL
5	Arsenic (as As), mg/l, max	0.05	BDL
6	Cadmium (as Cd), mg/l, max	0.01	BDL
7	Mercury (as Hg), mg/l, max	0.001	BDL
8	Lead (as Pb), mg/l, max	0.05	BDL
9	Zinc (as Zn), mg/l, max	5	0.26
10	Manganese (as Mn), mg/l, max	0.1	0.058

BDL Values: Copper- 0.001mg/l, Cadmium- 0.001 mg/l, Mercury- 0.0001 mg/l, Arsenic- 0.001 mg/l
Selenium-0.001 mg/l, Cr+6- 0.001 mg/l.

For S.S ENVIRONICS (I) PVT. LTD.

Annexure – III



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssenvironics.com

Ref No: SSE/12/R-2544

Date: 04.12.2013

GROUND WATER QUALITY ANALYSIS REPORT

Name of the Mines : Malda Manganese Mines (Tata Steel Ltd)
 Location of Sampling : GW1: Tube well at Malda Camp
 : GW2: Well at Ranishal (Near Block-III)
 Date of Sampling : 27.11.2013
 Date of Analysis : 30.11.2013

Sl. No	Parameter	Standard as per BIS: 10500	Sampling Locations	
			GW1	GW2
<i>Essential Characteristics</i>				
1	Colour	5	CL	CL
2	Odour	U/O	U/O	U/O
3	Taste	Agreeable	AL	AL
4	Turbidity (NTU), max	5	1.15	1.22
5	pH Value	6.5-8.5	7.2	7.1
6	Total Hardness (as CaCO ₃), mg/l, max	300	44	49
7	Iron (as Fe), mg/l, max	0.3	0.12	0.13
8	Chloride (as Cl), mg/l, max	250	10.3	10.9
9	Residual, free Chlorine, mg/l, min	0.2	ND	ND
<i>Desirable Characteristics</i>				
10	Dissolved Solids, mg/l, max	500	134	141
11	Calcium (as Ca), mg/l, max	75	9.7	9.2
12	Copper (as Cu), mg/l, max	0.05	BDL	BDL
13	Manganese (as Mn), mg/l, max	0.1	0.041	0.046
14	Sulphate (as SO ₄), mg/l, max	200	12.2	14.2
15	Nitrate (as NO ₃), mg/l, max	45	0.18	0.21
16	Fluoride (as F), mg/l, max	1.0	BDL	BDL
17	Phenolic Compounds (as C ₆ H ₅ OH), mg/l, max	0.001	ND	ND
18	Mercury (as Hg), mg/l, max	0.001	BDL	BDL
19	Cadmium (as Cd), mg/l, max	0.01	BDL	BDL
20	Selenium (as Se), mg/l, max	0.01	BDL	BDL
21	Arsenic (as As), mg/l, max	0.05	BDL	BDL
22	Cyanide (as CN), mg/l, max	0.05	BDL	BDL
23	Lead (as Pb), mg/l, max	0.05	BDL	BDL
24	Zinc (as Zn), mg/l, max	5	0.15	0.18
25	Anionic Detergents (as MBAS), mg/l, max	0.2	Absent	Absent
26	Chromium (as Cr+6), mg/l, max	0.05	BDL	BDL
27	Polynuclear aromatic hydrocarbons (as PAH), g/l, max	-	ND	ND
28	Mineral Oil, mg/l, max	0.01	ND	ND
29	Pesticides, mg/l, max	Absent	Absent	Absent
30	Alkalinity, mg/l, max	200	29	23
31	Aluminium as Al, mg/l, max	0.03	BDL	BDL
32	Boron mg/l, max	1.0	BDL	BDL

CL – Colourless, U/O – Unobjectionable, ND – Not detectable.

BDL Values: Copper- 0.001mg/l, Fluoride-0.001 mg/l, Cadmium- 0.001 mg/l, Mercury- 0.0001 mg/l, Lead- 0.001 mg/l,

Arsenic- 0.001 mg/l, Zinc- 0.005 mg/l, Cyanide- 0.001 mg/l, Cr+6- 0.001 mg/l, Selenium- 0.001 mg/l, Al-0.001 mg/l.

For S.S ENVIRONICS (I) PVT. LTD



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@sseenvironics.com

Ref No: SSE/12/R-3192

Date: 03.02.2014

GROUND WATER QUALITY ANALYSIS REPORT

Name of the Mines : Malda Manganese Mines (Tata Steel Ltd)
 Location of Sampling : GW1: Tube well at Malda Camp
 : GW2: Well at Ranishal (Near Block-III)
 Date of Sampling : 27.01.2014
 Date of Analysis : 30.01.2014

Sl No	Parameter	Standard as per BIS: 10500	Sampling Locations	
			GW1	GW2
Essential Characteristics				
1	Colour	5	CL	CL
2	Odour	U/O	U/O	U/O
3	Taste	Agreeable	AL	AL
4	Turbidity (NTU), max	5	1.28	1.36
5	pH Value	6.5-8.5	7.1	6.9
6	Total Hardness (as CaCO ₃), mg/l, max	300	47	55
7	Iron (as Fe), mg/l, max	0.3	0.11	0.14
8	Chloride (as Cl), mg/l, max	250	9.7	10.3
9	Residual, free Chlorine, mg/l, min	0.2	ND	ND
Desirable Characteristics				
10	Dissolved Solids, mg/l, max	500	129	155
11	Calcium (as Ca), mg/l, max	75	9.4	10.1
12	Copper (as Cu), mg/l, max	0.05	BDL	BDL
13	Manganese (as Mn), mg/l, max	0.1	0.035	0.052
14	Sulphate (as SO ₄), mg/l, max	200	13.7	16.5
15	Nitrate (as NO ₃), mg/l, max	45	0.20	0.28
16	Fluoride (as F), mg/l, max	1.0	BDL	BDL
17	Phenolic Compounds (as C ₆ H ₅ OH), mg/l, max	0.001	ND	ND
18	Mercury (as Hg), mg/l, max	0.001	BDL	BDL
19	Cadmium (as Cd), mg/l, max	0.01	BDL	BDL
20	Selenium (as Se), mg/l, max	0.01	BDL	BDL
21	Arsenic (as As), mg/l, max	0.05	BDL	BDL
22	Cyanide (as CN), mg/l, max	0.05	BDL	BDL
23	Lead (as Pb), mg/l, max	0.05	BDL	BDL
24	Zinc (as Zn), mg/l, max	5	0.13	0.16
25	Anionic Detergents (as MBAS), mg/l, max	0.2	Absent	Absent
26	Chromium (as Cr+6), mg/l, max	0.05	BDL	BDL
27	Polynuclear aromatic hydrocarbons (as PAH), g/l, max	-	ND	ND
28	Mineral Oil, mg/l, max	0.01	ND	ND
29	Pesticides, mg/l, max	Absent	Absent	Absent
30	Alkalinity, mg/l, max	200	26	21
31	Aluminium as Al, mg/l, max	0.03	BDL	BDL
32	Boron mg/l, max	1.0	BDL	BDL

CL - Colourless, U/O - Unobjectionable, ND - Not detectable.

BDL Values: Copper- 0.001mg/l, Fluoride-0.001 mg/l, Cadmium- 0.001 mg/l, Mercury- 0.0001 mg/l, Lead- 0.001 mg/l, Arsenic- 0.001 mg/l, Zinc- 0.005 mg/l, Cyanide- 0.001 mg/l, Cr+6- 0.001 mg/l, Selenium- 0.001 mg/l, Al-0.001 mg/l.

For S.S. ENVIRONICS (I) PVT. LTD

Annexure – IV

MALDA (UPSTREAM) W1				Oct'13		Nov'13		Dec'13		Jan'14		Feb'14		March'14		Avg 6 months
Sl.	Parameters	Unit	Standards as	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	W-1
1	Colour & Odour	--	300 & \$	21 & U/O	24 & U/O	16 & U/O	15 & U/O	14 & U/O	13 & U/O	11 & U/O	15 & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	17.16& U/O
2	Suspended Solids	mg/l	\$	94	112	58	52	51	47	44	54	37	34	31	26	53.33
3	Particular Size of S.S.	μ(micron)	\$	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850
4	Dissolved Solids	mg/l	1500	174	149	141	134	133	128	119	136	122	133	117	109	132.92
5	PH	--	6.5-8.5	7.1	7.3	7.2	7.1	7.1	7.1	7.1	7.2	7.2	7.1	7.1	7.1	7.14
6	Temperature	⁰ C	\$	25	25	25	25	25	24	24	24	24	24	25	25	24.58
7	Oil & Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	Total Residual Chlorine	mg/l	\$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	Amm. Nitrogen as N	mg/l	\$	0.58	0.59	0.43	0.39	0.38	0.31	0.33	0.42	0.29	0.24	0.33	0.3	ND
10	Total Kjeldal Nitrogen as N	mg/l	\$	1.37	1.33	1.22	1.17	1.14	1.08	1.05	1.29	0.86	0.65	0.94	0.89	1.08
11	Free Ammonia as NH ₃	mg/l	\$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	Dissolved Oxygen	mg/l	4	7	7.3	7.3	7.4	7.4	7.3	7.3	7.2	7.4	7.3	7.3	7.3	12.77
13	BOD (3) days at 27 ⁰ C	mg/l	3	1.58	1.33	1.24	1.17	1.19	1.1	1.05	1.24	1.13	1.18	1.11	1.06	1.20
14	COD	mg/l	\$	4.39	4.87	3.61	3.41	3.48	3.14	3.29	3.65	3.41	3.52	3.29	3.17	3.60
15	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Mercury as Hg	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Lead as Pb	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Hexa Chromium as Cr ⁺⁶	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Total Chromium as Cr	mg/l	\$	0.11	0.069	0.11	0.09	0.1	0.1	0.09	0.12	0.11	0.15	0.12	0.11	0.11
21	Copper as Cu	mg/l	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Zinc as Zn	mg/l	15	0.14	0.13	0.14	0.11	0.11	0.09	0.13	0.16	0.18	0.13	0.14	0.13	0.13
23	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Nickel as Ni	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Fluoride as F	mg/l	1.5	0.18	0.09	0.09	0.084	0.078	0.072	0.067	0.093	0.058	0.042	0.047	0.039	0.08
27	Diss. Phosphate as P	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Sulphide as S	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Phenolic Compounds as C ₆ H ₅ OH	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30	Bio-assay Test	--	\$	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98% .
31	Manganese as Mn	mg/l	\$	0.16	0.087	0.11	0.1	0.09	0.086	0.081	0.096	0.067	0.052	0.058	0.051	0.09
32	Iron as Fe	mg/l	50	0.51	0.37	0.32	0.24	0.27	0.27	0.22	0.41	0.19	0.17	0.2	0.17	0.28
33	Vanadium as V	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
34	Nitrate as NO ₃	mg/l	50	0.29	0.22	0.29	0.21	0.25	0.18	0.18	0.25	0.16	0.14	0.14	0.13	0.20

N.B. : \$- No Specific Limit , U/O-Unobjectionable , BDL- Below detection limit. ND-Not detectable

MALDA (DOWNSTREAM) W1			Oct'13		Nov'13		Dec'13		Jan'14		Feb'14		March'14		Avg 3 months	
Sl.	Parameters	Unit	Standards as	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	W-2
1	Colour & Odour	--	300 & \$	23 & U/O	27 & U/O	18 & U/O	17 & U/O	16 & U/O	14 & U/O	13 & U/O	17 & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	19.16 & U/O
2	Suspended Solids	mg/l	\$	104	118	63	57	59	51	47	61	41	39	37	28	58.75
3	Particular Size of S.S.	μ(micron)	\$	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850	<850
4	Dissolved Solids	mg/l	1500	179	156	145	142	139	133	131	142	129	141	122	114	139.42
5	PH	--	6.5-8.5	6.9	7.2	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.2	7.2	7.1	7.14
6	Temperature	⁰ C	\$	25	25	25	25	25	24	24	24	24	24	25	25	24.58
7	Oil & Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8	Total Residual Chlorine	mg/l	\$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
9	Amm. Nitrogen as N	mg/l	\$	0.65	0.64	0.49	0.44	0.41	0.34	0.39	0.56	0.31	0.28	0.39	0.35	ND
10	Total Kjeldal Nitrogen as N	mg/l	\$	1.46	1.39	1.27	1.21	1.18	1.13	1.11	1.36	0.92	0.72	1.01	0.91	1.14
11	Free Ammonia as NH ₃	mg/l	\$	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
12	Dissolved Oxygen	mg/l	4	6.8	7.2	7.2	7.2	7.3	7.2	7.2	7.2	7.4	7.2	7.3	7.2	7.20
13	BOD (3) days at 27 ⁰ C	mg/l	3	1.74	1.41	1.31	1.21	1.2	1.15	1.11	1.33	1.19	1.22	1.16	1.11	1.26
14	COD	mg/l	\$	4.56	4.95	3.73	3.49	3.56	3.22	3.42	3.83	3.57	3.69	3.43	3.28	3.73
15	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
16	Mercury as Hg	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
17	Lead as Pb	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
18	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
19	Hexa Chromium as Cr ⁺⁶	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
20	Total Chromium as Cr	mg/l	\$	0.12	0.077	0.12	0.1	0.11	0.11	0.1	0.14	0.12	0.17	0.12	0.12	0.12
21	Copper as Cu	mg/l	1.5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
22	Zinc as Zn	mg/l	15	0.17	0.16	0.17	0.13	0.14	0.1	0.17	0.19	0.19	0.16	0.15	0.14	0.16
23	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
24	Nickel as Ni	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
25	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
26	Fluoride as F	mg/l	1.5	0.2	0.1	0.1	0.091	0.089	0.08	0.075	0.1	0.061	0.057	0.055	0.045	0.09
27	Diss. Phosphate as P	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
28	Sulphide as S	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
29	Phenolic Compounds as C ₆ H ₅ OH	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30	Bio-assay Test	--	\$	98%	97%	98%	98%	98%	98%	98%	97%	98%	98%	98%	98%	97.83%
31	Manganese as Mn	mg/l	\$	0.18	0.09	0.12	0.11	0.1	0.093	0.089	0.11	0.072	0.059	0.064	0.056	0.10
32	Iron as Fe	mg/l	50	0.56	0.41	0.36	0.29	0.32	0.33	0.29	0.48	0.22	0.2	0.24	0.21	0.33
33	Vanadium as V	mg/l	\$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
34	Nitrate as NO ₃	mg/l	50	0.32	0.25	0.32	0.25	0.28	0.21	0.21	0.29	0.19	0.17	0.17	0.15	0.23

N.B. : \$- No Specific Limit , ,U/O-Unobjectionable , BDL- Below detection limit. ND-Not detectable

Annexure – V

MALDA Monthly Avgs	Location	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	Mn µg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a) Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Oct'13	Block -1	31.88	19.41	4.00	9.31	0.10	0.35	6.39	BDL	BDL	0.29	BDL	BDL	BDL
Nov'13	Block -1	37.13	21.99	4.05	9.99	0.12	0.54	5.84	BDL	BDL	0.39	BDL	BDL	BDL
Dec'13	Block -1	47.78	27.91	4.19	10.88	0.15	0.66	6.87	0.016	BDL	0.55	BDL	BDL	BDL
January'14	Block -1	38.11	22.19	4.02	10.12	0.12	0.53	6.43	BDL	BDL	0.44	BDL	BDL	BDL
Feb'13	Block -1	38.89	23.23	4.00	9.48	0.11	0.52	4.98	BDL	BDL	0.53	BDL	BDL	BDL
March'13	Block -1	37.56	22.32	4.00	9.60	0.10	0.51	4.86	BDL	BDL	0.53	BDL	BDL	BDL
6 Months Avgs	Block -1	38.56	22.84	4.04	9.90	0.12	0.52	5.89	BDL	BDL	0.46	BDL	BDL	BDL

MALDA Monthly Avgs	Location	PM10 µg/m3	PM2.5 µg/m3	SO2 µg/m3	NOx µg/m3	CO mg/m3	Mn µg/m3	O3 µg/m3	Pb µg/m3	NH3 µg/m3	Benzene µg/m3	Benzo(a) Pyrene ng/m3	Arsenic ng/m3	Nickel ng/m3
Oct'13	Dispensary	27.13	16.39	4.00	9.08	0.10	0.30	5.94	BDL	BDL	0.25	BDL	BDL	BDL
Nov'13	Dispensary	31.63	18.89	4.05	9.68	0.11	0.49	5.33	BDL	BDL	0.35	BDL	BDL	BDL
Dec'13	Dispensary	38.44	22.44	4.07	9.78	0.11	0.55	5.94	BDL	BDL	0.45	BDL	BDL	BDL
January'14	Dispensary	33.11	20.00	4.00	9.60	0.11	0.48	5.97	BDL	BDL	0.39	BDL	BDL	BDL
Feb'13	Dispensary	34.56	20.64	4.00	9.23	0.10	0.48	4.63	BDL	BDL	0.49	BDL	BDL	BDL
March'13	Dispensary	33.78	20.32	4.00	9.30	0.10	0.46	4.60	BDL	BDL	0.49	BDL	BDL	BDL
6 Months Avgs	Dispensary	33.11	19.78	4.02	9.44	0.11	0.46	5.40	BDL	BDL	0.40	BDL	BDL	BDL

Annexure – VI



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssevironics.com

RefNo: SSE/13/R-2555

Date: 04.12.2013

DUST FALL ANALYSIS RESULTS FOR TRACE METALS

Name of the Mines : Malda Manganese Mines (Tata Steel Ltd.)
Location of Sampling : DF1: Near Block-I
DF2: Block-III
Period of monitoring : November-2013

Sl. No.	Parameters	DF1	DF2
1.	Nickel as (Ni) in %	0.031	0.024
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.023	0.017
4.	Mercury as (Hg) in %	Nil	Nil

For S.S ENVIRONICS (I) PVT. LTD



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssenvironics.com

Ref No: SSE/13/R-3175

Date: 03.02.2014

DUST FALL ANALYSIS RESULTS FOR TRACE METALS

Name of the Mines : Malda Manganese Mines (Tata Steel Ltd.)
Location of Sampling : DF1: Near Block-I
DF2: Block-III
Period of monitoring : January-2014

Sl. No.	Parameters	DF1	DF2
1.	Nickel as (Ni) in %	0.026	0.019
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.019	0.013
4.	Mercury as (Hg) in %	Nil	Nil

For S.S ENVIRONICS (I) PVT. LTD

Annexure – VII



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"

At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha

Tele Fax: 0674- 2471574; E-mail: emails@ssenvironics.com

Ref No: SSE/13/R-2559

Date: 04.12.2013

SOIL QUALITY ANALYSIS RESULTS FOR TRACE METALS

Name of the Mines : Malda Manganese Mines (Tata Steel Ltd)
Location of Sampling : S1: Near Block-I
S2: Block-III
Date of Sampling : 27.11.2013
Date of Analysis : 30.11.2013

Sl. No.	Parameters	S1	S2
1.	Nickel as (Ni) in %	0.021	0.015
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.019	0.011
4.	Mercury as (Hg) in %	Nil	Nil

For S.S Environics (India) Pvt. Ltd.



S.S. Environics (India) Pvt. Ltd.

(An ISO 9001:2008, 14001:2004 and OHSAS 18001:2007 Certified Company)

Plot No-361/2314 "Sustenance Tower"
At: Patrapada, P.O: Dumuduma, Dist: Khurda, Bhubaneswar-751 019, Odisha
Tele Fax: 0674- 2471574; E-mail: emails@ssevironics.com

Ref No: SSE/13/R-3183

Date: 03.02.2014

SOIL QUALITY ANALYSIS RESULTS FOR TRACE METALS

Name of the Mines : Malda Manganese Mines (Tata Steel Ltd)
Location of Sampling : S1: Near Block-I
S2: Block-III
Date of Sampling : 28.01.2014
Date of Analysis : 31.01.2014

Sl. No.	Parameters	S1	S2
1.	Nickel as (Ni) in %	0.016	0.011
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.015	0.009
4.	Mercury as (Hg) in %	Nil	Nil

For S.S Environics (India) Pvt. Ltd.

Annexure – VIII

**TATA STEEL
MANGANESE GR.OF MINES, JODA**

RESULT OF NOISE LEVEL MONITORING AT DIFFERENT LOCATION

Mine	Location	Physical Condition	Period	Period
			20.12.13 to 31.12.13	06.03.14 to 11.03.14
			Noise Level dB(A)	Noise Level dB(A)
Malda	Block-I Pit	i) 2 mtr.away from Shovel Operation	Mining Operation stopped due to want of Forest Clearance	Mining Operation stopped due to want of Forest Clearance
		ii) Inside the Shvel Operator Cabin		
		iii) 1 mtr.away from wagon drill operation		
		iv) 1 mtr away from dozer operation		

NB : - Prescribed noise level for 8 hr. exposure is 90 dB(A)
* Ear Muff / Ear Plug has been provided to all the crew members of operation

**Annexure – XI
Organizational Structure**

