COMPLIANCE REPORT PERIOD : OCT'14 TO MAR'15

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.	4th 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 3rd 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 4th 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 27th 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 Octô14 to Marô15. 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. 12,160 nos. of saplings of local species (Gambhari, Chakunda, Mahanimba, Kala Sirs, Sisu etc) were planted during 2014-15 and the survival rate assessed during Mayô2015 was found to be 91.86 %. 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 ï 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, 0B 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 particularly after monsoon and maintained properly. 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	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. Size, gradient and length of the drains will be adequate to take care of the peak flow.

	and desilted at regular intervals.	
(viii)	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.	In order to prevent the siltation and to check the run-off it is proposed that toe walls and garland drains are being provided. Dimension of the Retaining Wall : Height ï 1 to 1.2 mtr. Width ï 1 mtr. Dimension of the Garland Drain : Depth ï 1.20 to 1.5 mtr. Width ï 1 to 1.2 mtr.
(ix)	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.	Plantation programme have been drawn regularly in consultation with the local DFO and OSPCB We have planted 2,84,119 nos of saplings of local species over an area of 91.2 ha with 83% survival rate. Tree density is maintained at the rate of 2726 saplings per ha. by considering the rate of survival.
(x)	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.	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.
(xi)	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.	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. It was observed that , the level of ground water , a) During post-monsoon was 2.14 mtr (at 564.86 mRL) to 1.65 mtr (at 617.35 mRL). b) During winter was 3.17 mtr (at 563.83 mRL) to 2.323 mtr (at 616.68 mRL). c) During winter was 6.94 mtr (at 565.06 mRL) for the Piezometric test point at Malda and was 3.82 mtr (at 568.17 mRL) during post-monsoon. 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 ï IV.
(xii)	Appropriate mitigative measures should be taken to prevent pollution of Suna 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 Suna river and also ground water, if any, required for the project.	Permission has been obtained for drawl of water from the nearby Sona river only. 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 m^3 per day. The ground water is not being used for mining and its allied activities.
(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)	Vehicular emissions should be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be overloaded.	Presently, the mining operation has been discontinued since 27th Febô2011 due to want of Forest Clearance. The mining equipments have been shifted to other units for its utilization. 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. All the trucks meant for transportation of mineral from mine to our captive plant & Railway Siding at Joda were bearing the ñPollution under Controlô certificate. The emissions are under control. 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.
(xvi)	Blasting operation should be carried out only 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.	Presently, the mining operation has been discontinued since 27th Febô2011 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 meantime, 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 30th

		Juneô13 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.	ñConsent to operateò 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 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.	3rd and 4th 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 Forest Division. Further, Site specific wildlife management plan has been prepared and approved by Principal Chief Conservator of Forest (WL)&Chief Wildlife Warden, Odisha. vide letter no- 2375/1 WL-SSP-70/2015 dated- 11th March 2015.
(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 2014-15: Production: 5,50,000 MT OB: 25,70,976 CuM Planned (Octô14 to Marô15) Production:- 2,75,000 MT OB:- 12,85,488 CuM Actual (Octô14 to Marô15)- Nil There was no production as well as quarry development due to discontinuation of mining operation due to want of Foreast 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, S02, NOx 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}, $PM_{2.5}$, $S0_2$, NOx.
(iv)	Data on ambient air quality (RPM, SPM, S02, NOx) 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 & NOx, CO & Mn. It was observed that, a) PM_{10} varies from 27.78 µg/m^3 (Marchô15) to 36.88 µg/m^3 (Novô14) near Dispensary (close proximity to residential colony) against the standard 100 µg/m^3. b) PM_{10} varies from 32.67 µg/m^3 (Marchô15) to 41.25 µg/m^3 (Novô14) near Block-I quarry area against the standard 100 µg/m^3. c) $PM_{2.5}$ varies from 16.41 µg/m^3 (Marchô15) to 22.00 µg/m^3 (Novô14) near Dispensary (close proximity to residential colony) against the standard 60 µg/m^3. d) $PM_{2.5}$ varies from 19.12 µg/m^3 (Marô15) to 24.86 µg/m^3 (Novô14) near Block-I quarry area against the standard 60 µg/m^3. e) SO_2 varies from 4.00 µg/m^3 (Marô15) to 4.02 µg/m^3 (Decô14) near Dispensary (close proximity to residential colony) against the standard 80 µg/m^3. f) SO_2 varies from 4.00 µg/m^3 (Marô15) to 4.02 µg/m^3 (Decô14) near Block-I quarry area against the standard 80 µg/m^3. g) NoX varies from 9.05 µg/m^3 (Febô15) to 10.53 µg/m^3 (Novô14) near Dispensary (close proximity to residential colony) against the standard 80 µg/m^3. h) NoX varies from 9.31 µg/m^3 (Febô15) to 11.05 µg/m^3 (Novô14) near Block-I quarry area against the standard 80-µg/m^3. i) CO varies from 0.10 µg/m^3 (Marô15) to 0.13 µg/m^3 (Novô14)) near Dispensary (close proximity to residential colony) against the standard 2 µg/m^3. j) CO varies from 0.10 µg/m^3 (Marô15) to 0.13 µg/m^3 (Novô14) near Block-I quarry area against the standard 2 µg/m^3. k) Mn varies from 0.34 µg/m^3 (Marô15) to 0.53 µg/m^3 (Novô14) near Dispensary (close proximity to residential colony) against the standard 0.25 mg/m^3.

		l) Mn varies from 0.39 µg/m^3 (Marô15) to 0.58 µg/m^3 (Novô14) near Block-I quarry area against the standard 0.25 mg/m^3. 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.** Similarly, samples have been analyzed for presence of trace metals in dust fall & soil during post monsoon & winter season. It was observed that, a) Presence of Co and Hg was nil. Only Ni & As presence varies from 0.019 to 0.026 & 0.022 to 0.030 respectively in dust-fall samples during winter season. b) Presence of Co and Hg was Nil. Only Ni & As presence varies from 0.014 to 0.021 & 0.011 to 0.017 respectively in soil samples during post-monsoon. The detail analysis result is enclosed as **Annexure-VI (Dust Fall) & VII (Soil)**
(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.	Effective water sprinkling by mobile water tanker is being done on haul roads. No fugitive dust monitoring has been carried out during the period Octô14 to Marô15 as the mining operation has been discontinued since 27th Febô2011 due to want of Forest Clearance.
(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.	Ear plugs & Ear muffs are provided to the workers working in drilling operations & DG operations. Rests of operations are below the noise levels of 80 dBA. No Noise monitoring has been carried out during the period Octô14 to Marô15 as the mining operation has been discontinued since 27th Febô2011 due to want of Forest Clearance
(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 programs 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, during 2014-15 01 nos employee for PME and 75 nos contractual employee were examined for IME. 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 Bhubaneswar.	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 Aprô14 to Marô15 was Rs. 17,33,670/- (Monitoring ï Rs 14,98,916/- & Plantation - Rs. 2,34,754/-) against the budget of Rs 7,68,375/-
(xi)	The project authorities should Inform to the Regional Office located at Bhubaneswar 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 Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data *I* 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, Bhubaneswar,. 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 and uploaded in company website : **http://www.tatasteelindia.com/corporate-citizen/environment-compliance-reports.asp**
(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 - New Indian express (Daily English) dated 22nd Aprô07 & - Samaja (Daily Odiya) dated 22nd Aprô07
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
6	**Additional conditions laid by MOEF vide letter no-106-9/11/EPE, dated 02/12/2014**	**Compliance Status**
a	The project Authority shall adopt Best Mining Practice for the mining conditions. In the mining area, adequate number of check dams, retaining walls/structures garland drains and settling ponds should be provided to arrest the wash-off with rain water in catchment area.	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 fast growing species. The overall slope angles of OB dumps are maintained within the natural angle of repose of the waste. In order to prevent the siltation and to check the run-off it is proposed that toe walls and garland drains are being provided. Dimension of the Retaining Wall : Height ï 1 to 1.2 mtr. Width ï 1 mtr. Dimension of the Garland Drain : Depth ï 1.20 to 1.5 mtr. Width ï 1 to 1.2 mtr. 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. Size, gradient and length of the drains will be adequate to take care of the peak flow.

b	The natural water bodies and or streams which are flowing in and around the village should not be disturbed. The Water Table should be natured so as not to go down below the pre-mining period. In case of any water scarcity in the area, the project Authorities have to provide water to the villagers for their use. A provision for regular monitoring of water table in open dug well located in village should be incorporated to ascertain the impact of mining over ground water table.	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 nala 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. Permission has been obtained for drawl of water from the nearby Sona river only. 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. The ground water is not being used for mining and its allied activities. The water table is recharged by the water bodies/streams flowing around the villages and also by the direct seepage of the rainfall occurring in the area. Regular monitoring of water table is being carried out in the open dug well located in the village and the monitoring report is attached as **Annexure-I** for your kind reference.
c	The illumination and sound at night at project sites disturb the villages in respect of both human and animal population. Consequent sleeping disorders and stress may affect the health in the villages located close to mining operations. Habitations have a right to darkness and minimal noise levels at night. The Project Proponents (PPs) must ensure that the biological clock of the villagers is not disturbed by orienting the floodlights/masks away from the villages and keeping the noise levels well within the prescribed limits for day/night hours.	There is no night shift operation in the Mines hence, the sound at night at project site is not applicable. Moreover, the illumination at night level is also low, as it not used for supporting the night shift operation. It is ensured that the biological clock of the villagers is not disturbed by orienting the floodlights/masks away from the villages and keeping the noise levels well within the prescribed limits for day/night hours.
d	The project Authority shall make necessary alternatives, where required, in consultation with the State Government to provide alternate areas for livestock grazing. In this context, Project Authority should implement the directions of the Hon'ble Supreme Court with regard to acquiring grazing land. The spares trees on such grazing ground, which provide midday shelter from the scorching sun should be scrupulously guarded against felling, last the cattle abandon the grazing ground or return home by noon.	The grazing land in the leasehold area is not disturbed till now and the directions of the Honble Supreme Court will be followed while acquiring grazing land in future. Presently, the mining operation has been discontinued since 27th Feb'2011 due to want of Forest Clearance.
e	Where ever blasting is undertaken as part mining activity, the Project Authority shall carry out vibration studies well before approaching any such habitats or other buildings to evaluate the zone of influence and impact of blasting on the neighborhood. Within 500 meters of such sites vulnerable to blasting vibrations, avoidance of use of explosives and adoption of alternative means of mineral extraction, such as ripper/dozer combination/rock breakers/surface miners etc. should be seriously considered and	Vibration Study due to blasting is being carried out by CIMFR on regular basis and the recommendations of the study are strictly being adhered. Controlled blasting is practiced with the use of Nonel. Every critical blast is being monitored and the covenant of lease deed under Rule 31 of MCR 1960 is being followed.

	practiced wherever practicable. A provision for monitoring of each blast should be made so that the impact of blasting on nearby habitation and dwelling units could be ascertained. The covenant of lease deed under Rule 31 of MCR 1960 provides that no mining operations shall be carried out within 50 meters of public works such as public roads and buildings or inhabited sites except with the prior permission from the Competent Authority.	
f	Main haulage road in the mine should be provided with permanent water sprinklers and other roads should be regularly wetted with water tankers fitted with sprinklers. Crusher and material transfer points should invariably be provided with Bag filters and or dry fogging system. Belt conveyors should be fully covered to avoid air borne dust.	Water sprinkling is also been carried out by the tankers fitted with sprinklers on regular interval with increased frequency during the dry seasons and is sufficient for dust suppression. There is no crusher unit as well as belt conveyor system installed in the mine. Regular dust monitoring of the Mine area is being carried out and the monitoring report is attached as **Annexure-V**
g	The Project Authority shall ensure that the productivity of agricultural crops is not affected due to mining operations. Crop liability insurance policy has to be taken by the PP as a precaution to compensate for any crop loss. The impact zone shall be 5km from the boundary of mine lease area for such insurance policy. In case, several mines are located in a cluster, the Associations of owners of the cluster mines, formed inter-alia, to sub-serve such an objective, shall take responsibility for securing such Crop Liability Policy.	It is being ensured that the productivity of agricultural crops is not affected by adopting the best mining practices in terms of maintaining zero effluent discharge and restricting the run-off from mines to a minimum by constructing retaining wall around the critical areas of the dump complementing it with garland drain and making settling pits, check dams at regular intervals. In this region several mines are located in a cluster hence the Associations of owners of the cluster mines, shall be formed inter-alia, to sub-serve such an objective, and shall take responsibility for securing such Crop Liability Policy.
h	In case any village is located within the mining leasehold which is not likely to be affected due to mining activities during the life of mine, the Expert Appraisal Committee (EAC) for reduced mining area. The Mining lease may be executed for the area for which EC is accorded. The mining plan may also be accordingly revised and required stipulations under the MMDR Act, 1957 and MCR, 1960 met.	All the area within the Mining Lease area will be affected due to Mining activities during the life of mine except the area considered for Safety Zone, the private lands, the ST land area, which will be utilized as per the prevailing norms.
i	Transportation of the minerals by road passing through the village shall not be allowed. A ôbypassô road should be constructed (say, leaving a gap of at least 200 meters) for the purpose of transportation of the minerals so that the impact of sound, dust and accidents could be mitigated. The PP shall bear the cost towards the widening and strengthening of existing public road network in case the same is proposed to be used for the Project. No road movement should be allowed on existing village road network without appropriately increasing the carrying capacity of such road.	Although, the mining operation has been discontinued since 27th Febô2011 due to want of Forest Clearance, the transportation of the minerals while the operation of Mines was not done by the road passing through the village. The current road used for transport is being maintained by us. The village road network will be used only when the carrying capacity of such roads is increased.
j	Likewise, alteration or re-routing of foot paths, pagdandies, cart roads and village infrastructure/public utilities or roads (for purposes of land acquisition for mining) shall be avoided to the extent possible and in case such acquisition is inevitable, alternative arrangements shall be made first and then only	Noted.

	the area acquired. In these types of cases, Inspection Reports by site visit by experts may be insisted upon which should be done through reputed Institutes.	
k	As CSR activities by Companies including the Mining Establishments has become mandatory up to 2% of their financial turn-over, Socio Economic Development of the neighborhood Habitats could also be planned and executed by the PPs more systematically based on the óNeed based door to door survey ó by established Social Institutes / Workers on the lines as required under TOR. ñR&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs / STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programs prepared and submitted accordingly, integrating the sectorial programs of line departments of the State Government. It may be clearly brought out whether the village located in the mine lease area will be shifted or not. The issues relating to shifting of village including their R&R and socio-economic aspects should be discussed in the EIA report.ò	Socio Economic Development of the neighborhood Habitats is planned and executed by us through a separate wing formed for the said purpose, TSRDS (Tata Steel Rural Development Society) in which Need based door to door survey is done and accordingly the CSR activities are planned. No displacement is there , hence R&R Plan is not applicable to us.

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/14/R-2867 *Date:* 04.12.2015

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
28.11.2015	W-1: Well at Malda Camp	567	564.86	2.14
28.11.2015	W-2: Well at Ranishal	619	617.35	1.65
28.11.2015	W-3: Peizometric test Point at Malda	572	568.17	3.82

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

S.S. ENVIRONICS (INDIA) PVT. LTD. BBSR

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/14/R-3365 *Date:* 04.02.2015

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
29.01.2015	W-1: Well at Malda Camp	567	563.83	3.17
29.01.2015	W-2: Well at Ranishal	619	616.68	2.32
29.01.2015	W-3: Peizometric test Point at Malda	572	565.06	6.94

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@ssenvironics.com

Ref No: SSE/14/R-2858 *Date:* 04.12.2014

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 : 22.11.2014
Date of Analysis : 24.11.2014

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	1	<1	<1
5	pH Value	6.5-8.5	7.1	7.2
6	Total Hardness (as $CaCO_3$), mg/l, max	300	41	46
7	Iron (as Fe), mg/l, max	0.3	0.11	0.12
8	Chloride (as Cl), mg/l, max	250	9.1	9.4
9	Residual, free Chlorine, mg/l, min	0.2	ND	ND
Desirable Characteristics				
10	Dissolved Solids, mg/l, max	500	128	136
11	Calcium (as Ca), mg/l, max	75	9.4	9.7
12	Copper (as Cu), mg/l, max	0.05	BDL	BDL
13	Manganese (as Mn), mg/l, max	0.1	0.008	0.008
14	Sulphate (as SO_4), mg/l, max	200	17.9	18.6
15	Nitrate (as NO_3), mg/l, max	45	0.19	0.23
16	Fluoride (as F), mg/l, max	1.0	BDL	BDL
17	Phenolic Compounds (as C_6H_5OH), 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	0.19	0.22
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	31
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,Flouride-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 (INDIA) PVT. LTD

A Group concerned with Environmental Pollution

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/14/R-3370 *Date:* 04.02.2015

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 : 29.01.2015
Date of Analysis : 31.01.2015

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	1	<1	<1
5	pH Value	6.5-8.5	7.2	7.2
6	Total Hardness (as $CaCO_3$), mg/l, max	300	48	55
7	Iron (as Fe), mg/l, max	0.3	0.13	0.15
8	Chloride (as Cl), mg/l, max	250	9.8	10.1
9	Residual, free Chlorine, mg/l, min	0.2	ND	ND
Desirable Characteristics				
10	Dissolved Solids, mg/l, max	500	117	124
11	Calcium (as Ca), mg/l, max	75	9.2	9.5
12	Copper (as Cu), mg/l, max	0.05	BDL	BDL
13	Manganese (as Mn), mg/l, max	0.1	0.013	0.010
14	Sulphate (as SO_4), mg/l, max	200	16.4	15.2
15	Nitrate (as NO_3), mg/l, max	45	0.17	0.14
16	Fluoride (as F), mg/l, max	1.0	BDL	BDL
17	Phenolic Compounds (as C_6H_5OH), 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	0.16	0.13
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	24
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,Flouride-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-0.001mg/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/14/R-2863

Date: 04.12.2014

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 : 22.11.2014
Date of Analysis : 24.11.2014

Sl. No	Parameter	Standard as per BIS: 10500	Analysis Results
1	Iron (as Fe), mg/l, max	0.3	0.16
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	0.29
10	Manganese (as Mn), mg/l, max	0.1	0.01

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.

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

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/14/R-3379

Date: 04.02.2015

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 : 29.01.2015
Date of Analysis : 31.01.2015

Sl. No	Parameter	Standard as per BIS: 10500	Analysis Results
1	Iron (as Fe), mg/l, max	0.3	0.18
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	0.015

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 – IV

Malda Mn Mines, M/s Tata Steel limited.

Abstract of Water Quality Monitoring Report.

MALDA (UPSTREAM) W1				Oct'14		Nov'14		Dec'14		Jan'15		Feb'15		March'15		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 & $	14 & U/O	CL & U/O	5 & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	**4.8 & U/O**
2	Suspended Solids	mg/l	$	48	49	44	31	40	26	33	25	29	20	26	18	**32.42**
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	138	148	121	141	117	135	122	119	116	106	108	101	**122.67**
5	PH	--	6.5-8.5	7.1	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	**7.19**
6	Temperature	^{0}C	$	24	24	24	24	23	23	22	22	24	24	25	25	**23.67**
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	$	0.39	0.48	0.35	0.35	0.31	0.31	0.26	0.29	0.23	0.25	0.19	0.21	**ND**
10	Total Kjeldal Nitrogen as N	mg/l	$	0.98	1.32	1.06	1.18	1	1.12	1.14	0.96	1.06	0.87	0.96	0.76	**1.03**
11	Free Ammonia as NH_3	mg/l	$	0.003	0.002	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.003	0.002	0.003	**ND**
12	Dissolved Oxygen	mg/l	4	7.2	7.1	7.3	7.3	7.4	7.4	7.3	7.4	7.4	7.4	7.3	7.3	**7.32**
13	BOD (3) days at 27^{0}C	mg/l	3	1.27	1.22	1.18	1.14	1.11	1.11	1	1.05	1.1	1.11	1	1.05	**1.11**
14	COD	mg/l	$	3.78	3.79	3.59	3.49	3.45	3.38	3.17	2.84	3.28	3.24	3.05	3.17	**3.35**
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	$	0.18	0.18	0.2	0.16	0.16	0.14	0.18	0.11	0.16	0.09	0.14	0.08	**0.15**
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	0.2	0.19	0.25	0.22	0.21	0.19	0.26	0.2	0.22	0.16	0.19	0.14	**0.20**
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	0.073	0.091	0.06	0.08	0.05	0.08	0.06	0.06	0.05	0.05	0.05	0.04	**0.06**
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_6H_5OH	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	$	0.079	0.078	0.08	0.065	0.05	0.059	0.049	0.048	0.038	0.041	0.031	0.038	**0.05**
32	Iron as Fe	mg/l	50	0.32	0.36	0.26	0.29	0.21	0.26	0.27	0.24	0.24	0.19	0.2	0.16	**0.25**
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	0.21	0.29	0.18	0.22	0.16	0.19	0.18	0.16	0.16	0.19	0.18	0.17	**0.19**

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

MALDA (DOWNSTREAM) WI				Oct'14		Nov'14		Dec'14		Jan'15		Feb'15		March'15		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-2
1	Colour & Odour	--	300 & $	17 & U/O	CL & U/O	5 & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	CL & U/O	4.9 & U/O
2	Suspended Solids	mg/l	$	51	55	49	37	45	29	38	28	35	24	31	21	36.92
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	142	154	126	148	121	142	134	127	122	118	117	107	129.83
5	PH	--	6.5-8.5	7.1	7.1	7.2	7.2	7.2	7.2	7.2	7.1	7.3	7.2	7.2	7.2	7.18
6	Temperature	^{0}C	$	24	24	24	24	23	23	22	22	24	24	25	25	23.67
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	$	0.41	0.55	0.39	0.42	0.35	0.38	0.3	0.32	0.27	0.29	0.21	0.26	ND
10	Total Kjeldal Nitrogen as N	mg/l	$	1.02	1.38	1.11	1.21	1.09	1.16	1.22	1.1	1.1	0.92	1	0.81	1.09
11	Free Ammonia as NH_3	mg/l	$	0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.003	0.003	0.003	0.002	0.003	ND
12	Dissolved Oxygen	mg/l	4	7.1	7	7.3	7.3	7.3	7.4	7.2	7.4	7.3	7.3	7.3	7.3	7.27
13	BOD (3) days at 27^{0}C	mg/l	3	1.31	1.29	1.24	1.21	1.16	1.17	1	1.1	1.14	1.14	1.1	1.1	1.16
14	COD	mg/l	$	3.84	3.84	3.66	3.57	3.52	3.45	3.04	2.96	3.36	3.31	3.17	3.22	3.41
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	$	0.21	0.21	0.24	0.18	0.19	0.16	0.2	0.13	0.19	0.11	0.15	0.1	0.17
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	0.23	0.25	0.29	0.26	0.24	0.21	0.29	0.24	0.25	0.2	0.2	0.17	0.24
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	0.077	0.097	0.06	0.08	0.05	0.08	0.07	0.07	0.06	0.05	0.05	0.05	0.07
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_6H_5OH	mg/l	$	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
30	Bio-assay Test	--	$	97%	97%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	97.50%
31	Manganese as Mn	mg/l	$	0.085	0.08	0.09	0.07	0.06	0.066	0.057	0.055	0.042	0.046	0.037	0.041	0.06
32	Iron as Fe	mg/l	50	0.35	0.42	0.31	0.33	0.28	0.3	0.31	0.27	0.28	0.23	0.25	0.18	0.29
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	0.24	0.33	0.2	0.26	0.19	0.23	0.21	0.18	0.19	0.23	0.21	0.19	0.22

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

Annexure – V

Malda Mn Mines, M/s Tata Steel limited.

Abstract of Air Quality Monitoring Report**.**

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'14	Block -1	37.56	22.60	4.01	10.31	0.11	0.50	5.33	BDL	BDL	0.49	BDL	BDL	BDL
Nov'14	Block -1	41.25	24.86	4.00	11.05	0.13	0.58	5.51	BDL	BDL	0.64	BDL	BDL	BDL
Dec'14	Block -1	38.44	22.48	4.02	10.41	0.11	0.51	5.07	BDL	BDL	0.44	BDL	BDL	BDL
January'15	Block -1	37.67	22.26	4.00	9.90	0.10	0.55	BDL	BDL	BDL	0.50	BDL	BDL	BDL
Feb'15	Block -1	36.38	21.84	4.00	9.31	0.11	0.42	BDL	BDL	BDL	0.39	BDL	BDL	BDL
March'15	Block -1	32.67	19.12	4.00	9.48	0.10	0.39	5.00	BDL	BDL	0.49	BDL	BDL	BDL
6 Months Avgs	Block -1	**37.33**	**22.19**	**4.01**	**10.08**	**0.11**	**0.49**	**5.23**	**BDL**	**BDL**	**0.49**	**BDL**	**BDL**	**BDL**
Oct'14	Dispensary	33.89	19.90	4.01	10.07	0.10	0.46	5.19	BDL	BDL	0.44	BDL	BDL	BDL
Nov'14	Dispensary	36.88	22.00	4.00	10.53	0.11	0.53	5.19	BDL	BDL	0.59	BDL	BDL	BDL
Dec'14	Dispensary	33.89	19.92	4.02	9.89	0.10	0.45	5.02	BDL	BDL	0.39	BDL	BDL	BDL
January'15	Dispensary	33.67	19.98	4.00	9.66	0.10	0.50	BDL	BDL	BDL	0.46	BDL	BDL	BDL
Feb'15	Dispensary	32.25	19.13	4.00	9.05	0.10	0.39	BDL	BDL	BDL	0.32	BDL	BDL	BDL
March'15	Dispensary	27.78	16.41	4.00	9.26	0.10	0.34	5.00	BDL	BDL	0.45	BDL	BDL	BDL
6 Months Avgs	Dispensary	**33.06**	**19.56**	**4.01**	**9.74**	**0.10**	**0.45**	**5.10**	**BDL**	**BDL**	**0.44**	**BDL**	**BDL**	**BDL**

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/14/R-2701 *Date:* 04.12.2014

DUST FALL ANALYSIS RESULTS FOR TRACE METALS

Name of the Mines : **Joda west Manganese Mines (Tata Steel Ltd)**
Location of Sampling: DF1: **H-QUARRY**
DF2: **D- QUARRY**
Period of monitoring : November-2014

Sl. No.	Parameters	DF1	DF2
1.	Nickel as (Ni) in %	0.038	0.031
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.044	0.050
4.	Mercury as (Hg) in %	Nil	Nil

S.S ENVIRONICS (INDIA) PVT. LTD. BBSR

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)

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Ref No: SSE/14/R-3362 *Date:* 04.02.2015

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-2015

Sl. No.	Parameters	DF1	DF2
1.	Nickel as (Ni) in %	0.030	0.022
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.027	0.019
4.	Mercury as (Hg) in %	Nil	Nil

For S.S ENVIRONICS (INDIA) 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"
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Ref No: SSE/14/R-2700 Date: 04.12.2014

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 : 22.11.2014
Date of Analysis : 25.11.2014

Sl. No.	Parameters	S1	S2
1.	Nickel as (Ni) in %	0.041	0.032
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.032	0.024
4.	Mercury as (Hg) in %	Nil	Nil

S.S ENVIRONICS (INDIA) PVT. LTD. BBSR.

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@ssenvironics.com

Ref No: SSE/14/R-3374 Date: 04.02.2015

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 : 29.01.2015
Date of Analysis : 31.01.2015

Sl. No.	Parameters	S1	S2
1.	Nickel as (Ni) in %	0.049	0.044
2.	Cobalt as (Co) in %	Nil	Nil
3.	Arsenic as (As) in %	0.037	0.030
4.	Mercury as (Hg) in %	Nil	Nil

S.S ENVIRONICS (INDIA) PVT. LTD. BBSR.

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

Annexure - VIII

LIST OF ENVIRONMENTAL MONITORING EQUIPMENT

Ambient Air Quality		
Sl.No.	**Name of the Instrument**	**Parameter**
1	Respirable Dust sampler	PM_{10}
2	Fine Particulate Sampler	$PM_{2.5}$
3	Spectrophotometer UV-Visible range	SO_2,NO_x
4	NDIR	CO
5	AAS	Manganese
Other Paraphernalia for analysis of air quality are also available in the laboratory.		
Water Quality		
Sl.No.	**Name of the Instrument**	**Parameter**
1	Analytical weighing Balance	Used for weighing the chemicals
2	Micro Balance	Used for weighing CRMs
3	AAS with VGA and Hallow cathode lamps	All Heavy metals (Arsenic, Mercury, Selenium, Cadmium, Chromium, Cobalt, Iron, Lead, Manganese, Zinc, Aluminium, etc..)
4	Spectrophotometer UV-Visible range	Nitrate, Nitrite, Sulphate, Chromium(VI),Fluoride, Cyanide, Phenolic compounds
5	Flame Photometer	Sodium ,Potassium
6	Ion Analyzer	Fluoride
7	BOD Incubator	BOD
8	COD Digester	COD
9	Furnace	Total volatile solids, Fixed solids
10	Hot Air Oven	Total Suspended Solids, Total Dissolved Solids
11	pH meter	pH
12	Conductivity meter	Conductivity
13	Turbidity Meter	Turbidity
14	Bacteriological Incubator	Total coli form and fecal coli form
15	Autoclave	sterilization
16	Microscope	Bacteriological colony count
17	Magnetic stirrer	Stirring purpose
18	Vacuum filtration unit	Rapid filtration
19	Water Bath	Boiling and evaporation purpose
20	Cadmium reduction column	Nitrate
21	Fluoride distillation unit	Fluoride
22	Kjeldal flask	Ammonia and Organic Nitrogen
23	Hot Plate	Digestion
24	Pizometer	Water level monitoring
25	Aquarium	Bio assay test
Adequate Titration , Distillation and Filtration unit with sufficient glassware required for laboratory analysis are available with us.		

Annexure – IX

Organizational Structure