



o/c

Regd Post with A/D

Ref.No.: MGM/P&E/1383/18

Date: 27/11/2018

To,

**The Additional Director,
Ministry of Environment and Forest & Climate Change
Eastern Region Office,
A/3, Chandrasekharapur,
Bhubaneswar-751023**

Sub: Submission of Six-monthly EC compliance report on implementation of safeguards in respect of Malda Manganese Mine, M/s TATA Steel Ltd. for the period April to September 2018.

Dear Sir,

We are submitting herewith six-monthly EC compliance report on implementation of safeguards in respect of Malda Manganese Mine, M/s TATA Steel Ltd. for the period April to September 2018 as per EIA notification 2006.

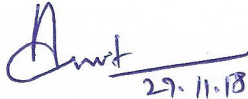
We trust that the measures taken towards environmental safeguards comply with the stipulated conditions. We look forward to your guidance which shall certainly help us in our endeavor for improving upon our environmental management practices.

This is for your kind perusal.

Thanking you,

Yours faithfully,

F: TATA STEEL LTD.



Agent, Malda Manganese Mine &
Head, Manganese Gr. of Mines
Ferro Alloys & Minerals Division,
Joda.

Encl: as above.

Copy to : Zonal Office Kolkata, Central Pollution Control Board

TATA STEEL LTD.

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

COMPLIANCE REPORT PERIOD : Apr'18 to Sept'18

**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 and Progressive Mine Closure Plan for Malda Manganese Mine over an area of 822 ha was submitted under Rule No.12, MCDR 1988 for the period 2015-16 to 2019-20 and was approved by IBM vide letter no. MS/OTFM/33-ORI/BHU/2014-15 dated 06.04.2015.

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.	<p>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.</p> <p>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.</p> <p>Stage I clearance over an area of 77.241 ha has been granted by MoEF vide letter no. F.NO .8-37/1996-FC dated 21st June 2012. We have also submitted compliance of stage I to DFO, Bonai vide our letter no. MMM/F-68/37/14 dated 26.12.2014.</p> <p>Mining operation and allied activities were discontinued since 17th May 2014 in pursuance Supreme Court verdict 16.05.2014.</p>
(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	As per field observation, Sona River passes 715m to west from Block - I, 158m to west

	obstructed due to any mining operations.	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.
(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 the period Apr'18 to Sept'18. 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.	<p>Mining operation and allied activities were discontinued since 17th May 2014 in pursuance Supreme Court verdict 16.05.2014. The inactive portion of OB dumps area being stabilized by plantation of local species.</p> <p>During the year 2018-19 (Apr'18 to Sept'18), we have planted 11,100 nos. of tree sapling of local species (Gambhari, Chakunda, Mahanimba, Kala Sirs, Sisu etc) in passive dumps. The overall slope angles of OB dumps are maintained within the natural angle of repose of the waste.</p> <p>As such, there are no presences of critical areas at OB dumps, so conventional plantation is being done for stabilization of dumps.</p> <p>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.</p>
(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	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>mine area, roads, green belt development etc. The drains should be regularly desilted 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.</p> <p><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 program have been drawn regularly in consultation with the local DFO and OSPCB.</p> <p>We have planted 3,27,649 nos. of saplings of local species over an area of 95.02 ha in passive dump and as avenue plantation till 2017-18.</p> <p>During the period Apr'18 to Sept'18, we have planted around 11,100 nos. of forest variety saplings. The process of plantation and maintenance is going on and the final figures shall be provided in the next six-monthly EC compliance report.</p> <p>Tree density is maintained at the rate of more than 2500 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 operation and allied activities were discontinued since 17th May 2014 in pursuance Supreme Court verdict 16.05.2014.</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 have encountered in course of mining activity, there</p>

		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.	<p>Presently, there is discontinuation of development of the mine and dispatch of ore since 27th Feb'2011 due to want of Forest Clearance.</p> <p>However, ground water level, ground water quality and trace metals in ground water at lower elevations is being monitored at existing tube well and open well. The monitoring results are enclosed as Annexure VII and III respectively.</p> <p>Similarly, surface water quality is being monitored on monthly basis and abstract of the same is enclosed as Annexure - I.</p>
(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.	<p>Application for allocation of water is in process and pending with water allocation committee. Water drawl charge is being paid regularly as per demand of irrigation department.</p> <p>The ground water is not being used for mining and its allied activities.</p> <p>Presently, there is discontinuation of development of the mine and dispatch of ore since 27th Feb'2011 due to want of Forest Clearance.</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)	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.	<p>Mining operation and allied activities were discontinued since 17th May 2014 in pursuance Supreme Court verdict 16.05.2014. The mining equipment's have been shifted to other units for its utilization.</p> <p>As a practice, the trucks were 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</p>

		<p>Km. So, it was not in practice to cover the OB transportation trucks with tarpaulin.</p> <p>As a practice, 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 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.	<p>Mining operation and allied activities were discontinued since 17th May 2014 in pursuance Supreme Court verdict 16.05.2014. But the practice is that:</p> <p>However, as a practice the blasting, is restricted during day hours only and is 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.</p>
(xvii)	Drills shall either be operated with dust extractors or equipped with water Injection system	The said condition would be strictly adhered to after resumption of mining operation.
(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.	<p>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 June'13 to Ministry of Environment and Forest and its regional office.</p> <p>It may please be noted that, no further land degradation due to discontinuation of development of the mine since 27.02.2011, hence the land use within the lease area of 822</p>

		ha submitted on 11.10.2011 is same as of now.
(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. We had applied application for CTO renewal on time vides our online application no. 410153. However, State Pollution Control Board, Odisha has directed us to re-approach SPCB, Odisha after grant of Forest Clearance.
(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 service vehicles are being maintained at workshop of Joda West Mn. Mine, where effluents are channelized 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.	3 rd and 4 th renewal forest diversion proposal has been submitted to State Govt. On receipt of demand from DFO, Bonai Division, we have paid Rs. 3,53,46,000/- 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- 11 th 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.	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. 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.
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 it will be strictly adhered after resumption of mining operation.
(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.	Five 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 3 nos. in buffer zone (at Chormalda, Kundrapani and Kolha Roida). 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.	<p>Samples are drawn twice in a week in core zone and once in a quarter in buffer zone to ascertain the 24hour monitoring average for PM₁₀, PM_{2.5}, SO₂ & NO_x, CO & Mn.</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-IV.</p> <p>It was observed that the result of environmental monitoring parameters is within the permissible limit.</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.	No fugitive dust monitoring has been carried out during the period Apr'18 to Sept'18 as the mining operation and allied activities were discontinued since 17th May 2014 in pursuance Supreme Court verdict 16.05.2014.
(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>Mining operation and allied activities were discontinued since 17th May 2014 in pursuance Supreme Court verdict 16.05.2014.</p> <p>Noise monitoring done during the period Apr'18 to Sept'18 is attached in Annexure VII.</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 services vehicles deployed in the mine are being 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	As a practice, suitable dust masks are being

	<p>should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.</p>	<p>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.</p>
	<p>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.</p>	<p>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 Apr'18 to Sept'18, total 17 contractual employees have undergone PME.</p> <p>There are no findings of pneumoconiosis and manganese poisoning which is classified as occupational disease.</p>
(ix)	<p>A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.</p>	<p>The department is in place and the Head of the department is reporting to General Manager of the division.</p> <p>The organizational structure in place is enclosed as Annexure-IX.</p>
(x)	<p>The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.</p>	<p>Funds allocated for environmental management are spent only for environment related purposes and not diverted to any other purpose.</p> <p>The utilization budget for environment management for the period 2017-18, for the construction of parapet wall/ retaining wall at toe of dump Rs 4,30,000 and Rs 5,50,000 for construction of settling ponds no fund was spend as mining activity was suspended and dumps were not extended. Rs 3,78,125 was allotted for Afforestation of dumps Rs 77,337 was spent. The amount was less due to unavailability of mature dumps. The budget kept for Environmental Monitoring was Rs. 1,70,000 out of which Rs. 7,32,625 was spent. The cost incurring in environmental monitoring and maintenance activities during 2018-19 shall be provided in the next six-monthly EC compliance report.</p>

(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 / 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 Bhubneswar.	Details of Env. Clearance with respect 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 & - Samaja (Daily Odiya) 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	Noted.

	conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	
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.


27.11.18

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

ANNEXURE-I
Surface Water Quality Report (Apr'18 to Sept'18)
Malda Manganese Mine, TATA STEEL LIMITED

Malda (Kundra Nallah entering Malda)			April'18	May'18	June'18	July'18	Aug-18	Sept-18
Parameters	Unit	Standard	1st Report	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	4	5.4	5.9	5.4	5.6	5.2	5.5
BOD (3) days at 27°C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/ 100 ml	5000	310	370	350	330	120	150
pH Value	--	6.0-9.0	7.34	7.28	7.2	7.24	7.14	7.2
Colour (max)	Hazen	300	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	1500	128	134	130	132	120	125
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.42	0.45	0.48	0.42	0.44	0.48
Chloride (max)	mg/l	600	27	29	30	32	20	24
Sulphates (SO ₄) (max)	mg/l	400	4.4	4.7	4.61	4.26	5.1	5.3
Nitrate as NO ₃ (max)	mg/l	50	1.54	1.68	1.72	1.78	1.8	2.2
Fluoride as F (max)	mg/l	1.5	0.013	0.016	0.014	0.012	0.012	0.011
Phenolic Compounds as C ₆ H ₅ OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr ⁺⁶	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Malda (Kundra Nallah leaving Malda)			April'18	May'18	June'18	July'18	Aug-18	Sept-18
Parameters	Unit	Standards	1st Report	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	4	5.5	6.1	6.2	6	5.4	5.2
BOD (3) days at 27°C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/ 100 ml	5000	270.0	310.0	260.0	280.0	150.0	170.0
pH Value	--	6.0-9.0	7.32	7.35	7.32	7.38	7.12	7.18

Colour (max)	Hazen	300	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	1500	133	136	134	138	124	128
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.45	0.46	0.48	0.46	0.46	0.5
Chloride (max)	mg/l	600	28	31	32	30	26	24
Sulphates (SO ₄) (max)	mg/l	400	4.6	4.8	4.8	4.2	4.7	4.5
Nitrate as NO ₃ (max)	mg/l	50	1.62	1.72	1.78	1.62	1.5	1.8
Fluoride as F (max)	mg/l	1.5	0.016	0.018	0.016	0.014	0.011	0.012
Phenolic Compounds as C ₆ H ₅ OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr ⁺⁶	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

ANNEXURE-II
 Drinking Water Quality Report (Apr'18 to Sept'18)
 Sampling Location: Near Office
 Malda Manganese Mine, TATA STEEL LIMITED

MICROBIOLOGICAL ANALYSIS OF WATER AS PER IS: 10500 – 1991

Sl No.	Test Parameters	Norms as per IS:10500-1991	18-Apr	18-May	18-June	18-July	18-Aug	18-Sept
1	Total Coliform Organism MPN/100ml	10 (MAX)	<2	<2	<2	<2	<2	<2
2	Faecal Coliforms	Absent	Absent	Absent	Absent	Absent	Absent	Absent
3	E. Coli	Absent	Absent	Absent	Absent	Absent	Absent	Absent

CHEMICAL ANALYSIS OF WATER AS PER IS: 10500 – 1991

Sl No.	Test Parameters	Norms as per IS: 10500-1991							
		Desirable Limit	Permissible Limit						
1	Colour (Hazen Unit)	5	25	CL	CL	CL	CL	CL	CL
2	Odour	Unobjectionable	--	U/O	U/O	U/O	U/O	U/O	U/O
3	Taste	Agreeable	--	AL	AL	AL	AL	AL	AL
4	pH value (250C)	6.5 - 8.5	No Relaxation	7.19	7.25	7.18	7.54	7.14	7.45
5	Turbidity in NTU	5	10	<2.0	<2.0	<2.0	<2.0	< 2.0	<2.0
6	Total Dissolved Solids in mg/l	500	2000	79	71	68	60	61	49
7	Aluminium (as Al) in mg/l	0.03	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
8	Anionic Detergents (as MBAS) in mg/l	0.2	1	<0.2	ND	ND	ND	<0.2	ND
9	Boron (as B) in mg/l	1	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
10	Calcium (as Ca) in mg/l	75	200	12.4	12.0	12.6	10.8	8	8.8
11	Chloride (as Cl) in mg/l	250	1000	16	13.0	13.2	12.8	15	10.5
12	Copper (asCu) in mg/l	0.05	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
13	Fluoride (as F) in mg/l	1	1.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
14	Residual Free Chlorine in mg/l	0.2(Min.)	---	ND	ND	ND	ND	ND	ND
15	Iron (as Fe) in mg/l	0.3	1	0.1	0.08	0.074	0.061	0.11	0.045
16	Magnesium (as Mg) in mg/l	30	100	3.4	2.9	3.1	2.1	1.9	1.7

17	Manganese (as Mn) in mg/l	0.1	0.3	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
18	Mineral Oil mg/l	0.01	0.03	<0.01	<0.1	<0.1	<0.1	<0.01	<0.1
19	Nitrate (as NO3) in mg/l	45	100	0.82	1.12	1.08	1.18	1.5	1.11
20	Phenolic Compounds (as C6H5OH) in mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	1.01
21	Selenium (as Se) in mg/l	0.01	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
22	Sulphate (as SO4) in mg/l	200	400	1.78	1.90	1.92	1.24	3.6	1.25
23	Alkalinity (as CaCO3) in mg/l	200	600	40	39.0	36.8	30.8	23	21.6
24	Total Hardness(as CaCO3) in mg/l	300	600	45	42.0	40.6	32.4	28	28.7
25	Cadmium (as Cd) in mg/l	0.01	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
26	Cyanide (as CN) in mg/l	0.05	No Relaxation	ND	ND	ND	ND	ND	ND
27	Lead (as Pb) in mg/l	0.05	No Relaxation	<0.001	<0.01	<0.01	<0.01	<0.01	<0.01
28	Mercury (as Hg) in mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
29	Arsenic (as As) in mg/l	0.05	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
30	Zinc (as Zn) in mg/l	5	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
31	Chromium (as Cr+6) in mg/l	0.05	No Relaxation	<0.05	<0.01	<0.01	<0.01	<0.05	<0.01
32	Poly Aromatic Hydrocarbon as PAH	--	--	<0.00001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
33	Pesticide	Absent	0.001	Absent	Absent	Absent	Absent	Absent	Absent

ANNEXURE-III
Ground Water Analysis Report as per IS:10500-1991
Sampling Location: GW1: Malda Camp TW (Apr'18 to Sept'18)
Malda Manganese Mine, M/S TATA STEEL LIMITED

Sl. No	Parameter	Unit	Standards as per IS: 10500, 1991	Analysis Results	
				May-18	Aug-18
<i>Essential Characteristics</i>				GW1	CL
1	Colour	Hazen	5	CL	U/O
2	Odour	--	U/O	U/O	Agreeable
3	Taste	--	Agreeable	Agreeable	<0.2
4	Turbidity	NTU	5	<0.2	7.28
5	pH Value	--	6.5-8.5	7.36	138.0
6	Total Hardness (as CaCO ₃)	mg/l	300	165.0	0.22
7	Iron (as Fe)	mg/l	0.3	0.27	36.0
8	Chloride (as Cl)	mg/l	250	42.0	ND
9	Residual, free Chlorine	mg/l	0.2	ND	CL
<i>Desirable Characteristics</i>					
10	Dissolved Solids	mg/l	500	254.0	213.0
11	Calcium (as Ca)	mg/l	75	44.9	37.3
12	Magnesium (as Mg)	mg/l	30	12.9	10.9
13	Copper (as Cu)	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	0.1	0.014	<0.005
15	Sulphate (as SO ₄)	mg/l	200	6.2	4.6
16	Nitrate (as NO ₃)	mg/l	45	2.32	2.3
17	Fluoride (as F)	mg/l	1	0.019	0.014

18	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	0.001	<0.001	<0.001
19	Mercury (as Hg)	mg/l	0.001	<0.001	<0.001
20	Cadmium (as Cd)	mg/l	0.01	<0.001	<0.001
21	Selenium (as Se)	mg/l	0.01	<0.001	<0.001
22	Arsenic (as As)	mg/l	0.05	<0.001	<0.001
23	Cyanide (as CN)	mg/l	0.05	ND	ND
24	Lead (as Pb)	mg/l	0.05	<0.001	<0.001
25	Zinc (as Zn)	mg/l	5	<0.05	<0.05
26	Anionic Detergents (as MBAS)	mg/l	0.2	<0.2	<0.2
27	Chromium (as Cr ⁺⁶)	mg/l	0.05	<0.05	<0.05
28	Mineral Oil	mg/l	0.01	<0.01	<0.01
29	Alkalinity	mg/l	200	148.0	124.0
30	Aluminium as(Al)	mg/l	0.03	<0.001	<0.001
31	Boron (as B)	mg/l	1	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	µg/l	--	<0.001	<0.001
33	Pesticide	mg/l	Absent	Absent	Absent

Sampling Location: GW1: Malda Camp TW (Apr'18 to Sept'18)

Sl. No	Parameter	Unit	Standards as per IS: 10500, 1991	Analysis Results	
				May-18	Aug-18
<i>Essential Characteristics</i>				GW1	GW-1
1	Colour	Hazen	5	CL	CL
2	Odour	--	U/O	U/O	U/O
3	Taste	--	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<0.2	<0.2

5	pH Value	--	6.5-8.5	7.39	7.16
6	Total Hardness (as CaCO ₃)	mg/l	300	154.0	146.0
7	Iron (as Fe)	mg/l	0.3	0.26	0.17
8	Chloride (as Cl)	mg/l	250	36.0	42.0
9	Residual, free Chlorine	mg/l	0.2	ND	ND
<i>Desirable Characteristics</i>					
10	Dissolved Solids	mg/l	500	231.0	234.0
11	Calcium (as Ca)	mg/l	75	41.7	40.1
12	Magnesium (as Mg)	mg/l	30	12.2	11.2
13	Copper (as Cu)	mg/l	0.05	<0.05	<0.05
14	Manganese (as Mn)	mg/l	0.1	0.012	0.012
15	Sulphate (as SO ₄)	mg/l	200	5.6	5.5
16	Nitrate (as NO ₃)	mg/l	45	2.16	2.8
17	Fluoride (as F)	mg/l	1	0.017	0.018
18	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	0.001	<0.001	<0.001
19	Mercury (as Hg)	mg/l	0.001	<0.001	<0.001
20	Cadmium (as Cd)	mg/l	0.01	<0.001	<0.001
21	Selenium (as Se)	mg/l	0.01	<0.001	<0.001
22	Arsenic (as As)	mg/l	0.05	<0.001	<0.001
23	Cyanide (as CN)	mg/l	0.05	ND	ND
24	Lead (as Pb)	mg/l	0.05	<0.001	<0.001
25	Zinc (as Zn)	mg/l	5	<0.05	<0.05
26	Anionic Detergents (as MBAS)	mg/l	0.2	<0.2	<0.2
27	Chromium (as Cr ⁺⁶)	mg/l	0.05	<0.05	<0.05
28	Mineral Oil	mg/l	0.01	<0.01	<0.01

29	Alkalinity	mg/l	200	142.0	133.0
30	Aluminium as(Al)	mg/l	0.03	<0.001	<0.001
31	Boron (as B)	mg/l	1	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	µg/l	--	<0.001	<0.001
33	Pesticide	mg/l	Absent	Absent	Absent

ANNEXURE-IV
Ambient Air Quality (AAQ) Monitoring Report (CORE ZONE)
(Apr'18 to Sept'18)
Malda Manganese Mine, M/S TATA STEEL LTD.

Near Dispensary

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	O ₃ (µg/m ³)	CO mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn µg/m ³)
Apr-18	44.20	20.78	4.20	9.62	< 4.0	0.22	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
May-18	39.44	18.36	<4.0	<9.0	< 4.0	0.22	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jun-18	38.01	17.96	3.60	8.40	< 4.0	0.19	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-18	37.29	16.93	3.10	8.10	< 4.0	0.18	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-18	36.5	17.51	<4.0	<9.0	< 4.0	0.18	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-18	42.28	20.93	4.15	10.85	4.10	0.16	23.50	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

Mines Pit

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	O ₃ (µg/m ³)	CO mg/m ³)	NH ₃ (µg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	As (ng/m ³)	C ₆ H ₆ (µg/m ³)	BaP (ng/m ³)	Mn µg/m ³)
Apr-18	46.19	21.74	4.20	9.85	<4.0	0.23	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
May-18	42.14	19.39	< 4.0	9.50	< 4.0	0.25	< 20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jun-18	41.03	18.74	4.00	9.10	< 4.0	0.22	< 20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-18	38.99	17.89	3.90	9.15	< 4.0	0.21	< 20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-18	40.41	20.80	<4.0	<9.0	< 4.0	0.16	< 20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-18	43.65	17.64	4.20	9.50	4.30	0.20	23.50	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001

ANNEXURE-V
 Ambient Air Quality (AAQ) Monitoring Report (BUFFER ZONE)
 (Apr'18 to Sept'18)
 Malda Manganese Mine, M/S TATA STEEL LTD.

BZ-1 : Kholaroida

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	C ₆ H ₆ (µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
Aug-18	29.2	13.9	<4.0	<9.0	<0.1	<4.0	<20.0	<0.002	<0.001	<0.001	<0.01	<0.001

BZ-2 : Kundrapani

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	C ₆ H ₆ (µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
Aug-18	26.8	14.1	<4.0	<9.0	<0.1	<4.0	<20.0	<0.002	<0.001	<0.001	<0.01	<0.001

BZ-3 : Choramalda

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO mg/m ³)	O ₃ (µg/m ³)	NH ₃ (µg/m ³)	BaP (ng/m ³)	C ₆ H ₆ (µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Pb (µg/m ³)
Aug-18	30.6	14.9	<4.0	<9.0	<0.1	<4.0	<20.0	<0.002	<0.001	<0.001	<0.01	<0.001

ANNEXURE-VI
GROUND WATER LEVEL (Apr'18 to Sept'18)
Malda Manganese Mine, M/S TATA STEEL LIMITED

Month	Name of Village	Unit	Result
May-18	Ranishal	Mt./bgl	13.9
	kolaRoida	Mt./bgl	13.9
Aug-18	Ranishal	Mt./bgl	4.1
	kolaRoida	Mt./bgl	3.8

ANNEXURE-VII
Ambient Noise Monitoring Report (Apr'18 to Sept'18)
Malda Manganese Mine, M/S TATA STEEL LIMITED

AAQ				Day Time
Sl. No	Date	Name of Location	Unit	Result
1	08.05.2018	Township	db	50.6
2		Hospital		48.2
3		Office Area		56.2
4		Mines Area		61.2
EQUIPMENT				
Sl. No	Date	Name of Location	Unit	Result
1	08.05.2018	DG Set	db	80.2
2		Water Treatment Plant		60.8
CPCB Standard				75

ANNEXURE-VIII
LIST OF ENVIRONMENTAL MONITORING EQUIPMENT
Malda Manganese Mine, M/S TATA STEEL LIMITED

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

ANNEXURE-IX
ORGANIZATION STRUCTURE
Malda Manganese Mine, M/S TATA STEEL LIMITED

