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

Ref No: MGM/P&E/761/2016
Date: 30.11.2016

Sub: **Submission of Six monthly compliance report on implementation of environmental safeguards of Malda Manganese Mine for the period from April'16 to September'16.**

Dear Sir,

We are herewith submitting the six monthly compliance report in respect of the stipulated environmental clearance conditions of Malda Manganese Mine for the period from April'16 to September'16 as per EIA Notification, 2006.

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

Thanking you,

Yours faithfully
F: TATA STEEL LTD.

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

Encl: As above

TATA STEEL LIMITED
Sukinda Chromite Mine PO Kalarangiatta Dist Jajpur Odisha 755028
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COMPLIANCE REPORT PERIOD : April'16 to September'16

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.	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. 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. 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.
(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 2016-17(Till Sept'16). 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.	Mining operation is under temporary suspension since 27.02.2011 due to want of Forest Clearance. The inactive portion of OB dumps area being stabilized by plantation of local species. 10,000 nos. of saplings of local species (Gambhari, Chakunda, Mahanimba, Kala Sirs, Sisu etc) were planted during the year 2016-17(till Sept'16). 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. The retaining wall and garland drain with sedimentation pit at corners near toe of OB dump. Their dimensions are matching the requirements to arrest effectively the run off.
(vi)	The void left unfilled in an area of 110.045ha shall be converted into water body. The higher benches of excavated void/mining pit shall be terraced and plantation done to stabilize the slopes. The slope of higher benches shall be made gentler for easy accessibility by local people to use the water body. Peripheral fencing shall be carried out along the excavated area.	The proposal for confirmatory exploration has been planned over the broken up area of 77.241 Ha to ensure the area is entirely barren. In case of occurrence of any ore body, the same shall be excavated prior to the reclamation and rehabilitation of the area. Stage –I approval under FC Act, 1980 has been granted over the 77.241 Ha area to carry out the above mentioned activities. Further proposal for development of the water body as a reclamation measure shall be taken up after the completion of the above mentioned planned activities.
(vii)	Catch drains and siltation ponds of appropriate size should be constructed to arrest silt and sediment flows from mine working, soil, 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 and desilted at regular intervals.	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.
(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. <u>Dimension of the Retaining Wall</u> : Height – 1 to 1.2 mtr. Width – 1 mtr.

		Dimension of the Garland Drain : Depth – 1.20 to 1.5 mtr. Width – 1 to 1.2 mtr.
(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 3,07,449 nos. of saplings of local species over an area of 92.42 ha with 84.6% survival rate. During the year 2016-17 (till Sept'16) we have planted around 10,000 nos. of forest variety sapling in inactive dumps. Tree density is maintained at the rate of around 2800 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 operation is under temporary suspension since 27.02.2011 due to want of Forest Clearance. 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.	Mining operation is under temporary suspension since 27.02.2011 due to want of Forest Clearance. 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. Similarly, surface water quality is being monitored on monthly basis and abstract of the same is enclosed as **Annexure – 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 Feb'2011 due to want of Forest Clearance. The mining equipment's 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 "Pollution under Control' 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 Feb'2011 due to want of Forest Clearance. But the practice was: Blasting is restricted during day hours only. The blasting is being carried out with the optimum blasting parameters based on the actual geo-mining conditions. This gives the measures to control over the ground vibrations and to arrest fly rocks and boulders. Controlled blasting technique with bottom initiation pattern is being practiced.
(xvii)	Drills shall either be operated with dust extractors or equipped with water Injection system	Presently, the mining operation has been discontinued since 27th Feb'2011 due to want of Forest Clearance. Wet drilling concept will be practiced once mine reopen.
(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 June'13 to Ministry of Environment and Forest and its regional office.
(xix)	Consent to operate should be obtained from	"Consent to operate" Order No.118 vide letter No.

	SPCB prior to start of enhanced production from the mine.	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.
(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 is 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 it will be strictly adhered. 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	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}, $PM_{2.5}$, $S0_2$,

	monitoring should be undertaken in consultation with the State Pollution Control Board.	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. 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.** 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.	No fugitive dust monitoring has been carried out during the period Oct'14 to Mar'15 as the mining operation has been discontinued since 27th Feb'2011 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.	Presently, the mining operation has been discontinued since 27th Feb'2011 due to want of Forest Clearance. Noise monitoring done during the period Oct'16 to March'16 is attached in **Annexure VIII**
(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 the calendar year 2015, 73 nos. IME and 4 nos. PME was done. 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-X.**
(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 budget for environment management for the period 2015-16, was Rs. 15,30,134/- (Monitoring – Rs. 12,35,330/- & Plantation - Rs. 2,94,804/-) against the budget of Rs. 19,80,000/-
(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 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 conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Noted.
5	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under.	Noted

Yours faithfully
F: TATA STEEL LTD.

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

Annexure – I Ground Water Level Monitoring

Mitra S. K. Private Limited

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MSK TESTING • INSPECTION

Ref. No.BBL/ENV/1394 **DATE: 31/05/2016**

CERTIFICATE OF ANALYSIS

This is to certify that a sample of **"Ground Water Level Monitoring "** reading taken by our representative at **M/s. Malda Manganese Mines; P.O: Malda, Dist: Sundargarh, Odisha** in the Presence of a representative of and on account of **M/s.Tata Steel Ltd.**,has been analysed with the following results:-

Date of Monitoring	Location	Water Level (Below Ground level, in mtrs)
06.05.2016	Well at Malda Camp	2.25
06.05.2016	Peizometric test Point at Malda	9.5

Checked by:-

For Mitra S. K. Private Limited

Authorised Signatory

MITRA S. K. (P) LTD. BARBIL

H. O.: Shrachi Centre (5th Floor), 74B, Acharya Jagadish Chandra Bose Road, Kolkata – 700 016, West Bengal, India
T: 91 33 22172249 / 4014 3000 / 2265 0006 / 2265 0007 F: 91 33 2265 0008 E:info@mitrask.com W: www.mitrask.com

Ref.: MSPL/16/R-879 *Date.:* 05.09.2016

GROUND WATER (LABEL) QUALITY ANALYSIS REPORT FOR THE MONTH OF AUGUST-2016

1. Name of Industry : **Malda Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1:** Ranishal **GW2-** KolaRoida
3. Label measured by : VCSPL Representative in presence of TATA Representative

Sl. No	Name of Village	Date	Unit	Result
1	Ranishal	04.08.2016	Mt./bgl	4.1
2	KolaRoida	20.08.2016	Mt./bgl	3.9

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Annexure – II: Ground Water Quality Monitoring

Mitra S. K. Private Limited

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MSK TESTING • INSPECTION

Ref. No.BBL/ENV/1306 **DATE:04/05/2016**

CERTIFICATE OF ANALYSIS

This is to certify that a sample of "**Ground Water** " drawn by our representative on 08/04/2016 at **Malda Manganeses Mines ; P.O: Malda, Dist: Sundargarh, Odisha** in the Presence of a representative of and on account of **M/s. Tata Steel Ltd.**, has been analyzed with the following results:-

MICROBIOLOGICAL ANALYSIS OF WATER AS PER IS: 10500 - 1991

Sl No.	Test Parameters	Norms as per IS:10500-1991	Results
1	Total Coliform Organism MPN/100ml	10 (MAX)	<1.8
2	Faecal Coliforms	Absent	Absent
3	E. Coli	Absent	Absent

CHEMICAL ANALYSIS OF WATER AS PER IS: 10500 - 1991

Sl No.	Test Parameters	Norms as per IS: 10500-1991		Results
		Desirable Limit	Permissible Limit	
1	Colour (Hazen Unit)	5	25	<1.0
2	Odour	Unobjectionable	--	Unobjectionable
3	Taste	Agreeable	--	Agreeable
4	Turbidity in NTU	5	10	<1.0
5	pH value (26^0C)	6.5 - 8.5	No Relaxation	6.69
6	Total Hardness(as $CaCO_3$) in mg/l	300	600	123.2
7	Iron (as Fe) in mg/l	0.3	1	<0.05
8	Chloride (as Cl) in mg/l	250	1000	10.5
9	Fluoride (as F) in mg/l	1	1.5	<0.10
10	Residual Free Chlorine in mg/l	0.2(Min.)	---	<0.10
11	Total Dissolved Solids in mg/l	500	2000	118
12	Calcium (as Ca) in mg/l	75	200	18.2
13	Magnesium (as Mg) in mg/l	30	100	15.61
14	Copper (asCu) in mg/l	0.05	1.5	<0.02
15	Manganese (as Mn) in mg/l	0.1	0.3	<0.02
16	Sulphate (as SO_4) in mg/l	200	400	<1.0
17	Nitrate (as NO_3) in mg/l	45	100	<0.05
18	Phenolic Compounds (as C_6H_5OH) in mg/l	0.001	0.002	<0.001
19	Mercury (as Hg) in mg/l	0.001	No Relaxation	<0.001
20	Cadmium (as Cd) in mg/l	0.01	No Relaxation	<0.002
21	Selenium (as Se) in mg/l	0.01	No Relaxation	<0.005
22	Arsenic (as As) in mg/l	0.05	No Relaxation	<0.01
23	Cyanide (as CN) in mg/l	0.05	No Relaxation	<0.01
24	Lead (as Pb) in mg/l	0.05	No Relaxation	<0.005
25	Zinc (as Zn) in mg/l	5	15	0.06
26	Anionic Detergents (as MBAS) in mg/l	0.2	1	<0.02
27	Chromium (as Cr^{+6}) in mg/l	0.1	No Relaxation	<0.01
28	Mineral Oil mg/l	---	---	<0.01
29	Alkalinity (as $CaCO_3$) in mg/l	200	600	125.4
30	Aluminium (as Al) in mg/l	0.03	0.2	<1.0
31	Boron (as B) in mg/l	1	5	<0.5
32	PAH mg/l	---	---	<0.0001
33	Pesticide mg/l	---	---	<0.00001

SAMPLING LOCATION :-Tube Well at Malda Camp

Checked by:-

For Mitra S. K. Private Limited
Authorised Signatory

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Dist :Keonjhar, Odisha - 758035
CIN: U51909WB1956PTC023037

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MSK
TESTING • INSPECTION

Ref. No.BBL/ENV/1307 **DATE:04/05/2016**

CERTIFICATE OF ANALYSIS

This is to certify that a sample of "**Ground Water** " drawn by our representative on 08/04/2016 at **Malda Manganeses Mines ; P.O: Malda, Dist: Sundargarh, Odisha** in the Presence of a representative of and on account of **M/s. Tata Steel Ltd.**, has been analyzed with the following results:-

MICROBIOLOGICAL ANALYSIS OF WATER AS PER IS: 10500 - 1991

Sl No.	Test Parameters	Norms as per IS:10500-1991	Results
1	Total Coliform Organism MPN/100ml	10 (MAX)	5.9
2	Faecal Coliforms	Absent	Absent
3	E. Coli	Absent	Absent

CHEMICAL ANALYSIS OF WATER AS PER IS: 10500 - 1991

Sl No.	Test Parameters	Norms as per IS: 10500-1991		Results
		Desirable Limit	Permissible Limit	
1	Colour (Hazen Unit)	5	25	<1.0
2	Odour	Unobjectionable	--	Unobjectionable
3	Taste	Agreeable	--	Agreeable
4	Turbidity in NTU	5	10	2.9
5	pH value (26^0C)	6.5 - 8.5	No Relaxation	6.72
6	Total Hardness(as $CaCO_3$) in mg/l	300	600	72
7	Iron (as Fe) in mg/l	0.3	1	0.53
8	Chloride (as Cl) in mg/l	250	1000	10.39
9	Fluoride (as F) in mg/l	1	1.5	<0.10
10	Residual Free Chlorine in mg/l	0.2(Min.)	---	<0.10
11	Total Dissolved Solids in mg/l	500	2000	112
12	Calcium (as Ca) in mg/l	75	200	12.3
13	Magnesium (as Mg) in mg/l	30	100	17.94
14	Copper (asCu) in mg/l	0.05	1.5	<0.02
15	Manganese (as Mn) in mg/l	0.1	0.3	0.20
16	Sulphate (as SO_4) in mg/l	200	400	11.49
17	Nitrate (as NO_3) in mg/l	45	100	<0.4
18	Phenolic Compounds (as C_6H_5OH) in mg/l	0.001	0.002	<0.001
19	Mercury (as Hg) in mg/l	0.001	No Relaxation	<0.001
20	Cadmium (as Cd) in mg/l	0.01	No Relaxation	<0.002
21	Selenium (as Se) in mg/l	0.01	No Relaxation	<0.005
22	Arsenic (as As) in mg/l	0.05	No Relaxation	<0.01
23	Cyanide (as CN) in mg/l	0.05	No Relaxation	<0.01
24	Lead (as Pb) in mg/l	0.05	No Relaxation	<0.005
25	Zinc (as Zn) in mg/l	5	15	0.14
26	Anionic Detergents (as MBAS) in mg/l	0.2	1	<0.02
27	Chromium (as Cr^{+6}) in mg/l	0.1	No Relaxation	<0.01
28	Mineral Oil mg/l	---	---	<0.01
29	Alkalinity (as $CaCO_3$) in mg/l	200	600	86
30	Aluminium (as Al) in mg/l	0.03	0.2	<0.01
31	Boron (as B) in mg/l	1	5	<0.5
32	PAH mg/l	---	---	<0.0001
33	Pesticide mg/l	---	---	<0.00001

SAMPLING LOCATION :- Well at Ranishal (Near Block-III)

For Mitra S. K. Private Limited

Checked by:- **Authorised Signatory**

MITRA S. K. (P) LTD. BARBIL

Ref.: VCS.PH/16/R-877

Date.: 05.09.2016

GROUND WATER QUALITY ANALYSIS REPORT FOR THE MONTH OF AUGUST-2016

1. Name of Industry : **Malda Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Tubewell Malda Camp**
   GW-2: Open Well Near Ranisha
3. Date of sampling : 20.08.2016
4. Date of analysis : 22.08.2016 to 26.08.2016
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results	
					GW-1	GW-2
Essential Characteristics						
1	Colour	APHA 2120 B, C	Hazen	**5**	CL	CL
2	Odour	APHA 2150 B	--	**U/O**	U/O	U/O
3	Taste	APHA 2160 C	--	**Agreeable**	AL	AL
4	Turbidity	APHA 2130 B	NTU	**5**	<2	<2
5	pH Value	APHA 4500H^+ B	--	**6.5-8.5**	7.28	7.16
6	Total Hardness (as $CaCO_3$)	APHA 2340 C	mg/l	**300**	138	146
7	Iron (as Fe)	APHA 3500Fe, B	mg/l	**0.3**	0.22	0.17
8	Chloride (as Cl)	APHA 4500Cl^- B	mg/l	**250**	36.0	42.0
9	Residual, free Chlorine	APHA 4500Cl, B	mg/l	**0.2**	ND	ND
Desirable Characteristics						
10	Dissolved Solids	APHA 2540 C	mg/l	**500**	213	234
11	Calcium (as Ca)	APHA 3500Ca B	mg/l	**75**	37.3	40.1
12	Magnesium (as Mg)	APHA 3500Mg B	mg/l	**30**	10.9	11.2
13	Copper (as Cu)	APHA 3111 B,C	mg/l	**0.05**	<0.05	<0.05
14	Manganese (as Mn)	APHA 3500Mn B	mg/l	**0.1**	<0.005	0.012
15	Sulphate (as SO_4)	APHA 4500 SO_4^{2-} E	mg/l	**200**	4.6	5.50
16	Nitrate (as NO_3)	APHA 4500 NO_3^- E	mg/l	**45**	2.3	2.8
17	Fluoride (as F)	APHA 4500F^- C	mg/l	**1.0**	0.014	0.018
18	Phenolic Compounds (as C_6H_5OH)	APHA 5530 B,D	mg/l	**0.001**	<0.001	<0.001
19	Mercury (as Hg)	APHA 3500 Hg	mg/l	**0.001**	<0.001	<0.001
20	Cadmium (as Cd)	APHA 3111 B,C	mg/l	**0.01**	<0.001	<0.001
21	Selenium (as Se)	APHA 3114 B	mg/l	**0.01**	<0.001	<0.001
22	Arsenic (as As)	APHA 3114 B	mg/l	**0.05**	<0.001	<0.001
23	Cyanide (as CN)	APHA 4500 CN^- C,D	mg/l	**0.05**	ND	ND
24	Lead (as Pb)	APHA 3111 B,C	mg/l	**0.05**	<0.001	<0.001
25	Zinc (as Zn)	APHA 3111 B,C	mg/l	**5**	BDL	BDL
26	Anionic Detergents (as MBAS)	APHA 5540 C	mg/l	**0.2**	ND	ND
27	Chromium (as Cr^{+6})	APHA 3500Cr B	mg/l	**0.05**	<0.05	<0.05
28	Mineral Oil	APHA 5220 B	mg/l	**0.01**	ND	ND
29	Alkalinity	APHA 2320 B	mg/l	**200**	124	133
30	Aluminium as(Al)	APHA 3500Al B	mg/l	**0.03**	<0.001	<0.001
31	Boron (as B)	APHA 4500B, B	mg/l	**1**	<0.01	<0.01
32	Poly Aromatic Hydrocarbon as PAH	APHA 6440 B	µg/l	**--**	<0.0001	<0.0001
33	Pesticide	APHA 6630 B,C	mg/l	**Absent**	Absent	Absent

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

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Annexure III – Analysis of Trace Metal Ground Water

Mitra S. K. Private Limited

[illegible]

MSK TESTING • INSPECTION

Ref. No.BDL/ENV/1340

DATE:04/05/2016

CERTIFICATE OF ANALYSIS

This is to certify that a sample of "Ground Water" drawn by our representative on 08/04/2016 at **Mahla Manganeses Mines ; P.O: Mahla, Dist: Sundargarh, Odisha** in the Presence of a representative of and on account of **M/s. Tata Steel Ltd.**, has been analyzed with the following results

CHEMICAL ANALYSIS OF WATER AS PER IS: 10500 - 1991

Sl No.	Test Parameters		Norms as per IS: 10500-1991		Results
			Desirable Limit	Permissible Limit	
1	Iron (as Fe) in	mg/l	0.3	1	0.16
2	Chromium (as Cr^{6}) in	mg/l	0.1	No Relaxation	<0.01
3	Copper (asCu) in	mg/l	0.05	1.5	<0.02
4	Selenium (as Se) in	mg/l	0.01	No Relaxation	<0.005
5	Arsenic (as As) in	mg/l	0.05	No Relaxation	<0.01
6	Cadmium (as Cd) in	mg/l	0.01	No Relaxation	<0.002
7	Mercury (as Hg) in	mg/l	0.001	No Relaxation	<0.001
8	Lead (as Pb) in	mg/l	0.05	No Relaxation	0.04
9	Zinc (as Zn) in	mg/l	5	15	0.06
10	Manganese (as Mn) in	mg/l	0.1	0.3	0.28

SAMPLING LOCATION :- **Bore Well at Ranishal(Near Block-III)**

For Mitra S. K. Private Limited

Checked by:

Authorised Signatory

[illegible] Kolkata – 700 0[illegible], West Bengal, India.

[illegible]

MITRA S. K. (P) LTD. BARBIL

Ref.: VCSPL/16/R – 878

Date.: 05.09.2016

GROUND WATER (TRESS METAL) QUALITY ANALYSIS REPORT FOR THE MONTH OF AUGUST-2016

1. Name of Industry : **Malda Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **GW-1: Tubewell Malda Camp**
3. Date of sampling : 20.08.2016
4. Date of analysis : 22.08.2016 to 24.08.2016
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl. No	Parameter	Testing Methods	Unit	Standard as per IS -10500:1991	Analysis Results
					GW-1
1	Iron (as Fe)	APHA 3500Fe, B	mg/l	**0.3**	0.22
2	Copper (as Cu)	APHA 3111 B,C	mg/l	**0.05**	< 0.05
3	Manganese (as Mn)	APHA 3500Mn B	mg/l	**0.1**	<0.005
4	Chromium (as Cr^{+6})	APHA 3500Cr B	mg/l	**0.05**	< 0.05
5	Mercury (as Hg)	APHA 3500 Hg	mg/l	**0.001**	< 0.001
6	Cadmium (as Cd)	APHA 3111 B,C	mg/l	**0.01**	< 0.01
7	Selenium (as Se)	APHA 3114 B	mg/l	**0.01**	< 0.001
8	Arsenic (as As)	APHA 3114 B	mg/l	**0.05**	< 0.001
9	Lead (as Pb)	APHA 3111 B,C	mg/l	**0.05**	< 0.01
10	Zinc (as Zn)	APHA 3111 B,C	mg/l	**5**	<0.05

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Annexure – IV

Malda Mn Mines, M/s Tata Steel limited.

Abstract of Surface Water Quality Monitoring Report

MALDA UPNSTREAM (Kundra Nallah entering Malda)				April'16	May'16	June'16	
Sl.	Parameters	Unit	Standards as per	1st Report	1st Report	1st Report	2nd Report
1	Colour	Hazen	5	<1.0	<1.0	<1.0	<1.0
2	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	pH at 26^0C	-	5.5-9.0	7.45	6.81	7.56	6.68
4	Total Dissolved Solids	mg/l	-	57	58	88	91
5	Copper as Cu	mg/l	3.0	<0.02	<0.02	<0.02	<0.02
6	Fluoride as F	mg/l	2.0	0.23	0.14	0.22	0.16
7	Total Residual Chlorine	mg/l	1.0	<0.1	<0.1	<0.1	<0.1
8	Iron as Fe	mg/l	3.0	0.50	0.84	1.19	0.84
9	Manganese as Mn	mg/l	2.0	<0.02	0.02	0.07	0.12
10	Nitrate as NO3	mg/l	10.0	<0.5	<0.5	0.53	1.63
11	Phenolic Compounds as C6H5OH	mg/l	1.0	<0.001	<0.001	<0.001	<0.001
12	Selenium as Se	mg/l	0.05	<0.005	<0.005	<0.005	<0.005
13	Cadmium as Cd	mg/l	2.0	<0.001	<0.001	<0.001	<0.001
14	Cyanide as CN	mg/l	0.2	<0.01	<0.01	<0.01	<0.01
15	Lead as Pb	mg/l	0.1	<0.005	<0.005	<0.005	<0.005
16	Mercury as Hg	mg/l	0.01	<0.001	<0.001	<0.001	<0.001
17	Nickel as Ni	mg/l	3.0	<0.02	<0.02	<0.02	<0.02
18	Arsenic as As	mg/l	0.2	<0.01	<0.01	<0.01	<0.01
19	Total Chromium as Cr	mg/l	2.0	<0.01	<0.01	<0.01	<0.01
20	Zinc as Zn	mg/l	5.0	<0.02	0.04	<0.02	<0.02
21	Hexavalent Chromium as Cr^{+6}	mg/l	0.1	<0.01	<0.01	<0.01	<0.01
22	Vanadium as V	mg/l	0.2	<0.2	<0.2	<0.2	<0.2
23	Total Suspended Solids	mg/l	50 / 100	13.7	5.4	8.1	25.7
24	Temperature	^0C	-	28	28	28	28
25	Dissolved Oxygen	mg/l	-	5.8	6.2	6.4	6.1
26	BOD	mg/l	30	<2.0	<2.0	<2.0	<2.0
27	COD	mg/l	250	<4.0	<4.0	<4.0	<4.0
28	Oil & Grease	mg/l	10	<1.4	<1.4	<1.4	<1.4
29	Ammonical Nitrogen as N	mg/l	50	<0.1	<0.1	<0.1	<0.1
30	Total Kjedahl Nitrogen as N	mg/l	100	<0.3	<0.3	<0.3	<0.3
31	Sulphide as S	mg/l	2.0	<0.1	<0.1	<0.1	<0.1
32	Free Ammonia as NH_3	mg/l	5.0	<0.1	<0.1	<0.1	<0.1
33	Particulate Size of Suspended Solids	mg/l	Passes through 850 um IS sieve	Passes through 850 um IS sieve	Passes through 850 um IS sieve	Passes through 850 um IS sieve	Passes through 850 um IS sieve
34	Bio-assay	mg/l	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent
35	Dissolved Phosphates as PO_4	mg/l	5.0	<0.05	<0.05	<0.05	<0.05

MALDA DOWNSTREAM (Kundra Nallah leaving Malda)				April'16	May'16	June'16	
Sl.	Parameters	Unit	Standards as per	1st Report	1st Report	1st Report	2nd Report
1	Colour	Hazen	5	<1.0	<1.0	<1.0	<1.0
2	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	pH at 26^0C	-	5.5-9.0	6.51	6.75	6.77	6.98
4	Total Dissolved Solids	mg/l	-	73	57	60	103
5	Copper as Cu	mg/l	3.0	<0.02	<0.02	<0.02	<0.02
6	Fluoride as F	mg/l	2.0	0.28	0.30	0.16	0.19
7	Total Residual Chlorine	mg/l	1.0	<0.1	<0.1	<0.1	<0.1
8	Iron as Fe	mg/l	3.0	0.35	0.91	1.66	0.64
9	Manganese as Mn	mg/l	2.0	<0.02	0.04	0.12	0.06
10	Nitrate as NO3	mg/l	10.0	<0.5	<0.5	<0.5	1.45
11	Phenolic Compounds as C6H5OH	mg/l	1.0	<0.001	<0.001	<0.001	<0.001
12	Selenium as Se	mg/l	0.05	<0.005	<0.005	<0.005	<0.005
13	Cadmium as Cd	mg/l	2.0	<0.001	<0.001	<0.001	<0.001
14	Cyanide as CN	mg/l	0.2	<0.01	<0.01	<0.01	<0.01
15	Lead as Pb	mg/l	0.1	<0.005	<0.005	<0.005	<0.005
16	Mercury as Hg	mg/l	0.01	<0.001	<0.001	<0.001	<0.001
17	Nickel as Ni	mg/l	3.0	<0.02	<0.02	<0.02	<0.02
18	Arsenic as As	mg/l	0.2	<0.01	<0.01	<0.01	<0.01
19	Total Chromium as Cr	mg/l	2.0	<0.01	<0.01	<0.01	<0.01
20	Zinc as Zn	mg/l	5.0	<0.02	<0.02	0.03	<0.02
21	Hexavalent Chromium as Cr^{+6}	mg/l	0.1	<0.01	<0.01	<0.01	<0.01
22	Vanadium as V	mg/l	0.2	<0.2	<0.2	<0.2	<0.2
23	Total Suspended Solids	mg/l	50 / 100	14.3	7.4	35.2	31.7
24	Temperature	^{0}C	-	28	28	28	28
25	Dissolved Oxygen	mg/l	-	5.6	6.6	5.2	6.4
26	BOD	mg/l	30	<2.0	<2.0	2.7	<2.0
27	COD	mg/l	250	<4.0	<4.0	15.7	<4.0
28	Oil & Grease	mg/l	10	<1.4	<1.4	<1.4	<1.4
29	Ammonical Nitrogen as N	mg/l	50	<0.1	<0.1	<0.1	<0.1
30	Total Kjedahl Nitrogen as N	mg/l	100	<0.3	<0.3	<0.3	<0.3
31	Sulphide as S	mg/l	2.0	<0.1	<0.1	<0.1	<0.1
32	Free Ammonia as NH_3	mg/l	5.0	<0.1	<0.1	<0.1	<0.1
33	Particulate Size of Suspended Solids	mg/l	Passes through 850 um IS sieve	Passes through 850 um IS sieve	Passes through 850 um IS sieve	Passes through 850 um IS sieve	Passes through 850 um IS sieve
34	Bio-assay	mg/l	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent	All fishes survive after 96 hrs in 100% effluent
35	Dissolved Phosphates as PO_4	mg/l	5.0	<0.05	<0.05	<0.05	<0.05

MALDA UPNSTREAM (Kundra Nallah entering Malda)			July'16		Aug '16		Sept '16	
Parameter	**Standards as per IS-2296:1992 Class 'C'**	**Unit**	**1st Report**	**2nd Report**	**1st Report**	**2nd Report**	**1st Report**	**2nd Report**
Dissolved Oxygen (minimum)	**4**	mg/l	6.2	5.9	5.7	6	5.8	5.9
BOD (3) days at 27^0C (max)	**3**	mg/l	<2	<2	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	**5000**	MPN/100 ml	170	350	220	350	450	410
pH Value	**6.0-9.0**		7.2	7.1	7.1	7.16	7.14	7.1
Colour (max)	**300**	Hazen	35	33	28	30	18	12
Total Dissolved Solids	**1500**	mg/l	116	118	120	126	120	120
Copper as Cu (max)	**1.5**	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	**0.5**	mg/l	0.46	0.43	0.46	0.42	0.62	0.56
Chloride (max)	**600**	mg/l	18	20	18	20	19	22
Sulphates (SO_4) (max)	**400**	mg/l	5.4	5.6	4.5	4.7	4.6	4.2
Nitrate as NO_3 (max)	**50**	mg/l	2.2	2.3	1.7	1.9	1.7	1.4
Fluoride as F (max)	**1.5**	mg/l	0.014	0.016	0.015	0.012	0.012	0.016
Phenolic Compounds as C_6H_5OH (max)	**0.005**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	**0.01**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	**0.05**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	**0.2**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	**0.05**	mg/l	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	**0.1**	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	**15**	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	**0.05**	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	**1**	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Suspended Solids		mg/l			108	98	54	52
Turbidity in		NTU			230	250	120	90
E. coli		MPN/100ml			Absent	Absent	Absent	Absent

SW-2:Kundra Nallah leaving Malda			July'16		Aug '16		Sept '16	
Parameter	**Standards as per IS-2296:1992 Class 'C'**	**Unit**	**1st Report**	**2nd Report**	**1st Report**	**2nd Report**	**1st Report**	**2nd Report**
Dissolved Oxygen (minimum)	**4**	mg/l	6.1	6	5.8	5.9	5.6	5.8
BOD (3) days at 27^0C (max)	**3**	mg/l	<2	<2	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	**5000**	MPN/100 ml	220	350	170	220	450	370
pH Value	**6.0-9.0**		7.1	7.1	7.14	7.2	7.14	7.12
Colour (max)	**300**	Hazen	34	33	29	32	16	12
Total Dissolved Solids	**1500**	mg/l	114	116	122	124	120	118
Copper as Cu (max)	**1.5**	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	**0.5**	mg/l	0.41	0.39	0.48	0.44	0.58	0.56
Chloride (max)	**600**	mg/l	16	17	20	19	18	22
Sulphates (SO_4) (max)	**400**	mg/l	4.8	5.2	4.4	4.9	4.6	4.1
Nitrate as NO_3 (max)	**50**	mg/l	1.8	2.1	1.8	2	1.5	1.2
Fluoride as F (max)	**1.5**	mg/l	0.016	0.018	0.014	0.015	0.13	0.014
Phenolic Compounds as C_6H_5OH (max)	**0.005**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	**0.01**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	**0.05**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	**0.2**	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	**0.05**	mg/l	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	**0.1**	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	**15**	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	**0.05**	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	**1**	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Suspended Solids		mg/l			114	90	58	60
Turbidity in		NTU			240	260	110	80
E. coli		MPN/100ml			Absent	Absent	Absent	Absent

Annexure – V

Malda Mn Mines, M/s Tata Steel limited.

Abstract of Air Quality Monitoring Report**.**

MMM(Dispensary)

Monthly Average	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	SO_2 (µg/m³)	NO_2 (µg/m³)	NH_3 (µg/m³)	O_3 (µg/m³)	CO (mg/m³)	Pb (µg/m³)	Ni (ng/m³)	Mn (µg/m3)	As (ng/m³)	Benzene (µg/m³)	Benzo(a) pyrene (ng/m³)
Apr-16	67.9	35.1	5.6	21.3	10.8	20.3	0.21	<0.02	<4	0.18	1.0	<2.08	<0.4
May-16	58	29	5.4	20.5	10.5	20.3	0.22	<0.02	<4	0.11	1.0	<2.08	<0.4
Jun-16	55.00	27.00	5.10	22.10	10.50	20.30	0.20	<0.02	<4	0.13	1.0	<2.08	<0.4
Jul-16	30.17	14.12	4.00	9.00	20.00	4.00	0.10	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Aug-16	29.76	14.03	4.00	9.00	20.00	4.00	0.10	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Sep-16	31.42	14.76	4.00	9.10	20.00	4.00	0.11	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
ANNUAL AVERAGE	45.38	22.34	4.68	15.17	15.30	12.15	0.16	-	--	0.14	1.00	--	--

MMM (Mine Pit)

Monthly Average	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	SO_2 (µg/m³)	NO_2 (µg/m³)	NH_3 (µg/m³)	O_3 (µg/m³)	CO (mg/m³)	Pb (µg/m³)	Ni (ng/m³)	Mn (µg/m3)	As (ng/m³)	Benzene (µg/m³)	Benzo(a) pyrene (ng/m³)
Apr-16	51.2	23.8	4.5	14.2	10	19.62	0.13	<0.02	<4.0	0.10	1.0	<2.08	<0.4
May-16	49	22.9	4.5	14.5	10	19.62	0.13	<0.02	<4.0	0.07	1.0	<2.08	<0.4
Jun-16	43.70	20.00	4.60	14.30	10	19.62	0.14	<0.02	<4.0	0.06	1.0	<2.08	<0.4
Jul-16	29.86	13.92	4.00	9.00	20.00	4.00	0.10	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Aug-16	28.94	13.42	4.00	9.00	20.00	4.00	0.10	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Sep-16	30.52	14.09	4.00	9.00	20.00	4.00	0.10	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
ANNUAL AVERAGE	38.87	18.02	4.27	11.67	15.00	11.81	0.12	--	--	0.08	1.00	--	--

Annexure – VI

Mitra S. K. Private Limited

At/P.O.:BARBIL Ward No-6
Dist.: Keonjhar, Odisha - 758035
CIN U51909WB1956PTC023037

T : +91 9437009815,9437009820,9437075269
E : barbil@mitrask.co.in
W : www.mitrask.com

MSK TESTING • INSPECTION

Ref. No.BBL/ENV/1317 Date:04/05/2016

DUST FALL ANALYSIS REPORT

Name of the Mines: Malda Manganese Mines

Period of Sampling: April' 2016

Sl.No.	Parameters	Location	
		Block-I	Block-II
1	Nickel (as Ni) in %	<0.0002	<0.0002
2	Cobalt (as Co) in %	<0.0002	<0.0002
3	Mercury (as Hg) in %	<0.00001	<0.00001
4	Arsenic (as As) in %	<0.00003	<0.00003

For Mitra S. K. Private Limited

Authorised Signatory

Checked by:-

MITRA S. K. (P) LTD. BARBIL

Ref.: VCSPL/16/R-1061

Date.: 05.10.2016

DUST FALL MONITORING REPORT FOR THE MONTH OF SEPTEMBER-2016

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

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

Total Dust fall for the month of September-2016=0.300 t/km^2/month

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

Annexure – VII

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

Ref.: VCSPL/16/R-1075 Date.: 05.10.2016

SOIL QUALITY ANALYSIS REPORT FOR THE MONTH OF SEPTEMBER-2016

1. Name of Industry : **Bamebari Manganese Mines (M/s TATA Steel Limited)**
2. Sampling Location : **S-1:** H-Quarry
3. Date of Sampling : 22.09.2016
4. Date of Analysis : 23.09.2016 to 26.09.2016
5. Sample collected by : VCSPL Representative in presence of TATA Representative

Sl No.	Parameters	Unit	Analysis Results
			S-1
1.	Cobalt as Co	%	0.0022
2.	Nickel as Ni	%	0.046
3.	Mercury as Hg	%	<0.000002
4.	Arsenic as As	%	<0.000002

For Visiontek Consultancy Services Pvt. Ltd.

VISIONTEK CONSULTANCY SERVICES PVT. LTD.

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

Annexure – VIII Noise Monitoring

Malda			May'16			Aug'16
Sl.No.	Sampling Location	Parameter	Max	Min	Avg.	Avg.
1	Township	dB (A) in Day Time	54.9	37.4	50.6	54
2	Hospital	dB (A) in Day Time	46.5	36.1	41.3	48
3	Office Area	dB (A) in Day Time	63.3	38.3	49.5	58
4	Mines Area	dB (A) in Day Time	61.3	36.4	43.8	59

Malda			May'16			Aug'16
Sl.No.	Sampling Location	Parameter	Max	Min	Avg.	Avg.
1	Township	dB (A) in Night Time	44.8	35.5	40.5	38
2	Hospital	dB (A) in Night Time	39.6	35.1	38.8	24
3	Office Area	dB (A) in Night Time	52.8	33.7	40.3	25
4	Mines Area	dB (A) in Night Time	48.6	32.2	37.7	37

Annexure - IX

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 – X

Organizational Structure