



ENVIRONMENTAL STATEMENT

2016-17

**UNDER RULE 14 OF ENVIRONMENT (PROTECTION)
RULES, 1986**

In

FORM - V

**MALDA MANGANESE MINES
TATA STEEL LIMITED**

SEPTEMBER 2017

Environmental Statement : Malda Manganese Mines – 2016-17

FORM V

[See Rule 14 of Environment (Protection) Rules, 1986]

ENVIRONMENTAL STATEMENT FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 2017

PART - A

- (i) Name and Address of the : **MALDA MANGANESE MINE**
Owner / occupier of the industry operation or process. Nominated Owner :-
Mr. T.V.Narendran
Managing Director, M/s TATA Steel Ltd.
Jamshedpur, Dist- East Singhbhum
Jharkhand - 831 001
- Agent :-
Mr. S. N. Jha,
Head(Manganese Group of Mines),
Joda, FA & MD, TATA Steel
P.O.: Bichhakundi, Via : Joda
Dist : Keonjhar, Orissa - 758 034
- (ii) Industry Category : Opencast Mining
- (iii) Production Capacity - Units : 550000 TPA (Manganese Ore)
- (iv) Year of Establishment : 1935
- (v) Date of the last environmental statement submitted : 27th Sept'2016
(Vide Letter No. MGM/P&E/612/16)

PART - B

Water and Raw Material Consumption

(1) Water Consumption m³/day

Process	: Nil
Cooling	: Nil
Domestic	: 46.38 m ³ /day (Avg. during 2016-17)

Name of the Products	<u>Process water consumption per unit of product output</u>	
	During the previous Financial year	During the current Financial year
	(1)	(2)
(1) Manganese Ore	Nil	Nil

Remarks : Manganese Ore is produced by semi mechanized Mining method, which does not involve beneficiation and thus precludes the consumption of water.

(2) Raw material consumption

Name of the raw materials	Name of the product	<u>Consumption of raw materials per unit</u>	
		During the previous Financial year	During the current Financial year
Manganese Ore	Manganese Ore	<u>Year - 2015-16</u>	<u>Year - 2016-17</u>
		Production :-	Production :-
		NIL	NIL
		Despatch :-	Despatch :-
		NIL	NIL

Remarks: Mining operation has stopped since Feb'2011 due to want of forest clearance.

PART - C

Pollution discharged to environment / unit of output

(Parameter as specified in the Consents issued)

Pollution	Quantity of pollutants discharged (mass/day)	Concentrations of Pollutants in discharges (mass/volume)	Percentage of variation from prescribed standards with reasons
(a) Water	The process of Manganese Ore production includes blasting, removal of overburden, breaking and sizing of ore to required size and then transportation to the customer does		

not require consumption of water. Thus, there is no process discharge from the mine.

The six month average surface water quality data is enclosed as **Annexure - I**. It shows that the concentrations of the pollutants are well within the permissible standards.

(b) Air

Since this is an open cast Mine, the dust generation is mainly due to the movement of vehicles in the haul roads, drilling activities etc, which is fugitive in nature and cannot be quantified. The fugitive dust is allayed by sprinkling of water by mobile tanker and development of green barrier by plantation around the residential area.

The monthly average ambient air quality data is enclosed as **Annexure - II**. It shows that the concentrations of the pollutants are well within the permissible standards.

PART - D

Hazardous Wastes

[As specified under the Hazardous wastes (Management & Handling) Rules, 1989]

Hazardous Wastes	Total Quantity	
	During the previous Financial year	During the current Financial year
	<u>Year - 2015-16</u>	<u>Year - 2016-17</u>
(i) From Process		
Waste Oil (in Ltrs.)	0.5	0
Used Oil (in Ltrs.)	40.0	0
Cotton Waste (in Kgs)	Nil	Nil
Duster (in Nos.)	Nil	Nil
Filters (in Nos.)	Nil	Nil
(ii) From pollution control facilities	Nil	Nil

Remarks: Mining operation has stopped since Feb'2011 due to want of forest clearance.

PART - E

Solid Wastes

	Total Quantity	
	During the previous Financial year	During the current Financial year
	<u>Year - 2015-16</u>	<u>Year - 2016-17</u>
(a) From Process (Overburden rejects)	Nil	Nil
(b) From pollution control facilities	Nil	Nil
(c)		
(1) Quantity recycled or re-utilized within the unit	Nil	Nil
(2) Sold	Nil	Nil
(3) Disposal	Nil	Nil

Mining operation has stopped since Feb'2011 due to want of forest clearance.

PART - F

Please specify the characterization (in terms of composition and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes.

- **Characterization of Hazardous Waste:** - The composition of hazardous wastes like Waste Oil & used oil are Hydrocarbons, lead and used acids. The composition of the solid wastes (Overburden and rejects) contains lateritic morrum, shale and quartzite.
- **Disposal Practice:-**
 - **SOLID WASTES** -The overburden is systematically and scientifically dumped on a geologically barren area and the same will be reclaimed by plantation after being declared inactive.
 - **WASTE OIL** -The waste oil generated at various sources is collected in leak proof barrels and then is kept on an impervious floor with oil catch pit. It is also ensured that the caps of the barrels remain intact and horizontal. The storage area is properly fenced and caution board displayed. During transfer of waste oil to barrels, a trough is placed underneath in order to prevent land contamination due to oil spillage. Then at a fixed interval, these barrels are returned to Ferro Manganese Plant Stores for final disposal through auction to the authorized party.

- USED COTTON WASTES - The used cotton wastes generated at various locations are kept in designated barrels and at a fixed interval, these wastes are handed over to the Shift in-charge of the Furnace Section of FAP, Joda for incinerating in the Electric Arc Furnace at a temperature of more than 1100 degree C.
- Provision of impervious pit for collection of oily waste in the workshop premises in addition to the existing practice of collection at specified barrels.

PART - G

Impact of pollution abatement measures taken on conservation of natural resources and on the cost of production.

1. Water spraying on haul Roads and Mine Pits is done regularly to suppress the dust.
2. All the haul roads in the mining area are made up of morrum & compacted. Regular repair is being done by dozer & grader after spreading the layer of sweat morrum over it.
3. Wet drilling has been implemented in all drills. Controlled blasting pattern is being followed.
4. 10000 nos. of saplings of various forestry species were planted covering an area of 2 hectare within the leasehold areas of Malda Mn. Mine wduring the year 2016-17
5. During the year 2016-17 an amount of Rs. 11,45,617 /- was incurred towards environmental management including Environmental Monitoring, Plantation activities and construction of toe-wall, check dams and garland drains.
6. In addition, Tata Steel Rural Development Society also undertakes the peripheral development activities with a large magnitude.

PART - H

Additional measures / investment proposal for environmental protection, abatement of pollution, prevention of pollution.

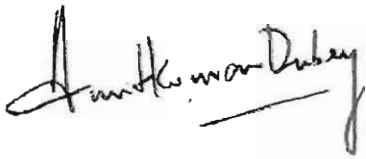
- a) Garland drains and toe wall around the OB dumping has been provided to check and channelize surface run-off.
- b) Plantation of forestry species planted over the inactive waste dump slopes to stabilize the dump slope and arrest the airborne dust.

PART – I

Any other particulars for improving the quality of environment.

1. With compliance to conditions of Environment Clearance obtained from MoEF, the following monitoring is being done at regular interval.
 - Ground Water Level at nearby bore wells
 - Trace metal in dust fall
 - Ground water quality at lower level
 - Trace metals such as Fe, Cr+6, Cu, Se, As, Cd, Hg, Pb, Zn and Mn at specific locations for both surface water (downstream & upstream) and ground water at lower elevation is being periodically monitored by referring to the standards as per BIS : 10500.
2. Top soils generated during excavation are utilized immediately for nursery development and dump slope plantation.
3. Measures taken to control Air Pollution :-
 - Water sprinkling on the haul road,
 - Provision of dust masks to the workmen,
 - Adoption of wet drilling arrangement in the drill machines and
4. Measures taken to control Water Pollution :-
 - Construction of toe wall and garland drain along the dump slope to prevent surface run-off during monsoon.
 - Construction of soak pits for discharge of sanitary sewage at residential colony.
5. Measures taken to control Noise & Ground Vibration :-
 - Thick plantation has been developed around the mines to provide a canopy cover
 - Implementation of advance blasting technique(NONEL) to reduce the blast induced ground vibration and
 - Workmen are provided with ear-muff while working near heavy earth moving machineries.
6. Measures taken to control Land Degradation :-
 - Afforestation around the non-active dump for stabilization

7. Surveillance of Occupational Health: - Periodical Medical Examination of employees (departmental & contractual) is conducted as per prescribed norms of Mines Rule, 1955. The initial and periodical examination includes blood haematology, blood pressure, detailed cardiovascular assessment, neurological examination etc. All chest radiographs are being classified for detection of pneumoconiosis, diagnosis and documentation made in accordance to ILO classifications. During the calendar year 2016, 2 nos. (Contractual-2, departmental-0) IME was done. There are no findings of pneumoconiosis and manganese poisoning which is classified as occupational disease.
8. The mine is certified with ISO-14001 (Environment Management System).



Agent,
Malda Mn.Mine,
M/s.TATA STEEL LTD.

MALDA UPSTREAM (Kundra Nallah entering Malda)						
Sl.	Parameters	Unit	Standards as per	April'16 1st Report	May'16 1st Report	June'16 2nd Report
1	Colour	Hazen	5	<1.0	<1.0	<1.0
2	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	pH at 26°C	-	5.5-9.0	7.45	6.81	6.68
4	Total Dissolved Solids	mg/l	-	57	58	91
5	Copper as Cu	mg/l	3.0	<0.02	<0.02	<0.02
6	Fluoride as F	mg/l	2.0	0.23	0.14	0.16
7	Total Residual Chlorine	mg/l	1.0	<0.1	<0.1	<0.1
8	Iron as Fe	mg/l	3.0	0.50	0.84	0.84
9	Manganese as Mn	mg/l	2.0	<0.02	0.02	0.12
10	Nitrate as NO3	mg/l	10.0	<0.5	<0.5	1.63
11	Phenolic Compounds as C6H5OH	mg/l	1.0	<0.001	<0.001	<0.001
12	Selenium as Se	mg/l	0.05	<0.005	<0.005	<0.005
13	Cadmium as Cd	mg/l	2.0	<0.001	<0.001	<0.001
14	Cyanide as CN	mg/l	0.2	<0.01	<0.01	<0.01
15	Lead as Pb	mg/l	0.1	<0.005	<0.005	<0.005
16	Mercury as Hg	mg/l	0.01	<0.001	<0.001	<0.001
17	Nickel as Ni	mg/l	3.0	<0.02	<0.02	<0.02
18	Arsenic as As	mg/l	0.2	<0.01	<0.01	<0.01
19	Total Chromium as Cr	mg/l	2.0	<0.01	<0.01	<0.01
20	Zinc as Zn	mg/l	5.0	<0.02	0.04	<0.02
21	Hexavalent Chromium as Cr+6	mg/l	0.1	<0.01	<0.01	<0.01
22	Vanadium as V	mg/l	0.2	<0.2	<0.2	<0.2
23	Total Suspended Solids	mg/l	50 / 100	13.7	5.4	25.7
24	Temperature	°C	-	28	28	28
25	Dissolved Oxygen	mg/l	-	5.8	6.4	6.1
26	BOD	mg/l	30	<2.0	<2.0	<2.0
27	COD	mg/l	250	<4.0	<4.0	<4.0
28	Oil & Grease	mg/l	10	<1.4	<1.4	<1.4
29	Ammonical Nitrogen as N	mg/l	50	<0.1	<0.1	<0.1
30	Total Kjeldahl Nitrogen as N	mg/l	100	<0.3	<0.3	<0.3
31	Sulphide as S	mg/l	2.0	<0.1	<0.1	<0.1
32	Free Ammonia as NH3	mg/l	5.0	<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
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
35	Dissolved Phosphates as PO4	mg/l	5.0	<0.05	<0.05	<0.05

MALDA DOWNSTREAM (Kundra Nallah leaving Malda)							May'16	June'16
Sl.	Parameters	Unit	Standards as per	April'16 1st Report	May'16 1st Report	June'16 1st Report	June'16 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°C	-	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	°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 Kjeldahl 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°C (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 ₆ H ₅ OH (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°C (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 ₆ H ₅ OH (max)	0.005	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium 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

SURFACE WATER QUALITY ANALYSIS REPORT

Sampling Location: SW-1: Kundra Nallah entering Malda

Sl. No	Parameter	Unit	Standard as per IS:2296:1992, Class 'C'	Oct'16		Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
				1st Report	2nd Report					
1	Dissolved Oxygen (minimum)	mg/l	4	5.6	5.4	5.3	5.1	5.2	5.5	5.6
2	BOD (3) days at 270C (max)	mg/l	3	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
3	Total Coli form	MPN/100 ml	5000	270	350	170	98	120	150	220
4	pH Value		6.0-9.0	7.2	7.16	7.1	7.08	7.14	7.2	7.28
5	Colour (max)	Hazen	300	6	5	2	1	CL	CL	CL
6	Total Dissolved Solids	mg/l	1500	130	134	126	122	120	125	126
7	Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	0.5	0.58	0.60	0.57	0.46	0.44	0.48	0.5
9	Chloride (max)	mg/l	600	20	22	24	22	20	24	27
10	Sulphates (SO4) (max)	mg/l	400	4.4	4.6	4.9	4.6	5.1	5.3	5.1
11	Nitrate as NO3 (max)	mg/l	50	1.8	1.9	1.7	1.5	1.8	2.2	1.9
12	Fluoride as F (max)	mg/l	1.5	0.016	0.014	0.012	<0.01	0.012	0.011	0.012
13	Phenolic Compounds as C6H5OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
16	Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND	ND
18	Lead as Pb (max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
19	Zinc as Zn (max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Hexa Chromium as Cr +6	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Sl. No	Parameter	Unit	Standard as per IS:2296:1992, Class 'C'	Oct'16		Nov'16	Dec'16	Jan'17	Feb'17	Mar'17
				1st Report	2nd Report					
1	Dissolved Oxygen (minimum)	mg/l	4	5.7	5.6	5.2	5.3	5.4	5.2	5.5
2	BOD (3) days at 270C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
3	Total Coli form	MPN/100 ml	5000	350	410	190	120	150	170	240
4	pH Value		6.0-9.0	7.18	7.19	7.2	7.16	7.12	7.18	7.24
5	Colour (max)	Hazen	300	7	6	1	1	CL	CL	CL
6	Total Dissolved Solids	mg/l	1500	132	135	122	128	124	128	132
7	Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
8	Iron as Fe (max)	mg/l	0.5	0.62	0.64	0.6	0.48	0.46	0.5	0.54
9	Chloride (max)	mg/l	600	21	24	20	22	26	24	26
10	Sulphates (SO4) (max)	mg/l	400	4.5	4.8	4.5	4.9	4.7	4.5	4.6
11	Nitrate as NO3 (max)	mg/l	50	1.7	2.0	1.5	1.6	1.5	1.8	1.7
12	Fluoride as F (max)	mg/l	1.5	0.014	0.012	0.014	<0.01	0.011	0.012	0.01
13	Phenolic Compounds as C6H5OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
14	Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
15	Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
16	Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
17	Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND	ND
18	Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
19	Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
20	Hexa Chromium as Cr +6	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
21	Anionic Detergents (max)	mg/l	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Annexure – II

Malda Mn Mines, M/s Tata Steel limited.
Abstract of Air Quality Monitoring Report.

MMM(Dispensary)													
Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	Mn (µg/m ³)	As (ng/m ³)	Benzo(a) pyrene (ng/m ³)	
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/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (µg/m ³)	NH ₃ (µg/m ³)	O ₃ (µg/m ³)	CO (mg/m ³)	Pb (µg/m ³)	Ni (ng/m ³)	Mn (µg/m ³)	As (ng/m ³)	Benzo(a) pyrene (ng/m ³)	
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	--	--

MMM (Mine pit)

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (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)	Benzene (µg/m ³)	Benzo(a) pyrene (ng/m ³)	Mn (µg/m ³)
Oct-16	32.31	14.83	4.03	9.25	4.00	0.11	20	0.00	0.0	0.0	0.001	0.002	0.00
Nov-16	49.69	24.04	4.38	10.30	5.37	0.19	20	0.00	0.0	0.0	0.001	0.002	0.00
Dec-16	54.56	26.90	4.78	11.42	6.44	0.27	20	0.00	0.0	0.0	0.001	0.002	0.00
Jan-17	54.46	27.09	4.47	11.37	6.56	0.27	20	0.00	0.0	0.0	0.001	0.002	0.00
Feb-17	55.64	27.15	4.55	11.56	5.49	0.27	20	0.00	0.0	0.0	0.001	0.002	0.00
Mar-17	45.09	20.67	4.00	9.24	4.07	0.16	20	0.00	0.0	0.0	0.001	0.002	0.00
AVERAGE	48.62	23.45	4.37	10.52	5.32	0.21	20.00	0.00	0.01	0.00	0.00	0.00	0.00

MMM (Dispensary)

Monthly Average	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)	SO ₂ (µg/m ³)	NO ₂ (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)	Benzene (µg/m ³)	Benzo(a) pyrene (ng/m ³)	Mn (µg/m ³)
Oct-16	33.9	16.0	4.0	9.3	4.0	0.1	20.0	0.001	0.010	0.001	0.001	0.002	0.001
Nov-16	46.2	22.4	4.2	10.0	5.2	0.2	20.0	0.001	0.010	0.001	0.001	0.002	0.001
Dec-16	48.4	23.5	4.3	10.2	5.2	0.2	20.0	0.001	0.010	0.001	0.001	0.002	0.001
Jan-17	49.6	24.5	4.4	10.5	4.9	0.2	20.0	0.001	0.010	0.001	0.001	0.002	0.001
Feb-17	54.2	27.0	4.5	10.8	5.5	0.2	20.0	0.001	0.010	0.001	0.001	0.002	0.001
Mar-17	43.0	18.4	4.0	9.1	4.0	0.1	20.0	0.001	0.010	0.001	0.001	0.002	0.001
AVERAGE	45.88	21.97	4.24	9.98	4.79	0.16	20.00	0.001	0.01	0.001	0.001	0.002	0.001