



ENVIRONMENTAL STATEMENT

2016-17

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

In

FORM - V

BAMEBARI MANGANESE MINES

TATA STEEL LIMITED

SEPTEMBER 2017

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 Owner / occupier of the industry operation or process. : **BAMEBARI MANGANESE MINE**
- Nominated Owner :-
Mr. T.V. Narendran
Managing Director, M/s TATA Steel Ltd.
Jamshedpur, Dist- East Singhbhum
Jharkhand - 831 001
- Agent :-
Mr. Amit Kumar Dubey,
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 : 83,000 TPA (Manganese Ore)
- (iv) Year of Establishment : 1938
- (v) Date of the last environmental statement submitted : 27th Sept'2016
(Vide Letter No. MGM/P&E/613/2016
Dt.27.09.2016)

PART - B

Water and Raw Material Consumption

(1) Water Consumption m³/day

Process	: 29.50 m ³ /day (Water sprinkling - Avg. during 2016-17)
Cooling	: Nil
Domestic	: 87.48 m ³ /day (Avg. during 2016-17)

Name of the Products	Process water consumption per unit of product output	
	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	Consumption of raw materials per unit	
		During the previous Financial year	During the current Financial year
		Year - 2015-16	Year - 2016-17
Manganese Ore	Manganese Ore	Production :- 66657.430 MT Despatch :- 62763.440 MT	Production :- 70674.497 MT Despatch :- 82221.370 MT

Remarks : Produced Manganese Ore dispatched for captive consumption in Ferro Alloys Plants within India.

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 monthly average(2016-17) 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 containing Oil	32 Kg	32 Kg
Used Oil (in Ltrs.)	88 Ltrs	88 Ltrs
Cotton Waste (in Kgs)	Nil	Nil
Duster (in Nos.)	Nil	Nil
Filters (in Nos.)	Nil	Nil
(ii) From pollution control facilities	Nil	Nil

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)	350218 MT	227295 MT
(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	350218 MT	227295 MT

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 sweet morrum over it.
3. Wet drilling has been implemented in all drills. Controlled blasting pattern is being followed.
4. 13650 nos. of saplings of various forestry species were planted covering an area of 1.200 hectare within the leasehold areas of Bamebari Mn.Mine
5. An amount of Rs. 30,73,645/- was incurred towards environmental monitoring job, plantation activities, vetiver plantation, dust suppression and construction of toe-wall, garland drain and check dams as included in environment management cost.
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 shall be provided to check and channelize surface run-off.
- b) Plantation of forestry species shall be planted over the inactive waste dump slopes to arrest the airborne dust.
- c) Vetiver Plantation has been done in inactive dump slope.
- d) One STP has installed in Bamebari Colony.
- e) Green belt has been developed along colony and mining.


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
 - Meteorological monitoring
 - 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
 - Black topped road in the residential colony.
 - Green belt along mining and colony
 - Native sapling and vetiver plantation in inactive dumps.
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.
 - Provision of oil separation pit for effluents coming out of work shop.
 - Native sapling and vetiver plantation in inactive dumps.
 - STP for domestic effluent in Bamebari colony.
5. Measures taken to control Noise & Ground Vibration :-
 - Thick plantation has been developed around the mines and office building 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 and
 - Reclamation and rehabilitation of mined out area as per approved Scheme of Mining.
7. Surveillance of Occupational Health: - Periodical Medical Examination of employees (departmental & contractual) are 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 year 2016-17, 277 number of employee (Contractual - 277, Departmental- 0) 1 employee underwent PME (Departmental-)1. 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).



Manager,
Bamebari Mn.Mine
M/s. TATA STEEL LTD.

Annexure – I (Surface Water Quality Analysis Report)

Annexure – VII(Surface Water Quality Analysis Report)

BAMEBARI Upstream (Before the Confluence point of Kassia Nalla and Baitarani River)		Standards as per		April '16	May '16	June '16
Sl.	Parameters	Unit	5	1st Report	1st Report	2nd Report
1	Colour	Hazen	Unobjectionable	<1.0	<1.0	<1.0
2	Odour	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	pH at 26°C	-	5.5-9.0	7.3	6.4	7.9
4	Total Dissolved Solids	mg/l	-	57	60	112
5	Copper as Cu	mg/l	3.0	<0.02	<0.02	<0.02
6	Fluoride as F	mg/l	2.0	0.23	0.46	0.21
7	Total Residual Chlorine	mg/l	1.0	<0.1	<0.1	<0.1
8	Iron as Fe	mg/l	3.0	0.69	0.59	1.2
9	Manganese as Mn	mg/l	2.0	<0.02	0.06	0.09
10	Nitrate as NO3	mg/l	10.0	<0.5	1.6	<0.5
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	0.07	<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	<2.5	45.0	12.7
24	Temperature	°C	-	28	28	28
25	Dissolved Oxygen	mg/l	-	6.2	4.2	5.9
26	BOD	mg/l	30	<2.0	6.3	<2.0
27	COD	mg/l	250	<4.0	28.2	<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

BAMEBARI Downstream (Intake Point at Tindharia)						June '16	
Sl.	Parameters	Unit	Standards as per	April '16 1st Report	May '16 1st Report	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	6.81	6.63	7.02	
4	Total Dissolved Solids	mg/l	-	55	55	68	
5	Copper as Cu	mg/l	3.0	<0.02	<0.02	<0.02	
6	Fluoride as F	mg/l	2.0	0.43	0.29	0.21	
7	Total Residual Chlorine	mg/l	1.0	<0.1	<0.1	<0.1	
8	Iron as Fe	mg/l	3.0	0.43	0.82	1.5	
9	Manganese as Mn	mg/l	2.0	<0.02	0.04	0.07	
10	Nitrate as NO ₃	mg/l	10.0	<0.5	1.07	<0.5	
11	Phenolic Compounds as C ₆ H ₅ OH	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	0.03	<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	3.7	47.0	13.7	
24	Temperature	°C	-	28	28	28	
25	Dissolved Oxygen	mg/l	-	5.9	5.2	6.1	
26	BOD	mg/l	30	<2.0	3.2	<2.0	
27	COD	mg/l	250	10.8	16.1	<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 NH ₃	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 PO ₄	mg/l	5.0	<0.05	<0.05	<0.05	

BAMEBARI Upstream (Before the Confluence point of Kassia Nalla and Baitarani River)		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	6.2	6.1	5.9	5.9	5.6
BOD (3) days at 27°C (max)	3	mg/l	<2	2.1	<2	<2	<1.8	<1.8
Total Coli form	5000	MPN/100 ml	350	240	350	280	280	410
pH Value	6.0-9.0		7.2	7.2	7.2	7.1	7.22	7.18
Colour (max)	300	Hazen	26	28	24	22	17	15
Total Dissolved Solids	1500	mg/l	120	122	125	118	118	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	0.48	0.44	0.42	0.48	0.72	0.74
Chloride (max)	600	mg/l	18	18	20	19	22	24
Sulphates (SO ₄) (max)	400	mg/l	4.8	4.4	5.2	4.9	4.9	5.1
Nitrate as NO ₃ (max)	50	mg/l	1.8	1.7	2.1	1.7	2.2	1.8
Fluoride as F (max)	1.5	mg/l	0.021	0.018	0.016	0.014	0.017	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
E. coli		MPN/100ml			Absent	Absent	Absent	Absent

BAMEBARI Downstream (Intake Point at Tindharia)		Standards as per IS-2296:1992 Class 'C'		July '16		Aug '16		Sept '16	
Parameter	Unit	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report	1st Report	2nd Report
Dissolved Oxygen (minimum)	mg/l	5.8	6	5.7	5.6	5.7	5.6	5.8	5.9
BOD (3) days at 27°C (max)	mg/l	<2	2.2	<2	<2	<2	<2	<1.8	<1.8
Total Coli form	MPN/100 ml	280	350	220	240	220	240	370	450
pH Value		7.1	7.1	7	6.9	7	6.9	6.84	6.94
Colour (max)	Hazen	20	27	28	25	28	25	14	12
Total Dissolved Solids	mg/l	118	116	112	118	112	118	108	114
Copper as Cu (max)	mg/l	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.46	0.41	0.44	0.5	0.44	0.5	0.68	0.71
Chloride (max)	mg/l	20	18	16	19	16	19	18	17
Sulphates (SO ₄) (max)	mg/l	5.1	4.9	4.6	4.2	4.6	4.2	4.4	4.1
Nitrate as NO ₃ (max)	mg/l	1.9	2	1.6	1.4	1.6	1.4	1.4	1.3
Fluoride as F (max)	mg/l	0.018	0.017	0.012	0.01	0.012	0.01	0.01	0.008
Phenolic Compounds as C ₆ H ₅ OH (max)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	mg/l	ND	ND	ND	ND	ND	ND	ND	ND
Lead as Pb (max)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn (max)	mg/l	<0.05	<0.05	<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	<0.05
Anionic Detergents (max)	mg/l	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
E. coli	MPN/100ml			Absent	Absent	Absent	Absent	Absent	Absent

SURFACE WATER QUALITY ANALYSIS REPORT

Sampling Location (Upstream):SW-1: Confluence Point at Kassia Nallah

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					
Dissolved Oxygen (minimum)	mg/l	4	5.6	5.4	5.1	5.2	4.9	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	<1.8
Total Coli form	MPN/100 ml	5000	350	320	120	150	120	150	120
pH Value		6.0-9.0	7.16	7.22	7.2	7.22	7.24	7.28	7.3
Colour (max)	Hazen	300	6	4	1	1	CL	CL	CL
Total Dissolved Solids	mg/l	1500	124	122	128	124	126	128	124
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.68	0.72	0.68	0.6	0.54	0.51	0.48
Chloride (max)	mg/l	600	20	22	24	22	25	28	27
Sulphates (SO4) (max)	mg/l	400	4.6	4.8	4.4	5.2	5.3	5.5	5.2
Nitrate as NO3 (max)	mg/l	50	1.8	1.9	1.6	1.9	2.1	2.3	2.1
Fluoride as F (max)	mg/l	1.5	0.019	0.018	0.02	0.018	0.02	0.022	0.024
Phenolic Compounds as C6H5OH (max)	mg/l	0.005	<0.001	<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	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<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	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	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	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<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	<0.05
Anionic Detergents (max)	mg/l	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
E. coli	MPN/100ml	Absent	Absent	Absent					

Sampling Location: SW-2:(Downstream)Intake Point at Tindharia

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	1st Report	1st Report	1st Report	1st Report	1st Report
Dissolved Oxygen (minimum)	mg/l	4	5.5	5.6	5.2	5	4.8	4.8	5.7
BOD (3) days at 27°C (max)	mg/l	3	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Total Coli form	MPN/100 ml	5000	410	270	150	170	150	150	170
pH Value		6.0-9.0	6.94	6.9	7.1	7.1	7.18	7.18	7.25
Colour (max)	Hazen	300	5	3	2	1	CL	CL	CL
Total Dissolved Solids	mg/l	1500	112	118	124	120	128	128	135
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.64	0.66	0.62	0.64	0.6	0.6	0.6
Chloride (max)	mg/l	600	19	18	22	24	28	28	33
Sulphates (SO4) (max)	mg/l	400	4.5	4.3	4.2	4.6	4.8	4.8	5.7
Nitrate as NO3 (max)	mg/l	50	1.9	1.5	1.3	1.2	1.5	1.5	2.5
Fluoride as F (max)	mg/l	1.5	0.015	0.012	0.015	0.013	0.016	0.016	0.019
Phenolic Compounds as C6H5OH (max)	mg/l	0.005	<0.001	<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	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<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	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	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	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<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	<0.05
Anionic Detergents (max)	mg/l	1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
E. coli	MPN/100ml	Absent	Absent	Absent	Absent	Absent	Absent	Absent	Absent

Annexure – II (Ambient Air Quality Report)

(Bamebari Camp)

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)	Benzene (µg/m ³)	Benzo(a) pyrene (ng/m ³)
Apr-16	64.4	32.2	5.1	18.9	10.4	20.1	0.17	<0.02	<4	0.11	<1	<2.08	<0.4
May-16	53.0	25.0	5.0	20.8	10.3	19.8	0.16	<0.02	<4	0.11	<1	<2.08	<0.4
Jun-16	51.0	25.0	4.8	19.5	10.30	19.80	0.19	<0.02	<4	0.09	<1	<2.08	<0.4
Jul-16	32.3	15.2	4.0	9.0	<20	<4	0.12	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Aug-16	32.4	15.4	4.0	9.1	<20	<4	0.11	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Sep-16	31.7	14.7	4.0	9.0	<20	<4	0.11	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002

Near Bamebari 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)	Benzene (µg/m ³)	Benzo(a) pyrene (ng/m ³)
Apr-16	64.8	32.8	4.7	17.6	<10	<19.62	0.17	<0.02	<4	0.14	<1	<2.08	<0.4
May-16	52.0	24.0	4.4	17.5	<10	<19.62	0.18	<0.02	<4	0.08	<1	<2.08	<0.4
Jun-16	51.0	25.0	4.7	18.4	<10	<19.62	0.17	<0.02	<4	0.09	<1	<2.08	<0.4
Jul-16	33.2	15.4	4.0	9.0	<20	<4	0.12	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Aug-16	34.0	16.3	4.1	9.2	<20	<4	0.13	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Sep-16	34.3	16.2	4.3	10.0	<20	<4	0.14	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002

BMM(Weigh Bridge)

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)	Benzene (µg/m ³)	Benzo(a) pyrene (ng/m ³)
Apr-16	67.2	34.0	5.6	21.3	<10	20.9	0.2	<0.02	<4	0.16	<1.0	<2.08	<0.4
May-16	57.0	27.0	5.3	21.6	<10	20.8	0.19	<0.02	<4	0.12	<1.0	<2.08	<0.4
Jun-16	56.0	28.0	5.1	21.2	<10	20.80	0.19	<0.02	<4	0.13	<1.0	<2.08	<0.4
Jul-16	34.5	16.0	4.0	9.0	<20	<4	0.12	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Aug-16	33.0	15.3	4.0	9.1	<20	<4	0.11	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002
Sep-16	34.8	16.5	4.2	9.7	<20	<4	0.13	<0.001	<0.01	<0.001	<0.001	<0.001	<0.002

Near Bamebari Mine Pit

Monthly Average	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	CO (mg/m3)	NH3 (µg/m3)	Pb (µg/m3)	Ni (ng/m3)	As (ng/m3)	Benzene (µg/m3)	Benzo(a) pyrene (ng/m3)	Mn (µg/m3)
Oct-16	34.1	15.9	4.1	9.4	4.0	0.1	20.0	0.001	0.01	0.001	0.001	0.002	0.001
Nov-16	54.8	26.9	4.8	11.7	6.5	0.2	23.0	0.001	0.01	0.001	0.001	0.002	0.001
Dec-16	64.6	32.8	5.2	13.7	7.9	0.3	26.1	0.001	0.01	0.001	0.001	0.002	0.007
Jan-17	66.2	33.1	5.3	14.5	7.7	0.4	25.8	0.001	0.01	0.001	0.001	0.002	0.006
Feb-17	69.8	34.8	5.5	15.5	8.5	0.4	24.8	0.001	0.01	0.001	0.001	0.002	0.009
Mar-17	45.0	20.1	4.0	9.8	4.2	0.2	20.3	0.001	0.01	0.001	0.001	0.002	0.001

BMM (Bamberi Camp)

Monthly Average	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	CO (mg/m3)	NH3 (µg/m3)	Pb (µg/m3)	Ni (ng/m3)	As (ng/m3)	Benzene (µg/m3)	Benzo(a) pyrene (ng/m3)	Mn (µg/m3)
Oct-16	33.9	15.8	4.1	9.3	4.0	0.12	20.0	0.001	0.01	0.001	0.001	0.002	0.001
Nov-16	53.0	25.8	4.6	11.3	6.2	0.21	21.5	0.001	0.01	0.001	0.001	0.002	0.001
Dec-16	56.2	27.6	4.5	12.4	7.2	0.24	22.6	0.001	0.01	0.001	0.001	0.002	0.001
Jan-17	57.4	28.6	4.7	13.0	7.0	0.27	23.3	0.001	0.01	0.001	0.001	0.002	0.001
Feb-17	59.4	29.5	4.8	13.5	7.3	0.30	23.7	0.001	0.01	0.001	0.001	0.002	0.001
Mar-17	45.0	20.1	4.0	9.8	4.2	0.18	20.3	0.001	0.01	0.001	0.001	0.002	0.001

BMM (Weight Bridge)

Monthly Average	PM10 (µg/m3)	PM2.5 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)	O3 (µg/m3)	CO (mg/m3)	NH3 (µg/m3)	Pb (µg/m3)	Ni (ng/m3)	As (ng/m3)	Benzene (µg/m3)	Benzo(a) pyrene (ng/m3)	Mn (µg/m3)
Oct-16	38.2	18.1	4.4	10.1	4.0	0.15	20.0	0.001	0.01	0.001	0.001	0.002	0.001
Nov-16	58.9	28.9	5.5	13.1	7.1	0.25	26.4	0.001	0.01	0.001	0.001	0.002	0.006
Dec-16	74.4	38.9	6.3	15.2	9.5	0.36	30.1	0.001	0.01	0.001	0.001	0.002	0.014
Jan-17	75.9	38.7	6.4	15.6	9.6	0.39	32.6	0.001	0.01	0.001	0.001	0.002	0.013
Feb-17	77.4	38.8	6.6	16.9	11.0	0.44	34.2	0.001	0.01	0.001	0.001	0.002	0.014
Mar-17	56.5	26.7	4.4	11.9	5.0	0.28	20.8	0.001	0.01	0.001	0.001	0.002	0.014