TATA

Regd Post with A/D

Ref.No.: MGM/P&E/1241/18 Date : 28/09/2018

The Member Secretary,
State Pollution Control Board, Orissa,
A/118, Nilakantha Nagar,
Bhubaneswar

Sub : Submission of Annual Environment Statement (FORM-V) for Bamebari Manganese Mine, M/s TATA Steel Ltd. for the year 2017-18.

Dear Sir,

We are enclosing herewith Annual Environment Statement in Form-V for Bamebari Manganese Mine, M/s TATA Steel Ltd. for the year ending 31st March'2018.

This is for your kind perusal.

Thanking you,

Yours faithfully,

F: TATA STEEL LTD.

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

Encl: as above.

Copy to : (1) The Regional Officer, State Pollution Control Board, Baniapat, DD College Road, Keonjhar, Orissa with enclosure.
(2) Central Pollution Control Board Southernd Conclave, Block 502, 5th & 6th Floors 1582 Rajdanga Main Road Kolkata - 700 107 (W. B.)

TATA

TATA STEEL

ENVIRONMENTAL STATEMENT

2017-18

UNDER RULE 14 OF ENVIRONMENT (PROTECTION) RULES, 1986

In

FORM - V

BAMEBARI MANGANESE MINES

TATA STEEL LIMITED

SEPTEMBER 2018

FORM V

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

ENVIRONMENTAL STATEMENT
FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 2018

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'2017 (Vide Letter No. MGM/P&E/666/17 Dt.27.09.2017)

PART – B

Water and Raw Material Consumption

(1) Water Consumption m^3/day

Process : 23.73 m^3/day (Water sprinkling – Avg. during 2017-18)
Cooling : Nil
Domestic : 67.94 m^3/day (Avg. during 2017-18)

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
Manganese Ore	Manganese Ore	Year – 2016-17 Production :- 70674.497 MT Despatch :- 82221.370 MT	Year – 2017-18 Production :- 31362.223 MT Despatch :- 63032.570 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 (2017-18) 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
	Year – 2016-17	Year – 2017-18
(i) From Process		
Waste containing Oil	32 Kg	61 Kg
Used Oil (in Ltrs.)	88 Ltrs	415 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
	Year – 2016-17	Year – 2017-18
(a) From Process (Overburden rejects)	227295 MT	169830.641 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	227295 MT	169830.641 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 Are 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. 8000 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. 30,67,031/- 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 2017-18, total 45 numbers of employees (Contractual -36, Departmental- 9) covered in PME and 59 contractual employees covered in IME. 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 Monitoring at Bamebari Mn Mine (WT Confluence Point at Kassia Nallah)

Parameters	Unit	Standard	April'17 1st Report	May'17 1st Report	June'17 1st Report	July-17 1st Report	Aug'17 1st Report	Sept'17 1st Report
Dissolved Oxygen (minimum)	mg/l	4	5.2	5.4	5.8	6.3	5.8	6.1
BOD (3) days at 27°C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/ 100 ml	5000	90	170	270	410	450	510
pH Value	--	6.0-9.0	7.26	7.22	7.16	7.20	7.24	7.20
Colour (max)	Hazen	300	CL	CL	8	22	18	15
Total Dissolved Solids	mg/l	1500	128.0	124.0	120.0	124.0	116.0	108.0
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.52	0.48	0.53	0.58	0.48	0.49
Chloride (max)	mg/l	600	29.0	31.0	26.0	20.0	18.0	19.0
Sulphates (SO_4) (max)	mg/l	400	5.1	4.9	4.6	4.4	4.1	4.2
Nitrate as NO_3 (max)	mg/l	50	2.2	1.9	1.8	1.6	1.5	1.4
Fluoride as F (max)	mg/l	1.5	0.022	0.021	0.021	0.015	0.012	0.015
Phenolic Compounds as C_6H_5OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	mg/l	0.05	<0.05	<0.05	<0.05.	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
			Oct'17	Nov'17	Dec'17	Jan'18	Feb'18	Mar'18
Dissolved Oxygen (minimum)	mg/l	4	5.8	5.8	5.5	5.2	5.7	5.2
BOD (3) days at 27°C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/100 ml	5000	410	450	410	210	210	310
pH Value	--	6.0-9.0	7.19	7.24	7.32	7.35	7.39	7.28
Colour (max)	Hazen	300	5	1	CL	CL	CL	CL
Total Dissolved Solids	mg/l	1500	114.0	122.0	127.0	134.0	130.0	135.0
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.46	0.46	0.48	0.50	0.46	0.42
Chloride (max)	mg/l	600	22.0	24.0	23.0	26.0	27.0	31.0
Sulphates (SO_4) (max)	mg/l	400	4.1	4.5	4.1	4.4	4.2	5.1
Nitrate as NO_3 (max)	mg/l	50	1.5	1.7	1.6	1.8	1.6	1.84
Fluoride as F (max)	mg/l	1.5	0.016	0.016	0.018	0.021	0.019	0.022
Phenolic Compounds as C_6H_5OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Annexure – I : Surface Water Quality Monitoring at Bamebari Mn Mine (W2 Intake Point at Tindharia)

Parameters	Unit	Standard	April'17 1st Report	May'17 1st Report	June'17 1st Report	July-17 1st Report	Aug'17 1st Report	Sept'17 1st Report
Dissolved Oxygen (minimum)	mg/l	4	5.4	5.2	5.7	6.5	6.1	6.2
BOD (3) days at 27°C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/ 100 ml	5000	150	210	220	350	570	900
pH Value	--	6.0-9.0	7.29	7.24	7.12	7.18	7.28	7.16
Colour (max)	Hazen	300	CL	CL	6	20	20	16
Total Dissolved Solids	mg/l	1500	133.0	130.0	124.0	126.0	114.0	116.0
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.56	0.46	0.55	0.6	0.44	0.51
Chloride (max)	mg/l	600	32.0	33.0	27.0	22.0	16.0	22.0
Sulphates (SO_4) (max)	mg/l	400	5.6	5.2	4.9	4.8	4.3	4.4
Nitrate as NO_3 (max)	mg/l	50	2.3	2.1	2.0	1.7	1.6	1.5
Fluoride as F (max)	mg/l	1.5	0.021	0.023	0.023	0.016	0.012	0.014
Phenolic Compounds as C_6H_5OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parameters			**Oct'17**	**Nov'17**	**Dec'17**	**Jan'18**	**Feb'18**	**Mar'18**
Dissolved Oxygen (minimum)	mg/l	4	6.1	5.9	5.4	5.6	5.5	5.4
BOD (3) days at 27°C (max)	mg/l	3	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/100 ml	5000	450	510	470	220	270	450
pH Value	--	6.0-9.0	7.24	7.28	7.36	7.40	7.45	7.22
Colour (max)	Hazen	300	5	1	CL	CL	CL	CL
Total Dissolved Solids	mg/l	1500	112.	125.0	129.0	138.0	140.0	138.0
Copper as Cu (max)	mg/l	1.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	0.5	0.52	0.44	0.48	0.52	0.49	0.45
Chloride (max)	mg/l	600	20.0	26.0	25.0	29.0	32.0	33.0
Sulphates (SO_4) (max)	mg/l	400	4.2	4.4	4.5	5.6	4.9	5.2
Nitrate as NO_3 (max)	mg/l	50	1.4	1.6	1.7	2.1	2.2	1.92
Fluoride as F (max)	mg/l	1.5	0.015	0.018	0.017	0.022	0.023	0.024
Phenolic Compounds as C_6H_5OH (max)	mg/l	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium as Cd (max)	mg/l	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium as Se (max)	mg/l	0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic as As	mg/l	0.2	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cyanide as CN (max)	mg/l	0.05	ND	ND	ND	ND	ND	ND
Lead as Pb(max)	mg/l	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zinc as Zn(max)	mg/l	15	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexa Chromium as Cr^{+6}	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Anionic Detergents (max)	mg/l	1.0	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Annexure-II : Ambient Air Quality Monitoring Report, Bamebari Manganese Mine, Sampling Location-1 (Bamebari Camp)													
	PARAMETERS												
	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	O_3 ($\mu g/m^3$)	CO mg/m^3)	NH_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Ni (ng/m^3)	As (ng/m^3)	C_6H_6 ($\mu g/m^3$)	BaP (ng/m^3)	Mn $\mu g/m^3$)
Limit as per CPCB notification, New Delhi,18th Nov, 2009, for Ambient air quality	100	60	80	80	180	4	400	1	20	6	5	1	---
Sampling and Analysis done according to	IS: 5182(Part -23)-1999	USEPA CFR-40,Part-50, Appendix-L	IS: 5182 (Part-2)-2001	IS: 5182 (Part- 6)-2006	IS: 5182 (Part-9)-1974	IS 5182 : Part.10-1999	Air Sampling , 3rd Edn.By James P. Lodge (Method-401)	EPA IO-3.2	EPA IO-3.2	APHA 22nd-3114 C	IS 5182 : Part. 11	IS 5182 : Part. 12	EPA IO-3.2
April'17	68.9	34.8	4.9	14.2	7.8	0.34	29.4	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
May'17	72.9	36.4	5.3	16.3	10.5	0.38	29.2	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jun'17	47.8	22.6	<4.0	<10.2	<4.5	0.25	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
July'17	35.4	15.6	<4.1	<9.5	<4.0	0.14	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug'17	29.2	12.3	<4.0	<9.16	<4.0	<0.11	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sept'17	35.1	16.7	<4.0	<9.2	<4.0	0.14	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Oct'17	47.4	22.9	<4.1	<10.02	<4.0	0.22	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Nov'17	52.3	26.2	<4.3	11.6	<4.2	0.30	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Dec'17	67.2	33.8	4.6	13.7	6.6	0.36	<22.3	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jan'18	66.9	33.4	4.7	14.0	7.1	0.33	23.0	<0.001	<0.01	<0.001	<0.001	<0.002	< 0.001
Feb'18	67.1	33.5	4.7	14.7	7.5	0.35	23.8	<0.001	<0.01	<0.001	<0.001	<0.002	< 0.001
Mar'18	67.7	33.9	4.6	14.8	7.4	0.39	23.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

Annexure-II : Ambient Air Quality Monitoring Report, Bamebari Manganese Mine, Sampling Location-2 (Bamebari Pit)													
	PARAMETERS												
	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	O_3 ($\mu g/m^3$)	CO mg/m^3)	NH_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Ni (ng/m^3)	As (ng/m^3)	C_6H_6 ($\mu g/m^3$)	BaP (ng/m^3)	Ma $\mu g/m^3$)
Limit as per CPCB notification, New Delhi,18th Nov, 2009 for Ambient air quality	100	60	80	80	180	4	400	1	20	6	5	1	---
Sampling and Analysis done according to	IS: 5182(Part -23)-1999	USEPA CFR-40,Part-50, Appendix-L	IS 5182 (Part-2)-2001	IS: 5182 (Part- 6)-2006	IS. 5182 (Part-9)-1974	IS 5182 : Part 10-1999	Air Sampling , 3rd Edn By James P. Ledge (Method-401)	EPA IO-3.2	EPA IO-3.2	APHA 22nd-3114 C	IS 5182 : Part. 11	IS 5182 Part. 12	EPA IO-3.2
April'17	78.3	41.3	6.3	16.7	8.9	0.41	30.2	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
May'17	79.8	41.1	6.6	18.2	11.4	0.43	30.6	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Jun'17	33.2	14.2	<4.0	<9.2	<4.0	0.12	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
July'17	33.2	14.2	<4.0	<9.2	<4.0	0.12	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Aug'17	30.0	12.8	<4.1	<9.1	<4.0	<0.11	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Sept'17	38.5	18.7	<4.2	<9.8	<4.0	0.18	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Oct'17	51.1	25.0	<4.3	<11.2	<4.0	0.26	<20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Nov'17	56.3	28.3	4.7	13.7	<4.6	0.35	<21.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.001
Dec'17	71.5	36.1	5.4	15.5	7.7	0.42	24.8	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.005
Jan'18	75.8	38.5	5.3	15.3	8.3	0.40	25.5	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.013
Feb'18	74.4	37.4	5.4	16.0	10.0	0.41	27.1	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.014
Mar'18	73.3	37.0	5.3	16.4	9.5	0.44	25.7	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.015

Annexure-II : Ambient Air Quality Monitoring Report, Bamebari Manganese Mine, Sampling Location-3 (Bamebari Weigh Bridge)													
	PARAMETERS												
	PM_{10} ($\mu g/m^3$)	$PM_{2.5}$ ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	O_3 ($\mu g/m^3$)	CO mg/m³)	NH_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Ni (ng/m³)	As (ng/m³)	C_6H_6 ($\mu g/m^3$)	BaP (ng/m³)	Mn µg/m³)
Limit as per CPCB notification, New Delhi,18th Nov, 2009. for Ambient air quality	100	60	80	80	180	4	400	1	20	6	5	1	---
Sampling and Analysis done according to	IS 5182(Part -23)-1999	USEPA CFR-40,Part-50, Appendix-L	IS: 5182 (Part-2)-2001	IS: 5182 (Part- 6)-2006	IS: 5182 (Part-9)-1974	IS 5182 Part.10-1999	Air Sampling , 3rd Edn.By James P. Lodge (Method-401)	EPA IO-3.2	EPA IO-3.2	APHA 22nd-3114 C	IS 5182 : Part. 11	IS 5182 : Part. 12	EPA IO-3.2
April'17	81.9	44.8	6.7	18.3	10.7	0.43	33.3	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.012
May'17	83.4	44.2	7.3	19.1	12.7	0.46	34.2	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.014
Jun'17	61.8	30.1	4.6	12.9	<4.6	0.36	<21.4	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	<0.0016
July'17	30.6	13.1	<4.0	<9.1	<4.0	0.12	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Aug'17	32.9	14.3	<4.0	<9.4	<4.0	0.13	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Sept'17	41.6	20.1	4.4	11.4	<4.0	0.24	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Oct'17	56.0	28.1	4.5	12.3	<4.0	0.30	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Nov'17	61.5	31.1	5.0	14.4	<5.2	0.39	<22.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Dec'17	74.7	37.7	5.7	16.0	7.9	0.45	26.6	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.009
Jan'18	80.3	40.8	5.7	16.1	9.2	0.43	27.4	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.014
Feb'18	79.2	41.0	6.0	16.8	11.3	0.44	29.6	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.018
Mar'18	79.3	40.9	6.0	17.3	10.9	0.47	28.9	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	0.019