o/c

Regd Post with A/D

Ref.No.: MGM/P&E/709 /19

Date : 26/09/2019

The Member Secretary,
State Pollution Control Board, Orissa,
A/118, Nilakantha Nagar,
Bhubaneswar, Odisha-751012

Sub : Submission of Annual Environment Statement (FORM-V) for Tiringpahar Manganese Mine, M/s TATA Steel Ltd. for the year 2018-19.

Dear Sir,

We are enclosing herewith Annual Environment Statement in Form-V for Tiringpahar Manganese Mine, M/s TATA Steel Ltd. for the year ending 31st March'2019.

This is for your kind perusal.

Thanking you,

Yours faithfully,

F: TATA STEEL LTD.

Agent & 26/09/19
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, Odisha-758001
(2) Central Pollution Control Board Southernd Conclave, Block 502, 5th & 6th Floors 1582 Rajdanga Main Road Kolkata - 700 107 (W. B.)

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

ENVIRONMENTAL STATEMENT

2018-19

UNDER RULE 14 OF ENVIRONMENT (PROTECTION) RULES, 1986

In

FORM - V

TIRINGPAHAR MANGANESE MINES

TATA STEEL LIMITED

SEPTEMBER 2019

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

ENVIRONMENTAL STATEMENT
FOR THE FINANCIAL YEAR ENDING THE 31ST MARCH 2019

PART – A

(i)	Name and Address of the Owner / occupier of the industry operation or process.	:	**TIRINGPAHAR 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	:	85000 TPA (Manganese Ore)
(iv)	Year of Establishment	:	1972
(v)	Date of the last environmental statement submitted	:	28th Sept'2018

PART – B

Water and Raw Material Consumption

(1) Water Consumption m^3/day

Process : 10.27 m^3/day (Water sprinkling – Avg. during 2018- 19)
Cooling : Nil
Domestic : 10.18 m3/day (Avg. during 2018-19)

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 – 2017-18 Production :- 56845.641 MT Dispatch :- 51508.890 MT	Year – 2018-19 Production :- 84923.229 MT Dispatch :- 82963.770MT

Remarks : Produced Manganese Ore dispatched to 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 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 and Other Waste (Management and Transboundary Movement) Rules, 2016]

Hazardous Wastes	Total Quantity	
	During the previous Financial year	During the current Financial year
	Year – 2017-18	Year – 2018-19
(i) From Process Waste Oil (in Ltrs.) Used Oil (in Ltrs.) Cotton Waste (in Kgs) Duster (in Nos.) Filters (in Nos.)	Nil*	Nil*
(ii) From pollution control facilities	Nil	Nil

* The mine has no facility for maintenance of equipment deployed at the mine itself. Viewing the close proximity and same management control, the equipment of Tiringpahar Mn.Mine are being maintained at Bamebari Mn.Mine

PART – E

Solid Wastes

	Total Quantity	
	During the previous Financial year	During the current Financial year
	Year – 2017-18	Year – 2018 -19
(a) From Process (Overburden rejects)	476217.107 MT	461201.0 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	476217.107 MT	461201.0 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.

  The mine has no facility for maintenance of equipment deployed at the mine itself. Viewing the close proximity and same management control, the equipment of Tiringpahar Mn.Mine are being maintained at Bamebari Mn.Mine.

  - 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 sweat morrum over it.
3. Wet drilling has been implemented in all drills. Controlled blasting pattern is being followed.
4. 18640 nos. of saplings of various forestry species were planted covering an area of 1.64 Hectare within the leasehold areas of Tiringpahar Mn.Mine with a during the year 2018-19.
5. The utilization of environment management for the period 2018-19 was Rs. 2340230/- 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 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.

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 centralized residential colony within Bamebari Mn.Mine.

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 FY 2018-19, PME was conducted for 64 contractual employees and 01 departmental employees. 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,
Tiringpahar Mn.Mine,
M/s.TATA STEEL LTD

Annexure – I : Surface Water Quality Monitoring at Tiringpahar Mn Mine (W1 Kundra Nallah Entering Tiringpahar)

Parameters	Unit	Standard	April'18 Result	May'18 Result	June'18 Result	July'18 Result	Aug-18 Result	Sept-18 Result
Dissolved Oxygen (minimum)	mg/l	**4**	5.1	5.4	5.8	5	4.9	4.8
BOD (3) days at 27^0C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/ 100 ml	**5000**	170	470	240	400	98	70
pH Value	--	**6.0-9.0**	7.24	7.28	7.28	7.28	7.16	7.2
Colour (max)	Hazen	**300**	CL	CL	1	CL	1	CL
Total Dissolved Solids	mg/l	**1500**	120	125	137	130	126	128
Copper as Cu (max)	mg/l	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	**0.5**	0.39	0.42	0.36	0.32	0.44	0.48
Chloride (max)	mg/l	**600**	27	28	36	32	22	26
Sulphates (SO_4) (max)	mg/l	**400**	4.1	4.4	5.6	4	4.6	4.5
Nitrate as NO_3 (max)	mg/l	**50**	1.44	1.52	1.82	1.6	1.5	1.4
Fluoride as F (max)	mg/l	**1.5**	0.013	0.011	0.021	0.011	0.017	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'18	**Nov'18**	**Dec'18**	**Jan'19**	**Feb-19**	**March -19**
Dissolved Oxygen (minimum)	mg/l	**4**	6.5	6.2	4.6	4.6	4.2	5.6
BOD (3) days at 27^0C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/100 ml	**5000**	350	380	176	178	120	210
pH Value	--	**6.0-9.0**	7.43	7.35	7.56	7.45	7.41	7.54
Colour (max)	Hazen	**300**	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	**1500**	151	145	121.5	120	126	128
Copper as Cu (max)	mg/l	**1.5**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron as Fe (max)	mg/l	**0.5**	0.26	0.21	0.45	0.56	0.51	0.51
Chloride (max)	mg/l	**600**	35	32	21	20	26	32
Sulphates (SO_4) (max)	mg/l	**400**	1.6	1.2	4.2	4.3	4.1	5.1
Nitrate as NO_3 (max)	mg/l	**50**	1.7	1.32	1.48	1.45	1.51	2.3
Fluoride as F (max)	mg/l	**1.5**	0.005	0.002	0.049	0.045	0.041	0.056
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 Tiringpahar Mn Mine (W2 Kundra Nallah Leaving Tiringpahar)

Parameters	Unit	Standard	April'18 Result	May'18 Result	June'18 Result	July'18 Result	Aug-18 Result	Sept-18 Result
Dissolved Oxygen (minimum)	mg/l	**4**	5.3	5.8	6.1	5.2	5.2	5.3
BOD (3) days at 27^0C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/100 ml	**5000**	210	510	310	460	120	98
pH Value	--	**6.0-9.0**	7.2	7.22	7.16	7.21	7.22	7.24
Colour (max)	Hazen	**300**	CL	CL	2	CL	1	CL
Total Dissolved Solids	mg/l	**1500**	128	134	142	136	128	130
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	0.45	0.42	0.38	0.5	0.52
Chloride (max)	mg/l	**600**	28	30	40	36	24	29
Sulphates (SO_4) (max)	mg/l	**400**	4.3	4.6	5.6	4.1	5.1	5.3
Nitrate as NO_3 (max)	mg/l	**50**	1.48	1.58	1.88	1.68	2.1	2.2
Fluoride as F (max)	mg/l	**1.5**	0.016	0.015	0.022	0.012	0.02	0.018
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'18**	**Nov'18**	**Dec'18**	**Jan19**	**Feb 19**	**March-19**
Dissolved Oxygen (minimum)	mg/l	**4**	6.9	6.4	5.4	5.4	5.3	6.4
BOD (3) days at 27^0C (max)	mg/l	**3**	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Total Coli form	MPN/100 ml	**5000**	400	410	221	232	180	240
pH Value	--	**6.0-9.0**	7.52	7.49	7.35	7.35	7.32	7.61
Colour (max)	Hazen	**300**	CL	CL	CL	CL	CL	CL
Total Dissolved Solids	mg/l	**1500**	156	451	126.5	125.6	131	134
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**	0.32	0.32	0.49	0.21	0.28	0.62
Chloride (max)	mg/l	**600**	40	38	27	26	31	44
Sulphates (SO_4) (max)	mg/l	**400**	1.71	4.6	4.9	4.6	4.52	6.4
Nitrate as NO_3 (max)	mg/l	**50**	1.91	2.1	0.47	0.59	0.61	0.78
Fluoride as F (max)	mg/l	**1.5**	0.006	0.008	0.045	0.025	0.029	0.064
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, Tiringpahar Manganese Mine, Sampling Location-1 (Guruda 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)	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
Apr-18	48.14	22.99	4.22	9.88	<4.0	0.27	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
May-18	45.86	22.04	4.20	9.85	<4.0	0.29	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jun-18	44.03	20.08	4.20	9.75	<4.0	0.25	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-18	48.95	19.39	3.65	9.63	<4.0	0.22	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-18	31.84	15.61	<4.0	9.33	<4.0	0.22	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-18	48.95	19.39	3.65	9.63	<4.0	0.22	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Oct-18	40.64	18.82	< 4.0	9.40	< 4.0	0.14	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Nov-18	43.35	19.76	< 4.0	9.35	4.30	0.26	20.30	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Dec-18	46.89	19.86	< 4.0	9.24	4.50	0.32	22.37	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Jan-19	48.04	20.20	4.53	9.54	4.41	0.55	24.40	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Feb-19	47.08	18.98	5.18	9.78	4.78	0.50	22.52	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Mar-19	42.78	18.53	4.43	9.54	4.28	0.39	22.98	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001

Annexure-II : Ambient Air Quality Monitoring Report, Tiringpahar Manganese Mine, Sampling Location-2 (Purunapani 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)	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
Apr-18	51.06	25.43	4.28	10.55	<4.0	0.23	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
May-18	42.76	20.40	<4.0	9.40	<4.0	0.24	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jun-18	40.10	18.89	<4.0	9.17	<4.0	0.22	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Jul-18	39.54	17.70	<4.0	8.80	<4.0	0.21	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Aug-18	30.38	15.90	4.22	8.84	<4.0	0.17	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Sep-18	33.59	16.93	4.27	9.40	<4.0	0.28	<20.0	<0.001	<0.01	<0.001	<0.001	<0.002	<0.001
Oct-18	38.3	16.5	4.1	9.4	< 4.0	0.24	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Nov-18	42.6	22.8	4.4	9.9	< 4.0	0.36	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Dec-18	51.37	26.87	4.67	10.18	< 4.0	0.38	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Jan-19	54.98	28.39	4.68	10.22	< 4.0	0.51	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Feb-19	54.98	28.39	4.68	10.22	< 4.0	0.51	< 20.0	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001
Mar-19	61.24	27.38	4.80	10.00	4.50	0.38	20.74	< 0.001	< 0.01	< 0.001	< 0.001	< 0.002	< 0.001