

# Six-Months Compliance Status Report of Talcher Fertilizers Limited, Talcher, Odisha

April-September 2019  
Report



**CSIR-National Environmental Engineering Research Institute**  
Nehru Marg, Nagpur

## 1.0 About the Industry

In 1971, The Fertilizer Corporation of India Ltd. (FCIL), set up Talcher Unit over an area of 902 acre in the district of Angul, Odisha which is located about 126 km away from Bhubaneswar to produce urea using coal as feed stock. Licensor for the Coal gasification was M/s Krupp Koppers, Germany and for Ammonia and Urea units Ammonia synthesis, M/s Tecnimont, Italy.

Commercial Production of Ammonia and Urea commenced on 01.11.1980 with Ammonia and Urea production capacity of 900 and 1500 Tons per day respectively. However due to frequent power restriction, obsolete and mismatch of technology and precarious steam balance the plant could not be sustained. The Board for Industrial and Financial Reconstruction (BIFR) declared the FCIL sick in 1992 and in 2002 Government of India initiated actions to close the company.

Due to shortage of domestic Urea and availability of large land banks, infrastructure and tied-up rail, water & electricity in the units of FCIL, GoI in the year 2007 decided to revive all units of FCIL. Government of India approved Policy for new Investments in the Urea Sector in September 2008 and constituted Empowered Committee of Secretaries (ECOS) in October 2008 with the mandate to evaluate all options of revival of closed units of FCIL/HFCL and to make suitable recommendations for consideration of the Government. In August, 2011, the Cabinet Committee on Economic Affairs (CCEA) had approved the Draft Rehabilitation Scheme (DRS) for revival of all the Units of FCIL and HFCL. DRS envisaged revival of Talcher Unit by the consortium of M/s.Rashtriya Chemical & Fertilizers Limited (RCF), M/s Coal India Limited (CIL) and M/s GAIL (India) Ltd. (GAIL).

## 2.0 About the Report

TFL received environmental clearance from MoEF&CC (F. No. J-11011/231/2013-1A-II(I) dated 9<sup>th</sup> February, 2018) for Setting up Ammonia & Urea Fertilizer Unit at Village Vikrampur, Tehsil Talcher, District Angul (Odisha); under the provisions of EIA Notification, 2006 and the amendments made therein, subject to the compliance of terms and conditions (**Annexure**

1):According to the suggestion given by MoEF&CC, six-month environmental status report should be furnished to the respective Regional Office of MoEF&CC, the respective Zonal Office of CPCB and SPCB. In this regard, the environmental monitoring was carried out by CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur for the period of October 2018 to March 2019. The report is formulated based on the data provided by CSIR-NEERI.

**3.0 Compliance report for EC condition 9(i): In view of the base line air quality data for PM<sub>10</sub> already exceeding the prescribed standards, one more season data to be collected to confirm the consistency of readings/values, and for suggesting mitigating measures accordingly.**

The baseline status with respect to ambient air quality has been established through a scientifically designed ambient air quality monitoring network based on the following considerations:

- Meteorological conditions prevailing within study area;
- Topography of the study area;
- Representatives of background air quality; and
- Representatives of likely impact areas.

Air Quality monitoring has been conducted at eight sampling locations during the pre- monsoon season (April- September 2019).The location of ambient air sampling stations has been presented below in **Table 1**.

**Table 1: Details of sampling locations**

Sl. No	Location Name	With respect to Project Site	
		Dir.	Distance
01.	Tech. Building of FCI	-	-
02.	Housing Board Colony	ENE	1.2 km
03.	Karnpur village	W	4.5 Km
04.	TFL Guest House	-	-
05.	Balanda village	NW	2.5 Km
06.	Kukudanga village	SW	2.5 km

Salient features of the observations made with respect to PM<sub>10</sub> during the study period are summarized below in **Table 2** as under:

**Table 2: Summary of PM<sub>10</sub> concentrations ( $\mu\text{g}/\text{m}^3$ ) (April –September 2019)**

Sampling Location	Min.	24-hr Average	Max.	NAAQS for PM <sub>10</sub> $\mu\text{g}/\text{m}^3$
Technical Building of FCI	47	67	111	100
Housing Board Colony	45	68	106	
Karnpur village	38	56	63	
TFL Guest House	44	57	103	
Balanda village	63	79	106	
Kukudanga village	33	46	56	

The average concentrations of PM<sub>10</sub> at all the six sampling locations were observed in the range of 46 to 79 $\mu\text{g}/\text{m}^3$ . It has been observed that the minimum value of 46  $\mu\text{g}/\text{m}^3$  have been observed at Kukudanga, whereas the maximum value of 79 $\mu\text{g}/\text{m}^3$  was observed at Balanda Village.

**4.0 Compliance report for EC condition 9(iv):The incremental ground level concentrations (GLCs) for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>& NO<sub>2</sub> due to the increased vehicular and other allied / developmental activities, shall be analysed and reported for actual impact of the project, besides remedial measures.**

Construction activities were started in the beginning of August 2018. Reconnaissance was undertaken to establish the existing status of air environment in the study region. Ambient Air Quality Monitoring (AAQM) locations were selected based on guidelines of network siting criteria based on meteorological data of Monsoon and post-Monsoon season (April to September, 2019). The ambient air quality monitoring was carried out in the study area of 10 km radial distance around the proposed site, details of these locations are presented in **Table 3**. Administrative building, Bikrampur housing board colony and guest houses are near to the proposed project site. The average values of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> and NH<sub>3</sub> are given in **Table 4 and 5**.

**Table 3 : Details of Air Quality Monitoring Locations  
(Post-Monsoon Season –April to September 2019)**

Sr. No.	Sample Code	Sampling Locations	Geographical Position
1.	TFL/A1	Administrative Building TFL	20°54'42.8" N 85°09'38.4" E
2.	TFL/A2	Housing Board Colony, Bikrampur	20°54'19.3" N 85°10'20.2" E
3.	TFL/A3	Village Karnapur	20°54'26.4" N 85°07'06.1" E
4.	TFL/A4	TFL-Guest House	20°54'14.8" N 85°09'56.9" E
5.	TFL/A5	Village Balanda	20°55'31.0" N 85°09'26.8" E
6.	TFL/A6	Village Kukudanga	20°53'23.3" N 85°08'50.8" E

**Table 4 Air Quality Status (PM<sub>10</sub>) within the Study Area**Units:  $\mu\text{g}/\text{m}^3$ 

Average: 24 hrs.

Sr. No.	Sampling Location	PM <sub>10</sub>					
		April 2019	May 2019	June 2019	July 2019	August 2019	September 2019
1	Administrative Building TFL	76	69	111	47	47	52
2	Housing Board Colony, Bikrampur	72	74	106	51	45	61
3	Village Karnapur	62	59	63	56	38	55
4	TFL-Guest House	57	49	103	68	44	46
5	Village Balanda	67	63	106	74	87	106
6	Village Kukudanga	56	50	53	40	33	46
	<b>Permissible limits</b>	<b>100</b>					

**Table 4 Air Quality Status (PM<sub>2.5</sub>) within the Study Area**Units:  $\mu\text{g}/\text{m}^3$ 

Average: 24 hrs.

Sr. No.	Sampling Location	PM <sub>2.5</sub>					
		April 2019	May 2019	June 2019	July 2019	August 2019	September 2019
1	Administrative Building TFL	55	49	47	36	24	38
2	Housing Board Colony, Bikrampur	44	42	55	52	48	50
3	Village Karnapur	42	13	44	34	32	51
4	TFL-Guest House	46	41	48	47	33	40
5	Village Balanda	53	48	65	59	57	65
6	Village Kukudanga	32	29	39	27	25	35
	<b>Permissible limits</b>	<b>60</b>					

**Table 5 Air Quality Status (SO<sub>2</sub>) within the Study Area Units:  $\mu\text{g}/\text{m}^3$** Units:  $\mu\text{g}/\text{m}^3$ 

Average: 24 hrs.

Sr. No.	Sampling Location	SO <sub>2</sub>					
		April 2019	May 2019	June 2019	July 2019	August 2019	September 2019
1	Administrative Building TFL	61	6	23	9	12	13
2	Housing Board Colony, Bikrampur	59	14	32	10	17	20
3	Village Karnapur	38	13	9	6	7	9
4	TFL-Guest House	34	13	21	7	12	13
5	Village Balanda	45	10	8	9	14	26
6	Village Kukudanga	37	16	13	8	11	11
	<b>Permissible limits</b>	<b>80</b>					

**Table 5 Air Quality Status (NO<sub>2</sub>) within the Study Area Units: µg/m<sup>3</sup>**  
 Units: µg/m<sup>3</sup> Average: 24 hrs.

Sr. No.	Sampling Location	NO <sub>2</sub>					
		April 2019	May 2019	June 2019	July 2019	August 2019	September 2019
1	Administrative Building TFL	47	116	94	69	28	68
2	Housing Board Colony, Bikrampur	31	112	117	59	21	34
3	Village Karnapur	45	55	31	38	16	31
4	TFL-Guest House	44	71	108	46	20	51
5	Village Balanda	42	68	32	48	22	48
6	Village Kukudanga	40	117	38	33	16	32
<b>Permissible limits</b>		<b>80</b>					

**Table 5 Air Quality Status (NH<sub>3</sub>) within the Study Area Units: µg/m<sup>3</sup>**  
 Units: µg/m<sup>3</sup> Average: 24 hrs.

Sr. No.	Sampling Location	NH <sub>3</sub>					
		April 2019	May 2019	June 2019	July 2019	August 2019	September 2019
1	Administrative Building TFL	54	51	54	35	29	28
2	Housing Board Colony, Bikrampur	24	31	15	12	12	27
3	Village Karnapur	33	41	15	11	27	35
4	TFL-Guest House	34	29	29	22	37	21
5	Village Balanda	23	27	16	12	17	43
6	Village Kukudanga	27	39	21	16	24	50
<b>Permissible limits</b>		<b>400</b>					

Baseline data provided in the EIA report clearly states that PM<sub>10</sub> and PM<sub>2.5</sub> concentrations in the buffer area of proposed project site is quite high. The concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> show an increasing trend during April to June, maximum PM<sub>10</sub> concentrations were recorded during June month with values exceeding permissible limits at maximum sites. July to September recorded normal levels. This is due to advent of monsoon during these months. PM<sub>10</sub> and PM<sub>2.5</sub> concentrations near the project sites (Administrative building, housing board colony and guest house) in June are above permissible limits than that of other locations. This is mainly due to the construction activities occurring at the proposed project site. Sites close to coal mining areas like

Balanda village has shown great increase in particulate concentrations also exceeding the permissible values in the month of June.

Slight variations in SO<sub>2</sub>, NO<sub>2</sub> and NH<sub>3</sub> were observed during the study period. Excess concentrations of NO<sub>2</sub> were observed during month of May at Administrative building, housing board colony and kukudanga. During the month of June housing board colony and guest house also showed excess NO<sub>2</sub> levels. All other values are within the permissible limits.

The detailed air monitoring report is enclosed as **Annexure 2**.

## 5.0 Water Environment

### 5.1. Methodology of Water Quality Assessment

Based on the reconnaissance, the type of water bodies and their relative importance with the project site; grab water sample were collected in April – September 2019. Two samples were taken from Bramhaniriver and one sample was collected from Nandira river within 10km radius study area. Ground water samples were taken from 3 locations from hand pumps of different villages within study area.

**Table 6: Water Quality- Sampling Location Details**

Sr. No.	Sample code	Sampling Locations	Geographical Position	
			Latitude	Longitude
<b>Surface water</b>				
<b>Bramhani River</b>				
1	SW/1	Near Village Talcher	20°57'05.5" N	85°14'25.8" E
2	SW/2	Near Village Sarang	20°55'08.3" N	85°14'11.1" E
<b>Nandira River</b>				
3	SW/3	Near NTPC Talcher	20°54'04.8" N	85°13'01.2" E
<b>Ground Water (Hand Pump)</b>				
4	GW/1	Village Tentulei	20°55'11.2" N	85°10'17.5" E
5	GW/2	Village Balanda	20°55'29.0" N	85°09'31.8" E
6	GW/3	Village Kukudanga	20°53'22.5" N	85°08'51.0" E

Sampling, preservation and transport of water samples from the field was done as per of guidance manual ISO (ISO 5667-1; 1980 water quality sampling part I: ISO 5667-11: 1993 part II) for surface and groundwater sources. Samples were analyzed for physico-chemical characteristics including physical,



inorganic, organic, nutrient and heavy metals. Bacteriological characteristics for total and faecal coliforms were also analyzed as per Standard methods for examination of water & Wastewater (APHA). The locations of water quality monitoring stations for surface and groundwater sources are listed in **Table 6**. Quality of water from April to September 2019 is given in **Table 7 (Surface water) and 8 (Groundwater)**.

**Table 7: Characteristics of Surface Water Samples  
(Results are expressed in mg/L, unless otherwise stated)**

**April 2019**

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
		Bramhani River		Nandira River	
		Nr. Village Talcher (SW/1)	Nr. Village Sarang (SW/2)	Nr. NTPC Talcher (SW/3)	
<b>Physical</b>					
1.	Temperature (°C)	26.9	26.1	26.4	-
2.	pH	8.4	8.1	8.2	6.5-8.5
3.	Total Dissolved Solid	133	159	366	500/2000
4.	Suspended Solid	1.36	1.4	2.32	-
5.	Turbidity (NTU)	0.32	0.31	0.35	5/10
<b>Chemical</b>					
1.	Total Alkalinity as CaCO <sub>3</sub>	92	84	184	200/600
2.	Chloride as Cl	12	24	44	250/1000
3.	Sulphate as SO <sub>4</sub>	49	19	40	200/400
4.	Nitrate as NO <sub>3</sub>	2.42	1.42	9.14	45/100
5.	Fluoride as F	0.21	0.19	0.82	1.0/1.5
6.	Total Hardness as CaCO <sub>3</sub>	134	104	192	300/600
7.	Calcium Hardness as Ca	118	96	130	75/200*
8.	Mag. Hardness as Mg	16	8	62	30/100
9.	Dissolved Oxygen	2.9	3.9	4.2	-
10.	BOD	0.7	0.3	0.4	-
11.	COD	32	29	23	-
12.	Sodium as Na	7	9	40	-
13.	Potassium as K	1	2	8	-
14.	Silica	0.3144	0.0078	0.0088	
<b>Heavy Metals</b>					
1.	Iron as Fe	4.2448	ND	ND	0.3/NR
2.	Manganese as Mn	0.0261	0.0340	0.0325	0.1/0.3
3.	Chromium as Cr	0.0872	0.0096	0.0067	0.05/NR
4.	Lead as Pb	0.0144	0.1691	0.1680	0.01/NR
5.	Zinc as Zn	0.0565	0.0941	0.0795	5.0/15

6.	Cadmium as Cd		0.0009	0.0067	0.0067	0.003/NR
7.	Copper as Cu		0.0134	0.0106	0.0105	0.05/1.5
8.	Nickel as Ni		0.0071	0.0137	0.0126	0.02/NR
9.	Arsenic as As		0.7574	ND	ND	0.01
<b>Others</b>						
1	Oil & Grease		0.0015	0.0078	0.0088	0.01/0.03
2	Coliform Organisms (CFU/100 ml)	Total Coliform	785	765	395	-
		Faecal Coliform	465	565	140	-

**May 2019**

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)	
		Bramhani River		Nandira River		
		Nr. Village Talcher (SW/1)	Nr. Village Sarang (SW/2)	Nr. NTPC Talcher (SW/3)		
<b>Physical</b>						
6.	Temperature (°C)	32.5	34.6	32.6	-	
7.	pH	7.81	8.08	8.25	6.5-8.5	
8.	Total Dissolved Solid	104	96	355	500/2000	
9.	Suspended Solid	<1	5	3	-	
10.	Turbidity (NTU)	<1	<1	<1	5/10	
<b>Chemical</b>						
15.	Total Alkalinity as CaCO <sub>3</sub>	68	80	136	200/600	
16.	Chloride as Cl	14	16	45	250/1000	
17.	Sulphate as SO <sub>4</sub>	7	9	78	200/400	
18.	Nitrate as NO <sub>3</sub>	1	3	17	45/100	
19.	Fluoride as F	0.34	0.13	0.49	1.0/1.5	
20.	Total Hardness as CaCO <sub>3</sub>	71	65	200	300/600	
21.	Calcium Hardness as Ca	60	57	142	75/200*	
22.	Mag. Hardness as Mg	11	8	58	30/100	
23.	Dissolved Oxygen	5.0	5.4	4.8	-	
24.	BOD	150	64	42	-	
25.	COD	<3	<3	<3	-	
26.	Sodium as Na	8	8	32	-	
27.	Potassium as K	2	2	13	-	
<b>Others</b>						
1	Oil & Grease		0.010	0.013	0.005	0.01/0.03
2	Coliform Organisms (CFU/100 ml)	Total Coliform	100	530	320	-
		Faecal Coliform	30	140	120	-

**June 2019**

Sr. No.	Parameters		Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
			Bramhani River		Nandira River	
			Nr. Village Talcher (SW/1)	Nr. Village Sarang (SW/2)	Nr. NTPC Talcher (SW/3)	
<b>Physical</b>						
11.	Temperature (°C)		32.4	33.6	30.3	-
12.	pH		7.3	8.2	6.9	6.5-8.5
13.	Total Dissolved Solid		98	92	339	500/2000
14.	Suspended Solid		<1	2	6	-
15.	Turbidity (NTU)		<1	<1	9	5/10
<b>Chemical</b>						
28.	Total Alkalinity as CaCO <sub>3</sub>		51	70	143	200/600
29.	Chloride as Cl		15	18	42	250/1000
30.	Sulphate as SO <sub>4</sub>		11	17	68	200/400
31.	Nitrate as NO <sub>3</sub>		2	3	13	45/100
32.	Total Hardness as CaCO <sub>3</sub>		67	97	231	300/600
33.	Calcium Hardness as Ca		63	90	182	75/200*
34.	Mag. Hardness as Mg		4	7	49	30/100
35.	Dissolved Oxygen		3	3.6	2.8	-
36.	BOD		<3	<3	<3	-
37.	COD		10	12	16	-
38.	Sodium as Na		5	6	12	-
39.	Potassium as K		2	2	7	-
<b>Others</b>						
1	Oil & Grease		0.027	0.019	0.034	0.01/0.03
2	Coliform Organisms (CFU/100 ml)	Total Coliform	340	800	540	-
		Faecal Coliform	160	380	180	-

**July 2019**

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)	
		Bramhani River		Nandira River		
		Nr. Village Talcher (SW/1)	Nr. Village Sarang (SW/2)	Nr. NTPC Talcher (SW/3)		
<b>Physical</b>						
16.	Temperature (°C)	33.3	32.3	32.4	-	
17.	pH	7.9	7.9	8.5	6.5-8.5	
18.	Total Dissolved Solid	142	169	343	500/2000	
19.	Suspended Solid	3	4	12	-	
20.	Turbidity (NTU)	<1	<1	9	5/10	
<b>Chemical</b>						
40.	Total Alkalinity as CaCO <sub>3</sub>	62	86	152	200/600	
41.	Chloride as Cl	16	21	43	250/1000	
42.	Sulphate as SO <sub>4</sub>	26	22	80	200/400	
43.	Nitrate as NO <sub>3</sub>	10	6	8	45/100	
44.	Fluoride as F	0.18	0.08	0.20	1.0/1.5	
45.	Total Hardness as CaCO <sub>3</sub>	95	122	234	300/600	
46.	Calcium Hardness as Ca	87	114	184	75/200*	
47.	Mag. Hardness as Mg	8	8	50	30/100	
48.	Dissolved Oxygen	4.0	4.4	5.5	-	
49.	BOD	136	52	40	-	
50.	COD	<3	<3	<3	-	
51.	Sodium as Na	6	8	19	-	
52.	Potassium as K	2	2	9	-	
<b>Others</b>						
1	Oil & Grease	0.0013	0.0034	0.0042	0.01/0.03	
2	Coliform Organisms (CFU/100 ml)	Total Coliform	320	560	420	-
		Faecal Coliform	200	100	220	-

August 2019

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)	
		Bramhani River		Nandira River		
		Nr. Village Talcher (SW/1)	Nr. Village Sarang (SW/2)	Nr. NTPC Talcher (SW/3)		
<b>Physical</b>						
21.	Temperature (°C)	29.8	29.9	30.5	-	
22.	Turbidity (NTU)	4	4	<1	5/10	
23.	pH	7.5	7.6	7.8	6.5-8.5	
24.	Total Dissolved Solid	199	201	398	500/2000	
25.	Suspended Solid	8	10	8	-	
<b>Chemical</b>						
53.	Total Alkalinity as CaCO <sub>3</sub>	98	92	182	200/600	
54.	Chloride as Cl	21	19	39	250/1000	
55.	Sulphate as SO <sub>4</sub>	39	44	82	200/400	
56.	Nitrate as NO <sub>3</sub>	7	9	7	45/100	
57.	Fluoride as F	0.36	0.16	0.43	1.0/1.5	
58.	Total Hardness as CaCO <sub>3</sub>	78	150	262	300/600	
59.	Calcium Hardness as Ca	58	138	194	75/200*	
60.	Mag. Hardness as Mg	20	12	68	30/100	
61.	Dissolved Oxygen	4.8	5.0	5.5		
62.	BOD	90	40	22		
63.	COD	<3	<3	<3		
64.	Sodium as Na	39	7	33	-	
65.	Potassium as K	2.5	2	7	-	
<b>Heavy Metals</b>						
10.	Iron as Fe	2.485	4.307	0.251	0.3/NR	
11.	Manganese as Mn	ND	ND	ND	0.1/0.3	
12.	Total Chromium as Cr	ND	ND	ND	0.05/NR	
13.	Lead as Pb	0.001	0.039	0.008	0.01/NR	
14.	Zinc as Zn	ND	0.466	0.191	5.0/15	
15.	Cadmium as Cd	0.001	0.002	0.001	0.003/NR	
16.	Copper as Cu	0.005	ND	ND	0.05/1.5	
17.	Nickel as Ni	ND	ND	ND	0.02/NR	
18.	Arsenic as As	0.001	ND	ND	0.01	
<b>Others</b>						
1	Oil & Grease	0.0010	0.0034	0.0023	0.01/0.03	
2	Coliform Organisms (CFU/100 ml)	Total Coliform	400	860	370	-
		Feacal Coliform	200	160	180	-

September 2019

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)	
		Bramhani River		Nandira River		
		Nr. Village Talcher (SW/1)	Nr. Village Sarang (SW/2)	Nr. NTPC Talcher (SW/3)		
<b>Physical</b>						
26.	Temperature (°C)	28.9	28.8	29.5	-	
27.	Turbidity (NTU)	7	1	1	5/10	
28.	pH	8.3	8.4	8.0	6.5-8.5	
29.	Total Dissolved Solid	232	194	359	500/2000	
30.	Suspended Solid	10	1	4	-	
<b>Chemical</b>						
66.	Total Alkalinity as CaCO <sub>3</sub>	92	84	172	200/600	
67.	Chloride as Cl	28	22	39	250/1000	
68.	Sulphate as SO <sub>4</sub>	42	44	77	200/400	
69.	Nitrate as NO <sub>3</sub>	8	9	7	45/100	
70.	Fluoride as F	0.28	0.18	0.33	1.0/1.5	
71.	Total Hardness as CaCO <sub>3</sub>	54	138	200	300/600	
72.	Calcium Hardness as Ca	42	106	144	75/200*	
73.	Mag. Hardness as Mg	12	32	56	30/100	
74.	Dissolved Oxygen	5.0	5.2	5.6		
75.	BOD	84	42	25		
76.	COD	<3	<3	<3		
77.	Sodium as Na	65	7	39	-	
78.	Potassium as K	3	2	7	-	
<b>Heavy Metals</b>						
19.	Iron as Fe	ND	1.043	0.700	0.3/NR	
20.	Manganese as Mn	0.199	0.202	0.109	0.1/0.3	
21.	Total Chromium as Cr	ND	0.127	0.011	0.05/NR	
22.	Lead as Pb	ND	0.050	0.006	0.01/NR	
23.	Zinc as Zn	0.006	0.032	0.002	5.0/15	
24.	Cadmium as Cd	ND	0.003	0.001	0.003/NR	
25.	Copper as Cu	ND	0.018	ND	0.05/1.5	
26.	Nickel as Ni	0.011	0.019	0.005	0.02/NR	
27.	Arsenic as As	ND	ND	ND	0.01	
<b>Others</b>						
1	Oil & Grease	0.0042	0.0028	0.0034	0.01/0.03	
2	Coliform Organisms (CFU/100 ml)	Total Coliform	520	780	340	-
		Feacal Coliform	220	180	140	-

**Table 8: Physico-Chemical Characteristics of Ground Water Samples  
(Results are expressed in mg/L, unless otherwise stated)**

**April 2019**

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
		Ground Water (Hand Pump)			
		Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
<b>Physical</b>					
1.	pH	7.9	8.2	8.1	6.5-8.5
2.	Temperature (°C)	24.1	26.7	26.8	-
3.	Turbidity (NTU)	0.72	0.37	0.08	1/5
4.	Total Suspended Solid	1.64	2.4	7.4	-
5.	Total Dissolved Solid	585	790	470	500/2000
<b>Chemical</b>					
1.	Total Alkalinity as CaCO <sub>3</sub>	350	312	310	200/600
2.	Chloride as Cl	122	202	74	250/1000
3.	Sulphate as SO <sub>4</sub>	63	77	73	200/400
4.	Nitrate as NO <sub>3</sub>	2.42	6.5	4.38	45/100
5.	Fluoride as F	0.38	0.19	0.68	1.0/1.5
6.	Total Hardness as CaCO <sub>3</sub>	464	444	320	300/600
7.	Calcium Hardness as Ca	316	332	168	75/200*
8.	Mag. Hardness as Mg	148	112	152	30/100
9.	Sodium as Na	70	114	75	-
10.	Potassium as K	1	9	1	-
11.	Silica as SiO <sub>2</sub>	ND	ND	ND	-
<b>Heavy Metals</b>					
1.	Iron as Fe	ND	3.272	ND	0.3/NR
2.	Manganese as Mn	0.0589	0.214	0.0268	0.1/0.3
3.	Chromium as Cr	0.011	ND	ND	0.05/NR
4.	Lead as Pb	0.0362	0.0794	ND	0.01/NR
5.	Zinc as Zn	0.2690	2.9023	0.0632	5.0/15
6.	Cadmium as Cd	0.0010	0.0025	ND	0.003/NR
7.	Copper as Cu	0.0218	0.0054	0.0004	0.05/1.5

Sr. No.	Parameters		Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
			Ground Water (Hand Pump)			
			Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
8.	Nickel as Ni		0.0054	0.0078	0.0088	0.02/NR
9.	Arsenic as As		ND	ND	ND	0.01
<b>Others</b>						
1	Oil & Grease		0.001	0.008	0.0085	0.01/0.03
2	Coliform (CFU/100 ml)	Total Coliform	200	1515	1290	-
		Faecal Coliform	ND	ND	ND	-

**May 2019**

Sr. No.	Parameters		Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
			Ground Water (Hand Pump)			
			Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
<b>Physical</b>						
6.	pH		7.13	7.11	7.15	6.5-8.5
7.	Temperature (°C)		30.5	31.2	30.2	-
8.	Turbidity (NTU)		<1	<1	<1	1/5
9.	Total Suspended Solid		2	3	1	-
10.	Total Dissolved Solid		726	737	480	500/2000
<b>Chemical</b>						
12.	Total Alkalinity as CaCO <sub>3</sub>		4	8	12	200/600
13.	Chloride as Cl		304	276	260	250/1000
14.	Sulphate as SO <sub>4</sub>		102	152	39	200/400
15.	Nitrate as NO <sub>3</sub>		96	112	95	45/100
16.	Fluoride as F		68	4	3	1.0/1.5
17.	Total Hardness as CaCO <sub>3</sub>		0.14	0.14	0.69	300/600
18.	Calcium Hardness as Ca		424	306	232	75/200*



Sr. No.	Parameters		Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
			Ground Water (Hand Pump)			
			Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
19.	Mag. Hardness as Mg		305	238	153	30/100
20.	Sodium as Na		119	68	79	-
21.	Potassium as K		68	114	76	-
<b>Others</b>						
1	Oil & Grease		0.006	0.012	0.017	0.01/0.03
2	Coliform (CFU/100 ml)	Total Coliform	40	110	170	-
		Faecal Coliform	8	ND	ND	-

**June 2019**

Sr. No.	Parameters		Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
			Ground Water (Hand Pump)			
			Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
<b>Physical</b>						
11.	pH		6.4	6.5	6.7	6.5-8.5
12.	Temperature (°C)		29.4	30.9	29.6	-
13.	Turbidity (NTU)		<1	<1	2	1/5
14.	Total Suspended Solid		3	3	2	-
15.	Total Dissolved Solid		786	712	493	500/2000
<b>Chemical</b>						
22.	Total Alkalinity as CaCO <sub>3</sub>		310	280	272	200/600
23.	Chloride as Cl		144	158	35	250/1000
24.	Sulphate as SO <sub>4</sub>		86	108	90	200/400
25.	Nitrate as NO <sub>3</sub>		71	4	3	45/100
26.	Total Hardness as CaCO <sub>3</sub>		460	67	162	300/600
27.	Calcium Hardness as Ca		342	200	122	75/200*

Sr. No.	Parameters		Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
			Ground Water (Hand Pump)			
			Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
28.	Mag. Hardness as Mg		118	36	40	30/100
29.	Sodium as Na		68	94	111	-
30.	Potassium as K		2	12	2	-
<b>Others</b>						
1	Oil & Grease		0.025	0.014	0.031	0.01/0.03
2	Coliform (CFU/ 100 ml)	Total Coliform	380	440	320	-
		Faecal Coliform	ND	ND	3	-

**July 2019**

Sr. No.	Parameters		Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
			Ground Water (Hand Pump)			
			Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
<b>Physical</b>						
16.	pH		6.9	7.1	7.4	6.5-8.5
17.	Temperature (°C)		30.2	31.5	28.4	-
18.	Turbidity (NTU)		<1	<1	<1	1/5
19.	Total Suspended Solid		2	2	1	-
20.	Total Dissolved Solid		762	744	458	500/2000
<b>Chemical</b>						
31.	Total Alkalinity as CaCO <sub>3</sub>		8	8	12	200/600
32.	Chloride as Cl		298	231	274	250/1000
33.	Sulphate as SO <sub>4</sub>		110	154	42	200/400
34.	Nitrate as NO <sub>3</sub>		112	130	46	45/100
35.	Fluoride as F		78	4	2	1.0/1.5
36.	Total Hardness as CaCO <sub>3</sub>		0.09	0.08	0.10	300/600
37.	Calcium Hardness		443	318	184	75/200*

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)	
		Ground Water (Hand Pump)				
		Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)		
	as Ca					
38.	Mag. Hardness as Mg	331	270	126	30/100	
39.	Sodium as Na	113	48	58	-	
40.	Potassium as K	64	99	102	-	
<b>Others</b>						
1	Oil & Grease	0.0011	0.0052	0.0042	0.01/0.03	
2	Coliform (CFU/100 ml)	Total Coliform	140	240	300	-
		Faecal Coliform	ND	ND	ND	-

**August 2019**

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
		Ground Water (Hand Pump)			
		Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
<b>Physical</b>					
21.	pH	7.1	7.2	7.4	6.5-8.5
22.	Temperature (°C)	22.3	23.8	25.1	-
23.	Turbidity (NTU)	<1	<1	<1	1/5
24.	Total Suspended Solid	2	7	1	-
25.	Total Dissolved Solid	742	764	514	500/2000
<b>Chemical</b>					
41.	P- Alkalinity as CaCO <sub>3</sub>	8	12	12	
42.	Total Alkalinity as CaCO <sub>3</sub>	302	246	324	200/600
43.	Chloride as Cl	121	172	29	250/1000
44.	Sulphate as SO <sub>4</sub>	133	145	62	200/400
45.	Nitrate as NO <sub>3</sub>	64	3	5	45/100
46.	Fluoride as F	0.19	0.18	0.5	1.0/1.5
47.	Total Hardness as CaCO <sub>3</sub>	458	326	124	300/600
48.	Calcium Hardness as Ca	346	244	70	75/200*
49.	Mag. Hardness as	112	82	121	30/100

	Mg					
50.	Sodium as Na	71	115	111	-	
51.	Potassium as K	2.2	16	16	-	
52.	Silica as SiO <sub>2</sub>	0.18	1.08	1.32		
<b>Heavy Metals</b>						
10.	Manganese as Mn	ND	12.203	3.290	0.1/0.3	
11.	Total Chromium as Cr	ND	ND	ND	0.05/NR	
12.	Lead as Pb	ND	ND	ND	0.01/NR	
13.	Zinc as Zn	ND	0.027	0.006	5.0/15	
14.	Cadmium as Cd	0.063	3.738	0.201	0.003/NR	
15.	Copper as Cu	ND	0.002	0.001	0.05/1.5	
16.	Nickel as Ni	ND	ND	ND	0.02/NR	
17.	Arsenic as As	ND	ND	ND	0.01	
<b>Others</b>						
1	Oil & Grease	0.0029	0.0048	0.0020	0.01/0.03	
2	Coliform (CFU/100 ml)	Total Coliform	20	30	40	-
		Feacal Coliform	ND	ND	ND	-

### September 2019

Sr. No.	Parameters	Analysis Results			Requirement (Acceptable)/ Permissible Limits (IS: 10500)
		Ground Water (Hand Pump)			
		Village Tentulei (GW/1)	Village Balanda (GW/2)	Village Kukudanga (GW/3)	
<b>Physical</b>					
26.	pH	7.9	7.9	8.4	6.5-8.5
27.	Temperature (°C)	31.2	30.5	29.2	-
28.	Turbidity (NTU)	<1	3	1	1/5
29.	Total Suspended Solid	<1	9	1	-
30.	Total Dissolved Solid	743	772	504	500/2000
<b>Chemical</b>					
53.	P- Alkalinity as CaCO <sub>3</sub>	12	8	12	
54.	Total Alkalinity as CaCO <sub>3</sub>	300	228	308	200/600
55.	Chloride as Cl	117	186	34	250/1000
56.	Sulphate as SO <sub>4</sub>	128	138	68	200/400
57.	Nitrate as NO <sub>3</sub>	62	3	3	45/100
58.	Fluoride as F	0.21	0.18	0.42	1.0/1.5
59.	Total Hardness as CaCO <sub>3</sub>	452	332	224	300/600
60.	Calcium Hardness as Ca	328	254	132	75/200*
61.	Mag. Hardness as Mg	124	78	92	30/100

62.	Sodium as Na	70	111	103	-	
63.	Potassium as K	2	14	14	-	
64.	Silica as SiO <sub>2</sub>	ND	0.188	1.308		
<b>Heavy Metals</b>						
18.	Manganese as Mn	ND	1.136	0.131	0.1/0.3	
19.	Total Chromium as Cr	0.121	0.213	ND	0.05/NR	
20.	Lead as Pb	ND	ND	ND	0.01/NR	
21.	Zinc as Zn	ND	0.034	0.003	5.0/15	
22.	Cadmium as Cd	0.031	0.300	0.018	0.003/NR	
23.	Copper as Cu	ND	0.001	ND	0.05/1.5	
24.	Nickel as Ni	ND	ND	ND	0.02/NR	
25.	Arsenic as As	0.003	ND	0.001	0.01	
<b>Others</b>						
1	Oil & Grease	0.0024	0.0071	0.0052	0.01/0.03	
2	Coliform (CFU/100 ml)	Total Coliform	150	320	220	-
		Feacal Coliform	ND	ND	ND	-

## 6.0. Noise Environment

Studies pertaining to noise were conducted during April – September 2019 the Talcher Fertilizer Limited by monitoring the noise levels from the predetermined locations. Noise level monitoring is performed with the help of a well calibrated sound level meter. The ambient noise levels were monitored at selected locations in and around the project site covering residential, commercial/industrial areas and silent zones. Background noise levels were monitored in the residential locations within the study area. Noise levels were monitored for few commercial areas and silence zones also. Details of locations for monitoring of noise levels along with noise levels recorded in respective villages are presented in **Table 9** and the standards for ambient noise are given in **Table 10**.

**Table 9: Ambient Noise Levels (Average)**

Sr. No.	Sampling Locations	Geographical Position	April 2019		May 2019		June 2019		July 2019		August 2019		September 2019	
			Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
1.	TFL-Main Gate	20°54'38.4" N 85°09'35.5" E	66	54	59	58	56	52	54	51	55	52	57	53
2.	Police Station, Bikrampur	20°54'30.2" N 85°10'00.8" E	58	54	58	54	56	51	55	50	54	51	55	52
3.	Village Karnapur (Residential zone)	20°54'02.9" N 85°07'23.5" E	53	42	58	53	57	55	56	54	55	53	56	54
4.	Nehru Shatabdi Central Hospital (NSCH), near Village Balanda. (Silent zone)	20°55'54.1" N 85°10'27.7" E	51	42	52	50	51	46	50	47	51	48	52	48
5.	Market area near village Angul (Commercial zone)	20°50'01.2" N 85°05'24.2" E	64	55	66	65	63	60	60	58	62	59	64	61
6.	Highway near Village Angul (Highway)	20°50'39.2" N 85°07'06.5" E	71	66	68	63	66	61	65	60	66	61	66	62

**Table 10: Ambient Noise Quality Standards**

Area Code	Category of Area/Zone	Limits in dBA <sub>Leq</sub>	
		Day time	Night time
A	Industrial	75	70
B	Commercial	65	55
C	Residential	55	45
D	Silent	50	40

**Annexure 1**  
**Environmental Clearance Letter**

F. No. J-11011/231/2013-IA-II(I)  
 Government of India  
 Ministry of Environment, Forest and Climate Change  
 (IA- II Section)

Indira Paryavaran Bhawan  
 Jorbagh Road, New Delhi -3

Dated: 9<sup>th</sup> February, 2018

To

M/s Talcher Fertilizers Ltd  
 Village Vikrampur, Tehsil Talcher  
 District Angul (Odisha)

**Sub: Setting up Ammonia & Urea Fertilizer Unit at Village Vikrampur, Tehsil Talcher, District Angul (Odisha) by M/s Talcher Fertilizers Ltd - Environmental Clearance -reg.**

Sir,

This has reference to your proposal No. IA/OR/IND2/58560/2013 dated 11<sup>th</sup> October, 2017, submitting the EIA/EMP report with public consultation details on the above subject matter.

2. The Ministry of Environment, Forest and Climate Change has examined the proposal for environmental clearance to the project for setting up ammonia & urea fertilizer unit based on coal gasification for production of 1.27 MMTPA of neem coated urea (end product) by M/s Talcher Fertilizers Ltd at Village Vikrampur, Tehsil Talcher, District Angul (Odisha).

3. The total land area of the project is 570 acre, out of which green belt will be developed in 180 acre. The cost of the project is Rs.10741.05 Crores. The project will provide employment to 1500 people during construction phase.

4. The proposed product/unit and capacity are as under:

S.No	Product/Unit	Capacity
1	Ammonia	2200 MTPD
2	Urea (Neem coated)	3850 MTPD
3	Coal Gasification Plant	Synthesis Gas: 242978 Nm <sup>3</sup> /hr

5. Total water requirement for the project is 49,200 m<sup>3</sup>/day. The permission for drawal of surface water from Brahmini River has been obtained from the State Government of Odisha vide letter No. 1513/SF/59 dated 3<sup>rd</sup> November, 2009.

The power requirement of 72 MW will be met from the Captive Power Plant. The raw Material required for the project are Coal, Pet Coke and lime stone. During initial stages of operation of the plant, coal shall be supplied through Bhubaneswari Coal Mine of M/s Mahanadi Coalfields Ltd. Later, the project proponent shall develop the dedicated coal mine for the procurement of coal in the desired quantity.

6. The project/activity is covered under category A of item 5(a) 'Chemical fertilizers' of the Schedule to the Environment Impact Assessment Notification, 2006, and requires appraisal at central level by the sectoral Expert Appraisal Committee in the Ministry.

7. The terms of reference (ToR) for the project was initially granted on 26<sup>th</sup> November, 2013, and then extended up to 25<sup>th</sup> November, 2017. The ToR was transferred in the name of M/s Talcher Fertilizers Ltd from M/s Rashtriya Chemicals & Fertilizers Ltd, vide Ministry's letter dated 27<sup>th</sup> September, 2017. Public hearing was conducted by the State Pollution Control Board on 30<sup>th</sup> August, 2017.

*(Signature)*

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8. The proposal for environmental clearance was considered by the EAC (Industry-2) in its meeting held on 12-13 October, 2017. The project proponent and the accredited consultant M/s Projects & Development India Ltd presented the EIA/EMP report. The committee found the EIA/EMP report satisfactory and recommended the proposal for environmental clearance with certain conditions.

9. Based on the proposal submitted by the project proponent and recommendations of the EAC (Industry-2), the Ministry of Environment, Forest and Climate Change hereby accords environmental clearance to the project 'Setting up Ammonia & Urea Fertilizer Unit for production of 1.27 MMTPA of Neem Coated Urea (end product)' by M/s Talcher Fertilizers Ltd at Village Vikrampur, Tehsil Talcher, District Angul (Odisha), under the provisions of EIA Notification, 2006 and the amendments made therein, subject to the compliance of terms and conditions, as under:-

- (i) In view of the base line air quality data for PM<sub>10</sub> already exceeding the prescribed standards, one more season data to be collected to confirm the consistency of readings/values, and for suggesting mitigating measures accordingly.
- (ii) The project proponent shall take stringent mitigating measures to minimize the incremental concentration of air pollutants (mainly PM<sub>10</sub> & PM<sub>2.5</sub>) to the extent possible due to the proposed industrial operations.
- (iii) The project proponent shall develop local air quality management plan in consultation with SPCB and implemented to achieve desired standards.
- (iv) The incremental ground level concentrations (GLCs) for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> & NO<sub>2</sub> due to the increased vehicular and other allied/developmental activities, shall be analysed and reported for actual impact of the project, besides remedial measures.
- (v) Consent to Establish/Operate for the project shall be obtained from the State Pollution Control Board as required under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.
- (vi) As already committed by the project proponent, Zero Liquid Discharge shall be ensured and no waste/treated water shall be discharged outside the premises.
- (vii) Necessary authorization required under the Hazardous and Other Wastes (Management and Trans-Boundary Movement) Rules, 2016, Solid Waste Management Rules, 2016 shall be obtained and the provisions contained in the Rules shall be strictly adhered to.
- (viii) National Emission Standards for Organic Chemicals Manufacturing Industry Issued by the Ministry vide G.S.R. 608(E) dated 21<sup>st</sup> July, 2010 and amended from time to time shall be followed.
- (ix) To control source and the fugitive emissions, suitable pollution control devices shall be installed to meet the prescribed norms and/or the NAAQS. The gaseous emissions shall be dispersed through stack of adequate height as per CPCB/SPCB guidelines.
- (x) Total fresh water requirement shall not exceed 49200 cum/day to be met from surface water from Brahmini River. Prior permission in this regard shall be obtained from the concerned regulatory authority.
- (xi) Process effluent/any wastewater shall not be allowed to mix with storm water. Storm water drain shall be passed through guard pond.
- (xii) Hazardous chemicals shall be stored in tanks, tank farms, drums, carboys etc. Flame arresters shall be provided on tank farm, and solvent transfer through pumps.
- (xiii) ETP sludge, process Inorganic & evaporation salt, if any, shall be disposed off to the TSDF.



- (xiv) The Company shall strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 as amended time to time. All transportation of Hazardous Chemicals shall be as per the Motor Vehicle Act (MVA), 1989.
- (xv) The company shall undertake waste minimization measures as below:-
- (a) Metering and control of quantities of active ingredients to minimize waste.
  - (b) Reuse of by-products from the process as raw materials or as raw material substitutes in other processes.
  - (c) Use of automated filling to minimize spillage.
  - (d) Use of Close Feed system into batch reactors.
  - (e) Venting equipment through vapour recovery system.
  - (f) Use of high pressure hoses for equipment clearing to reduce wastewater generation.
- (xvi) The green belt of 5-10 m width shall be developed in more than 33% of the total project area, mainly along the plant periphery, in downward wind direction, and along road sides etc. Selection of plant species shall be as per the CPCB guidelines in consultation with the State Forest Department.
- (xvii) All the commitment made regarding issues raised during the Public Hearing/consultation meeting held on 30<sup>th</sup> August, 2017 shall be satisfactorily implemented
- (xviii) At least 2.5% of the total project cost shall be allocated for Enterprise Social Commitment based on Public Hearing issues and item-wise details along with time bound action plan shall be prepared and submitted to the Ministry's Regional Office.
- (xix) For the DG sets, emission limits and the stack height shall be in conformity with the extant regulations and the CPCB guidelines. Acoustic enclosure shall be provided to DG set for controlling the noise pollution.
- (xx) The unit shall make the arrangement for protection of possible fire hazards during manufacturing process in material handling. Fire fighting system shall be as per the norms.
- (xxi) Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.
- (xxii) Continuous online (24x7) monitoring system for stack emissions shall be installed for measurement of flue gas discharge and the pollutants concentration, and the data to be transmitted to the CPCB and SPCB server. For online continuous monitoring of effluent, the unit shall install web camera with night vision capability and flow meters in the channel/drain carrying effluent within the premises.
- 9.1.** The grant of environmental clearance is subject to compliance of other general conditions, as under:-
- (i) The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board, Central Pollution Control Board, State Government and any other statutory authority.
  - (ii) No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forest and Climate Change. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.
  - (iii) The locations of ambient air quality monitoring stations shall be decided in consultation with the State Pollution Control Board (SPCB) and it shall be ensured that at least one station each is installed in the upwind and downwind direction as well as where maximum ground level concentrations are anticipated.






- (iv) The National Ambient Air Quality Emission Standards issued by the Ministry vide G.S.R. No. 826(E) dated 16th November, 2009 shall be followed.
- (v) The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under Environment (Protection) Act, 1986 Rules, 1989 viz. 75 dBA (day time) and 70 dBA (night time).
- (vi) The Company shall harvest rainwater from the roof tops of the buildings and storm water drains to recharge the ground water and use the same water for the process activities of the project to conserve fresh water.
- (vii) Training shall be imparted to all employees on safety and health aspects of chemicals handling. Pre-employment and routine periodical medical examinations for all employees shall be undertaken on regular basis. Training to all employees on handling of chemicals shall be imparted.
- (viii) The company shall also comply with all the environmental protection measures and safeguards proposed in the documents submitted to the Ministry. All the recommendations made in the EIA/EMP in respect of environmental management, and risk mitigation measures relating to the project shall be implemented.
- (ix) The company shall undertake all relevant measures for improving the socio-economic conditions of the surrounding area. ESC activities shall be undertaken by involving local villages and administration.
- (x) The company shall undertake eco-developmental measures including community welfare measures in the project area for the overall improvement of the environment.
- (xi) The company shall earmark sufficient funds towards capital cost and recurring cost per annum to implement the conditions stipulated by the Ministry of Environment, Forest and Climate Change as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so earmarked for environment management/ pollution control measures shall not be diverted for any other purpose.
- (xii) A copy of the clearance letter shall be sent by the project proponent to concerned Panchayat, Zilla Parishad/Municipal Corporation, Urban local Body and the local NGO, if any, from whom suggestions/ representations, if any, were received while processing the proposal.
- (xiii) The project proponent shall also submit six monthly reports on the status of compliance of the stipulated Environmental Clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the respective Regional Office of MoEF&CC, the respective Zonal Office of CPCB and SPCB. A copy of Environmental Clearance and six monthly compliance status report shall be posted on the website of the company.
- (xiv) The environmental statement for each financial year ending 31st March in Form-V as is mandated shall be submitted to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.
- (xv) The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the SPCB/Committee and may also be seen at Website of the Ministry at <http://moef.nic.in>. This shall be advertised within seven days from the date of issue of the clearance letter, at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular




language of the locality concerned and a copy of the same shall be forwarded to the concerned Regional Office of the Ministry.

- (xvi) The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of the project.
10. The Ministry may revoke or suspend the clearance, at subsequent stages, if implementation of any of the above conditions is not satisfactory.
11. The Ministry reserves the right to stipulate additional conditions, if found necessary. The company in a time bound manner will implement these conditions.
12. The above conditions will be enforced, inter alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention & Control of Water Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

  
 9/2/2018  
 (S. K. Srivastava)  
 Scientist E

**Copy to:-**

1. The Additional PCCF (C), MoEF&CC Regional Office (EZ), A/3, Chandrasekharpur, Bhubaneswar - 23 (Odisha)
2. The Secretary, Department of Forest and Environment, Government of Odisha, Bhubaneswar (Odisha)
3. The Member Secretary, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 32
4. The Member Secretary, Odisha State Pollution Control Board, Paribesh Bhawan, A/118, Nilakantha Nagar, Unit - VIII, Bhubaneswar -12 (Odisha)
5. Guard File/Monitoring File/Website/Record File

  
 9/2/2018  
 (S. K. Srivastava)  
 Scientist E

**Annexure 2**  
**Air Quality Monitoring Report (April-September 2019)**

## 1.0 Methodology adopted for Air Quality monitoring

The baseline status with respect to ambient air quality has been established through a scientifically designed ambient air quality monitoring network based on the following considerations:

- Meteorological conditions prevailing within study area;
- Topography of the study area;
- Representatives of background air quality; and
- Representatives of likely impact areas.

Air Quality monitoring has been conducted at six sampling locations during the monsoon season (April-September 2019).

## 2.0 Sampling Period, Frequency & Parameters

The following air pollutants were monitored on 24-hourly basis for consecutive two days in a week for a period of six months from April to September 2019:

- Particulate matter(PM10)
- Particulate matter(PM2.5)
- Sulphur Dioxide
- Nitrogen Dioxide
- Ammonia

## 2.1 Sampling & Analytical Procedure

A brief description of the sampling and analytical procedures followed during the ambient air quality monitoring is as follows:

### **Particulate Matter (PM<sub>10</sub>):**

The sampling of ambient air for evaluating PM<sub>10</sub> levels were performed with a FPS Sampler for separation of particles larger than 10 microns diameter. Air exiting the separator is drawn at a measured rate through pre-weighed PTFE glass fiber filters. The PM<sub>10</sub> concentrations were computed from the average air flow rate, sampling period and the mass of particulate matter collected over the filter surface.

### **Particulate Matter (PM<sub>2.5</sub>)**

PM<sub>2.5</sub> is determined as per USEPA (United State Environment Protection Agency) guidelines with the help of Fine Dust Sampler. Ambient air is allowed to pass through Louvered inlet and impactor as well as particulate matter of size <2.5 microns is deposited on 46.2 mm dia PTFE filter paper. The difference of final weight of filter and initial weight gives the weight of particulate matter of size <2.5 microns. The concentration of PM<sub>2.5</sub> is computed with the help of dust deposited on the filter, volume of air sampled monitoring temperature and barometric pressure.

### **Gaseous sampling**

Gaseous sampling was carried out by using particular absorbing medias for each gas and standard procedures were followed to analyse the samples and obtain results by spectrophotometric detection.

## **2.2 Details of sampling locations**

The location of ambient air sampling stations has been presented below in **Table-1**.

**TABLE – 1 Details of Sampling Locations**

Sl. No	Location Name	With respect to Project Site	
		Dir.	Distance
01.	Tech. Building of FCI	-	-

02.	Housing Board Colony	ENE	1.2 km
03.	Karnpur village	W	4.5 Km
04.	TFL Guest House	-	-
05.	Balanda village	NW	2.5 Km
06.	Kukudanga village	SW	2.5 km

### 2.3 Techniques for Measurement

The techniques used for measurement of pollutants may be summarized as under:

**TABLE – 2 MEASUREMENT TECHNIQUES**

Sr. No.	Air Quality Parameter	Unit	Analytical Method used for Testing/Analysis	Analytical Measurement Range	Standard value as per NAAQs, 2009 and Monitoring duration
1.	Particulate Matter size < 10 microns or PM <sub>10</sub>	µg/m <sup>3</sup>	Gravimetric IS-5182: Part-23, 2006	5-5000	100 (24 h)
2.	Particulate Matter size < 2.5 microns or PM <sub>2.5</sub>	µg/m <sup>3</sup>	Gravimetric U.S.EPA EQM-0308-170	5-500	60 (24 h)
3.	Sulphur Dioxide (SO <sub>2</sub> )	µg/m <sup>3</sup>	EPA Improved West and Gaeke Method IS-5182: Part-2, 2001	5-1000	80 (24 h)
4.	Nitrogen Dioxide (NO <sub>2</sub> )	µg/m <sup>3</sup>	Modified Jacobs-Hachheiser Method IS-5182: Part-6, 2006	7-750	80 (24 h)
5.	Ammonia (NH <sub>3</sub> )	µg/m <sup>3</sup>	Indophenol Blue method Method 401: Methods of Air Sampling and analysis, James P. Lodge	5-1000	400 (24 h)
6.	Benzene (C <sub>6</sub> H <sub>6</sub> )	µg/m <sup>3</sup>	GC based continuous analyzer IS-5182: Part-11, 2006	0.01-10	5.0 (Annual)
7.	VOCs	µg/m <sup>3</sup>	U.S. EPA Method TO17: 1999	0.01-10	0.01-500 (Annual)
8.	Hydrocarbons	µg/m <sup>3</sup>	HC Analyzer for Spot Concentration	0.01 – 10	-



### 3.0 Discussion on Air Quality Monitoring

The observations made at all the six sampling stations during the study period are presented through Tables 3 to 12. In each of these tables, minimum, maximum, average, 98th percentile values have been computed and presented.

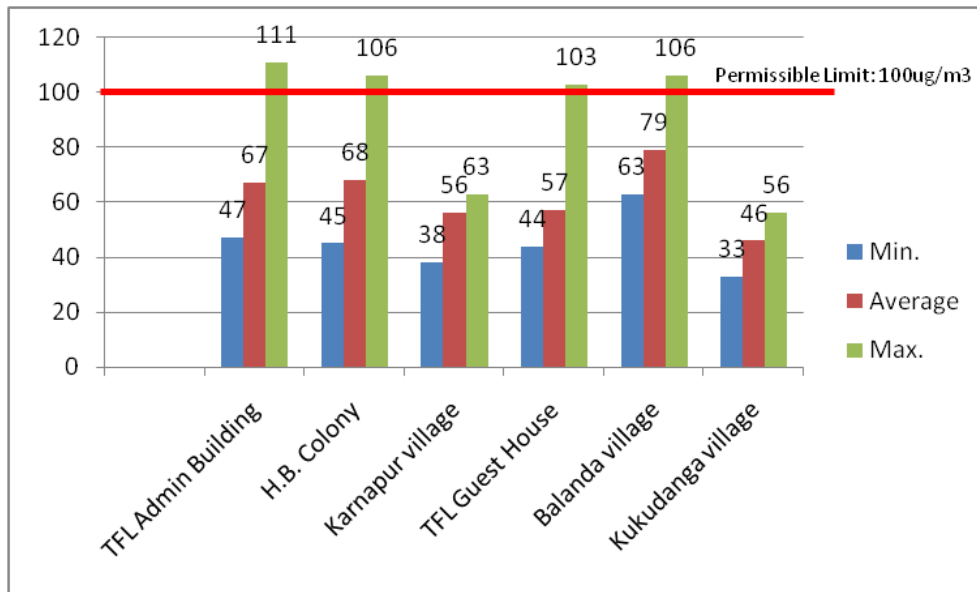
#### PM<sub>10</sub>

Salient features of the observations made with respect to PM<sub>10</sub> during the study period are summarized below in Table – 3 as under:

**TABLE – 3 SUMMARY OF PM<sub>10</sub> CONCENTRATIONS (µg/m<sup>3</sup>)**

Sampling Location	Min.	24-hr Average	Max.	Air Quality Index (AQI)	NAAQS for PM <sub>10</sub> µg/m <sup>3</sup>
TFL Admin Building	47	67	111	Satisfactory	100
H.B. Colony	45	68	106	Satisfactory	100
Karnapur village	38	56	63	Satisfactory	100
TFL Guest House	44	57	103	Satisfactory	100
Balanda village	63	79	106	Satisfactory	100
Kukudanga village	33	46	56	Satisfactory	100

The average concentrations of PM<sub>10</sub> at all the six sampling locations were observed in the range of 46 to 79 µg/m<sup>3</sup>. It would not be out of place to mention here that although there are few observations which are above prescribed limited, yet the average concentration of PM<sub>10</sub> was observed well below 100 µg/m<sup>3</sup>, which is the ambient air quality standard for industrial, residential and rural area.



**Figure-3** Graph showing Variation of PM10 during study period from April to September 2019

The 24-hr average value of PM10 is below the limit prescribed under NAAQ Standard.

**PM<sub>2.5</sub>**

Salient features of the observations made with respect to PM<sub>2.5</sub> during the study period are summarized below in Table - 4 as under:

**TABLE – 4 SUMMARY OF PM<sub>2.5</sub> CONCENTRATIONS (µg/m<sup>3</sup>)**

Sampling Location	Min.	24-hr Average	Max.	Air Quality Index (AQI)	NAAQS for PM <sub>2.5</sub> µg/m <sup>3</sup>
TFL Admin Building	24	42	55	Satisfactory	60
H.B. Colony	42	49	55	Satisfactory	60
Karnapur village	13	30	51	Satisfactory	60
TFL Guest House	33	43	48	Satisfactory	60
Balanda village	48	58	65	Satisfactory	60
Kukudanga village	25	31	39	Satisfactory	60

The average concentrations of PM<sub>2.5</sub> at all the six sampling locations were observed in the range of 30 to 58µg/m<sup>3</sup>. It has been observed that the minimum value has been observed at Karnapur, whereas the maximum value of 58µg/m<sup>3</sup> was observed at Balanda village. The average concentration of PM<sub>2.5</sub> was observed below 60µg/m<sup>3</sup>, which is the ambient air quality standard for industrial, residential and rural area.

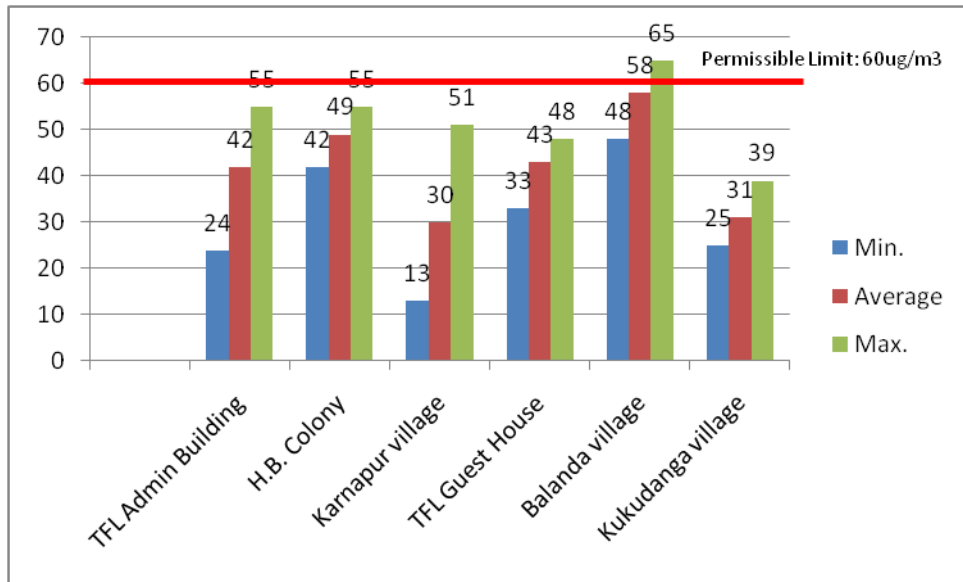


Figure-4 Graph showing variation of PM2.5 during study period from April to September 2019

The 24-hr average value of PM2.5 is below the limit prescribed under NAAQ Standard.

**SO<sub>2</sub>**

Salient features of the observations made with respect to SO<sub>2</sub> during the study period are summarized below in Table - 4 as under:

**TABLE – 4 SUMMARY OF SO<sub>2</sub> CONCENTRATIONS (µg/m<sup>3</sup>)**

Sampling Location	Min.	24-hr Average	Max.	Air Quality Index (AQI)	NAAQS for SO <sub>2</sub> µg/m <sup>3</sup>
TFL Admin Building	6	21	61	Satisfactory	80
H.B. Colony	10	25	59	Satisfactory	80
Karnapur village	6	14	38	Satisfactory	80
TFL Guest House	7	17	34	Satisfactory	80
Balanda village	8	19	45	Satisfactory	80
Kukudanga village	8	16	37	Satisfactory	80

The average concentrations of SO<sub>2</sub> at all the six sampling locations were observed in the range of 14 to 25µg/m<sup>3</sup>. It has been observed that the minimum value has been observed at Karnapur village, whereas the maximum value of 25µg/m<sup>3</sup> was observed at HB Colony. The average concentration of SO<sub>2</sub> was observed well below 80µg/m<sup>3</sup>, which is the ambient air quality standard for industrial, residential and rural area.

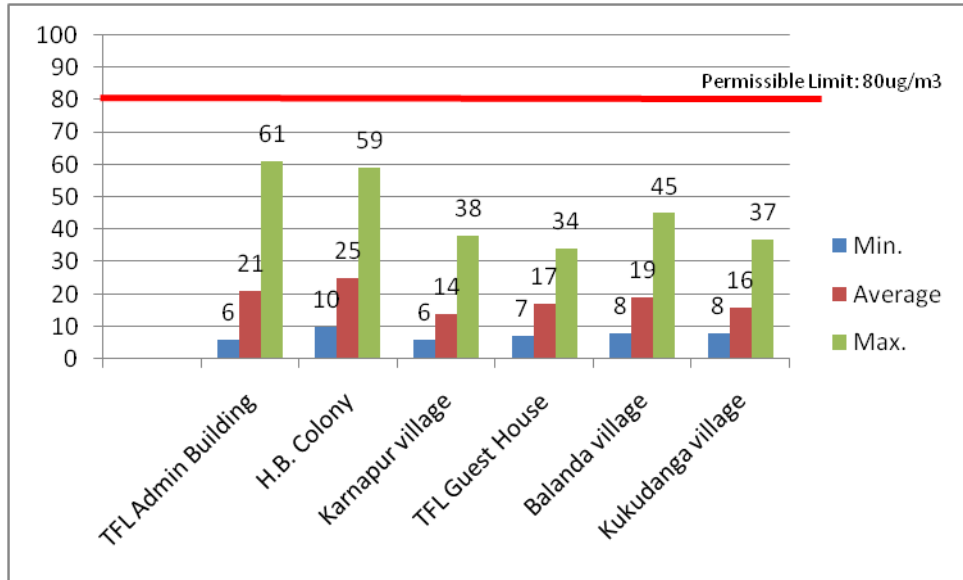


Figure-4 Graph showing variation of SO<sub>2</sub> during study period from April to September 2019

The 24-hr average value of SO<sub>2</sub> is below the limit prescribed under NAAQ Standard.

**NO<sub>2</sub>**

Salient features of the observations made with respect to NO<sub>2</sub> during the study period are summarized below in Table - 4 as under:

**TABLE – 4 SUMMARY OF NO<sub>2</sub> CONCENTRATIONS (µg/m<sup>3</sup>)**

Sampling Location	Min.	24-hr Average	Max.	Air Quality Index (AQI)	NAAQS for NO <sub>2</sub> µg/m <sup>3</sup>
TFL Admin Building	28	70	116	Satisfactory	80
H.B. Colony	21	62	117	Satisfactory	80
Karnapur village	16	36	55	Satisfactory	80
TFL Guest House	20	57	108	Satisfactory	80
Balanda village	22	43	68	Satisfactory	80
Kukudanga village	16	46	117	Satisfactory	80

The average concentrations of NO<sub>2</sub> at all the six sampling locations were observed in the range of 36 to 70µg/m<sup>3</sup>. It has been observed that the minimum value has been observed at Karnapur village, whereas the maximum value of 70µg/m<sup>3</sup> was observed at TFL Admin Building. The average concentration of NO<sub>2</sub> was observed well below 80µg/m<sup>3</sup>, which is the ambient air quality standard for industrial, residential and rural area.

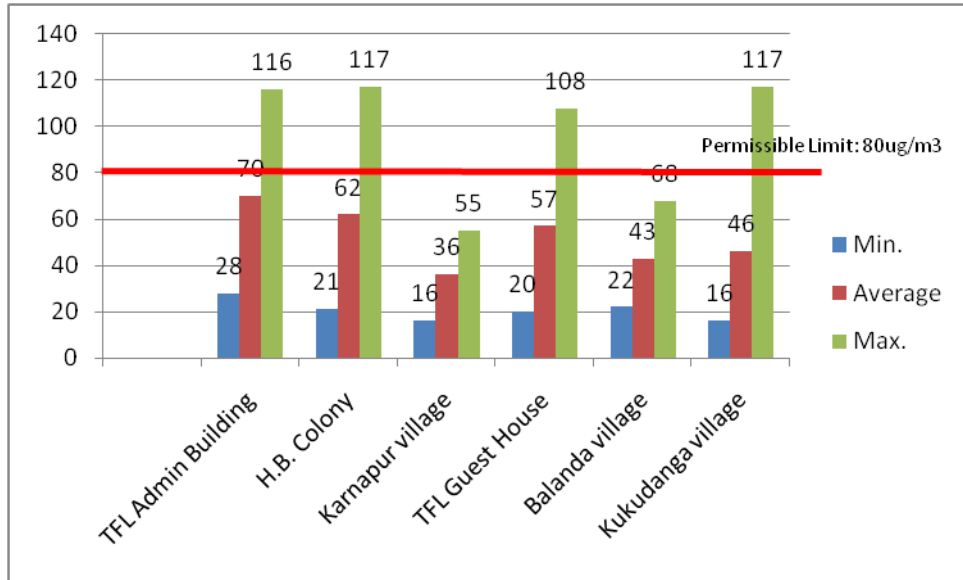


Figure-4 Graph showing variation of NO<sub>2</sub> during study period from April to September 2019

The 24-hr average value of NO<sub>2</sub> is below the limit prescribed under NAAQ Standard.



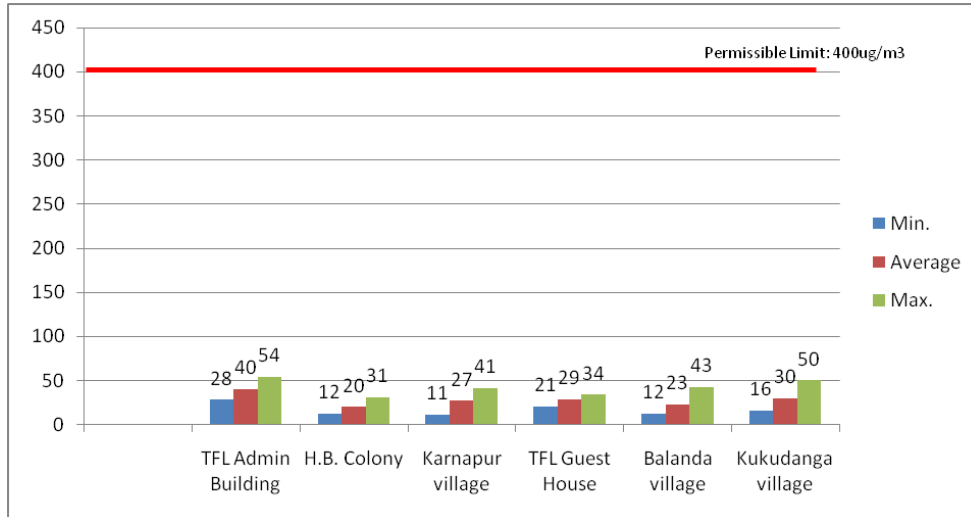
**NH<sub>3</sub>**

Salient features of the observations made with respect to NH<sub>3</sub> during the study period are summarized below in Table - 4 as under:

**TABLE – 4 SUMMARY OF NH<sub>3</sub> CONCENTRATIONS (µg/m<sup>3</sup>)**

Sampling Location	Min.	24-hr Average	Max.	Air Quality Index (AQI)	NAAQS for NH <sub>3</sub> µg/m <sup>3</sup>
TFL Admin Building	28	40	54	Satisfactory	400
H.B. Colony	12	20	31	Satisfactory	400
Karnapur village	11	27	41	Satisfactory	400
TFL Guest House	21	29	34	Satisfactory	400
Balanda village	12	23	43	Satisfactory	400
Kukudanga village	16	30	50	Satisfactory	400

The average concentrations of NH<sub>3</sub> at all the six sampling locations were observed in the range of 20 to 40µg/m<sup>3</sup>. It has been observed that the minimum value has been observed at HB Colony, whereas the maximum value of 40µg/m<sup>3</sup> was observed at TFL Admin Building. The average concentration of NH<sub>3</sub> was observed well below 400µg/m<sup>3</sup>, which is the ambient air quality standard for industrial, residential and rural area.



**Figure-4** Graph showing variation of NH<sub>3</sub> during study period from April to September 2019

The 24-hr average value of NH<sub>3</sub> is below the limit prescribed under NAAQ Standard.