



# मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड

## MANGALORE REFINERY AND PETROCHEMICALS LIMITED

अनुसूची 'अ' के अंतर्गत भारत सरकार का उद्यम SCHEDULE 'A' GOVT. OF INDIA ENTERPRISE.  
(ऑयल एण्ड नेचुरल गैस कॉर्पोरेशन लिमिटेड की सहायक कंपनी A SUBSIDIARY OF OIL AND NATURAL GAS CORPORATION LIMITED)  
सीआईएन/CIN : L23209KA1988GOI008959

पंजीकृत कार्यालय : कुत्तेतूर पोस्ट, वाया काटीपल्ला मंगलूर - 575 030 (भारत) दूरभाष: 0824-2270400, फैक्स: 0824-2271404, E-mail: mrplmlr@mrpl.co.in  
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आई.एस.ओ. 9001, 14001 एवं 50001 प्रमाणित कंपनी AN ISO 9001, 14001 AND 50001 CERTIFIED COMPANY

L/MS/MoEF&CC/6736  
11<sup>th</sup> February, 2022

The Director  
Ministry of Environment, Forest & Climate Change,  
4<sup>th</sup> Floor, E&F Wing, Kendriya Sadan,  
Koramangala, Bengaluru – 560 034

Dear Sir,

**विषय Subject:- Submission of Compliance to the Environmental Clearance(s) along with monitoring data**

Please find enclosed herewith point wise compliance to the following Environmental Clearance(s) issued to MRPL by Ministry of Environment, Forest & Climate Change (MoEF & CC), New Delhi.

1. Letter No. J – 11011/1/96-IA. II (I) dated 5<sup>th</sup> August, 1996 (Phase-II Project)

Also environment monitoring data of Noise level, Base levels of Ground Water, Ground Water quality, SO<sub>2</sub> Emission and Ambient Air Quality for the period April, 2021 to September, 2021 is enclosed as **Annexure – I to V.**

धन्यवाद Thanking You,

भवदीय Yours sincerely,

मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड  
For Mangalore Refinery & Petrochemicals Limited,

*M.S. Sudarsan*  
11/2/2022

एम.एस सुदर्शन M.S Sudarsan

मुख्य महा प्रबंधक (स्वास्थ्य, संरक्षा एवं पर्यावरण)  
Chief General Manager (Health, Safety and Environment)

Encl: As above

Cc: Zonal Office, CPCB, Bengaluru  
Head Office, KSPCB, Bengaluru

बंगलूर कार्यालय : प्लॉट नं. A-1, - के .एस.एस.आई.डी.सी. प्रशासनिक कार्यालय भवन के सामने, इंडस्ट्रीयल एस्टेट, राजाजीनगर, बंगलूर -560 010  
Bengaluru Office: Plot A-1, Opp. KSSIDC A. O. Building, Industrial Estate, Rajajinagar, Bengaluru - 560 010.  
दूरभाष : Tel: (का.) (O) 080-22642200, फैक्स Fax : 080 - 23505501  
दिल्ली कार्यालय : कोर-8,7<sup>th</sup> मंजिल, स्कोप कांप्लेक्स, लोधी रोड, नई दिल्ली- 110003 दूरभाष: 011-24306400, फैक्स: 011-24361744  
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Mumbai Office : Maker Tower, 'E' Wing, 15th Floor, Cuffe Parade, Mumbai-400 005. Tel.: 022-22173000, Fax : 22173233

**Compliance to the Environmental Clearance for Expansion of Mangalore Refinery from 3.0 MMTPA to 9.0 MMTPA issued by Ministry of Environment, Forest & Climate Change, New Delhi**

**Letter No. J – 11011/1/96-IA. II (I) dated 5<sup>th</sup> August, 1996**

<b>Sl. No.</b>	<b>Stipulation</b>	<b>Compliance</b>
i.	The project authorities must obtain final NOC from the State Pollution Control Board before operating expansion facilities of 6 MTPA	KSPCB Clearances obtained
ii.	SPCB before granting "consent to operate" should ensure about adherence to safeguards stipulated in this letter.	Yes. KSPCB has ensured adherence to safeguards stipulated.
iii.	The project authority must strictly adhere to the stipulations made by the Karnataka Pollution Control Board and the State Government	Yes. Adhered to the stipulations made by the KSPCB
iv.	Any further expansion of the plant, either with the existing product mix or new product (s) or storage facilities etc., can be taken up only with the prior approval of this Ministry	Noted & Being complied  Any further expansion of the plant, either with the existing product mix or new product (s) or storage facilities etc., will be taken up only with the prior approval of this Ministry
v.	Total emissions of SO <sub>2</sub> from the expanded facilities should be in the range of 30 – 40 TPD maximum. Only low sulphur fuel should be used.	Noted and complied.  Only low sulphur fuel is being used in the Heaters/Boilers.
vi.	The gaseous and particulate matter emissions from various process units should conform to the standards prescribed by the concerned authorities, from time to time. At no time, the emissions level should go beyond the stipulated standards. In the event of failure of any pollution control system (s) adopted by the unit, the respective unit should be shut down immediately and should not be restarted until the control measures are rectified to achieve the desired efficiency.	Noted and being complied.  The gaseous and particulate matter emissions from various process units is conformed to the standards prescribed by the concerned authorities
vii.	Sulphur recovery units with more than 99% efficiency for sulphur recovery should be provided.	In MRPL, total 6 Sulphur Recovery Units are provided with > 99% efficiency
viii.	Low NOx burners to avoid excessive formulations of NOx should be provided.	Low NOx burners are provided in various heaters.

ix.	At least five ambient air quality monitoring stations should be set up in the refinery area in the down wind direction as well as where maximum ground level concentrations of SO <sub>2</sub> , NO <sub>x</sub> , CO and SPM are anticipated. The monitoring network should be decided based on the modelling exercise to represent the short term GLCs. A mobile van with adequate facilities to monitor ambient air quality outside the refinery premises should also be planned.	Yes. 10 nos. AAQ stations are installed in and around the Refinery complex in consultation with KSPCB and monitoring data are being submitted to KSPCB regularly.
x.	Fugitive emissions of HC from storage tanks, crude oil tanks etc., should be minimised by adopting necessary measures.	Yes, complied by providing floating roof tanks with Secondary seal in all crude and distillates (MS, HSD, Naphtha, ATF/Kero) to mitigate the fugitive emissions
xi.	Adequate facilities for monitoring the fugitive emissions should be planned, data recorded and maintained.	Yes, data being collected and maintained.
xii.	The stacks should be of appropriate design and height and should be attached to pollution control systems wherever necessary.	Stacks are provided with heights well above CPCB stipulation.
xiii.	Designing of LPG spheres including the exclusion zone should be finalised in consultation and approval of the Department of Explosives.	Complied
xiv.	Liquid effluents from the refinery should conform to the standards as prescribed by the State Pollution Control Board/Ministry of Environment and Forests under the EPA, 1986. Treatment effluent should be subjected to bio assay test. Recycling / reuse of the treated effluent should be as per orders of the Karnataka Government of December 1995.	Treated Effluent Quality of various parameters is maintained far lesser than the KSPCB stipulated standards. Bio assay test of TE is carried out CMFRI/CoF.  Treated effluent is reused in the cooling towers to the maximum extent and balance is being discharged into sea.
xv.	Adequate number of influent and effluent quality monitoring stations should be set up with adequate facilities especially for the parameters like phenols, sulphides, oil and grease, suspended solids, BOD-5 DAYS AT 27 ° C, COD, pH and flow.	Complied. Daily analysis reports are being submitted to KSPCB on monthly basis. Also treated effluent from APMC yard is monitored on daily basis and analysis report of same is being submitted to KSPCB on monthly basis.

		<p>In addition to the above, M/s. College of Fisheries, Mangalore is monitoring at 10 stations (7 inside the sea at Marine Outfall Point + 3 on the shore) on fortnightly basis. No adverse effects on the marine ecosystem observed till date.</p> <p>Online Continuous Monitoring stations installed for monitoring treated effluent as per CPCB guidelines.</p>
xvi.	System to recover oil from oily sludges and incinerator for burning the residues should be provided.	<p>Chemical and oily sludge are treated in Centrifuges and oil is recovered to the maximum extent. Centrifuged sludge is stored scientifically in impervious sludge lagoon.</p> <p>MRPL has designed a system for reprocessing of oily sludge and the crude oil tank sludge in the Delayed Coking Unit (DCU). Apart from the above, we have installed an advanced Closed Bioremediation unit which helps in bioremediation of oily sludge in phased manner.</p> <p>Further, Oily sludge is being disposed to Cement Industries for Co-processing in their unit.</p>
xvii.	Hazardous wastes should be handled as per the Hazardous Waste (Management and Handling) Rules, 1989 of the EPA, 1986 and necessary approval of State Pollution Control Board for safe collection, treatment, storage and disposal of hazardous wastes should also be obtained.	Hazardous Waste Authorization received from KSPCB.
xviii.	Handling, manufacture, storage and transportation of	Complied

	hazardous chemicals should be carried out in accordance with the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 as amended in October 1994.	
xix.	Cutting of trees from the project site should be kept to minimum while developing the site and planning infrastructural facilities.	Cutting of trees were minimized and restricted to the bare minimum.
xx.	The industrial township should not be located in the down wind direction with respect to the refinery.	Location of Industrial township was finalized in consultation with DEE, KSPCB & KIADB.
xxi.	Noise levels in the work environment should not exceed 85 dB. The workers engaged in the noisy places should be provided with the ear plugs/muffs.	Noise limits are well within the limits in the surrounding areas of Refinery. Workers are provided with adequate earplugs and ear muffs.
xxii.	A green belt of adequate width and density (2000-2500 trees/ha.) should be developed in consultation with the local DGO/Agriculture Department preferably using native plant species. A minimum of 30% of the land area should be earmarked for this purpose.	Greenbelt existing inside MRPL total land area 1592 acres comprises of 54 type of tree species spread over 462 acre including compensatory afforestation at Pilikula in 50 acres.  MRPL is also supporting Govt. of Karnataka (GoK) " <i>Koti Vriksha Andolan</i> " Program by sponsoring and planting sapling in the neighbouring schools and villages
xxiii.	Suitable alarm system and standard procedures for permitting the information on fire or accidental release of hazardous/toxic substances to the nearby areas and the proper focal point should be established. Steps should also be taken to ensure access to information on weather conditions prevailing at that time and weather forecast. Wind socks at appropriate locations should be provided.	Yes, suitable alarm system, meteorological station and windsocks are provided.
xxiv.	Necessary approvals from Chief Explosives Directorate, Inspector of Factories, Fire Safety Inspector etc., should be obtained and copies of approval letters be made available to this Ministry.	Obtained & submitted to Ministry
xxv.	The project authorities must set up laboratory facilities for collection and analysis of samples under	A well established Laboratory has been set up

	supervision of competent technical personnel, who will directly report to the Chief Executive.	and functioning round the clock.
xxvi.	A separate environmental management cell with suitably qualified people to carry out various functions should be set up under the control of a Senior Executive, who will report directly to the Head of the organisation.	MRPL is having a separate Environment Cell headed by Chief General Manager (CGM) and having required laboratory infrastructure earmarked for Environmental cell activities.
xvii.	The funds earmarked for the environmental protection measures should be kept in a separate account and should not be diverted for any other purpose and year-wise expenditure should be reported to this Ministry.	Complied
xviii.	Six monthly reports on the compliance status of project implementation vis-à-vis above environmental measures should be submitted to Regional Office of this Ministry at Bangalore.	Complied
3.	The above conditions are in addition to conditions No.10, 11, 13 & 14 of this Ministry's letter No.J-11011/6/89-IA.II dated 1 <sup>st</sup> February 1991 and those contained in letter No.J-11011/6/89-IA. II of 30 <sup>th</sup> April 1993.	Noted
4.	This Ministry or any competent authority may stipulate any further condition(s) on receiving reports from the project authorities.	Noted
5.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Noted
6.	The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention and Control of Pollution) Act, 1974; Air (Prevention and Control of Pollution) Act, 1981; the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 with their amendments and rules.	Noted

## ANNEXURE - I

### AVERAGE MONTHLY EXTRACT OF NOISE LEVEL (IN dB) AROUND REFINERY

MONTH	BOUNDARY WALL NORTH OF THE REFINERY	BOUNDARY WALL SOUTH OF THE REFINERY	BOUNDARY WALL EAST OF THE REFINERY	BOUNDARY WALL WEST OF THE REFINERY
Apr-21	53.0	62.0	56.0	53.0
May-21	55.4	60.8	52.8	57.5
Jun-21	51.1	64.1	52.2	51.3
Jul-21	53.6	53.6	53.9	50.9
Aug-21	58.5	69.3	54.9	71.5
Sep-21	45.7	54.8	50.9	55.4

### Base Levels value (Period 1995) of Ground Water

Location	Kuthethur (Monsoon)	Kuthethur (winter)	Kuthethur (summer)	Kalavar (Monsoon)	Kalavar (winter)	Kalavar (summer)	Jokatte (Monsoon)	Jokatte (winter)	Jokatte (summer)	Malyapada (Monsoon)	Malyapada (winter)	Malyapada (summer)
Parameter												
pH	8.2	8	8.3	7.1	7	7.6	8.1	8.5	7.8	7	7.7	8.1
Conductivity (µS)	220	630	70	60	300	70	100	620	240	70	300	106
TDS, ppm	121	284	30	28	154	45	88	341	127	30	210	23
Turbidity (NTU)	21	1	30	1	1	2	1	8	3	0.2	0	1.1
p-alkalinity, ppm	NA	NA	NA	NA	NA.	NA.	NA	NA	NA	NA	NA	NA
M-alkalinity, ppm	80	130	108	10	30	8	82	116	74	23	30	50
Total Hardness ppm	70.4	100	84	10.8	100	44	87	105	115	23.4	100	62
Ca Hardness ppm	40.2	50	44	10.1	20	13	50.3	85	78	18.8	30	31
Chloride ppm	11	45	10	10	38	10	21	80	11	8	40	18
Phenol ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron ppm	0.154	ND	0.24	0.016	ND	0.023	0.013	ND	0.071	0.007	ND	ND
Copper micro gm/l	ND	ND	ND	1	ND	2	1	ND	3	1	ND	ND
Zinc ppm	0.051	ND	ND	0.024	ND	ND	0.02	ND	ND	0.183	ND	ND
Arsenic, Micro gm/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead micro gm/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium micro gm/l	11	ND	ND	15	ND	ND	14	20	ND	18	ND	ND
Oil ppm	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND – Non detectable level

NA - Not applicable

Annexure - II



**GROUND WATER MONITORING REPORT FOR THE MONTH OF April-2021**

Sampling not done due to COVID-19 as KSPCB official not come for sampling

**GROUND WATER MONITORING REPORT FOR THE MONTH OF MAY-21**

Parameters	D'souza Well	Fernandes Well	Hand Bore	HGIL Bore 5	HGIL Bore 6	Kalavar Church	MD Bunglow
pH	6.8	6.8	6.8	6.7	7.1	6.2	7.7
T-Hardness, ppm	60.00	56.00	96.00	84.00	88.00	32.00	44.00
Ca-Hardness, ppm	38.00	44.00	50.00	52.00	54.00	8.00	24.00
Mg-Hardness, ppm	22.0	12.0	56.0	32.0	34.0	24.0	20.0
Chloride, ppm	54.00	45.00	45.00	46.00	43.00	22.00	10.00
Sulphate, ppm	19.00	12.00	<1.0	40.00	<1.0	<1.0	5.40
Fluoride, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Iron, ppm	<0.1	0.58	4.60	7.70	10.80	<0.1	<0.1
Nitrate, ppm	1.5	1.1	<1.0	<1.0	<1.0	15.2	1.1
TDS, ppm	201.00	185.00	269.00	269.00	268.00	111.00	68.00
Phenol, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexavalent Chromium, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Copper, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Chromium, ppm	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
COD, ppm	45.0	50.0	20.0	15.0	10.0	20.0	15.0
Oil, ppm	<1.0	<1.0	2.00	3.00	2.50	<1.0	<1.0
Appearance	Clear	Clear	Muddy	Muddy	Muddy	Clear	Clear
Odour	Odourless	Odourless	Odourless	HC	HC	Odourless	Odourless

**GROUND WATER MONITORING REPORT FOR THE MONTH OF JUNE-21**

Parameters	D'souza Well	Fernandes Well	Kalavar Church	MD Bunglow
pH	6.1	6.1	5.9	7.6
T-Hardness, ppm	56.00	44.00	30.00	38.00
Ca-Hardness, ppm	24.00	24.00	14.00	30.00
Mg-Hardness, ppm	32.0	20.0	16.0	8.0
Chloride, ppm	52.00	48.00	58.00	27.00
Sulphate, ppm	28.00	9.70	13.10	28.00
Fluoride, ppm	<0.1	<0.1	<0.1	<0.1
Iron, ppm	0.56	1.00	0.24	<0.1
Nitrate, ppm	<1.0	<1.0	26.0	1.7
TDS, ppm	165.00	165.00	112.00	66.00
Phenol, ppm	<0.1	<0.1	<0.1	<0.1
Lead, ppm	<0.1	<0.1	<0.1	<0.1
Cadmium, ppm	<0.1	<0.1	<0.1	<0.1
Hexavalent Chromium, ppm	<0.1	<0.1	<0.1	<0.1
Copper, ppm	<0.1	<0.1	<0.1	<0.1
Zinc, ppm	<0.1	<0.1	<0.1	<0.1
Nickel, ppm	<0.1	<0.1	<0.1	<0.1
Manganese, ppm	<0.1	<0.1	<0.1	<0.1
Total Chromium, ppm	<0.03	<0.03	<0.03	<0.03
COD, ppm	60.0	20.0	60.0	40.0
Oil, ppm	<1.0	<1.0	<1.0	<1.0
Appearance	Clear	Clear	Clear	Clear
Odour	Odourless	Odourless	Odourless	Odourless

**GROUND WATER MONITORING REPORT FOR THE MONTH OF JULY-21**

Parameters	D'souza Well	ETP-2 Bore	Fernandes Well	Hand Bore	HGIL Bore 5	HGIL Bore 6	Kalavar Church	MD Bunglow
pH	6.3	7.7	6.1	6.6	6.5	6.5	5	7.4
T-Hardness, ppm	40	20	44	83	80	90	38	38
Ca-Hardness, ppm	28	18	24	72	62	58	14	24
Mg-Hardness, ppm	12	2	20	11	18	32	24	14
Chloride, ppm	34	15	30	39	44	43	24	15
Sulphate, ppm	51	23	45	15	77	35	86	26
Fluoride, ppm	1.1	0.9	1.1	0.8	1	0.9	0.9	1.3
Iron, ppm	0.44	2.4	0.8	4.3	6.2	7.4	<0.1	<0.1
Nitrate, ppm	<1.0	<1.0	5.9	<1.0	2.5	<1.0	20	1.1
TDS, ppm	141	53	139	340	280	286	104	76
Phenol, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexavalent Chromium, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Copper, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Chromium, ppm	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
COD, ppm	20	30	69	40	59	84	35	30
Oil, ppm	<1.0	<1.0	<1.0	2	6.5	6	<1.0	<1.0
Appearance	Clear	Clear	Clear	Muddy	Muddy	Muddy	Clear	Clear
Odour	Odourless	Odourless	Odourless	Odourless	HC	HC	Odourless	Odourless

GROUND WATER MONITORING REPORT FOR THE MONTH OF AUGUST-21							
Parameters	D'souza Well	Fernandes Well	Hand Bore	HGIL Bore 5	HGIL Bore 6	Kalavar Church	MD Bunglow
pH	5.9	6.5	6.5	6.5	6.6	5.2	7.5
T-Hardness, ppm	26	44	104	132	88	29	30
Ca-Hardness, ppm	16	20	51	80	55	12	18
Mg-Hardness, ppm	10	24	53	52	33	17	12
Chloride, ppm	28	36	56	30	22	35	15
Sulphate, ppm	18	31	9	26	11	12	25
Fluoride, ppm	0.9	<0.1	0.8	0.9	0.8	0.8	<0.1
Iron, ppm	0.8	0.2	2.5	12	15	0.28	0.62
Nitrate, ppm	<0.1	3.6	<0.1	<1.0	0.8	51	<0.1
TDS, ppm	70	110	244	235	230	116	58
Phenol, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lead, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexavalent Chromium, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Copper, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Chromium, ppm	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
COD, ppm	55	50	65	30	20	120	20
Oil, ppm	<1.0	<1.0	3	7.5	4.5	1.5	<1.0
Appearance	Clear	Clear	Muddy	Muddy	Muddy	Clear	Clear
Odour	Odourless	Odourless	HC	HC	HC	Odourless	Odourless

GROUND WATER MONITORING REPORT FOR THE MONTH OF SEPTEMBER-21								
Parameters	D'souza Well	ETP-2 Bore	Fernandes Well	Hand Bore	HGIL Bore 5	HGIL Bore 6	Kalavar Church	MD Bunglow
pH	6.2	6.3	6.2	6.9	6.9	6.6	4.9	7.4
T-Hardness, ppm	39	39	47	102	100	71	29	27
Ca-Hardness, ppm	17	23	19	63	47	49	9	19
Mg-Hardness, ppm	22	16	28	39	53	22	20	8
Chloride, ppm	33	46	25	64	74	78	50	17
Sulphate, ppm	30	6.7	20	2.6	11	2.6	3.8	13
Fluoride, ppm	0.9	<0.1	1.7	1.1	0.8	<0.1	1	1
Iron, ppm	0.22	7.4	0.28	12.2	10.8	15.2	<0.1	<0.1
Nitrate, ppm	<1.0	<1.0	2.9	<0.1	<0.1	<0.1	50	0.6
TDS, ppm	128	161	134	340	341	300	125	60
Phenol, ppm	<0.10	0.13	<0.10	<0.1	0.19	<0.1	0.12	<0.1
Lead, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Cadmium, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Hexavalent Chromium, ppm	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Copper, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Manganese, ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Chromium, ppm	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
COD, ppm	25	20	15	75	106	30	35	15
Oil, ppm	<1.0	2	<1.0	4	9	18	<1.0	<1.0
Appearance	Clear	Muddy	Clear	Muddy	Muddy	Muddy	Clear	Clear
Odour	Odourless	Odourless	Odourless	Odourless	HC	HC	Odourless	Odourless

Annexure-IV

**Total SO<sub>2</sub> Emission from the Plant (Through Stacks)**

<b>MONTH</b>	<b>Total SO<sub>2</sub> Emission (TPD)</b>
Apr-21	30.0
May-21	26.6
Jun-21	25.0
Jul-21	27.4
Aug-21	36.6
Sep-21	32.5

Note: TPD --Tonnes per Day

**Additional SO<sub>2</sub> Emission through flaring as follow;**

<b>MONTH</b>	<b>SO<sub>2</sub> emission (Through Flaring), TPD</b>
Apr-21	13.4
May-21	11.7
Jun-21	16.1
Jul-21	28
Aug-21	28.7
Sep-21	17.3

Note: TPD - Tonnes per Day

## Ambient Air Quality Monitoring Data for April- 2021

LOCATION	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	O <sub>3</sub>
	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>
Permude	13.9	17.1	37	28	BDL	BDL
Perara	14.0	17.5	36	26	BDL	BDL
Ganeshpura	14.3	17.9	41	29	BDL	BDL
Cooling Tower	14.6	18.3	36	27	BDL	BDL
ETP	15.7	20.0	36	27	BDL	BDL
Benkinatheswara Temple	14.1	16.1	42	29	BDL	BDL
Substation - 45 area	14.6	17.9	41	29	BDL	BDL
Near CL area Weighbridge	13.9	16.5	46	33	BDL	BDL
Substation - 40 area	14.7	18.6	39	28	BDL	BDL
CISF Quarters	12.5	14.0	34	25	BDL	BDL

BDL : Below Detectable Limit

## Ambient Air Quality Monitoring Data for May- 2021

LOCATION	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	O <sub>3</sub>
	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>
Permude	13.8	16.8	36	27	BDL	BDL
Perara	13.8	17.3	35	25	BDL	BDL
Ganeshpura	14.2	17.6	40	27	BDL	BDL
Cooling Tower	14.3	18.0	35	26	BDL	BDL
ETP	15.4	19.6	35	25	BDL	BDL
Benkinatheswara Temple	13.8	15.9	40	28	BDL	BDL
Substation - 45 area	14.4	17.6	40	27	BDL	BDL
Near CL area Weighbridge	13.7	16.3	45	31	BDL	BDL
Substation - 40 area	14.5	18.3	38	27	BDL	BDL
CISF Quarters	12.3	13.7	33	24	BDL	BDL

BDL : Below Detectable Limit

## Ambient Air Quality Monitoring Data for June- 2021

LOCATION	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	O <sub>3</sub>
	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>
Permude	13.0	16.0	33	24	BDL	BDL
Perara	13.1	16.5	32	22	BDL	BDL
Ganeshpura	13.4	16.9	36	25	BDL	BDL
Cooling Tower	13.8	17.5	32	24	BDL	BDL
ETP	14.8	19.1	32	23	BDL	BDL
Benkinatheswara Temple	13.2	15.3	37	24	BDL	BDL
Substation - 45 area	13.7	16.9	36	24	BDL	BDL
Near CL area Weighbridge	13.1	15.8	41	28	BDL	BDL
Substation - 40 area	14.1	17.8	35	25	BDL	BDL
CISF Quarters	11.8	13.0	30	22	BDL	BDL

BDL : Below Detectable Limit

LOCATION	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	O <sub>3</sub>
	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>
Permude	12.8	15.7	31	23	BDL	BDL
Perara	12.9	16.3	30	21	BDL	BDL
Ganeshpura	13.1	16.6	34	23	BDL	BDL
Cooling Tower	13.3	17.0	31	22	BDL	BDL
ETP	14.4	18.6	30	22	BDL	BDL
Benkinatheswara Temple	12.8	14.8	35	23	BDL	BDL
Substation - 45 area	13.5	16.5	35	23	BDL	BDL
Near CL area Weighbridge	12.7	15.3	39	27	BDL	BDL
Substation - 40 area	13.5	17.2	33	23	BDL	BDL
CISF Quarters	11.4	12.6	29	20	BDL	BDL

BDL : Below Detectable Limit

#### Ambient Air Quality Monitoring Data for Aug- 2021

LOCATION	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	O <sub>3</sub>
	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>
Near Weighbridge	12.3	14.8	37	26	BDL	BDL
Near SS 40 (Jokattae Panch	13.1	16.8	32	22	BDL	BDL
CT	12.9	16.5	30	21	BDL	BDL
ETP	14.0	18.1	29	21	BDL	BDL
Ganeshpura	12.7	16.1	33	22	BDL	BDL
Permude	12.4	15.2	30	22	BDL	BDL
Perara	12.5	15.8	29	20	BDL	BDL
SS-45	13.0	16.0	34	22	BDL	BDL
B.Temple	12.5	14.3	34	22	BDL	BDL
CISF Quarters	11.0	12.1	28	19	BDL	BDL

BDL : Below Detectable Limit

#### Ambient Air Quality Monitoring Data for Sept- 2021

LOCATION	SO <sub>2</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	O <sub>3</sub>
	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	µg/m <sup>3</sup>	mg/m <sup>3</sup>	µg/m <sup>3</sup>
Near Weighbridge	12.5	15.1	39	27	BDL	BDL
Near SS 40 (Jokattae Panch	13.3	17.0	33	23	BDL	BDL
CT	13.2	16.7	31	22	BDL	BDL
ETP	14.2	18.4	31	22	BDL	BDL
Ganeshpura	12.9	16.4	34	23	BDL	BDL
Permude	12.7	15.5	31	23	BDL	BDL
Perara	12.8	16.1	31	21	BDL	BDL
SS-45	13.3	16.4	35	23	BDL	BDL
B.Temple	12.7	14.6	35	23	BDL	BDL
CISF Quarters	11.3	12.4	29	20	BDL	BDL

BDL : Below Detectable Limit