



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 कॉरपोरेशन लिमिटेड की सहायक कंपनी A SUBSIDIARY OF OIL AND NATURAL GAS CORPORATION LIMITED)
सीआईएन/CIN : L23209KA1988GOI008959

पंजीकृत कार्यालय : कुचेतूर 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/6738
11th February, 2022

The Director
Ministry of Environment, Forest & Climate Change,
4th 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. F. No. J - 11011/8/2009 - IA II (I) dated 23rd December, 2009 (CDU-I & GOHDS Revamp Project)

Also environment monitoring data of Noise level, Base levels of Ground Water, Ground Water quality, SO₂ 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

बेंगलूर कार्यालय : प्लाट नं. A-1, - के .एस.एस.आई.डी.सी. प्रशासनिक कार्यालय भवन के सामने, इंडस्ट्रीयल एस्टेट, राजाजीनगर, बेंगलूर -560 010
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Compliance to the Environmental Clearance for Diesel Quality Improvement Project and expansion of the Refinery to 13.6 MMTPA issued by Ministry of Environment, Forests & Climate Change, New Delhi

F. No. J - 11011/8/2009 - IA II (I) dated 23-12-2009

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A. SPECIFIC CONDITIONS

<p>i. M/s Mangalore Refinery and Petrochemical Limited shall comply with new standards/norms for Oil Refinery Industry notified under the Environment (Protection) Rules, 1986 vide G.SR 186(E) dated 18th March 2008.</p>	<p>MRPL is adhering to new standards for Oil Refinery Industry notified under the Environment (Protection) Rules, 1986.</p>
<p>ii. The project authorities make efforts to further reduce the SO₂ emission less than the prescribed limits of 37.74 TPD for the existing capacity.</p>	<p>Production and consumption of low sulphur internal Fuel Oil in the fired heaters is being ensured. The liquid fuel is consumed after consuming all the ultra-low sulphur Fuel Gas.</p> <p>Off gases generated from the process units are being utilized in the heaters to reduce fuel oil consumption and thereby reduce SO₂ emission.</p>
<p>iii. Supply of products from refinery shall not result in additional load due to tankers movements. Measures shall be taken to prevent the traffic congestion. Further, the truck owners for naphtha truck loading shall be informed to provide the truck with bottom loading capacity and for VOC recovery System.</p>	<p>Industries have so far not switched over to bottom loading and the existing practice of top loading is continuing. As and when trucks are fitted with proper facility with bottom loading, we will explore the possibility of bottom-loading and VOC recovery system</p>
<p>iv The process emissions (SO₂, NO_x, HC, VOCs and Benzene) from various units shall conform to the standards prescribed by the AP State Pollution Control Board from time to time. At no time, the emission levels should go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit, the unit should be Immediately put out of operation and should not be restarted until the desired efficiency has been achieved.</p> <p>The above condition amended by MoEF vide letter no. F.No. J-11011/8/2009-IA II (I) dated 18.02.11 "as to be read by Karnataka State Pollution Control Board".</p>	<p>Being complied with the stipulations of Karnataka State Pollution Control Board. As per the revised standards for refineries notified under the Environment (Protection) Rules dated 18th March 2008, we are monitoring SO₂ and NO_x in the stacks through on line analyzers. VOC (Hydrocarbon) is being checked through LDAR program and Benzene through our work environment monitoring.</p>

<p>v. Ambient. Air quality monitoring stations, (PM₁₀, /PM_{2.5}, SO₂, NO_x, H₂S, Mercaptan, NMHC, Ozone, Nickel and Benzene) should be set up in the Refinery complex in consultation with SPCB, and based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on modeling exercise to represent short term GLCs Continuous online stack monitoring equipment should be installed for measurement of SO₂, NO_x, CO and CO₂. Low NO_x burners should be installed with online analyzers.</p> <p>The above condition amended by MoEF vide letter no. F.No. J-11011/8/2009-IA II (I) dated 18.02.11 “No monitoring of Mercaptans in Ambient Air and CO₂ in stacks”.</p>	<p>Two continuous ambient air quality monitoring system (CAAQMS) have been installed within the refinery which was finalized in consultation with Pollution Control Board.</p> <p>Manual Ambient Air Quality Monitoring at 10 locations in and around the refinery is being carried out. Out of 10 locations, five are installed in the neighbouring villages and five inside the refinery. H₂S and NMHC are monitored inside the refinery through one of the CAAQMS and Nickel is measured by Manual Monitoring.</p> <p>This project is for revamp of CDU-I and GOHDS hence no additional stacks are provided</p>
<p>vi. The proponent shall upload the status of compliance of the stipulated EC conditions, including monitored data on their website and shall update the same periodically, It shall simultaneously be sent to the Regional and Office of MoEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant namely; Particulate matter (PM₁₀ /PM_{2.5}, SO₂, NO_x, Benzene (Ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the project shall be monitored and displayed at the convenient location near the main gate of the Company in the public domain.</p>	<p>Compliance to EC conditions is already uploaded in MRPL website. Monitored data is being sent to MoEF office.</p> <p>Critical sectoral parameters are being displayed at the main gate.</p>
<p>vii. Monitoring of fugitive emissions should be carried out as per the guidelines of CPCB by fugitive emission detectors and reports should be submitted to the Ministry’s Regional Office at Bangalore, For control of fugitive emission all unsaturated hydrocarbon will be routed to the flare system and the flare system should be designed for smoke less burning.</p>	<p>VOC monitoring is being carried out as per MoEF guidelines and monitoring is already extended to the revamp projects.</p>
<p>viii. Fugitive emissions of HC from product storage tank yards etc must be regularly monitored. Sensors for detecting HC leakage should also be provided at strategic locations. The company should use low sulphur fuel to minimize SO₂ emission Sulphur recovery units should have efficiency of 99.5 %. Leak Detection and Repair programme should be implemented to control HC/VOC emissions;</p>	<p>HC monitoring extended to new storage tanks yard.</p> <p>LDAR program is being carried out as per MoEF schedule.</p> <p>Work Zone monitoring is carried out by M/s. Eko Pro Engineers Pvt. Ltd, Ghaziabad.</p>

<p>Work zone monitoring should be carried out near the storage tanks besides monitoring of HCs/VOCs in the work zone.</p>	<p>Low Sulphur fuel being used to minimise SOx emission.</p> <p>Since the project is only revamp of CDU-1 & GOHDS, the capacity of existing Sulphur Recovery Units is adequate to meet the revamp conditions.</p>
<p>ix. The wastewater should be treated in the wastewater treatment plant and the treated effluent should meet the prescribed standards. Efforts should be made to recycle the treated effluent to achieve zero discharge. The RO plant shall be installed for reuse and conservation of water.</p>	<p>Waste water generation due to revamp project is treated in the existing waste water treatment plants. Quality of the treated effluent always meets the prescribed standards.</p> <p>RO plant installed under the Phase-3 Refinery up gradation and expansion project.</p>
<p>x. The project authorities must strictly comply with the rules and regulation with regard to handling and disposal of Hazardous Wastes (Management, Handling and Trans Boundary Movement) Rules, 1989/ 2003/ 2008 wherever applicable. Authorization from the State Pollution Control Board must be obtained for collection/ treatment/storage/disposal of hazardous wastes.</p>	<p>Hazardous Waste Rule is being followed and complied. Hazardous waste Authorization is obtained for Handling, Storage and Disposal of Hazardous Waste from Karnataka State Pollution Control Board.</p>
<p>xi. The company should strictly follow all the recommendation mentioned in the charter on Corporate Responsibility for Environmental Protection (CREP) for the oil refineries.</p>	<p>Being strictly followed all the recommendation mentioned in the charter on Corporate Responsibility for Environmental Protection (CREP) for the oil refineries.</p>
<p>xii. The Company should take necessary measures to prevent fire hazards, containing oil spill and soil remediation on as needed. At place of ground flaring, the overhead flaring stack with knockout drums should be installed to minimize gaseous emissions during flaring.</p>	<p>Complied.</p>
<p>xiii. To prevent fire and explosion at Oil and Gas facility, potential ignition sources should be kept to a minimum and adequate separation distance between potential ignition sources and flammable material should be in place.</p>	<p>Being strictly ensured.</p> <p>Oil Industry Safety Directorate (OISD) standard being followed at the design stage itself to maintain adequate distance between potential ignition sources and flammable material.</p>
<p>xiv. The operators and lab room shall be shifted to safe location, as the predicted damage distance</p>	<p>Amended Environmental Clearance is obtained from MoEF vide letter</p>

due to leaking pre-fractionators is 90 m only.	dated 05.09.2012 with alternative mitigative measures. All the measures are complied.
xv. Onsite and offsite DMP shall be updated to cover the additional facilities and the updated plans shall be implemented.	DMP is amended for revamp projects.
xvi. Occupational health surveillance of worker should be done on a regular basis and records maintained as per the Factory Act.	Health surveillance of workers was done by the respective contractors during the project execution time and records were maintained.
xvii. Greenbelt should be developed to mitigate the effect of fugitive emission all around the plant in a minimum 33% plant area in consultation with DFO as per CPCB guidelines	Greenbelt existing inside MRPL total land area 1592 acres comprises of 54 types of tree species spread over 462 acres 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
xviii. The Company should undertake measures for rainwater harvesting to recharge the ground water and minimize fresh water consumption.	Mangalore is experiencing more than six months of heavy rain fall. Ground water table is very high in this region and therefore rain water harvesting to recharge the ground water may not be feasible.
xix. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	Revamp Project job completed and unit commissioned successfully. All the facilities were provided during the project stage as directed.

B. GENERAL CONDITIONS

i. The project authorities must strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government and any other statutory body.	Being complied.
ii. No further expansion or modification in the project shall be carried without prior approval of the Ministry of Environment and Forests, In case of deviations or alternations in the project proposal from those submitted to the Ministry for clearance, a fresh reference shall be made to	Noted. No further expansion or modification in the project will be carried without prior approval of the Ministry of Environment, Forest and

the Ministry.	Climate Change.
iii. At no time, the emissions shall go beyond the prescribed standards. In the event of failure of any pollution control system, the respective facilities should be immediately put out of operation and should not be restarted until the desired efficiency has been achieved. Provision of adequate height of stack attached to DG sets & flare is to be done	Emission levels of the pollutants are always maintained within the permissible levels. Adequate height of stack attached to DG Sets and Flare is provided.
iv. Waste water shall be properly collected and treated so as to conform to the standards prescribed under EP Act & Rules and mentioned In the Consents provided by the relevant SPCB.	Waste Water generated from the process units is being collected properly and routed through closed network to Waste Water Treatment plant (WWTP). The same is treated to meet the standards prescribed under EP Act.
v. The overall noise levels in and around the premises shall be limited within the prescribed standards (75 dBA) by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels should conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (day time) and 70 dBA I (night time).	Noise levels near the boundary of the premises are within the prescribed limit.
vi. The project authorities must strictly comply with the provisions made in Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 as amended In 2000 for handling of hazardous chemicals etc. Necessary approvals from Chief Controller of Explosives must be obtained before commission of the expansion project, if required. Requisite On-site and Off-site Disaster Management Plans will be prepared and implemented.	Being followed.
vii. The project authorities will provide adequate funds as non-recurring and recurring expenditure to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government along with the implementation schedule for all the conditions stipulated herein. The funds so provided should not be diverted for any other purposes.	Complied
viii. The company shall develop rainwater harvesting structures to harvest the run off water for recharge of ground water.	Mangalore is experiencing more than six months of heavy rain fall. Ground water table is very high in this region and therefore rain water harvesting to recharge the ground water may not be feasible.
ix. The stipulated conditions will be monitored	Being followed.

<p>by the concerned Regional Office of this Ministry/ Central Pollution Control Board/ State Pollution Control Board. A six monthly compliance report and the monitored data should be submitted to them regularly. It will also be displayed on the Website of the Company.</p>	
<p>x. The project proponent shall also submit six monthly reports on the status of compliance of the stipulated EC conditions including results of monitored data (both on hard copies as well as by e-mail) to the respective Regional Office of MoEF, the respective Zonal Office of CPCB and the SPCB.</p>	<p>Six monthly report on compliance and monitoring data is being submitted to Ministry regularly.</p>
<p>xi. A copy of clearance letter shall be sent by the 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. The clearance letter shall also put up on the website of the Company by the proponent.</p>	<p>There were no suggestions/representation received from Zilla Parishad/ Municipal Corporation, NGO or any other local body.</p>
<p>xii. The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http://www.envfor.nic.in This should 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 conceded and a copy of the same should be forwarded to the concerned Regional office of this Ministry.</p>	<p>Complied.</p>
<p>xiii. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent 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 EC conditions and shall also be sent to the respective regional Office of the MoEF by e-mail.</p>	<p>Environment Statement for refinery is being submitted for each financial year ending 31st March in Form-V to KSPCB regularly and same is being uploaded at MRPL website. Compliance to the EC conditions also uploaded at the website.</p>
<p>xiv. A separate environment management cell with full-fledged laboratory facilities to carry out various management and monitoring functions</p>	<p>A separate Environmental Management Cell is already functioning in the refinery and is</p>

shall be set up under the control of a Senior Executive.	headed by Chief General Manager (CGM)
xv. 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	We have informed MoEF with the details vide our letter No. L/D/MoEF/4333 dated 18.02.2011
9. The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.	Noted.
10. The Ministry reserves the right to stipulate additional conditions if found necessary. The company will implement these conditions in a time bound manner.	Noted.
11. Any appeal against this environmental clearance shall lie with the National Environment Appellate Authority, if We preferred within a period of 30 days as prescribed under Section II of the National and Environment Appellate Authority Act, 1997	We have submitted letters to MoEF to reconsider conditions stipulated in the EC. Amended EC obtained from MoEF dated 05.09.2012.
12. The above conditions will be enforced. Inter-ella under the provisions of the Water (Prevention & Control of Pollution) Act.1974, Air (Prevention & Control of Pollution) Act. 1981, the Environment. (Protection) Act. 1986. Hazardous Wastes (Management, Handling and Trans: boundary Movement) Rules, 2008 and the Public Liability Insurance Act, 1991 along with their amendments and rules made there under and also any other orders passed by the Hon'ble Supreme Court of India/ High Court of Karnataka or any other Court of Law relating to the subject matter.	Being complied.

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 SO₂ Emission from the Plant (Through Stacks)

MONTH	Total SO₂ Emission (TPD)
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 SO₂ Emission through flaring as follow;

MONTH	SO₂ emission (Through Flaring), TPD
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 ₂	NO ₂	PM ₁₀	PM _{2.5}	CO	O ₃
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³
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 ₂	NO ₂	PM ₁₀	PM _{2.5}	CO	O ₃
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³
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 ₂	NO ₂	PM ₁₀	PM _{2.5}	CO	O ₃
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³
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 ₂	NO ₂	PM ₁₀	PM _{2.5}	CO	O ₃
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³
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 ₂	NO ₂	PM ₁₀	PM _{2.5}	CO	O ₃
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³
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	11.4	12.6	29	20	BDL	BDL

BDL : Below Detectable Limit

Ambient Air Quality Monitoring Data for Sept- 2021

LOCATION	SO ₂	NO ₂	PM ₁₀	PM _{2.5}	CO	O ₃
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³
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