



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

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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/6737
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. Letter No. J – 21-383/2007-IA- III dated 3rd April, 2008 (Phase-III Expansion 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

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Compliance to the Environmental Clearance for setting up of Phase-I of Special Economic Zone at Mangalore issued by Ministry of Environment, Forests & Climate Change, New Delhi

Letter No. J – 21-383/2007-IA- III dated 3rd April, 2008

Sl. No.	Environmental Clearance conditions	Compliance
A	SPECIFIC CONDITIONS	
(i)	No objection Certificate from the Karnataka State Pollution Control Board shall be obtained before initiating the project.	Consent for Establishment (CFE) for the MRPL Phase-III Project has obtained from KSPCB ref. No.PCB / 426 / CFE / 08 / 247 dated 08-08-2008.
(ii)	The MSEZ project shall be restricted to the Phase-I of the project, proposed over 1,800 acres. The phase II of the project shall be considered by Ministry of Environment and Forests only after receipt of all requisite documents/information as laid down in the Environmental Impact Assessment Notification, 2006 and Coastal Regulation Zone Notification, 1991 as applicable.	This point pertains to M/s MSEZL for compliance.
(iii)	All Development in the Coastal Regulation Zone area shall be in accordance with the Coastal Regulation Zone Notification, 1991. No destruction of mangroves shall be undertaken except while undertaking the permissible activities in the Coastal Regulation Zone-1 areas.	Noted and followed as applicable.
(iv)	The project proponent shall not take up any activity in 875 acres of Coastal Regulation Zone land, other than those permissible under the Coastal Regulation Zone Notification 1991 such as pipeline corridors, pipelines roads on stilts.	Noted and followed as applicable.

SI. No.	Environmental Clearance conditions	Compliance
(v)	<p>With regard to the containing the suspected contamination of the groundwater near Atturkodi area of Kuthethoor village, MRPL have given an undertaking vide their letter dated 19.3.2008 which is as follows:-</p> <p>(a) "Implementation of recommendation of NGPRI will be started immediately after submission of their report.</p> <p>(b) Depending upon the nature of their recommendations, we will make efforts to complete necessary actions within 6 months from the date of receipt of their report.</p> <p>(c) In addition to above, a daily vigil is already in place to take samples from different places and to monitor any suspected oil leakage. This will continue till the problem is resolved.</p> <p>(d) We are also in continuous contact with the residents in the surround areas with regard to any contamination".</p> <p>KSPCB and MRPL shall ensure that (a) to (d) above is implemented in a time bound manner and a monthly report on the progress of the activities provided to the Regional Office of this Ministry at Bangalore. For this purpose a separate budget would be allocated by MRPL.</p>	<p>Copy of the final report from M/s. NGRI submitted to MoEF and KSPCB on 16/7/2009 and 2/7/2009 respectively.</p> <p>All Recommendations implemented. Monthly sample is being collected from Atturkodi along with KSPCB and found no oil content present in the water stream</p> <p>Daily vigil was maintained.</p> <p>We are also in continuous contact with the residents in the surround area.</p> <p>NGRI study completed & MRPL has complied with all the recommendations of the report.</p> <p>Further as directed by KSPCB, M/s. National Institute of Hydrology (NIH), Belgaum is engaged to conduct Hydrogeological study in the entire refinery complex. Study has completed and implementation of the recommendation is completed.</p> <p>MRPL has submitted a letter vide no. L/MS/MoEFCC/6038 dated 29-05-2019 to the Ministry of Environment, Forest and Climate Change, Bengaluru regarding status on suspected oily water seepage into Atturkodi village</p>
(vi)	<p>The project proponent shall obtain a report from the Wildlife Department with regard to existence of wildlife in the proposed site as claimed by the public before implementing the project.</p>	<p>This point pertains to M/s. MSEZL for compliance. Report from the Forest Dept. is obtained & submitted to Ministry by MSEZL.</p>
(vii)	<p>The R&R package shall be strictly in accordance with the laid down norms of the State Government.</p>	<p>This point pertains to M/s. MSEZL for compliance. Further, MRPL abide by the directions of State Govt. regarding the implementation of the R&R package to the extent applicable.</p>
(viii)	<p>A marine Environment Impact Assessment and Risk Assessment along with the Disaster Management Plan shall be prepared for the outfall facilities proposed in the Coastal Regulations Zone and the marine areas.</p>	<p>This point pertains to M/s. MSEZL for compliance.</p>

(ix)	Project proponent shall put up a dedicated website and a display panel to inform the public regarding the Ambient Air Quality along with SO ₂ , NO _x and other parameters as prescribed by Central Pollution Control Board (CPCB).	Electronic Panel at MRPL gate display SO ₂ , NO _x , PM ₁₀ , PM _{2.5} , Oil content in treated effluent and % recycling of treated effluent parameters since year 2008. MRPL web site displays the Ambient Air quality monitoring parameters such as SO _x , NO ₂ , CO, PM ₁₀ , PM _{2.5} etc.
x)	The gaseous emissions (SO ₂ , NO _x , HC, VOC and Benzene) from various process units shall conform to the standards prescribed by the concerned State Pollution Control Board. All the measures detailed in the EMP and response to the Public Hearing shall be taken to control the point/stack and fugitive gaseous emissions from the proposed facilities, processes and storage units etc., for ensuring that the ambient air quality around the Refinery due to the expansion is maintained at the predicted 24 hourly average maximum concentration.	The Detailed Engineering of the Phase-III processing facilities carried out to meet the standards set for gaseous emissions, as applicable. Further, the following aspects considered for ensuring the Ambient air quality around the Refinery due to expansion is maintained at the predicted 24 Hourly average maximum concentration. <ul style="list-style-type: none"> (a) The low Sulphur in Liquid Fuel oil is used in the heaters/boilers. (b) The Design efficiency of the Sulphur Recovery units are 99.9% against the stipulation of 99.5%. (c) Low NO_x burners have been installed for all the fired heaters. (d) Vapour Recovery scheme from storage tanks for high RVP materials is implemented. (e) Double seal arrangement is implemented in all storage tanks being built. (f) VOC treatment system is implemented in the Waste water treatment plant. (g) The heights of the stacks are either equal to or more than the values considered during EIA studies. (h) Separate and closed system for Spent Caustic treatment (Wet Air Oxidation Process) is commissioned. <p>Moreover, with a view to be proactive, the Phase-III facilities (Process furnaces and boilers and Gas turbines) have designed to burn Natural gas also.</p>
(xi)	The emission levels of the other pollutants shall also remain within the permissible levels.	Emission levels of the pollutants maintained within the permissible levels.

(xii)	The industrial units in the SEZ and the associated facilities shall be strictly in accordance with the norms laid-down by the Karnataka State Government and CPCB.	MRPL is committed to the full compliance to the norms laid down by KSPCB and CPCB.
(xiii)	The project proponent shall ensure that the greenery of the area is maintained. Further, 33% of the project area shall be dedicated for green belt development of which at least 5% shall be for mangrove afforestation. The local Forest Department shall be associated for this purpose and requisite budget earmarked.	<p>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.</p> <p>MRPL is also supporting Govt. of Karnataka (GoK) "Koti Vriksha Andolan" Program by sponsoring and planting sapling in the neighbouring schools and villages</p> <p>MRPL has planted saplings in the vicinity of Phase – III area. Majority of the plantation is done in the stretch between DCU/SRU/Coke Laydown area towards Jokatte Village side.</p>
(xiv)	The project proponent shall ensure that the water requirement of the Mangalore city does not get affected due to the SEZ operation. Adequate provision shall be made in the reservoirs to provide for the water requirement of the cities.	This point pertains to M/S MSEZL for compliance.
(xv)	The project proponent shall ensure that during construction and operation of the project the traffic in the city is not affected.	<p>MRPL has developed an exclusive road for moving large consignments from the NMPT port to Phase-III project site. This drastically reduced the movement of consignments in other roads.</p> <p>The same road is being used to the maximum for movement of products during operation Phase. Further new fly over constructed was made operational which drastically reduced truck movement through habitation.</p>
(xvi)	All precautions of the highest standards shall be incorporated in the design of the project to ensure that there is no chance of emission/leakage of hazardous chemicals including Benzene. Detailed monitoring program shall be designed and the information provided to the public through display and dedicated website by means of online monitoring.	<p>The MRPL Phase-III project processing facilities is designed conforming to the standards as applicable to a refinery project (Such as OISD guidelines, API standards etc). There is no Benzene production from the MRPL Phase-III Units.</p> <p>Leak Detection and Repair (LDAR) program is implemented.</p>
(xvii)	Low Sulphur internal fuel oil and fuel gas shall be fired in process heaters and boilers.	Low Sulphur internal fuel oil and fuel gas is being fired in process heaters and boilers.

(xviii)	<p>Quarterly monitoring of fugitive emissions shall be carried out by Fugitive Emission Detectors (GMI Leak Surveyor). Guidelines of CPCB will be followed for monitoring fugitive emissions. For control of fugitive emissions, all unsaturated hydrocarbons shall be routed to the flare system. The flare system shall be designed for smokeless burning. Flare Gas Recovery System shall be installed for reduction of Hydrocarbon loss and emission of VOCs, NOx, N2O, SOx & CO2 to the environment.</p>	<p>The monitoring and reporting of fugitive emissions being carried out as per stipulations.</p> <p>All unsaturated Hydrocarbons are designed to be routed to flare system, as required and the flare system is designed for smokeless burning.</p> <p>Further during normal operation the system is designed for minimum / Zero flaring.</p> <p>Flare gas recovery system installed to recover hydrocarbon flare gases which is connected to the fuel gas header for utilizing the same in process heaters.</p>
(xix)	<p>Regular Ambient Air Quality Monitoring shall be carried out. The location and results of existing monitoring stations shall be reviewed in consultation with the concerned State Pollution Control Board based on the occurrence of maximum ground level concentration and downwind direction of wind. Additional Stations shall be set up, if required. It shall be ensured that at least one monitoring station is set up in up-wind & down-wind direction along with those in other directions.</p>	<p>Currently MRPL has 10 nos. AAQ monitoring stations located in consultation with the KSPCB including 4 numbers AAQ monitoring stations added exclusively to monitor Phase III areas</p>
(xx)	<p>On-line data for air emissions shall be transferred to the CPCB and SPCB regularly. The instruments used for ambient air quality monitoring shall be calibrated regularly. The monitoring protocol shall ensure continuous monitoring of all the parameters.</p>	<p>On-line data being transferred to the CPCB server.</p> <p>The instruments used for Ambient Air Quality Monitoring is calibrated regularly.</p>
(xxi)	<p>The practice of acoustic plant design shall be adopted to limit noise exposure for personnel to an 8 hr time weighted average of 90 db (A).</p>	<p>All the noise source equipments (Static and rotary) are designed to meet the laid down stipulations and standards.</p>
(xxii)	<p>All the pumps and other equipment's, where there is a likelihood of HC leakages, shall be provided with appropriate indicators and detectors. Provision for immediate isolation of such equipment, in case of a leakage shall also be made. The company shall adopt Leak Detection and Repair (LDAR) programme for quantification and control of fugitive emissions.</p>	<p>HC leakage detectors have been provided in various locations of the processing facilities and the LDAR programme implemented for Phase III units.</p>
(xxiii)	<p>The product loading gantry shall be connected to the product sphere is closed circuit through the vapour arm connected to the tanker. Data on fugitive emissions shall be regularly monitored and records shall be maintained.</p>	<p>No product loading gantry envisaged as a part of the Phase-III project facilities.</p>

(xxiv)	The company shall ensure that no halogenated organic is sent to the flares. If any of the halogenated organic are present, then the respective streams may be incinerated, if there are no technically feasible or economically viable reduction/recovery options. Any stream containing organic carbon, other than halogenated shall be connected to proper flaring system, if not to a recovery device or an incinerator.	There is no generation of halogenated organic compound from the Phase-III facilities. For other streams containing organic carbon suitable flaring system has been designed.
(xxv)	The new standards/norms that are being proposed by the CPCB for Petrochemical Plants and Refineries shall be applicable for the proposed expansion unit. The company shall conform to the process vent standards for organic chemicals including non-VOCs and all possible VOCs i.e., TOCs standards and process vent standards for top priority chemicals. Regular monitoring will be carried out for VOC and HC and On-line monitors for VOC measurements may be installed.	HC leakage detectors have been provided in various locations of the processing facilities and the LDAR programme implemented in Phase III units.
(xxvi)	Regular monitoring of relevant parameters for the under ground water in the surrounding areas shall be undertaken and the results shall be submitted to the relevant States Pollution Control Board.	Monthly monitoring of relevant parameters for the under ground water samples being collected along with Karnataka State Pollution Control Board (KSPCB) in and around the Refinery complex.
(xxvii)	Solid waste generated as Pretreater and Reformer Catalysts, Sulphur guard absorbent and Alumina Balls shall be disposed off as per the authorization from the State Pollution Control Board.	The Spent catalysts disposed off to the CPCB/KSPCB Authorized Recyclers/Reprocessors as per the authorization of the Board.
(xxviii)	Oily sludge shall be sent to melting pit treatment for recovery of oil. The recovered oil shall be recycled into the refinery system. The residual sludge will be stored in HDPE lined pit for disposal after treatment. The sludge shall be incinerated in the premises only.	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. Further, Oily sludge is being disposed to Cement Industries for co-processing in their unit.
(xxix)	The company shall strictly follow all the recommendations mentioned in the Charter on Corporate Responsibility for Environmental Protection (CREP).	All the recommendation mentioned in CREP is complied.

(xxx)	The company shall harvest surface as well as rainwater from the rooftops of the buildings proposed in the expansion project and storm water drains to recharge the ground water and use the same water for the various activities of the project to conserve fresh water.	Noted In order to conserve fresh water consumption, tertiary treated sewage water from Mangalore city is being used in the cooling towers
(xxxii)	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	Occupational Health surveillance of the workers was done by the respective contractors during the project execution time and records were maintained.
(xxxiii)	The company shall implement all the recommendations made in the Environmental Impact Assessment/EMP report and risk assessment report.	All the recommendation mentioned in EIA/ EMP is complied.
(xxxiv)	The company will undertake all relevant measures, as indicated during the Public Hearing for improving the Socio-economic conditions of the surrounding area.	This point pertains to M/s. MSEZL for compliance.
(xxxv)	With regard to R&R colony the project proponent shall obtain all requisite clearance as prescribed by the concerned agencies.	This point pertains to M/s. MSEZL for compliance.
B.	GENERAL CONDITIONS :	
(i)	The project authorities shall strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government.	Strictly adhere to KSPCB stipulation.
(ii)	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	No expansion or modifications carried out without prior approval of the Ministry of Environment, Forest and Climate Change.
(iii)	At no time, the emissions shall be allowed to go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the units, the respective unit should be immediately put out of operation and should not be restarted until the desired efficiency has been achieved.	Emissions are always maintained below prescribed standard. Emission being monitored continuously through online analyzers provided in all the units
(iv)	Adequate number of influent and effluent quality monitoring stations shall be set up in consultation with the SPCB. Regular monitoring shall be carried out for relevant parameters for both surface and ground water.	Regular monitoring is carried out in and around the refinery for both surface and ground water along with KSPCB.
(v)	Industrial wastewater shall be properly collected and treated so as to conform to the standards prescribed under GSR 422. (E) dated 19th May 1993 and 31st December, 1993 or as amended from time to time. The treated wastewater shall be utilized for plantation purpose.	Proper and suitable designs were put in place for collection of Industrial waste water and an advanced waste water treatment plant was commissioned for its treatment. Advance WWTP consists of latest technology like Sequential Batch Reactor (SBR), Membrane Bio Reactor (MBR), Ultra Filtration (UF) and Reverse Osmosis (RO) unit.

(vi)	The overall noise levels in an around the plant area shall be limited within the prescribed standards (85 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 (night time).	The ambient Noise levels confirms to the standards prescribed under EPA Rules, 1989.
(vii)	The project authorities shall strictly comply with 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. Requisite On-site and Off-site Disaster Management Plans will be prepared and implemented.	Necessary approvals from Chief Controller of Explosives are obtained before commissioning. On-site and Off-site Disaster Management Plans prepared.
(viii)	Authorization from the State Pollution Control Board must be obtained for collections/treatment/storage/disposal of hazardous wastes.	The Hazardous Waste Authorization received from KSPCB and valid till 30-06-2021. HWA further extended by 3 more months vide KSPCB OM No. KSPCB/Corp cell/2021/644 dated 02 June 2021.
(ix)	The project authorities shall provide adequate funds both recurring and non-recurring 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 shall not be diverted for any other purposes.	Noted
(x)	The stipulated conditions shall be monitored by the concerned Regional Office of this Ministry/Central Pollution Control Board. A six monthly compliance report and the monitored data shall be submitted to them regularly. It shall also be displayed on the Website of the Company.	A six monthly compliance report and the monitored data is being submitted to MoEF/CPCB/KSPCB regional office.

(xi)	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 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 concerned and a copy of the same should be forwarded to the concerned Regional office of this Ministry.	The same was carried out and the information regarding this was submitted to MoEF & KSPCB.
(xii)	The date of Financial Closure and final approval of the project by the concerned authorities and the date of commencing the land development work as the commissioning of the project shall be informed to the Ministry and /its Regional Office.	Data provided to MoEF.
(xiii)	Proper House Keeping and adequate occupational health programmes shall be taken up. Regular Occupational Health Surveillance Programme for the relevant diseases shall be carried out and the records shall be maintained properly for at least 30-40 years. Sufficient preventive measures shall be adopted to avoid direct exposure to emission and other Hydrocarbons etc.	Proper House Keeping and adequate occupational health programmes taken up. An Occupational Health Center is already functioning round the clock inside the Refinery.
(xiv)	A separate environment management cell with full fledged laboratory facilities to carry out various management and monitoring functions shall be set up under the control of a Senior executive.	A separate environment management cell headed by Chief General Manager (CGM) with full fledged laboratory facilities to carry out various management and monitoring functions under the control of a Senior executive
4.	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory	Noted.
5.	The Ministry reserves the right to stipulate additional conditions if found necessary. The company shall implement these conditions in a time bound manner.	Noted.

6.	The above conditions will be enforced, inter-alia the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986, the Public Liability Insurance Act, 1991, Hazardous Waste (Management & Handling) Rules, 1989 and Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 along with their amendments and rules.	Noted.
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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

Total SO₂ Emission from the Plant (Through Stacks)

MONTH	Total SO ₂ 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	SO ₂ 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	11.0	12.1	28	19	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