O/C

Mangalore SEZ Limited
3rd Floor, MUDA Building, Ashok nagar,
Urwa Stores, Mangalore - 575 006
Phone: 0824-2452748 / 2452750
Fax: 0824-2452749
Website: www.mangaloresez.com
CIN: U45209KA2006PLC038590

MSEZL/MNG/EN/2018-19

03 July, 2019

To,

The Director,
Southern Region, Regional Office,
Ministry of Environment and Forests,
Kendriya Sadan, 4th Floor, E&F Wings,
17th Main Road, 1st Block, Koramangala,
Bangalore – 560 034

REGIONAL OFFICE 6/7/19
Karnataka State Pollution Control Board
Plot No.10-B, Baikampady Industrial Area
MANGALORE-575011

Sir,

Sub: Six monthly Compliance Report.

Ref:

1. Environmental Clearance No: 21-383/2007-IA-III, dated 3rd April 2008.
2. Amendment to Environmental Clearance for setting up of Phase-I of Special Economic Zone at Mangalore by M/s Mangalore SEZ Ltd – regarding No: 21-383/2007-IA-III dated 13th July, 2012.
3. Amendment to Environmental Clearance for setting up of Phase-I of Special Economic Zone at Mangalore by M/s Mangalore SEZ Ltd date 27 Aug 2014.
4. Amendment to Environmental Clearance for development of Multi Product Units as Mangalore SEZ dated 18 June 2015.

With reference to above, we would like to submit the compliance report as on date.

S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(i)	No Objection Certificate from the Karnataka State Pollution Control Board shall be obtained before initiating the project.	Consent For Establishment from KSPCB obtained on 30 April 2008 and Extension of validity of Consent For Establishment obtained on 27 May 2013 and the copy was submitted to MoEF.
(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.	Will be complied. MSEZL will approach MoEF with requisite documents as per EIA Notification, 2006 for Phase-2 expansions if taken in future.
(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	Complied.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
	undertaken except while undertaking the permissible activities in the Coastal Regulation Zone-I areas.	
(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.	Complied.
(v)	With regard to the containing the suspected contamination of the groundwater near Athurkodi area of Kuthethoor village, MRPL have given an undertaking vide their letter dated 19.3.2008 which is as follows:- a) Implementation of recommendation of NGPRI will be started by MRPL immediately after submission of their report. 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. 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. d) We are also in continuous contact with the residents in the surround areas with regard to any contamination. 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.	This condition pertains to MRPL phase III expansion project. MRPL phase III expansion has been detached from MSEZ phase I project vide EC amendment dated 13th July 2012. MRPL shall be complying conditions relevant to them as part of their existing clearance.
(vi)	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.	Report from the Forest Department is obtained and submitted to the MoEF dated June 5, 2008.
(vii)	The R&R package shall be strictly in accordance with the laid down norms of the State Government.	The R&R Package is being implemented strictly as per approved policy by State Government. In 1st PDF **1245** families out of **1253**, In 2nd PDF **214** families out of **214**, In 3rd PDF **146** families out of **147** families & **14** shops has been compensated with R&R Packages. Totally **1619** families have vacated their houses and are rehabilited.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(viii)	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 Regulation Zone and the marine areas.	NIO has carried out EIA, Risk Assessment, DMP and Bathymetry survey along with Marine, Outfall pipeline alignment. The detailed design report of the Marine Outfall facility is prepared by Master planning consultants of MSEZ under the guidance of Department of Oceanography, IIT Chennai. The design report was also vetted by NIO, Goa. The detailed project report of the facility is submitted to MoEF during November 2009. MSEZ has taken up the implementation of the above facility and completed the work by July 2014. MSEZ obtained consent for operation of treated waste water discharge line from KSPCB vide dated 9 Sep 2014, 8 Oct 2015 & 27 Aug 2016.
(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 NOx and other parameters as prescribed as Central Pollution Control Board (CPCB).	MSEZL has dedicated website 'www.msezl.com', wherein Environment Monitoring Parameters are periodically uploaded and made available to the public. Installation and commissioning of Continuous Ambient Air Quality Monitoring station (CAAQMS) has been completed during the month July 2017 and presently data is being transferred to CPCB server continuously. The location of monitoring station is finalized in consultation with KSPCB.
(x)	The gaseous emissions (SO2, NOx, 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.	Noted. The existing units in MSEZ are complying the conditions and submitting reports to KSPCB directly. MRPL phase III expansion has been detached from MSEZ phase I project vide EC amendment dated 13th July 2012. MRPL shall be complying conditions relevant to them as part of their existing clearance.
(xi)	The emission levels of the other pollutants shall also remain within the permissible levels	Noted.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(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.	Noted and will be adhered.
(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.	Presently MSEZL has completed Green Belt development in 247 acres out of 272 acres by planting 111150 saplings and remaining green belt development will be completed in the year 2019-20. Green Belt operation & maintenance is for 2-3 years & plants are maintained as per the good practises to ensure 100% survival. Slope stabilisation in about 18 acres with vetiver grass has been completed.
(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.	Noted.
(xv)	The project proponent shall ensure that during construction and operation of the project the traffic in the city is not affected.	Complied.
(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 programme shall be designed and the information provided to the public through display and dedicated website by means of online monitoring.	Noted and will be complied.
(xvii)	Low Sulphur internal fuel oil and fuel gas shall be fired in process heaters and boilers.	Noted and will be complied.
(xviii)	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, N_2O, SOx & CO_2 to the environment.	Noted and will be complied.
(xix)	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	Ambient Air Quality Monitoring is being carried out regularly in two locations and the locations of monitoring are selected in consultation with KSPCB. The reports of

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
	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 & in down-wind direction along with those in other directions.	monitored data attached as **Annexure-I.**
(xx)	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.	Installation and commissioning of Continuous Ambient Air Quality Monitoring station (CAAQMS) has been completed during the month July 2017 and presently data is being transferred to CPCB server continuously. The location of monitoring station is finalized in consultation with KSPCB.
(xxi)	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).	Noted and will be complied.
(xxii)	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.	Noted and will be complied.
(xxiii)	The product loading gantry shall be connected to the product sphere in closed circuit through the vapour arm connected to the tanker. Data on fugitive emissions shall be regularly monitored and records shall be maintained	Noted and will be complied.
(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.	Noted and will be complied.
(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.	Noted and will be complied.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(xxvi)	Regular monitoring of relevant parameters for the underground water in the surrounding areas shall be undertaken and the results shall be submitted to the relevant States Pollution Control Board.	Regular monitoring of ground water is being carried in 10 locations & the reports are attached as **Annexure-I**. The locations are finalized in consultation with KSPCB.
(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.	Noted and will be complied. During operation stage MSEZL will dispose the solid waste as per the directions of State Pollution Control 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.	Noted and will be complied.
(xxix)	The company shall strictly follow all the recommendations mentioned in the Charter on Corporate Responsibility for Environmental Protection (CREP).	Noted and will be 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 and will be complied.
(xxxi)	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	Complied and copy of the same is attached as **Annexure-II**.
(xxxii)	The Company shall implement all the recommendations made in the Environmental Impact Assessment /EMP report and risk assessment report.	MSEZL has implemented most of the recommendations of EIA/EMP report and still some of the projects of MSEZL as per EIA/EMP recommendations are under way.
(xxxiii)	The company will undertake all relevant measures, as indicated during the Public Hearing for improving the Socio-economic conditions of the surrounding area.	MSEZL is undertaking all relevant measures for improving the Socio-economic condition of the surrounding area as indicated during the Public Hearing.
(xxxiv)	With regard to R&R colony the project proponent shall obtain all requisite clearances as prescribed by the concerned agencies.	The R&R Colonies are developed after obtaining the requisite clearances from the concerned Departments like MoEF, KSPCB, Mangalore Urban Development Authority etc.

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S. No	B. GENERAL CONDITIONS	Compliance
(i)	The project authorities shall strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government.	Noted and will be complied.
(ii)	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	MSEZ obtained amendment to EC 1. Dated 13 July 2012 2. 27 Aug 2014, this involves widening of existing public road towards river side adjacent to MSEZ proposed pipeline cum road Corridor in Reach-II area. 3. 18th June 2015 for development of Multi Product Units as Mangalore SEZ. Copy of amendments is submitted.
(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.	Noted and will be complied.
(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.	The treated effluent parameters are measured through online measuring instruments installed at outlet line of Marine outfall pump house for the parameters like pH, DO, COD, TSS, and Conductivity. Further Ground water and surface water monitoring is carried out in the surrounding areas regularly & the reports are attached as **Annexure-I**. The locations are finalized in consultation 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.	Noted and will be complied.
(vi)	The overall noise levels in and around the plant area shall be limited within the prescribed standards (85dBA) 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.	Noted and will be complied.

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S. No	B. GENERAL CONDITIONS	Compliance
	75dBA (day time) and 70dBA (night time).	
(vii)	The project authorities shall 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. Requisite On-site and Off-site Disaster Management Plans will be prepared and implemented.	Noted and will be complied. MRPL phase III expansion has been detached From MSEZ phase I project vide EC amendment dated 13th July 2012. MRPL shall be complying conditions relevant to them as part of their existing clearance.
(viii)	Authorization from the State Pollution Control Board must be obtained for collections/treatment/storage/ disposal of hazardous wastes.	Noted and will be complied.
(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 and will be complied.
(x)	The stipulated conditions shall be monitored 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 shall be submitted to them regularly. It shall also be displayed on the Website of the Company.	Compliance report is being submitted to MoEF/KSPCB on regular basis for every six months along with Ambient Air Quality monitoring report, Noise monitoring report & Ground water monitoring report. Compliance report is also displayed in the Company website.
(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 information regarding the EC has been published in the news papers and same was submitted to Ministry and 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 well as the commissioning of the project shall be informed to the	MSEZL has taken up the land development & infrastructure works from April 2011. MSEZL Board has approved the Business Plan for Infrastructure

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S. No	B. GENERAL CONDITIONS	Compliance
	Ministry and its Regional Office.	Development during Aug. 2012.
(xiii)	Proper Housekeeping 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.	Noted and will be complied.
(xiv)	A separate environment management cell with full fledge laboratory facilities to carry out various management and monitoring functions shall be set up under the control of a Senior Executive.	Sr. General Manager (Environment & Civil) & Sr. Environmental Engineer are in place to take care of Environmental issues. Horticulture Sr. Manager is appointed for development and maintenance of Green belt. The set up of laboratory facilities is under progress.

S. No	EC Amendment conditions dtd. 13th July 2012	Compliance
(i)	Only the sector Specific shall be permitted in the SEZ & those units shall obtain separate Environmental Clearance as applicable.	MSEZL obtained amendment to EC for development of Multi Product units as Mangalore SEZ dated 18th June 2015.
(ii)	Proponent shall enhance the allocation for the CSR activities from 2.5 to 5 % of the total cost & item-wise details along with time bound action plan shall be prepared & submitted to the Ministry's Regional office at Bangalore. Implementation of such program shall be ensured accordingly in a time bound manner.	MSEZL has already taken up CSR activities and details of CSR activity is attached as **Annexure- III.**
(iii)	The green belt shall be 33% all along the periphery & width of the green belt shall be minimum 50 mts.	Noted and will be complied.

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S. No	EC Amendment conditions dtd. 27th Sep 2014	Compliance
(i)	The project proponent while carrying out the road widening works towards river side should not cause any impact to the river water flow and should be clear of river water way.	Complied.
(ii)	The project proponent to take up the bank protection works like stone pitching etc to avoid soil erosion of the banks.	River bank protection works as directed by WRDO are carried out.
(iii)	The project proponent to take up all adequate measures to mitigate the dust pollution during the road widening works.	Complied.
(iv)	The proponent shall not dump any construction wastes etc in the river portion.	Complied.

With Regards

Eta Sreenivasulu

Sr. General Manager

Mangalore SEZ Ltd.

Encl.:

1. Monitoring reports for Air, Water & Noise Environment.
2. Environmental compliance report & Environmental Monitoring Reports from OMPL.

Copy to: Environmental Officer, Karnataka State Pollution Control Board, Mangalore.

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MSEZL/MNG/EN/2018-19

03, July 2019

To,

The Director,
Southern Region, Regional Office,
Ministry of Environment and Forests,
Kendriya Sadan, 4th Floor, E&F Wings,
17th Main Road, Ist Block, Koramangala,
Bangalore – 560 034

Sir,

Sub: Development of Residential Colony for Rehabilitation and Resettlement for SEZ Complex at Kulai & Thokur village, Mangalore Taluk & District by M/s Mangalore SEZ Limited, Mangalore.

Ref: 1) Environmental Clearance No: SEIAA: 140: CON: 2008, dated 25th June 2008.

With reference to above, we would like to submit the compliance report as on date

A. SPECIFIC CONDITIONS		
I. CONSTRUCTION PHASE		
(i)	Setup an Environment Management cell and ensure that the cell manages/maintains all the environmental aspects such as sewage treatment, solid waste disposal, maintenance of green belt areas etc, and in case the commercial space is sold/leased, then enter into agreement as per the draft agreement copy submitted, with the prospective buyers to ensure that they maintain the cell and take care of all environment concerns during the operation phase of the project. In addition sufficient fees should be levied so as to raise a corpus fund to maintain the Environment Cell.	MSEZL Environment Management cell is established to look after the environmental aspects like sewage treatment, Solid waste disposal & Development and maintenance of Green belt etc. The conditions specified regarding selling or leasing of Commercial space will be complied.
(ii)	Appoint an Environment and Safety Engineer during the construction phase to take care of environment and safety aspects as committed.	Yes. Sr. Environmental Engineer and Sr. General Manager (Environment & Civil) are in place to take care of Environmental issues and Safety aspects. Horticulture Sr. Manager has appointed for development and maintenance of Green belt.

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Karnataka State Pollution Control Board
Plot No.10-B, Baikampady Industrial Area
MANGALORE-575011
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(iii)	All required sanitary and hygienic measures should be in place before starting construction activities and to be maintained throughout the construction phase. Sufficient number of toilets/bathrooms should be provided with required septic tanks and soak pits for construction work force.	Complied.
(iv)	A First Aid Room should be provided in the project both during construction and operation of the project.	A Doctor, clinic and Medical shop is established at 48 acres R&R colony to look after the Project Rehabilitated People. MSEZL has taken up with GoK for setting up Primary Health centre and agreed to provide land for the setting up the same.
(v)	Adequate drinking water and sanitary facilities should be provided for construction workers at the site. The safe disposal of waste water and solid wastes generated during the construction phase should be ensured.	Works are completed.
(vi)	Provision should be made for the supply of fuel (kerosene or cooking gas) utensils such as pressure cookers etc, to the labourers during the construction phase.	Works are completed.
(vii)	All the labourers to be engaged for construction should be screened for health and adequately treated before engaging them to work at the site and detailed report submitted to SEIAA. Safety standards as per National Building Code (NBC) should be ensured.	Works are completed.
(viii)	For disinfection of waste water meant for uses other than toilet flushing, use ultra violet radiation and not chlorination. For recirculation of treated waste water for toilet flushing, use chlorination.	Works are completed.
(ix)	All the top soil excavated during construction activities should be stored for use in horticulture/Landscape development within the Project site.	Works are completed.
(x)	Disposal of construction waste during construction phase should not create any adverse effect on the neighbouring communities and be disposed taking the necessary precautions for general safety and health aspects of people, only in approved sites with the approval of competent authority.	Works are completed.
(xi)	Soil and ground water samples should be tested at the project site during the construction phase to ascertain that there is no threat to ground water quality by leaching of heavy metals and or other toxic contaminants and report submitted to SEIAA.	The project is for development of R&R Colony and the scope of works is to develop the graded sites to Project displaced families with water and sanitation facilities. There are no chances of heavy metals or toxic

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		contaminants produced from the activity. However MSEZL has carried out the portability test for water & report has been forwarded.
(xii)	Construction spoils, including bituminous material and other hazardous materials, must not be allowed to contaminate water courses and the dumpsites for such material must be secured, so that they should not leach into the ground water.	Noted. The project is development of R&R Colony and the scope of works is to develop the graded sites to Project displaced families with water and sanitation facilities. There are no chances of construction spoils or Hazardous materials produced from the activity.
(xiii)	The diesel generator sets to be used during construction phase should be of low sulphur diesel type and should conform to Environment (Protection) Rules prescribed for air and noise emission standards.	Noted. No Diesel generators were used during the construction works.
(xiv)	Vehicles hired for bringing construction material to the site should be in good condition and should conform to applicable air and noise emission standards and should be operated only during non-peak hours.	Works are completed.
(xv)	Ambient noise levels should conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality should be closely monitored during construction phase. Adequate measures to reduce air and noise pollution during construction keeping in mind CPCB norms on noise limits.	Works are completed.
(xvi)	Fly ash should be used as building material in the construction as per the provisions of Fly Ash Notification of September 1999 and amended as on August 2003	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement of building construction and hence usage of Fly ash does not arise. However in future if MSEZL takes up any building the same will be complied.
(xvii)	Ready mixed concrete must be used in building construction.	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement of building construction and hence usage of Ready mixed concrete does not arise. However in future if MSEZL takes up any building the same will be complied.
(xviii)	Storm water control and its re-use as per CGWB and BIS standards for various applications.	Complied by developing efficient drainage facilities.

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(xix)	Water demand during construction should be reduced by use of pre-mixed concrete, curing agents and other best practices.	Complied.
(xx)	The Project Authorities shall not undertake either drawls of Ground water or drilling of bore wells.	Complied.
(xxi)	Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.	Project is development of R&R colonies and there is no scope for MSEZ in plumbing work.
(xxii)	Treatment of 100% grey water by decentralized treatment should be done.	100 cum/day Skid mounted STP is erected already in 48 Acres & 35 Acres colony to treat the grey water.
(xxiii)	Fixtures for showers, toilet flushing and drinking should be of low flow either by use of aerators or pressure reducing devices or sensor based control.	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement for usage of Showers, toilet flushing etc and the condition is not relevant to project implementation.
(xxiv)	Use of glass may be reduced by up to 40% of exposed area to reduce the electricity consumption and load on air conditioning. If necessary, use high quality double glass with special reflective coating in windows.	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement for usage of glass etc and the condition is not relevant to project implementation.
(xxv)	Roof should meet prescriptive requirement as per Energy Conservation Building Code by using appropriate thermal insulation material.	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement for construction of Building roof etc and the condition is not relevant to project implementation.
(xxvi)	Opaque wall should meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all air conditioned spaces while it is optional for non-air conditioned spaces by use of appropriate thermal insulation material to fulfil the requirement.	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement for construction of Building wall or air conditioned spaces etc and the condition is not relevant to project implementation.
II. OPERATION PHASE		
(i)	The installation of the Sewage Treatment Plant (STP) of	It was informed to the Assessment Authority

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	16.5 MLD capacity should be carried out before the construction of the second floor of the main structures is commenced and the plant shall be got certified by an independent expert and a report in this regard should be submitted to the SEIAA immediately. Discharge of treated sewage shall conform to the norms & standards of the Karnataka State Pollution Control Board. Treated sewage should be used for flushing, gardening, etc. as proposed.	by vide our letter dated 22nd July 2008, that MSEZL has not proposed installation of 16.5 MLD STP, but however the sewage generated in the proposed Colonies will be taken to the proposed 16.5 MLD STP by Mangalore City Corporation.
(ii)	Rainwater harvesting for roof run-off with sufficient capacity artificial pond at ground level for rainwater collection and also surface run-off harvesting should be implemented. Before recharging the surface runoff, pre-treatment must be done to remove suspended matter, oil and grease. Detailed rainwater harvesting plan should be submitted immediately.	The project is development of R&R colonies. The scope of MSEZL is development of plots and hand over to PDF's. The building construction is in the scope of PDF's.
(iii)	Ensure that the excess runoff rainwater from the green belt area, which is irrigated by treated water, does not get into infiltration pits and contaminate the ground water. Such excess flow should be safely let in to the storm water drains.	Complied.
(iv)	The solid waste generated should be properly collected and segregated before disposal to the City Municipality Facility.	Noted. Being complied.
(v)	Any hazardous waste including biomedical waste should be disposed of as per applicable Rules and norms with necessary approvals of the Karnataka State Pollution Control Board.	Noted and will be complied.
(vi)	As agreed to by the project proponent, develop minimum 13% of the project area i.e., minimum 50 acres area for green belt and plant with tree species at an espacement of 3mts x 3mts i.e. 1,111 plants/hectare. The balance 20% shall be made up by taking up tree planting on the road sides in the project and if required outside the project so as to ensure that 33% of the project area covered under green belt. The green belt design along the Periphery of the plot shall achieve attenuation factor conforming to the day and night noise standards prescribed for residential land use. The open spaces inside the plot should be suitably landscaped and covered with vegetation of indigenous variety.	The green belt development is already taken up in Phase I (48 Acres) colony. Around 3000 trees are planted in an extent of 6.6 acres and 600 trees are planted in Bajpe R&R Colony and 8500 tree samplings are planted in other R&R colonies. The balance tree plantation in 22.5 Acres land will be taken in the year of 2018-19. Slope stabilization by vetiver grass taken up in 3 Acre area to check soil erosion.
(vii)	Incremental pollution loads on the ambient air quality;	Noted.

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	noise and water quality should be periodically monitored after commissioning of the project.	
(viii)	Application of Solar energy should be incorporated for illumination of common areas, lighting for gardens and street lighting in addition to provision for solar water heating. A hybrid system or fully solar system for the complex should be provided. Details in this regard should be submitted to the SEIAA.	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement for solar water heating or lighting for gardens and the condition is not relevant to project implementation. The colony will be handed over to Mangalore City Corporation after development & O&M tenure issued. Hence the street lighting with MESCOM connections are provided.
(ix)	Traffic congestion near the entry and exit points from the roads adjoining the proposed project site must be avoided. Parking must be fully internalized and no public space should be utilized.	Complied.
(x)	A Report on the energy conservation measures confirming to energy conservation norms finalized by Bureau of Energy Efficiency should be prepared incorporating details about building materials & technology, R&U Factors etc and submit to the SEIAA in three months time.	The Project is for development of R&R Colonies with Infrastructure like roads, water & Drainage facilities. There is no requirement for energy consumption equipments or Building appliances and the condition is not relevant to project implementation.
B. GENERAL CONDITIONS		
(i)	The Environmental safeguards contained in the EIA Report should be implemented in letter and spirit.	Complied.
(ii)	All commitments made by the proponents in their application, and subsequent letters addressed to the SEAC/SEIAA should be accomplished before the construction work of the project is completed.	Complied.
(iii)	Six monthly monitoring reports should be submitted to the SEIAA and the Regional Office, MoEF, Bangalore, failing which action may be taken to cancel the Environmental Clearance certificate issued.	Noted. Being complied.
(iv)	Officials from the Department of Ecology and Environment, Bangalore/Regional Office of MoEF, Bangalore/Regional Director (Environment) Dept. of Ecology and Environment, Mangalore/ Regional Officer, KSPCB Mangalore and KSPCB Bangalore who would be monitoring the implementation of Environmental safe guards should be given full	The complete sets of documents submitted to MoEF/SEIAA were forwarded as directed in the Conditions. MSEZL will comply in providing the full cooperation to the Monitoring officers.

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	cooperation, facilities and documents/data by the project proponents during their inspection. A complete set of all the documents submitted to MoEF/SEIAA should be forwarded to the CCF, Regional Office of MoEF, Bangalore/Department of Ecology and Environment, Bangalore /Regional Director, (Environment) Department of Ecology and Environment, Mangalore/Regional Officer, KSPCB Mangalore and KSPCB Bangalore.	
(v)	In the case of any change(s) in the scope of project, the project would require a fresh appraisal by this Authority.	Noted.
(vi)	The Authority reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environment (Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.	Noted.
(vii)	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act 1980 and Wildlife (Protection) Act, 1972 etc shall be obtained, as applicable by project proponents from the competent authorities.	Noted.
(viii)	The project proponent should advertise in at least two local Newspapers widely circulated in the region, one of which shall be in vernacular language informing that the project has been accorded environmental clearance and copies of clearance letters are available with the Karnataka State pollution Control board and may also be seen on the website of the Ecology and Environment Department at http://seiaa.kar.nic.in. The advertisement should be made within 7 days from the day of issue of the clearance letter and a copy of the same should be forwarded to the Regional Office of MoEF at Bangalore/Department of Environment and Ecology, Bangalore.	Noted. The advertisement was made in three local News papers and the copy of the same was forwarded to all concerned as directed.
(ix)	These stipulations would be enforced among others under the provisions of water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification,2006.	Noted.

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(x)	Under the provisions of Environment (Protection) Act, 1986, legal action shall be initiated against the project proponent if it was found that construction of the project has been started without obtaining environmental clearance.	Noted.

The R&R Package is being implemented strictly as per Approved policy by State Government. In 1st PDF 1245 families out of 1253, In 2nd PDF 214 families out of 214, In 3rd PDF 146 families out of 147 families & 14 shops has been compensated with R&R Packages. Totally 1619 families have vacated their houses and the process is in progress for the balance.

10 nos. R&R colonies developed - 1403 sites allotted to eligible Project Displaced Families so far and balance 30 is in the process. 359 nominees of the displaced people given training at Karnataka Polytechnic (KPT) for diploma equivalent programs in Chemical, Mechanical & Electrical disciplines and 341 nominees have already been employed. 1628 nominees would have been eligible for employment out of which 872 nominees have opted for "one time" compensation in lieu of job and balance 756 nominees opted for the jobs. 594 nos. PDF nominees have already got employment out of 756 nos. empanelled.

With Regards,

Sr. General Manager

Civil & Environment

Mangalore SEZ Ltd.

Copy to: 1) Environmental Officer, Karnataka State Pollution Control Board, Mangalore.

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MSEZL/MNG/EN/2018-19

03 July, 2019

To,

The Director,
Southern Region, Regional Office,
Ministry of Environment and Forests,
Kendriya Sadan, 4th Floor, E&F Wings,
17th Main Road, 1st Block, Koramangala,
Bangalore – 560 034

Sir,

Sub: Six monthly Compliance Report.

Ref:

1. Environmental Clearance No: 21-383/2007-IA-III, dated 3rd April 2008.
2. Amendment to Environmental Clearance for setting up of Phase-I of Special Economic Zone at Mangalore by M/s Mangalore SEZ Ltd – regarding No: 21-383/2007-IA-III dated 13th July, 2012.
3. Amendment to Environmental Clearance for setting up of Phase-I of Special Economic Zone at Mangalore by M/s Mangalore SEZ Ltd date 27 Aug 2014.
4. Amendment to Environmental Clearance for development of Multi Product Units as Mangalore SEZ dated 18 June 2015.

With reference to above, we would like to submit the compliance report as on date.

S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(i)	No Objection Certificate from the Karnataka State Pollution Control Board shall be obtained before initiating the project.	Consent For Establishment from KSPCB obtained on 30 April 2008 and Extension of validity of Consent For Establishment obtained on 27 May 2013 and the copy was submitted to MoEF.
(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.	Will be complied. MSEZL will approach MoEF with requisite documents as per EIA Notification, 2006 for Phase-2 expansions if taken in future.
(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	Complied.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
	undertaken except while undertaking the permissible activities in the Coastal Regulation Zone-I areas.	
(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.	Complied.
(v)	With regard to the containing the suspected contamination of the groundwater near Athurkodi area of Kuthethoor village, MRPL have given an undertaking vide their letter dated 19.3.2008 which is as follows:- a) Implementation of recommendation of NGPRI will be started by MRPL immediately after submission of their report. 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. 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. d) We are also in continuous contact with the residents in the surround areas with regard to any contamination. 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.	This condition pertains to MRPL phase III expansion project. MRPL phase III expansion has been detached from MSEZ phase I project vide EC amendment dated 13th July 2012. MRPL shall be complying conditions relevant to them as part of their existing clearance.
(vi)	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.	Report from the Forest Department is obtained and submitted to the MoEF dated June 5, 2008.
(vii)	The R&R package shall be strictly in accordance with the laid down norms of the State Government.	The R&R Package is being implemented strictly as per approved policy by State Government. In 1st PDF **1245** families out of **1253**, In 2nd PDF **214** families out of **214**, In 3rd PDF **146** families out of **147** families & **14** shops has been compensated with R&R Packages. Totally **1619** families have vacated their houses and are rehabilited.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(viii)	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 Regulation Zone and the marine areas.	NIO has carried out EIA, Risk Assessment, DMP and Bathymetry survey along with Marine Outfall pipeline alignment. The detailed design report of the Marine Outfall facility is prepared by Master planning consultants of MSEZ under the guidance of Department of Oceanography, IIT Chennai. The design report was also vetted by NIO, Goa. The detailed project report of the facility is submitted to MoEF during November 2009. MSEZ has taken up the implementation of the above facility and completed the work by July 2014. MSEZ obtained consent for operation of treated waste water discharge line from KSPCB vide dated 9 Sep 2014, 8 Oct 2015 & 27 Aug 2016.
(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 NOx and other parameters as prescribed as Central Pollution Control Board (CPCB).	MSEZL has dedicated website 'www.msezl.com', wherein Environment Monitoring Parameters are periodically uploaded and made available to the public. Installation and commissioning of Continuous Ambient Air Quality Monitoring station (CAAQMS) has been completed during the month July 2017 and presently data is being transferred to CPCB server continuously. The location of monitoring station is finalized in consultation with KSPCB.
(x)	The gaseous emissions (SO2, NOx, 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.	Noted. The existing units in MSEZ are complying the conditions and submitting reports to KSPCB directly. MRPL phase III expansion has been detached from MSEZ phase I project vide EC amendment dated 13th July 2012. MRPL shall be complying conditions relevant to them as part of their existing clearance.
(xi)	The emission levels of the other pollutants shall also remain within the permissible levels	Noted.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(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.	Noted and will be adhered.
(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.	Presently MSEZL has completed Green Belt development in 247 acres out of 272 acres by planting 111150 saplings and remaining green belt development will be completed in the year 2019-20. Green Belt operation & maintenance is for 2-3 years & plants are maintained as per the good practises to ensure 100% survival. Slope stabilisation in about 18 acres with vetiver grass has been completed.
(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.	Noted.
(xv)	The project proponent shall ensure that during construction and operation of the project the traffic in the city is not affected.	Complied.
(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 programme shall be designed and the information provided to the public through display and dedicated website by means of online monitoring.	Noted and will be complied.
(xvii)	Low Sulphur internal fuel oil and fuel gas shall be fired in process heaters and boilers.	Noted and will be complied.
(xviii)	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, N_2O, SOx & CO_2 to the environment.	Noted and will be complied.
(xix)	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	Ambient Air Quality Monitoring is being carried out regularly in two locations and the locations of monitoring are selected in consultation with KSPCB. The reports of

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
	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 & in down-wind direction along with those in other directions.	monitored data attached as **Annexure-I.**
(xx)	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.	Installation and commissioning of Continuous Ambient Air Quality Monitoring station (CAAQMS) has been completed during the month July 2017 and presently data is being transferred to CPCB server continuously. The location of monitoring station is finalized in consultation with KSPCB.
(xxi)	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).	Noted and will be complied.
(xxii)	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.	Noted and will be complied.
(xxiii)	The product loading gantry shall be connected to the product sphere in closed circuit through the vapour arm connected to the tanker. Data on fugitive emissions shall be regularly monitored and records shall be maintained	Noted and will be complied.
(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.	Noted and will be complied.
(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.	Noted and will be complied.

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S. No.	A. SPECIFIC CONDITIONS	COMPLIANCE
(xxvi)	Regular monitoring of relevant parameters for the underground water in the surrounding areas shall be undertaken and the results shall be submitted to the relevant States Pollution Control Board.	Regular monitoring of ground water is being carried in 10 locations & the reports are attached as **Annexure-I**. The locations are finalized in consultation with KSPCB.
(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.	Noted and will be complied. During operation stage MSEZL will dispose the solid waste as per the directions of State Pollution Control 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.	Noted and will be complied.
(xxix)	The company shall strictly follow all the recommendations mentioned in the Charter on Corporate Responsibility for Environmental Protection (CREP).	Noted and will be 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 and will be complied.
(xxxi)	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	Complied and copy of the same is attached as **Annexure-II**.
(xxxii)	The Company shall implement all the recommendations made in the Environmental Impact Assessment /EMP report and risk assessment report.	MSEZL has implemented most of the recommendations of EIA/EMP report and still some of the projects of MSEZL as per EIA/EMP recommendations are under way.
(xxxiii)	The company will undertake all relevant measures, as indicated during the Public Hearing for improving the Socio-economic conditions of the surrounding area.	MSEZL is undertaking all relevant measures for improving the Socio-economic condition of the surrounding area as indicated during the Public Hearing.
(xxxiv)	With regard to R&R colony the project proponent shall obtain all requisite clearances as prescribed by the concerned agencies.	The R&R Colonies are developed after obtaining the requisite clearances from the concerned Departments like MoEF, KSPCB, Mangalore Urban Development Authority etc.

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S. No	B. GENERAL CONDITIONS	Compliance
(i)	The project authorities shall strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government.	Noted and will be complied.
(ii)	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	MSEZ obtained amendment to EC 1. Dated 13 July 2012 2. 27 Aug 2014, this involves widening of existing public road towards river side adjacent to MSEZ proposed pipeline cum road Corridor in Reach-II area. 3. 18th June 2015 for development of Multi Product Units as Mangalore SEZ. Copy of amendments is submitted.
(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.	Noted and will be complied.
(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.	The treated effluent parameters are measured through online measuring instruments installed at outlet line of Marine outfall pump house for the parameters like pH, DO, COD, TSS, and Conductivity. Further Ground water and surface water monitoring is carried out in the surrounding areas regularly & the reports are attached as **Annexure-I**. The locations are finalized in consultation 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.	Noted and will be complied.
(vi)	The overall noise levels in and around the plant area shall be limited within the prescribed standards (85dBA) 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.	Noted and will be complied.

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S. No	B. GENERAL CONDITIONS	Compliance
	75dBA (day time) and 70dBA (night time).	
(vii)	The project authorities shall 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. Requisite On-site and Off-site Disaster Management Plans will be prepared and implemented.	Noted and will be complied. MRPL phase III expansion has been detached From MSEZ phase I project vide EC amendment dated 13th July 2012. MRPL shall be complying conditions relevant to them as part of their existing clearance.
(viii)	Authorization from the State Pollution Control Board must be obtained for collections/treatment/storage/ disposal of hazardous wastes.	Noted and will be complied.
(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 and will be complied.
(x)	The stipulated conditions shall be monitored 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 shall be submitted to them regularly. It shall also be displayed on the Website of the Company.	Compliance report is being submitted to MoEF/KSPCB on regular basis for every six months along with Ambient Air Quality monitoring report, Noise monitoring report & Ground water monitoring report. Compliance report is also displayed in the Company website.
(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 information regarding the EC has been published in the news papers and same was submitted to Ministry and 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 well as the commissioning of the project shall be informed to the	MSEZL has taken up the land development & infrastructure works from April 2011. MSEZL Board has approved the Business Plan for Infrastructure

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CIN: U45209KA2006PLC038590

S. No	B. GENERAL CONDITIONS	Compliance
	Ministry and its Regional Office.	Development during Aug. 2012.
(xiii)	Proper Housekeeping 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.	Noted and will be complied.
(xiv)	A separate environment management cell with full fledge laboratory facilities to carry out various management and monitoring functions shall be set up under the control of a Senior Executive.	Sr. General Manager (Environment & Civil) & Sr. Environmental Engineer are in place to take care of Environmental issues. Horticulture Sr. Manager is appointed for development and maintenance of Green belt. The set up of laboratory facilities is under progress.

S. No	EC Amendment conditions dtd. 13th July 2012	Compliance
(i)	Only the sector Specific shall be permitted in the SEZ & those units shall obtain separate Environmental Clearance as applicable.	MSEZL obtained amendment to EC for development of Multi Product units as Mangalore SEZ dated 18th June 2015.
(ii)	Proponent shall enhance the allocation for the CSR activities from 2.5 to 5 % of the total cost & item-wise details along with time bound action plan shall be prepared & submitted to the Ministry's Regional office at Bangalore. Implementation of such program shall be ensured accordingly in a time bound manner.	MSEZL has already taken up CSR activities and details of CSR activity is attached as **Annexure- III.**
(iii)	The green belt shall be 33% all along the periphery & width of the green belt shall be minimum 50 mts.	Noted and will be complied.

Mangalore SEZ Limited
3rd Floor, MUDA Building, Ashok nagar,
Urwa Stores, Mangalore - 575 006
Phone: 0824-2452748 / 2452750
Fax: 0824-2452749
Website: www.mangaloresez.com
CIN: U45209KA2006PLC038590

S. No	EC Amendment conditions dtd. 27th Sep 2014	Compliance
(i)	The project proponent while carrying out the road widening works towards river side should not cause any impact to the river water flow and should be clear of river water way.	Complied.
(ii)	The project proponent to take up the bank protection works like stone pitching etc to avoid soil erosion of the banks.	River bank protection works as directed by WRDO are carried out.
(iii)	The project proponent to take up all adequate measures to mitigate the dust pollution during the road widening works.	Complied.
(iv)	The proponent shall not dump any construction wastes etc in the river portion.	Complied.

With Regards

Eta Sreenivasulu

Sr. General Manager

Mangalore SEZ Ltd.

Encl.:

1. Monitoring reports for Air, Water & Noise Environment.
2. Environmental compliance report & Environmental Monitoring Reports from OMPL.

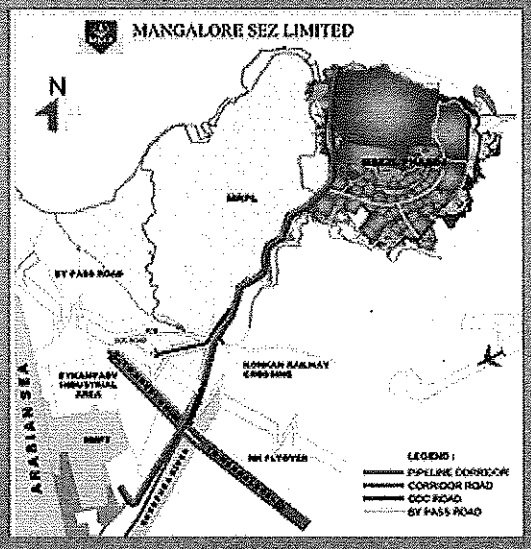
Copy to: Environmental Officer, Karnataka State Pollution Control Board, Mangalore.

Mangalore SEZ Limited

ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY, WATER QUALITY AND NOISE LEVEL MONITORING REPORT FOR THE MONTH OF APRIL 2019

Submitted to



Submitted By

M/s Hubert Enviro Care Systems Private Limited
(NABL Accredited & MOEF&CC Recognized Laboratory)
7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka - 575011
Email: krom@hecs.in; kro@hecs.in

INDEX

AMBIENT AIR, WATER QUALITY AND NOISE MONITORING REPORT - APRIL 2019

1. INTRODUCTION

Mangalore Special Economic Zone, known as MSEZ is spread across 1638 acres, located 15 km from Mangalore city, off Cochin-Mumbai NH 66, 5 km from Mangalore International Airport and 8 km from all-weather deep draft sea port, New Mangalore Port in Mangalore, Karnataka, India. MSEZ limited is jointly promoted by Oil and Natural Gas Corporation (ONGC), a fortune 500 company & infrastructure leasing & finance services, one of India's leading infrastructure development and finance companies, Karnataka Industrial Area Development Board (KIADB) and Kanara Chamber of Commerce and Industry (KCCI). A unique combination of Government entities, a large financial institution and an apex chamber brings in the expertise to develop MSEZL with world-class industrial infrastructure.

2. ENVIRONMENT MONITORING

Environmental monitoring is being carried out at Mangalore SEZ, following guidelines and regulations of MoEFCC/CPCB and KSPCB statutory norms. In this regard, MSEZL has awarded the work to M/s Hubert EnviroCare Systems Pvt Ltd. and to monitor air quality, water quality & noise level for the three years. As per work order, during April 2019, we have conducted ambient air quality, ground water quality and noise level monitoring at 2, 6 and 2 locations respectively.

3. SCOPE AND METHODOLOGY

The scope of work carried out and methodology adopted for the survey are described below:

3.1. Ambient Air Quality

Ambient air quality monitoring was carried out at each location on 24 hour basis on two consecutive days per month. The identified monitoring stations are: A_1-CETP & A_2-WTP Area. To assess the ambient air quality status, monitoring stations are identified on the basis of meteorology in the upwind and downwind direction as well as to represent the cross sectional scenario of the MSEZ. Based on the activities the parameters chosen for assessment of air quality are $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2-Nitrogen-di-oxide; CO-Carbon Mono Oxide (DL 0.1 mg/m^3); O_3-Ozone (DL 10 µg/m^3); NH_3-Ammonia (DL 5 µg/m^3); Pb-Lead (DL 0.05 µg/m^3); As-Arsenic (DL 0.1 ng/m^3); Ni- (DL 0.5 ng/m^3); Benzene-(DL 1 µg/m^3); B(α)P- Benzo-α-pyrene(DL0.1 ng/m^3) as per CPCB stipulation.

3.1.1. Sampling and analysis of $PM_{2.5}$ and PM_{10} in ambient air (Gravimetric Method)

i. Condition a filter paper in oven (i.e. 10 or 2.5 µm diameter)
ii. Prepare a sampling assembly by uncorking screws of the bracket
iii. Take a tare (initial) weight of the filter paper (w_i, *mg*)
iv. Place the filter in the sampling system securely and tighten the screws of the bracket
v. Set the timer for the period of sampling
vi. Start the sampler and adjust flow rate to about 2L/ min for 24 hrs sampling
vii. Note the flow rate at the end of the desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions
ix. Condition the filter paper again for the same period as was done prior to sampling.

Laboratory analysis:

Weighing of exposed samples:

i. Take final weight of the exposed filter with a standard balance (*wf, mg*)

Calculations:

i. Average flow rate (initial and final flow rates) in L/ min
= (Initial flow rate + final flow rate)/ 2
ii. Total vol. of air sampled (TVA) in m^3
= Avg. flow rate (*L/min*) * 10^{-3} (m^3/*L*) * sampling time (*hr*) * 60 (*min/hr*)
iii. Concentration of SPM in $\mu g/m^3$
= $(w_f - w_i)$ *(mg)*/ TVA (m^3) * $10^6 \mu g/m^3$

3.1.2. Sampling and analysis of Sulphur dioxide

i. Prepare absorbing reagent (sodium tetra-chloromecurate) by dissolving 27.2 g mercuric chloride and 11.7 g sodium chloride in 1 lit of water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for 24 hours sampling)
v. To eliminate interference of traces metals, if any ,1 drop of 0.01% EDTA solution could be added to the reagent prior to sampling ;similarly, effect of oxide of nitrogen could also be eliminated by adding 1 ml of 0.06% sulphamic acid to the reagent at site
vi. Start the sampler and adjust flow rate to 2 lit/ min.
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of SO_2 concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (μgSO_2) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
iii. $\mu gSO_2/TVA$

3.1.3. Sampling and analysis of Nitrogen-di-oxide

i. Prepare absorbing reagent (a solution of sodium hydroxide and arsenite) by dissolving 4 g sodium hydroxide and 1 g of sodium arsenite in 1 lit of distilled water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for hours sampling)
v. To eliminate interference of sulphur dioxide, drop of hydrogen peroxide to be added to the reagents to convert sulphur dioxide into sulphate during analysis
vi. Start the sampler and adjust flow rate to about 0.2 lit/ min for 24 hours sampling
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of NO_x concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µg NO_x) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
µg NO_x/TVA

3.1.4. Sampling and analysis of Carbon Mono Oxide

Preparation of sample train:

i. Sampling begins with conditioning a sampling train and then gas analyzer
ii. Pressure system is preferred to condition the sampling train by installing pump before the analyzer. Reducing valve needs to be fitted between the analyser and pump to eliminate the pulsing effect of pump on the analyzer
iii. Flow meter is to be installed just before the analyzer
iv. A fibre filter is used to capture the particulate matter prior to the optical cell to prevent its interference. As it often accumulates on the optical cell reducing the efficiency
v. To eliminate the interference of water vapour ,refrigeration or desiccant with magnesium perchlorate could be used

Mode of operation:

i. Continuous analysis is carried out at the flow rate of about 100 ml/min to 1000 ml/min (depending upon the level of pollution near the location) for the desired sampling period
ii. Discrete sampling could also be possible with infra red analyzer. It however requires proper cleaning of the sampling train.

Steps:

i. Calibration of analyzer can be carried out if required using standard gases
ii. Sampler is allowed to warm up for some time before actual readings are taken till the sampler gives steady response and temperature stability

3.1.5. Sampling and analysis of Ozone

Dynamic calibration:

i. Dynamic calibration be performed by preparing a large mixture of ozone in air
ii. The output of an ozonizer is fed into the intake of a small blower delivering air. The mixture of gas however emerges through a short length of pipe
iii. One portion of this mixture is analyzed in the recorder.
iv. Another portion is analyzed through a faintly blue iodine solution containing starch and potassium iodide.
v. Titrated this solution with sodium thiosulphate(0.1N)
vi. The end point established by comparison with the blue starch- iodine solution
vii. Mixture of ozone and air in polyester film bag to be prepared and admitted to the analyzer.
viii. The mixture is analyzed at the time it is used since the ozone decomposes gradually
ix. Analysis is then performed by passing a measured volume through an impinge containing buffered KI solution and determined the released iodine by spectrometer method
x. Make the second mixture about midscale concentration and adjust sample or reagent flow rates until the recorder reading agrees with the absorbance scale according to the analytically determined concentration of ozone
xi. Check several other points on the curve if desired and liner or logarithmic chart to be prepared followed by a calibration curve to read in ppm

Laboratory analysis:

Calibration curve:

i. Plot graph of absorbance v/s concentration

Procedure:

i. Place a fresh absorbent solution in the storage bottle and operate the solution pump until the liquid are full
ii. After the flow has stabilized itself, zero the recorder and start the air pump
iii. Set the flow at convenient rates such as 4 ml/ min of solution and 4 l/min of air
iv. Check and adjust the flow rates daily.
v. Adjust the pH of the solution once or twice a week ,at time the solution shall be brought up to volume by addition of distilled water
vi. Change the carbon filter about once a month. Also change the absorbing solution at the same time

3.1.6. Sampling and analysis of Ammonia:

Ammonia is collected in dilute Sulphuric acid solution in midget impingers to form Ammonium Sulphate. The solution is treated with Nesselers reagent to produce a yellow brown complex. The Ammonia concentration is determined by reading the absorption of the complex at 440 nm and comparing with a standard curve.

3.1.7. Sampling and analysis of Lead, Nickel, Arsenic:

1. **Sampling procedure:**

Tilt back the inlet and secure it according to manufacturer's instructions. Loosen the face-plate wing-nuts and remove the face plate. Remove the filter from its jacket and centre it on the support screen with the rough side of the filter facing upwards. Replace the face-plate and tighten the wing-nuts to secure the rubber gasket against the filter edge. Gently lower the inlet. For automatically flow-controlled units, record the designated flow rate on the data sheet. Record the reading of the elapsed time meter. The specified length of sampling is commonly 8 hours or 24 hours. During this period, several reading (hourly) of flow rate should be taken. After the required time of sampling, record the flow meter reading and take out the filter media from the sampler and put in a container or envelope

2. **Analysis:**

i. **Hot plate procedure:**

Cut a 1" x 8" strip or half the filter from the 8" x 10" filter using a stainless steel pizza cutter. Place the filter in a beaker using vinyl gloves or plastic forceps. Cover the filter with the extraction solution (3% HNO_3 & 8% HCl). Place beaker on the hotplate, contained in a fume hood, and reflux gently while covered with a watch glass for 30 min. Do not allow sample to dry. Remove the beakers from the hot-plate and allow to cool. Rinse the beaker walls and wash with distilled water. Add approximately 10 mL reagent water to the remaining filter material in the beaker and allow to stand for at least 30 min. Transfer the extraction fluid in the beaker to a 100 mL volumetric flask or other graduated vessel. Rinse the beaker and any remaining solid material with distilled water and add the rinses to the flask. Dilute to the mark with distilled water (Type I) water and shake. The final extraction solution concentration is 3 % HNO3/ 8% HCl. The filtered sample is now ready for analysis

2.1. Analysis of samples:

i. Instrument / Equipment:

A light beam containing the corresponding wavelength of the energy required to raise the atoms of the analyte from the ground state to the excited state is directed through the flame or furnace. This wavelength is observed by a monochromator and a detector that measure the amount of light absorbed by the element, hence the number of atoms in the ground state in the flame or furnace. A hollow cathode lamp for the element being determined provides a source of that metal's particular absorption wavelength. The method describes both flame atomic absorption (FAA) spectroscopy and graphite furnace atomic absorption (GFAA) spectroscopy. Atomic Absorption Spectrophotometer - analyze the metals by Flame; if results are below detection limit then go for GTA. Arsenic is analyzed by Flame – VGA.

ii. Flame Procedure:

Set the atomic absorption spectrophotometer for the standard condition as follows: choose the correct hollow cathode lamp, align the instrument, position the monochromator at the value recommended by the manufacturer, select the proper monochromator slit width, set the light source current, ignite the flame, regulate the flow of fuel and oxidant, adjust the burner for maximum absorption and stability and balance the meter. Run a series of standards of the metal of interest and construct a calibration curve. Aspirate the blanks and samples. Dilute samples that exceed the calibration range. For Lead (Pb) and Nickel (Ni), the wavelength required for analysis is 217nm and 232nm respectively. Where as in case of Arsenic (As), the VGA should attach with Flame and the wavelength required for analysis is 193.7nm.

3. Calibration:

Prepare standard solutions from the stock solutions. Select at least three standards to cover linear range as recommended by method. Aspirate the standards into the flame or inject the standards into the furnace and record the absorbance. Prepare the calibration graph by plotting absorbance and concentration in µg/ml.

i. Preparation of Standards:

For each metal that is to be determined, standards of known concentration must be acquired commercially certified standards.

ii. Standard Curve:

Standard curve is prepared by using standard solutions of known concentration.

4. Calculations:

i. Sample Air Volume:

Sample air volume can be calculated by using the following equation:

$V = (Q)(t)$

Where,

V = volume of air, m^3

Q = average sampling rate, m3/min.

t = time in minutes.

ii. Metal Concentration:

$C = (Ms - Mb) \times Vs \times Fa/V \times Ft$

Where,

C = concentration, µg metal/m^3

Ms = metal concentration µg/mL

Mb = blank concentration µg/mL

Vs = total volume of extraction in mL

Fa = total area of exposed filter in cm^2

V = Volume of air sampled in m^3

Ft = Area of filter taken for digestion in cm^2

3.1.8. Sampling and analysis of Benzo-α-pyrene:

Benzo (a) Pyrene (BaP) is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo (a) Pyrene in the particulate phase. The molecular formula of B(a)P is C_2OH_{12} having molecular weight 252.

It is based on BIS method IS 5182 (Part 12):2004 and USEPA method (TO-13). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary gas chromatograph equipped with flame ionization detector. It is a high volume ($1.2m^3$/min) sampling method capable of detecting sub.ng/m^3 concentration of PAH in 24 hours sample (i.e. collected in 3 shifts of 8 hour each with 480 m^3 sampling volume of air).

i. Sampling:

i. Instrument/Filter Selection:

24 hr. sampling using PM_{10} high volume sampler with 8 hourly samples using EPM-2000 glass fibre or equivalent filter

ii. Sample Processing

a. Extraction:

Filter papers (half of all the filters papers collected in a day) are cut into strips using scissors and transfer to 250 ml beaker. Add ~50 ml. of Toluene (GC/HPLC grade). These samples are extracted with toluene using ultra sonic sample can be extracted using Soxhlet bath for about 30 minutes. Repeat the procedure twice (50ml x 2 times) for complete extraction. Alternatively, extraction apparatus for about 8 hr. with Toluene and repeat it twice.

b. Filtration:

Filter the extracted samples with Whatman filter paper No.41 containing 2 gm of Anhydrous Sodium Sulphate (to remove moisture).

c. Concentration:

After filtration, the filtrate is concentrated using Rotary vacuum evaporator to 2ml final volume.

d. Clean-up with silica Gel:

To clean up the impurities, pass 2 ml of concentrated sample through silica gel column (pre conditioned, 60-80 mesh, and 200-250mm×10 mm with Teflon stopcock). After cleaning add 5ml cyclohexane and collect the elute in 25 ml beaker. Repeat the process for at least 3 times and collect it in the same beaker. Alternatively Solid Phase Extraction (SPE) could be used for clean up the impurities of sample.

e. Re-concentration with rotary vacuum evaporator:

The Cleaned up extract/filtrate (approximately 17 ml) is further concentrated using rotary evaporator and it is evaporated to nearly dryness with Nitrogen.

f. Final Sample volume:

The dried sample is re-dissolved in 1ml of toluene and transfer into 4 or 5 ml amber vials final analysis.

ii. Calculations:

Calculate the concentration in ng/µL of each identified analyte or B(a)P in the sample extract (Cs) as follows:

Calculate the air volume from the periodic flow reading taken during sampling using the following equation:

$V = Q \times T$

Where,

Q =Average flow rate of sampling m^3/min

T = sampling time, in min.

V = total sample volume at ambient conditions in m^3

Concentration of analyte i.e B(a)P:

The concentration of PAH compound or Benzo(a)pyrene in ng /m3 in the air sampled is given by:

C (ng /m3) = Cs * Ve / Vi *Vs

Where,

Cs : Concentration of Benzo (a) pyrene in ng / µL in the sample extract recorded by GC.

Ve : Final volume of extract in µL (i.e 1000)

Vi : Injection Volume (i.e 1µL)

Vs : Volume of air sample in m^3

3.2 Noise Levels

In general, noise is sound which is composed of many frequency components of various loudness distributed over the audible frequency range. Various noise scales have been introduced to describe, in a single number, the response of an average human to a complex sound made up of various frequencies at different loudness levels. The most common and universally accepted scale is the A weighted scale which is measured as decibel (dB). This is more suitable for audible range of 20 to 20000 HZ and has been designed to weigh various components of noise according to the response of human ear.

The impact of noise can be undertaken by taking in to consideration various factors like potential damage to hearing. Physiological responses, annoyance and general community responses, which have several effects, like Noise Induced Hearing Loss (NIHL). Noise generating sources are identified based on the activities like vehicle movement & associated activities. Accordingly, about 2 locations were identified to assess the noise levels. The identified locations are:

N_1-CETP and **N_2-WTP**

Noise measurements were carried out using Lutron SL 4001 model. The sound level meter used was in accordance with IS: 9779 and IEC 651 standards for noise survey. Instrument calibration was done in NABL accredited.

Noise measurements were undertaken at all locations, with duration of 10 minutes per hour (as per Order one minute per hour) continuously for 24 hours in a day for two days in a week for four weeks in the month. The day noise levels were monitored during 6 am to 10 pm and night levels during 10 pm to 6 am at all locations.

For noise levels measured over a given period of time interval, it is possible to describe important features of noise using statistical quantities. This is calculated using the percent of the time certain noise levels are exceeded during the time interval. The notation for the statistical quantities of noise levels are:
L10 is the noise level exceeded 10 percent of the time,
L50 is the noise level exceeded 50 percent of the time and
L90 is the noise level exceeded 90 percent of the time.
Leq is the Equivalent sound pressure level, which is equivalent to the same sound energy as the actual fluctuating sound.

This is necessary because sound from noise source often fluctuates widely during a given period of time. Leq is calculated from the following equation:
Leq (hrly) = L50 + [(L10-L90)^2/60]

The noise rating developed for community noise from all sources is the Day-Night sound Level (Ldn). It is similar to a 24 hrs, equivalent sound level except that during night time period a 10 dB(A) weighting penalty is added to the instantaneous sound level before computing the 24 hourly average. This nighttime penalty is added to account for the fact that noise during night when people usually sleep is judged as more annoying than the same noise during the daytime.

The Ldn for a given location in a community is calculated from the hourly Leq values by the following equation: Ldn= 10 log (1/24 (16[$10^{Ld/10}$]+[$10^{Ln-10/10}$]))
Where Ld is the equivalent sound level during the day time (6 am to 10 pm) and Ln is the equivalent Sound level during the night time (10 pm to 6 am).

Ambient Noise standards have been notified by the Ministry of environment and Forests vide Gazette notification dated 18th April, 2009 based on the 'A' weighted equivalent noise level (Leq). The standards are given in the Annexure.

Noise measurements were made at 1.5 m above the ground level and a suitable distance from the corridor. The basic Unit of measurements was taken in the fast mode and was sampled to yield statistical information's such as Leq (equivalent noise level), L 10 and L9, those exceeded for 10 and 90 percent of the time respectively. The noise level L10 can be considered as long term noise L90 can be considered as the background noise.

Calibration: The monitoring and analytical instruments are being calibrated by ETDC periodically. The correction factors, if any, are being used in computation of the data.

3.3 Water Quality

Any adverse impact or pollution water will have serious effect on the environment. Hence, it becomes important to monitor the water quality periodically in the port project area. The samples were analysed as per IS: 3025 and compared to the specifications of IS: 10500 norms. The locations identified for collection of samples were

W_1-Oddidakal (GW)
W_2-Shantigudde (GW)
W_3-Chandrahas Nagar (GW)
W_4- Permude (GW)
W_5- CETP (GW)
W_6- Non Processing Area (GW)
W_7- Permude-Bajpe Village Boundary (GW)
W_8- Kalavar (GW)
W_9- 10mL water Reservoir (GW)
W_{10}- Permude Surface Water

During April 2019, six out of 10 location water samples, namely Oddidakal (GW), Shantigudde (GW), Permude (GW), Permude - Bajpe Village Boundary (GW), Kalavar (GW) and 10 mL water Reservoir (GW) were collected and analysed for physico-chemical analysis. Whereas water from Chandrahas Nagar (GW), CETP (GW), Non Processing Area (GW) and Surface Water of Permude have been dried. Hence, we unable to perform analysis.

4.0 Results

4.1 Ambient Air Quality

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: APRIL 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP
Sampling Date	15.04.2019
Report Date	09.05.2019
Report No	HECS/AA/001/090519

CONSOLIDATED TEST RESULTS: APRIL 2019

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	29
PM_{10} ($\mu g/m^3$)	100*	59
SO_2 ($\mu g/m^3$)	80*	16
NO_2 ($\mu g/m^3$)	80*	21
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: * **24 hours average;** ** **:8 hours average;** *** **: Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2 Sulphur dioxide; NO_2-Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

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AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: APRIL 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	WTP
Sampling Date	17.04.2019
Report Date	09.05.2019
Report No	HECS/AA/002/090519

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	32
PM_{10} ($\mu g/m^3$)	100*	60
SO_2 ($\mu g/m^3$)	80*	19
NO_2 ($\mu g/m^3$)	80*	21
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: * 24 hours average; ** :8 hours average; * : Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

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4.2 Noise level:

TEST REPORT: NOISE MONITORING: APRIL 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP & WTP areas
Sampling Date	15-16.04.2019 & 17-18.04.2019
Report Date	09.05.2019
Report No.	HECS/N/001-004/090519

Time (Hrs)	CETP AREA (15-16.04.2019)	WTP AREA (17-18.04.2019)
06.00	51.4	51.3
07.00	51.1	52.4
08.00	51.6	52.8
09.00	52.5	54.6
10.00	54.4	55.7
11.00	55.3	55.4
12.00	56.2	58.6
13.00	57.4	59.4
14.00	58.6	58.7
15.00	59.7	59.6
16.00	60.8	57.4
17.00	59.6	58.5
18.00	58.7	58.3
19.00	57.8	58.4
20.00	57.5	59.2
21.00	56.7	58.4
22.00	56.9	57.7
23.00	56.2	57.3
00.00	56.3	55.6
01.00	55.2	55.1
02.00	52.1	53.7
03.00	50.4	53.4
04.00	45.6	46.3
05.00	44.2	48.5
MIN	**44.2**	**46.3**
MAX	**60.8**	**59.6**
Day dB(A)	**56.25**	**56.85**
Night dB(A)	**51.43**	**52.84**

Limits: Industrial Area: Day Time-75 dB (A), Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Monitoring Date represents 24 hours from 6:00 am to 6:00am next day. Legend: Leq- Equivalent Noise Level (hourly); Ld-Day Time Equivalent Noise Level (06:00-22:00 hrs); Ln-Night Time Equivalent Noise Level (22:00-06:00 hrs); and Ldn-24 hourly Equivalent Noise Level. Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

CONCLUSION: All the parameters meet MoEF Standards

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TEST REPORT: NOISE MONITORING: APRIL 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP & WTP areas
Sampling Date	26-27.04.2019 & 29-30.04.2019
Report Date	09.05.2019
Report No.	HECS/N/001-002/090519

Time (Hrs)	CETP AREA (26-27.04.2019)	WTP AREA (29-30.04.2019)
06.00	51.6	52.3
07.00	60.3	51.5
08.00	51.2	52.4
09.00	51.8	52.7
10.00	53.5	54.2
11.00	54.9	56.1
12.00	55.5	56.3
13.00	56.6	57.6
14.00	56.7	58.2
15.00	57.4	58.8
16.00	58.3	57.8
17.00	59.4	59.4
18.00	59.3	58.4
19.00	58.7	57.3
20.00	57.3	57.4
21.00	58.4	57.6
22.00	55.6	58.7
23.00	55.4	56.8
00.00	55.3	55.6
01.00	55.6	55.5
02.00	53.7	52.6
03.00	52.2	53.2
04.00	51.1	50.4
05.00	50.3	52.3
MIN	**50.3**	**50.4**
MAX	**60.3**	**59.4**
Day dB(A)	**56.26**	**56.28**
Night dB(A)	**53.37**	**53.77**

Limits: Industrial Area: Day Time-75 dB (A), Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Monitoring Date represents 24 hours from 6:00 am to 6:00am next day. Legend: Leq- Equivalent Noise Level (hourly); Ld-Day Time Equivalent Noise Level (06:00-22:00 hrs); Ln-Night Time Equivalent Noise Level (22:00-06:00 hrs); and Ldn-24 hourly Equivalent Noise Level. Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

CONCLUSION: All the parameters meet MoEF Standards

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4.3 Water Analysis Results

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Oddidakal (GW)
Date of Sampling	15.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.05.2019
Report No	HECS/W/001/090519

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.40	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	210	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	160	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	79.2	200	600
9.	Total Hardness	mg/L	126.72	200	600
10.	Calcium as Ca	mg/L	28.56	75	200
11.	Magnesium as Mg	mg/L	13.47	30	100
12.	Iron as Fe	mg/L	0.04	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	6.82	200	400
14.	Chloride as Cl	mg/L	BDL (DL 0.1)	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.16	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.71	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Shantigudde (GW)
Date of Sampling	15.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.05.2019
Report No	HECS/W/002/090519

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	8.14	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	240	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	180	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	99	200	600
9.	Total Hardness	mg/L	158.4	200	600
10.	Calcium as Ca	mg/L	38.09	75	200
11.	Magnesium as Mg	mg/L	15.40	30	100
12.	Iron as Fe	mg/L	BDL (DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	5.29	200	400
14.	Chloride as Cl	mg/L	11.66	250	1000
15.	Boron as B	mg/L	BDL (DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.26	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	1.5	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Permude (GW)
Date of Sampling	15.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.05.2019
Report No	HECS/W/003/090519

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	8.42	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	210	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	150	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	53.2	200	600
9.	Total Hardness	mg/L	154.44	200	600
10.	Calcium as Ca	mg/L	42.85	75	200
11.	Magnesium as Mg	mg/L	11.55	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	5.76	200	400
14.	Chloride as Cl	mg/L	12.63	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.25	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.63	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Permude - Bajpe Village Boundary (GW)
Date of Sampling	15.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.05.2019
Report No	HECS/W/004/090519

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.26	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	280	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	260	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	133.65	200	600
9.	Total Hardness	mg/L	207.9	200	600
10.	Calcium as Ca	mg/L	63.48	75	200
11.	Magnesium as Mg	mg/L	12.03	30	100
12.	Iron as Fe	mg/L	0.056	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	31.29	200	400
14.	Chloride as Cl	mg/L	4.86	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.24	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.18	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Kalavar (GW)
Date of Sampling	15.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.05.2019
Report No	HECS/W/005/090519

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.60	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	128	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	96	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	21.78	200	600
9.	Total Hardness	mg/L	59.4	200	600
10.	Calcium as Ca	mg/L	17.46	75	200
11.	Magnesium as Mg	mg/L	3.85	30	100
12.	Iron as Fe	mg/L	0.021	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	4.59	200	400
14.	Chloride as Cl	mg/L	15.54	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.17	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.13	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	10 mL water Reservoir (GW)
Date of Sampling	15.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.05.2019
Report No	HECS/W/006/090519

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.93	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	155	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL(DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	117	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	41.8	200	600
9.	Total Hardness	mg/L	83.16	200	600
10.	Calcium as Ca	mg/L	22.85	75	200
11.	Magnesium as Mg	mg/L	6.36	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	12.12	200	400
14.	Chloride as Cl	mg/L	9.71	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.18	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.13	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

5. MONITORING SCHEDULE OF MANGALORE SEZ LIMITED ENVIRONMENTAL MONITORING

Sl.No	Environmental Attributes monitored	Parameters analyzed and presented in analysis Report	Monitoring requirement
1	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, O_3, NH_3, Pb, As, Ni, Benzene, B(α)P	Two Locations/Month, 24 hrs/day
2	Surface/ Ground Water Quality	Colour, pH (at 25 °C),Odour, Taste, Turbidity, Total Dissolved Solids, Alkalinity as $CaCO_3$, Total Hardness, Calcium as Ca, Magnesium as Mg, Iron as Fe, Sulphate as SO_4, Chloride as Cl, Boron as B, Residual free chlorine, Fluoride, Phenolic Compounds, Carbon monoxide, Manganese as Mn, Zinc as Zn, Arsenic as As, Cyanide as CN, Cadmium as Cd, Chromium as Cr, Aluminium as Al, Selenium as Se, Lead as Pb, Mercury as Hg, Nitrate Nitrogen NO_3, *E.Coli*	Ten Locations, Seasons (Summer, Winter, Post monsoon), By using Grab Sampling technique
3	Ambient Noise Level	Noise Level (db) in Day and Night	Two Locations, Seasons (Summer, Winter, Post monsoon), Fortnightly interval

ANNEXURE

Speed Post

No.Q.15018/42/2014-CPW
Government of India
Ministry of Environment, Forest & Climate Change
CP Division

Indira Paryavaran Bhawan,
Prithvi, 2nd Floor,
Jorbagh Road, Aliganj,
New Delhi-110 003.
Dated: 18th August, 2016

To,

M/s Hubert Enviro Care Systems Pvt. Ltd.
No. C-45, Industrial Estate, Baikampady,
Mangalore- 575011,
Karnataka .

Subject: **Recognition of M/s Hubert Enviro Care Systems Pvt. Ltd. No. C-45, Industrial Estate, Baikampady, Mangalore- 575011, Karnataka as Environmental Laboratory under the Environment (Protection) Act, 1986 - reg.**

Sir,

Kindly refer to your letter no. nil Dated 17.12.2014 approval for recognition of laboratory under Environment (Protection) Act, 1986.Based on the recommendation of the 44th meeting of Expert Committee for recognition of environmental laboratories held on 09.10.2015 & 14.10.2015 and your acceptance of the terms & conditions at Annexure –III, IV&V of guidelines for recognition of environmental laboratories under the Environment (Protection) Act,1986,this Ministry approves the recognition of your laboratory for five years as shall be notified in the Gazette of India.

2. The laboratory shall compulsorily participate in the Analytical Quality Control (AQC) exercise conducted by the Central Pollution Control Board, at least once a year to ascertain the capability of the laboratory and analysis from time to time and to provide quarterly progress reports of your laboratory to the MoEF&CC.

3. Periodic surveillance of recognized Environmental Laboratory under Environment (Protection) Act, 1986 will be undertaken by MoEF&CC/Central Pollution Control Board (CPCB) to assess its proper functioning, systematic operation and reliability of data generated at the laboratory.

4. It is also mandatory for the laboratory to renew NABL, ISO 9001:2008, ISO 14001:2004 and OHSAS from time to time.

Yours faithfully,

(Dr. (Ms.) Rubab Jaffer),
Deputy Director.

National Accreditation Board for Testing and Calibration Laboratories
(A Constituent Board of Quality Council of India)

CERTIFICATE OF ACCREDITATION

HUBERT ENVIRO CARE SYSTEMS PRIVATE LIMITED

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka

in the field of

TESTING

Certificate Number TC-7920 *(in lieu of T-3180)*

Issue Date 31/10/2018 **Valid Until** 30/10/2020

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL

8907697010003000 2021

Anil Relia
Chief Executive Officer

National Accreditation Board for Testing and Calibration Laboratories
(A Constituent Board of Quality Council of India)

CERTIFICATE OF ACCREDITATION

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

No. 18, 92nd Street, Ashok Nagar, Chennai, Tamil Nadu

in the field of

TESTING

Certificate Number TC-5786 *(in lieu of T-0985 & T-2528)*

Issue Date 30/04/2017 **Valid Until** 29/04/2019

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL

N. Venkateswaran
Program Director

8907697010003000043

Anil Relia
Chief Executive Officer

National Accreditation Board for Testing and Calibration Laboratories
(A Constituent Board of Quality Council of India)

NABL/T/0586 26.04.2019

To,

Dr. Rajkumar Samuel
Hubert Enviro Care Systems (P) Ltd.,
No 18th, 92nd Street,
Ashok Nagar, Chennai- 600 083
Tel: 044-24891007, 24712052
Mob: 9884391099
moses@hec.in , rajkumar@hecs.in

Sub: Extension of validity NABL accreditation

Dear Sir,

We are pleased to inform you that your testing laboratory has been recommended for extension of validity of your current accreditation in the discipline of Chemical and Biological for the existing scope and authorized signatories till 23.05.2019.

Monika Gupta

Yours Sincerely
Monika Gupta

Accreditation Officer

Quality Council of India

National Accreditation Board for Education & Training

CERTIFICATE OF ACCREDITATION

Hubert Enviro Care Systems (P) Ltd.

A-21, III Phase, Behind Lions Club School, ThiruViKa Industrial Estate, Guindy, Chennai – 600 032

Accredited as **Category - A** organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA-EMP reports in the following Sectors:

Sl. No.	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2	Onshore oil and gas exploration, development & production	2	1 (b)	A
3	Thermal power plants	4	1 (d)	A
4	Metallurgical industries (secondary metallurgy only)	8	3 (a)	B
5	Cement plants	9	3 (b)	B
6	Petroleum refining industry	10	4 (a)	A
7	Petro-chemical complexes (industries based on processing of petroleum fractions & natural gas and/or reforming to aromatics)	18	5 (c)	A
8	Petrochemical based processing (processes other than cracking & reformation and not covered under the complexes)	20	5 (e)	A
9	Synthetic organic chemicals industry	21	5 (f)	A
10	Isolated storage & handling of Hazardous chemicals	28	6 (b)	B
11	Industrial estates/ parks/ complexes/areas, export processing Zones(EPZs), Special Economic Zones(SEZs), Biotech Parks, Leather Complexes	31	7 (c)	A
12	Common Municipal Solid Waste Management Facility (CMSWMF)	37	7 (i)	B
13	Building and construction projects	38	8 (a)	B
14	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in RA AC minutes dated Nov. 03, 2017 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/18/0566 dated Feb. 16, 2018.The accreditation needs to be renewed before the expiry date by Hubert Enviro Care Systems (P) Ltd., Chennai following due process of assessment

Sr. Director, NABET
Dated: Feb. 16, 2018

Certificate No.
NABET/ EIA/1619/ RA 0083

Valid till
13.10.2019

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

BSCIC Certifications

BSCIC

CERTIFICATE OF REGISTRATION

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM

This is to certify that:

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

LOCATION-I: # 18, 92ND STREET, ASHOKNAGAR
CHENNAI – 600 083, TAMIL NADU, INDIA
LOCATION-II: # C-45 INDUSTRIAL ESTATE, BAIKAMPADI
MANGALORE – 575 011, KARNATAKA, INDIA

Hereby granted the Certificate Number : **BN7480/6888:0713**

Subsequent to the **Re-Assessment** conducted on **06-Jul-2016** and the organization has been found to be operating a Occupational Health & Safety Management System which complies with the requirements of

OHSAS 18001:2007

For the following scope:

Provision of Environmental Management Consultancy, Turnkey Environmental Management Projects, Operation and Maintenance of ETP/STP/WTP and Other Environmental Installations, Laboratory Testing Covering Chemical/ Microbiological/ Environmental Fields and Allied Activities

Originally Registered: **13-Jul-2013** Latest Issue: **13-Jul-2016** Expiry Date: **12-Jul-2019**

For BSCIC CERTIFICATIONS PVT.LTD.

Page 1 of 1

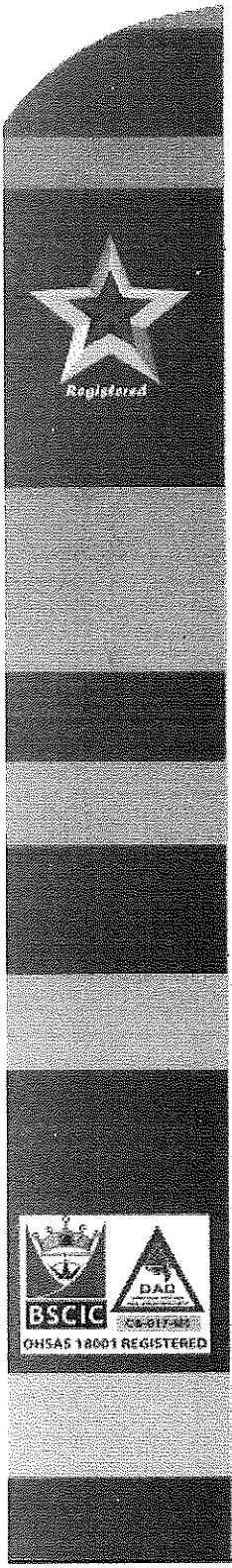
Sanjay Seth
Managing Director

Validity of this Certificate is subject to Annual Surveillance Audits to be done Successfully on or before 06-Jul-2017 and 06-Jul-2018 resp.

(In case if Surveillance Audit is not allowed to be conducted; this Certificate shall be Suspended/Withdrawn)

Please Re-validate this certificate's status at http://bsci-cert.com/Online_Portal/certificatestatus.php or www.bsc-rcc.com at REGISTRATION STATUS.
This Certificate of Registration is granted subject to relevant provisions of the BSCIC Certifications Pvt. Ltd. Contract Terms & Scheme for Registration Form B 018 (Latest Version). Please see B 018 at our website www.bsc-rcc.com The certificate of Registration remains the property of BSCIC Certifications Pvt. Ltd. and shall be returned immediately upon request.
BSCIC Headquarters: IInd Floor, SCO 150, Sector - 24 C, Faridabad 121001 Haryana, India.

BSCIC DAC OHSAS 18001 REGISTERED



BSCIC Certifications

BSCIC

CERTIFICATE OF REGISTRATION

OCCUPATIONAL HEALTH&SAFETY MANAGEMENT SYSTEM

This is to certify that:

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LOCATION-I: # 18, 92ND STREET, ASHOK NAGAR
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The certificate of Registration remains the property of BSCIC Certifications Pvt. Ltd. and shall be returned immediately upon request.
BSCIC Headquarters: 11nd Floor, SCO 150, Sector - 21 C, Faridabad 121001 Haryana, India.

CERTIFICATE

QUALITY MANAGEMENT SYSTEM

kfq® Korean Foundation for Quality

Hubert Enviro Care Systems (P) Ltd.

- HO : #18, 92nd Street, Ashok Nagar, Chennai, Tamilnadu, India (Zip code : 600083)
- Mangalore site : #C-45 Industrial Estate, Baikampadi, Mangalore, Karnataka, India (Zip code : 575011)

Registration Date	2018-09-17
Expiration Date	2021-09-16
Initial Registration Date	2018-09-17
Revision Date	2018-09-17
Certificate Number	AC-07045

Korean Foundation for Quality certifies that The Quality Management System of the above organization has been audited and has complied with the requirements of the following standard

Standard

ISO 9001:2015/KS Q ISO 9001:2015

Scope of certification

PROVISION OF ENVIRONMENTAL MANAGEMENT CONSULTANCY,TURNKEY ENVIRONMENTAL MANAGEMENT PROJECTS, OPERATION AND MAINTENANCE OF ETP / STP / WTP AND OTHER ENVIRONMENTAL INSTALLATION LABORATORY TESTING COVERING CHEMICAL / MICROBIOLOGICAL / ENVIRONMENTAL / FOOD AND AGRI PRODUCTS / WATER / CONSUMER PRODUCTS AND ALLIED ACTIVITIES

▸ PERMITTED EXEMPTION [8.3 DESIGN & DEVELOPMENT OF PRODUCTS AND SERVICES]

IQNet

KAB (KAB-QC-01)

IAF

KFQ has been accredited in respect of ISO 9001 covered by the KAB(Accreditation Certificate Number KAB-QC-01)

Dae Hyeon Nam
President & CEO of KFQ

www.kfq.or.kr
13F, Woolim Lion's Valley Bldg.B,168,Gasan digital 1-ro,Geumcheon-gu,Seoul,08507,Korea

IQNet®

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

KFQ has issued an IQNet recognized certificate that the organization:

Hubert Enviro Care Systems (P) Ltd.

· **HO : #18, 92nd Street, Ashok Nagar, Chennai, Tamilnadu, India (Zip code : 600083)**
· **Mangalore site : #C-45 Industrial Estate, Baikampadi, Mangalore, Karnataka, India (Zip code : 575011)**

for the following scope

PROVISION OF ENVIRONMENTAL MANAGEMENT CONSULTANCY,TURNKEY ENVIRONMENTAL MANAGEMENT PROJECTS, OPERATION AND MAINTENANCE OF ETP / STP / WTP AND OTHER ENVIRONMENTAL INSTALLATION
LABORATORY TESTING COVERING CHEMICAL / MICROBIOLOGICAL / ENVIRONMENTAL / FOOD AND AGRI PRODUCTS / WATER / CONSUMER PRODUCTS AND ALLIED ACTIVITIES

has implemented and maintains a
Environmental Management System
which fulfils the requirements of the following standard
ISO 14001:2015
Issued on : 2018-09-20
First Issued on : 2018-09-20
For the validity date, please refer to the original certificate issued by KFQ*
Registration Number : KR - 07043

IQNet

Alex Stoichitoiu
President of IQNet

Dae Hyeoun Nam
President & CEO of KFQ

kfq

IQNet Partners*:
AENOR Spain AFNOR Certification France APCER Portugal CCC Cyprus CISQ Italy
CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany FCAV Brazil
FONDONORMA Venezuela ICONTEC Colombia Inspecta Sertifiointi Oy Finland INTECO Costa Rica
IRAM Argentina JQA Japan KFQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland
NYCE-SIGE México PCBC Poland Quality Austria Austria RR Russia SII Israel SIQ Slovenia
SIRIM QAS International Malaysia SQS Switzerland SRAC Romania TEST St Petersburg Russia TSE Turkey YUQS Serbia
IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

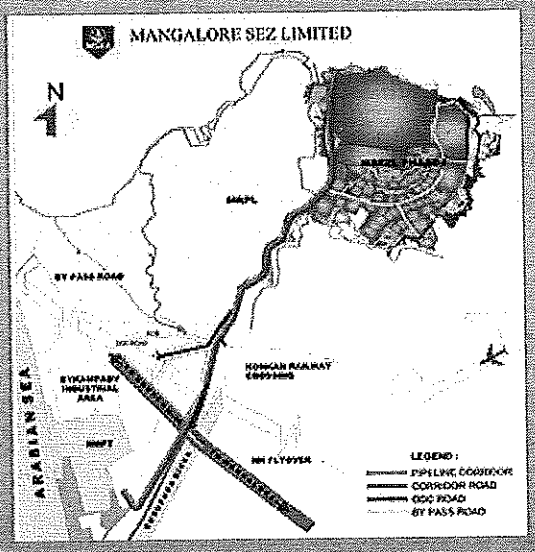
* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

Mangalore SEZ Limited

ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY
REPORT FOR THE MONTH OF MARCH 2019

Submitted to



Submitted By

HECS

M/s Hubert Enviro Care Systems Private Limited
(NABL Accredited & MOEF Recognized Laboratory)
7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka - 575011
Email: krom@hecs.in; kro@hecs.in

INDEX

AMBIENT AIR QUALITY MONITORING REPORT - MARCH 2019

1. INTRODUCTION

Mangalore Special Economic Zone, known as MSEZ is spread across 1638 acres, located 15 km from Mangalore city, off Cochin-Mumbai NH 66, 5 km from Mangalore International Airport and 8 km from all-weather deep draft sea port, New Mangalore Port in Mangalore, Karnataka, India. MSEZ limited is jointly promoted by Oil and Natural Gas Corporation (ONGC), a fortune 500 company & infrastructure leasing & finance services, one of India's leading infrastructure development and finance companies, Karnataka Industrial Area Development Board (KIADB) and Kanara Chamber of Commerce and Industry (KCCI). A unique combination of Government entities, a large financial institution and an apex chamber brings in the expertise to develop MSEZL with world-class industrial infrastructure.

2. ENVIRONMENTAL MONITORING

Environmental monitoring is being carried out at Mangalore SEZ, following guidelines and regulations of MoEF/CPCB and KSPCB statutory norms. In this regard, MSEZL has awarded the work to M/s Hubert EnviroCare Systems Pvt Ltd. and to monitor air quality, water quality & noise level for the three years. As per work order, during March 2019, we have conducted ambient air quality monitoring at 2 locations, namely CETP and WTP area.

3. SCOPE AND METHODOLOGY

The scope of work carried out and methodology adopted for the survey are described below:

3.1. Ambient Air Quality

Ambient air quality monitoring was carried out at each location on 24 hour basis on two consecutive days per month. The identified monitoring stations are: A_1-CETP & A_2-WTP Area. To assess the ambient air quality status, monitoring stations are identified on the basis of meteorology in the upwind and downwind direction as well as to represent the cross sectional scenario of the MSEZ. Based on the activities the parameters chosen for assessment of air quality are $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2-Nitrogen-di-oxide; CO-Carbon Mono Oxide (DL 0.1 mg/m^3); O_3-Ozone (DL 10 µg/m^3); NH_3-Ammonia (DL 5 µg/m^3); Pb-Lead (DL 0.05 µg/m^3); As-Arsenic (DL 0.1 ng/m^3); Ni- (DL 0.5 ng/m^3); Benzene-(DL 1 µg/m^3); B(α)P- Benzo-α-pyrene (DL0.1 ng/m^3) as per CPCB stipulation.

3.1.1. Sampling and analysis of $PM_{2.5}$ and PM_{10} in ambient air (Gravimetric Method)

i. Condition a filter paper in oven (i.e. 10 or 2.5 µm diameter)
ii. Prepare a sampling assembly by uncorking screws of the bracket
iii. Take a tare (initial) weight of the filter paper (w_i *mg*)
iv. Place the filter in the sampling system securely and tighten the screws of the bracket
v. Set the timer for the period of sampling
vi. Start the sampler and adjust flow rate to about 2L/ min for 24 hrs sampling
vii. Note the flow rate at the end of the desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions
ix. Condition the filter paper again for the same period as was done prior to sampling.

Laboratory analysis:

Weighing of exposed samples:

i. Take final weight of the exposed filter with a standard balance (*wf, mg*)

Calculations:

i. Average flow rate (initial and final flow rates) in L/ min
   = (Initial flow rate + final flow rate)/ 2
ii. Total vol. of air sampled (TVA) in m^3
   = Avg. flow rate (*L/min*) * 10^{-3} (m^3/*L*) * sampling time (*hr*) * 60 (*min/hr*)
iii. Concentration of SPM in $\mu g/m^3$
   = $(w_f - w_i)$ *(mg)*/ TVA (m^3) * 10^6 $\mu g/m^3$

3.1.2. Sampling and analysis of Sulphur dioxide

i. Prepare absorbing reagent (sodium tetra-chloromecurate) by dissolving 27.2 g mercuric chloride and 11.7 g sodium chloride in 1 lit of water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for 24 hours sampling)
v. To eliminate interference of traces metals, if any ,1 drop of 0.01% EDTA solution to be added to the reagent prior to sampling ;similarly, effect of oxide of nitrogen also be eliminated by adding 1 ml of 0.06% sulphamic acid to the reagent at site
vi. Start the sampler and adjust flow rate to 2 lit/ min.
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of SO_2 concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (μgSO_2) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
iii. $\mu gSO_2/TVA$

3.1.3. Sampling and analysis of Nitrogen-di-oxide

i. Prepare absorbing reagent (a solution of sodium hydroxide and arsenite) by dissolving 4 g sodium hydroxide and 1 g of sodium arsenite in 1 lit of distilled water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried .
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for hours sampling)
v. To eliminate interference of sulphur dioxide, drop of hydrogen peroxide could be added to the reagents to convert sulphur dioxide into sulphate during analysis
vi. Start the sampler and adjust flow rate to about 0.2 lit/ min for 24 hours sampling
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of NO_x concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µg NO_x) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
$\mu gNO_x/TVA$

3.1.4. Sampling and analysis of Carbon Mono Oxide

Preparation of sample train:

i. Sampling begins with conditioning a sampling train and then gas analyzer
ii. Pressure system is preferred to condition the sampling train by installing pump before the analyzer. Reducing valve needs to be fitted between the analyser and pump to eliminate the pulsing effect of pump on the analyzer
iii. Flow meter is to be installed just before the analyzer
iv. A fibre filter is used to capture the particulate matter prior to the optical cell to prevent its interference. As it often accumulates on the optical cell reducing the efficiency
v. To eliminate the interference of water vapour, refrigeration or desiccant with magnesium perchlorate could be used

Mode of operation:

i. Continuous analysis is carried out at the flow rate of about 100 ml/min to 1000 ml/min (depending upon the level of pollution near the location) for the desired sampling period
ii. Discrete sampling is also possible with infra red analyzer. It however requires proper cleaning of the sampling train.

Steps:

i. Calibration of analyzer can be carried out if required using standard gases
ii. Sampler is allowed to warm up for some time before actual readings are taken till the sampler gives steady response and temperature stability

3.1.5. Sampling and analysis of Ozone

Dynamic calibration:

i. Dynamic calibration could be performed by preparing a large mixture of ozone in air
ii. The output of an ozonizer is fed into the intake of a small blower delivering air. The mixture of gas however emerges through a short length of pipe
iii. One portion of this mixture is analyzed in the recorder.
iv. Another portion is analyzed through a faintly blue iodine solution containing starch and potassium iodide.
v. Titrated this solution with sodium thiosulphate(0.1N)
vi. The end point established by comparison with the blue starch- iodine solution
vii. Mixture of ozone and air in polyester film bag could be prepared and admitted to the analyzer.
viii. The mixture is analyzed at the time it is used since the ozone decomposes gradually
ix. Analysis is then performed by passing a measured volume through an impinge containing buffered KI solution and determined the released iodine by spectrometer method
x. Make the second mixture about midscale concentration and adjust sample or reagent flow rates until the recorder reading agrees with the absorbance scale according to the analytically determined concentration of ozone
xi. Check several other points on the curve if desired and liner or logarithmic chart to be prepared followed by a calibration curve to read in ppm

Laboratory analysis:

Calibration curve:

i. Plot graph of absorbance v/s concentration

Procedure:

i. Place a fresh absorbent solution in the storage bottle and operate the solution pump until the liquid are full
ii. After the flow has stabilized itself, zero the recorder and start the air pump
iii. Set the flow at convenient rates such as 4 ml/ min of solution and 4 l/min of air
iv. Check and adjust the flow rates daily.
v. Adjust the pH of the solution once or twice a week ,at time the solution shall be brought up to volume by addition of distilled water
vi. Change the carbon filter about once a month. Also change the absorbing solution at the same time

3.1.6. Sampling and analysis of Ammonia:

Ammonia is collected in dilute Sulphuric acid solution in midget impingers to form Ammonium Sulphate. The solution is treated with Nesselers reagent to produce a yellow brown complex. The Ammonia concentration is determined by reading the absorption of the complex at 440 nm and comparing with a standard curve.

3.1.7. Sampling and analysis of Lead, Nickel, Arsenic:

1. Sampling procedure:

Tilt back the inlet and secure it according to manufacturer's instructions. Loosen the face-plate wing-nuts and remove the face plate. Remove the filter from its jacket and centre it on the support screen with the rough side of the filter facing upwards. Replace the face-plate and tighten the wing-nuts to secure the rubber gasket against the filter edge. Gently lower the inlet. For automatically flow-controlled units, record the designated flow rate on the data sheet. Record the reading of the elapsed time meter. The specified length of sampling is commonly 8 hours or 24 hours. During this period, several reading (hourly) of flow rate should be taken. After the required time of sampling, record the flow meter reading and take out the filter media from the sampler and put in a container or envelope

2. Analysis:

i. Hot plate procedure:

Cut a 1" x 8" strip or half the filter from the 8" x 10" filter using a stainless steel pizza cutter. Place the filter in a beaker using vinyl gloves or plastic forceps. Cover the filter with the extraction solution (3% HNO_3 & 8% HCl). Place beaker on the hotplate, contained in a fume hood, and reflux gently while covered with a watch glass for 30 min. Do not allow sample to dry. Remove the beakers from the hot-plate and allow to cool. Rinse the beaker walls and wash with distilled water. Add approximately 10 mL reagent water to the remaining filter material in the beaker and allow to stand for at least 30 min. Transfer the extraction fluid in the beaker to a 100 mL volumetric flask or other graduated vessel. Rinse the beaker and any remaining solid material with distilled water and add the rinses to the flask. Dilute to the mark with distilled water (Type I) water and shake. The final extraction solution concentration is 3 % HNO3/8% HCl. The filtered sample is now ready for analysis

2.1. Analysis of samples:

i. Instrument / Equipment:

A light beam containing the corresponding wavelength of the energy required to raise the atoms of the analyte from the ground state to the excited state is directed through the flame or furnace. This wavelength is observed by a monochromator and a detector that measure the amount of light absorbed by the element, hence the number of atoms in the ground state in the flame or furnace. A hollow cathode lamp for the element being determined provides a source of that metal's particular absorption wavelength. The method describes both flame atomic absorption (FAA) spectroscopy and graphite furnace atomic absorption (GFAA) spectroscopy. Atomic Absorption Spectrophotometer - analyze the metals by Flame, if results are below detection limit then go for GTA. Arsenic is analyzed by Flame – VGA.

ii. Flame Procedure:

Set the atomic absorption spectrophotometer for the standard condition as follows: choose the correct hollow cathode lamp, align the instrument, position the monochromator at the value recommended by the manufacturer, select the proper monochromator slit width, set the light source current, ignite the flame, regulate the flow of fuel and oxidant, adjust the burner for maximum absorption and stability and balance the meter. Run a series of standards of the metal of interest and construct a calibration curve. Aspirate the blanks and samples. Dilute samples that exceed the calibration range. For Lead (Pb) and Nickel (Ni), the wavelength required for analysis is 217nm and 232nm respectively. Where as in case of Arsenic (As), the VGA should attach with Flame and the wavelength required for analysis is 193.7nm.

3. Calibration:

Prepare standard solutions from the stock solutions. Select at least three standards to cover linear range as recommended by method. Aspirate the standards into the flame or inject the standards into the furnace and record the absorbance. Prepare the calibration graph by plotting absorbance and concentration in µg/ml.

i. Preparation of Standards:

For each metal that is to be determined, standards of known concentration must be acquired commercially certified standards.

ii. Standard Curve:

Standard curve is prepared by using standard solutions of known concentration.

4. Calculations:

i. Sample Air Volume:

Sample air volume can be calculated by using the following equation:

$V = (Q)\ (t)$

Where,

V = volume of air, m^3

Q = average sampling rate, m3/min.

t = time in minutes.

ii. Metal Concentration:

$C = (Ms - Mb) \times Vs \times Fa/V \times Ft$

Where,

C = concentration, µg metal/m^3

Ms = metal concentration µg/mL

Mb = blank concentration µg/mL

Vs = total volume of extraction in mL

Fa = total area of exposed filter in cm^2

V = Volume of air sampled in m^3

Ft = Area of filter taken for digestion in cm^2

3.1.8. Sampling and analysis of Benzo-α-pyrene:

Benzo (a) Pyrene (BaP) is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo (a) Pyrene in the particulate phase. The molecular formula of B(a)P is C_2OH_{12} having molecular weight 252.

It is based on BIS method IS 5182 (Part 12):2004 and USEPA method (TO-13). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary gas chromatograph equipped with flame ionization detector. It is a high volume ($1.2m^3$/min) sampling method capable of detecting sub.ng/m3 concentration of PAH in 24 hours sample (i.e. collected in 3 shifts of 8 hour each with 480 m3 sampling volume of air).

i. Sampling:

i. Instrument/Filter Selection:

24 hr. sampling using PM_{10} high volume sampler with 8 hourly samples using EPM-2000 glass fibre or equivalent filter

ii. Sample Processing

a. Extraction:

Filter papers (half of all the filters papers collected in a day) are cut into strips using scissors and transfer to 250 ml beaker. Add ~50 ml. of Toluene (GC/HPLC grade). These samples are extracted with toluene using ultra sonic sample can be extracted using soxhlet bath for about 30 minutes. Repeat the procedure twice (50ml x 2 times) for complete extraction. Alternatively, extraction apparatus for about 8 hr. with Toluene and repeat it twice.

b. Filtration:

Filter the extracted samples with Whatman filter paper No. 41 containing 2 gm of Anhydrous Sodium Sulphate (to remove moisture).

c. Concentration:

After filtration, the filtrate is concentrated using Rotary vacuum evaporator to 2ml final volume.

d. Clean-up with silica Gel:

To clean up the impurities, pass 2 ml of concentrated sample through silica gel column (pre conditioned, 60-80 mesh, and 200-250mm×10 mm with Teflon stopcock). After cleaning add 5ml cyclohexane and collect the elute in 25 ml beaker. Repeat the process for at least 3 times and collect it in the same beaker. Alternatively Solid Phase Extraction (SPE) could be used for clean up the impurities of sample.

e. Re-concentration with rotary vacuum evaporator:

The Cleaned up extract/filtrate (approximately 17 ml) is further concentrated using rotary evaporator and it is evaporated to nearly dryness with Nitrogen.

f. Final Sample volume:

The dried sample is re-dissolved in 1ml of toluene and transfer into 4 or 5 ml amber vials final analysis.

ii. Calculations:

Calculate the concentration in ng/µl of each identified analyte or B(a)P in the sample extract (Cs) as follows:

Calculate the air volume from the periodic flow reading taken during sampling using the following equation:

V =Q x T

Where,

Q =Average flow rate of sampling m3/min

T = sampling time, in min.

V = total sample volume at ambient conditions in m3

Concentration of analyte i.e B(a)P:

The concentration of PAH compound or Benzo(a)pyrene in ng /m3 in the air sampled is given by:

C (ng /m3) = Cs * Ve / Vi *Vs

Where,

Cs : Concentration of Benzo (a) pyrene in ng / µl in the sample extract recorded by GC.

Ve : Final volume of extract in µl (i.e 1000)

Vi : Injection Volume (i.e 1µl)

Vs : Volume of air sample in m3

4.0 Results

4.1 Ambient Air Quality

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: MARCH 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP
Sampling Date	05.03.2019
Report Date	28.03.2019
Report No	HECS/AA/001/280319

CONSOLIDATED TEST RESULTS: MARCH 2019

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	28
PM_{10} ($\mu g/m^3$)	100*	61
SO_2 ($\mu g/m^3$)	80*	17
NO_2 ($\mu g/m^3$)	80*	21
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: *: 24 hours average; **: 8 hours average; ***: Annual average

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo -α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

HUBERT ENVIRO CARE SYSTEM

(Dr K GANESAN)
Authorized Signatory

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: MARCH 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	WTP
Sampling Date	06.03.2019
Report Date	28.03.2019
Report No	HECS/AA/001/280319

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	29
PM_{10} ($\mu g/m^3$)	100*	59
SO_2 ($\mu g/m^3$)	80*	18
NO_2 ($\mu g/m^3$)	80*	23
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: * 24 hours average; ** : 8 hours average; * : Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo - α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

5. MONITORING SCHEDULE OF MANGALORE SEZ LIMITED
ENVIRONMENTAL MONITORING

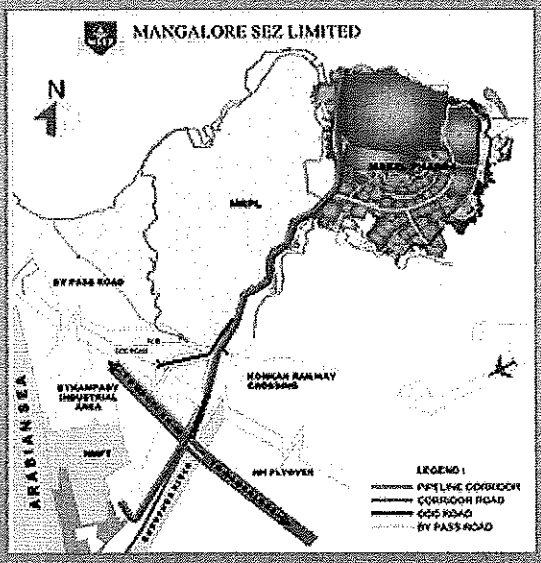
Sl.No	Environmental Attributes monitored	Parameters analyzed and presented in analysis Report	Monitoring requirement
1	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, O_3, NH_3, Pb, As, Ni, Benzene, B(α)P	Two Locations/Month, 24 hrs/day
2	Surface/ Ground Water Quality	Colour, pH (at 25 °C), Odour, Taste, Turbidity, Total Dissolved Solids, Alkalinity as $CaCO_3$, Total Hardness, Calcium as Ca, Magnesium as Mg, Iron as Fe, Sulphate as SO_4, Chloride as Cl, Boron as B, Residual free chlorine, Fluoride, Phenolic Compounds, Carbon monoxide, Manganese as Mn, Zinc as Zn, Arsenic as As, Cyanide as CN, Cadmium as Cd, Chromium as Cr, Aluminium as Al, Selenium as Se, Lead as Pb, Mercury as Hg, Nitrate Nitrogen NO_3, *E.Coli*	Ten Locations, Seasons (Summer, Winter, Post monsoon), By using Grab Sampling technique
3	Ambient Noise Level	Noise Level (db) in Day and Night	Two Locations, Seasons (Summer, Winter, Post monsoon), Fortnightly interval

Mangalore SEZ Limited

ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY
REPORT FOR THE MONTH OF FEBRUARY 2019

Submitted to



Submitted By

M/s Hubert Enviro Care Systems Private Limited
(NABL Accredited & MOEF Recognized Laboratory)
7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka - 575011
Email: krom@hecs.in; kro@hecs.in

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AMBIENT AIR QUALITY MONITORING REPORT - FEBRUARY 2019

1. INTRODUCTION

Mangalore Special Economic Zone, known as MSEZ is spread across 1638 acres, located 15 km from Mangalore city, off Cochin-Mumbai NH 66, 5 km from Mangalore International Airport and 8 km from all-weather deep draft sea port, New Mangalore Port in Mangalore, Karnataka, India. MSEZ limited is jointly promoted by Oil and Natural Gas Corporation (ONGC), a fortune 500 company & infrastructure leasing & finance services, one of India's leading infrastructure development and finance companies, Karnataka Industrial Area Development Board (KIADB) and Kanara Chamber of Commerce and Industry (KCCI). A unique combination of Government entities, a large financial institution and an apex chamber brings in the expertise to develop MSEZL with world-class industrial infrastructure.

2. ENVIRONMENTAL MONITORING

Environmental monitoring is being carried out at Mangalore SEZ, following guidelines and regulations of MoEF/CPCB and KSPCB statutory norms. In this regard, MSEZL has awarded the work to M/s Hubert EnviroCare Systems Pvt Ltd. and to monitor air quality, water quality & noise level for the three years. As per work order, during February 2019, we have conducted ambient air quality monitoring at 2 locations, namely CETP and WTP area.

3. SCOPE AND METHODOLOGY

The scope of work carried out and methodology adopted for the survey are described below:

3.1. Ambient Air Quality

Ambient air quality monitoring was carried out at each location on 24 hour basis on two consecutive days per month. The identified monitoring stations are: A_1-CETP & A_2-WTP Area. To assess the ambient air quality status, monitoring stations are identified on the basis of meteorology in the upwind and downwind direction as well as to represent the cross sectional scenario of the MSEZ. Based on the activities the parameters chosen for assessment of air quality are $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2-Nitrogen-di-oxide; CO-Carbon Mono Oxide (DL 0.1 mg/m^3); O_3-Ozone (DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni- (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo-α-pyrene (DL0.1 ng/m^3) as per CPCB stipulation.

3.1.1. Sampling and analysis of $PM_{2.5}$ and PM_{10} in ambient air (Gravimetric Method)

i. Condition a filter paper in oven (i.e. 10 or 2.5 µm diameter)
ii. Prepare a sampling assembly by uncorking screws of the bracket
iii. Take a tare (initial) weight of the filter paper (w_i, *mg*)
iv. Place the filter in the sampling system securely and tighten the screws of the bracket
v. Set the timer for the period of sampling
vi. Start the sampler and adjust flow rate to about 2L/ min for 24 hrs sampling
vii. Note the flow rate at the end of the desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions
ix. Condition the filter paper again for the same period as was done prior to sampling.

Laboratory analysis:

Weighing of exposed samples:

i. Take final weight of the exposed filter with a standard balance (*wf, mg*)

Calculations:

i. Average flow rate (initial and final flow rates) in L/ min
   = (Initial flow rate + final flow rate)/ 2
ii. Total vol. of air sampled (TVA) in m^3
   = Avg. flow rate (*L/min*) * 10^{-3} (m^3/*L*) * sampling time (*hr*) * 60 (*min/hr*)
iii. Concentration of SPM in $\mu g/m^3$
   = $(w_f\text{-}w_i)$ *(mg)*/ TVA (m^3) * 10^6 $\mu g/m^3$

3.1.2. Sampling and analysis of Sulphur dioxide

i. Prepare absorbing reagent (sodium tetra-chloromecurate) by dissolving 27.2 g mercuric chloride and 11.7 g sodium chloride in 1 lit of water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for 24 hours sampling)
v. To eliminate interference of traces metals, if any ,1 drop of 0.01% EDTA solution to be added to the reagent prior to sampling ;similarly, effect of oxide of nitrogen also be eliminated by adding 1 ml of 0.06% sulphamic acid to the reagent at site
vi. Start the sampler and adjust flow rate to 2 lit/ min.
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of SO_2 concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µgSO_2) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
iii. *µgSO_2/TVA*

3.1.3. Sampling and analysis of Nitrogen-di-oxide

i. Prepare absorbing reagent (a solution of sodium hydroxide and arsenite) by dissolving 4 g sodium hydroxide and 1 g of sodium arsenite in 1 lit of distilled water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried .
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for hours sampling)
v. To eliminate interference of sulphur dioxide, drop of hydrogen peroxide could be added to the reagents to convert sulphur dioxide into sulphate during analysis
vi. Start the sampler and adjust flow rate to about 0.2 lit/ min for 24 hours sampling
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of NO_x concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µg NO_x) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
$\mu gNO_x/TVA$

3.1.4. Sampling and analysis of Carbon Mono Oxide

Preparation of sample train:

i. Sampling begins with conditioning a sampling train and then gas analyzer
ii. Pressure system is preferred to condition the sampling train by installing pump before the analyzer. Reducing valve needs to be fitted between the analyser and pump to eliminate the pulsing effect of pump on the analyzer
iii. Flow meter is to be installed just before the analyzer
iv. A fibre filter is used to capture the particulate matter prior to the optical cell to prevent its interference. As it often accumulates on the optical cell reducing the efficiency
v. To eliminate the interference of water vapour, refrigeration or desiccant with magnesium perchlorate could be used

Mode of operation:

i. Continuous analysis is carried out at the flow rate of about 100 ml/min to 1000 ml/min (depending upon the level of pollution near the location) for the desired sampling period
ii. Discrete sampling is also possible with infra red analyzer. It however requires proper cleaning of the sampling train.

Steps:

i. Calibration of analyzer can be carried out if required using standard gases
ii. Sampler is allowed to warm up for some time before actual readings are taken till the sampler gives steady response and temperature stability

3.1.5. Sampling and analysis of Ozone

Dynamic calibration:

i. Dynamic calibration could be performed by preparing a large mixture of ozone in air
ii. The output of an ozonizer is fed into the intake of a small blower delivering air. The mixture of gas however emerges through a short length of pipe
iii. One portion of this mixture is analyzed in the recorder.
iv. Another portion is analyzed through a faintly blue iodine solution containing starch and potassium iodide.
v. Titrated this solution with sodium thiosulphate(0.1N)
vi. The end point established by comparison with the blue starch- iodine solution
vii. Mixture of ozone and air in polyester film bag could be prepared and admitted to the analyzer.
viii. The mixture is analyzed at the time it is used since the ozone decomposes gradually
ix. Analysis is then performed by passing a measured volume through an impinge containing buffered KI solution and determined the released iodine by spectrometer method
x. Make the second mixture about midscale concentration and adjust sample or reagent flow rates until the recorder reading agrees with the absorbance scale according to the analytically determined concentration of ozone
xi. Check several other points on the curve if desired and liner or logarithmic chart to be prepared followed by a calibration curve to read in ppm

Laboratory analysis:

Calibration curve:

i. Plot graph of absorbance v/s concentration

Procedure:

i. Place a fresh absorbent solution in the storage bottle and operate the solution pump until the liquid are full
ii. After the flow has stabilized itself, zero the recorder and start the air pump
iii. Set the flow at convenient rates such as 4 ml/ min of solution and 4 l/min of air
iv. Check and adjust the flow rates daily.
v. Adjust the pH of the solution once or twice a week ,at time the solution shall be brought up to volume by addition of distilled water
vi. Change the carbon filter about once a month. Also change the absorbing solution at the same time

3.1.6. Sampling and analysis of Ammonia:

Ammonia is collected in dilute Sulphuric acid solution in midget impingers to form Ammonium Sulphate. The solution is treated with Nesselers reagent to produce a yellow brown complex. The Ammonia concentration is determined by reading the absorption of the complex at 440 nm and comparing with a standard curve.

3.1.7. Sampling and analysis of Lead, Nickel, Arsenic:

1. Sampling procedure:

Tilt back the inlet and secure it according to manufacturer's instructions. Loosen the face-plate wing-nuts and remove the face plate. Remove the filter from its jacket and centre it on the support screen with the rough side of the filter facing upwards. Replace the face-plate and tighten the wing-nuts to secure the rubber gasket against the filter edge. Gently lower the inlet. For automatically flow-controlled units, record the designated flow rate on the data sheet. Record the reading of the elapsed time meter. The specified length of sampling is commonly 8 hours or 24 hours. During this period, several reading (hourly) of flow rate should be taken. After the required time of sampling, record the flow meter reading and take out the filter media from the sampler and put in a container or envelope

2. Analysis:

i. Hot plate procedure:

Cut a 1" x 8" strip or half the filter from the 8" x 10" filter using a stainless steel pizza cutter. Place the filter in a beaker using vinyl gloves or plastic forceps. Cover the filter with the extraction solution (3% HNO_3 & 8% HCl). Place beaker on the hotplate, contained in a fume hood, and reflux gently while covered with a watch glass for 30 min. Do not allow sample to dry. Remove the beakers from the hot-plate and allow to cool. Rinse the beaker walls and wash with distilled water. Add approximately 10 mL reagent water to the remaining filter material in the beaker and allow to stand for at least 30 min. Transfer the extraction fluid in the beaker to a 100 mL volumetric flask or other graduated vessel. Rinse the beaker and any remaining solid material with distilled water and add the rinses to the flask. Dilute to the mark with distilled water (Type I) water and shake. The final extraction solution concentration is 3 % HNO3/8% HCl. The filtered sample is now ready for analysis

2.1. Analysis of samples:

i. Instrument / Equipment:

A light beam containing the corresponding wavelength of the energy required to raise the atoms of the analyte from the ground state to the excited state is directed through the flame or furnace. This wavelength is observed by a monochromator and a detector that measure the amount of light absorbed by the element, hence the number of atoms in the ground state in the flame or furnace. A hollow cathode lamp for the element being determined provides a source of that metal's particular absorption wavelength. The method describes both flame atomic absorption (FAA) spectroscopy and graphite furnace atomic absorption (GFAA) spectroscopy. Atomic Absorption Spectrophotometer - analyze the metals by Flame, if results are below detection limit then go for GTA. Arsenic is analyzed by Flame – VGA.

ii. Flame Procedure:

Set the atomic absorption spectrophotometer for the standard condition as follows: choose the correct hollow cathode lamp, align the instrument, position the monochromator at the value recommended by the manufacturer, select the proper monochromator slit width, set the light source current, ignite the flame, regulate the flow of fuel and oxidant, adjust the burner for maximum absorption and stability and balance the meter. Run a series of standards of the metal of interest and construct a calibration curve. Aspirate the blanks and samples. Dilute samples that exceed the calibration range. For Lead (Pb) and Nickel (Ni), the wavelength required for analysis is 217nm and 232nm respectively. Where as in case of Arsenic (As), the VGA should attach with Flame and the wavelength required for analysis is 193.7nm.

3. Calibration:

Prepare standard solutions from the stock solutions. Select at least three standards to cover linear range as recommended by method. Aspirate the standards into the flame or inject the standards into the furnace and record the absorbance. Prepare the calibration graph by plotting absorbance and concentration in µg/ml.

i. Preparation of Standards:

For each metal that is to be determined, standards of known concentration must be acquired commercially certified standards.

ii. Standard Curve:

Standard curve is prepared by using standard solutions of known concentration.

4. Calculations:

i. Sample Air Volume:

Sample air volume can be calculated by using the following equation:

$V = (Q)(t)$

Where,

V = volume of air, m^3

Q = average sampling rate, m3/min.

t = time in minutes.

ii. Metal Concentration:

$C = (Ms - Mb) \times Vs \times Fa/V \times Ft$

Where,

C = concentration, µg metal/m^3

Ms = metal concentration µg/mL

Mb = blank concentration µg/mL

Vs = total volume of extraction in mL

Fa = total area of exposed filter in cm^2

V = Volume of air sampled in m^3

Ft = Area of filter taken for digestion in cm^2

3.1.8. Sampling and analysis of Benzo-α-pyrene:

Benzo (a) Pyrene (BaP) is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo (a) Pyrene in the particulate phase. The molecular formula of B(a)P is C_20H_{12} having molecular weight 252.

It is based on BIS method IS 5182 (Part 12):2004 and USEPA method (TO-13). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary gas chromatograph equipped with flame ionization detector. It is a high volume ($1.2m^3$/min) sampling method capable of detecting sub.ng/m3 concentration of PAH in 24 hours sample (i.e. collected in 3 shifts of 8 hour each with 480 m3 sampling volume of air).

i. Sampling:

i. Instrument/Filter Selection:

24 hr. sampling using PM_{10} high volume sampler with 8 hourly samples using EPM-2000 glass fibre or equivalent filter

ii. Sample Processing

a. Extraction:

Filter papers (half of all the filters papers collected in a day) are cut into strips using scissors and transfer to 250 ml beaker. Add ~50 ml. of Toluene (GC/HPLC grade). These samples are extracted with toluene using ultra sonic sample can be extracted using soxhlet bath for about 30 minutes. Repeat the procedure twice (50ml x 2 times) for complete extraction. Alternatively, extraction apparatus for about 8 hr. with Toluene and repeat it twice.

b. Filtration:

Filter the extracted samples with Whatman filter paper No. 41 containing 2 gm of Anhydrous Sodium Sulphate (to remove moisture).

c. Concentration:

After filtration, the filtrate is concentrated using Rotary vacuum evaporator to 2ml final volume.

d. Clean-up with silica Gel:

To clean up the impurities, pass 2 ml of concentrated sample through silica gel column (pre conditioned, 60-80 mesh, and 200-250mm×10 mm with Teflon stopcock). After cleaning add 5ml cyclohexane and collect the elute in 25 ml beaker. Repeat the process for at least 3 times and collect it in the same beaker. Alternatively Solid Phase Extraction (SPE) could be used for clean up the impurities of sample.

e. Re-concentration with rotary vacuum evaporator:

The Cleaned up extract/filtrate (approximately 17 ml) is further concentrated using rotary evaporator and it is evaporated to nearly dryness with Nitrogen.

f. Final Sample volume:

The dried sample is re-dissolved in 1ml of toluene and transfer into 4 or 5 ml amber vials final analysis.

ii. Calculations:

Calculate the concentration in ng/µl of each identified analyte or B(a)P in the sample extract (Cs) as follows:

Calculate the air volume from the periodic flow reading taken during sampling using the following equation:

V =Q x T

Where,

Q =Average flow rate of sampling m3/min

T = sampling time, in min.

V = total sample volume at ambient conditions in m3

Concentration of analyte i.e B(a)P:

The concentration of PAH compound or Benzo(a)pyrene in ng /m3 in the air sampled is given by:

C (ng /m3) = Cs * Ve / Vi *Vs

Where,

Cs : Concentration of Benzo (a) pyrene in ng / µl in the sample extract recorded by GC.

Ve : Final volume of extract in µl (i.e 1000)

Vi : Injection Volume (i.e 1µl)

Vs : Volume of air sample in m3

4.0 Results

4.1 Ambient Air Quality

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: FEBRUARY 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP
Sampling Date	23.02.2019
Report Date	06.03.2019
Report No	HECS/AA/001/260219

CONSOLIDATED TEST RESULTS: FEBRUARY 2019

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	26
PM_{10} ($\mu g/m^3$)	100*	60
SO_2 ($\mu g/m^3$)	80*	16
NO_2 ($\mu g/m^3$)	80*	19
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: *: 24 hours average; **: 8 hours average; *: Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo -α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: FEBRUARY 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	WTP
Sampling Date	26.02.2019
Report Date	09.03.2019
Report No	HECS/AA/001/260219

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	27
PM_{10} ($\mu g/m^3$)	100*	58
SO_2 ($\mu g/m^3$)	80*	16
NO_2 ($\mu g/m^3$)	80*	21
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: * 24 hours average; ** : 8 hours average; * : Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
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BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo - α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

5. MONITORING SCHEDULE OF MANGALORE SEZ LIMITED ENVIRONMENTAL MONITORING

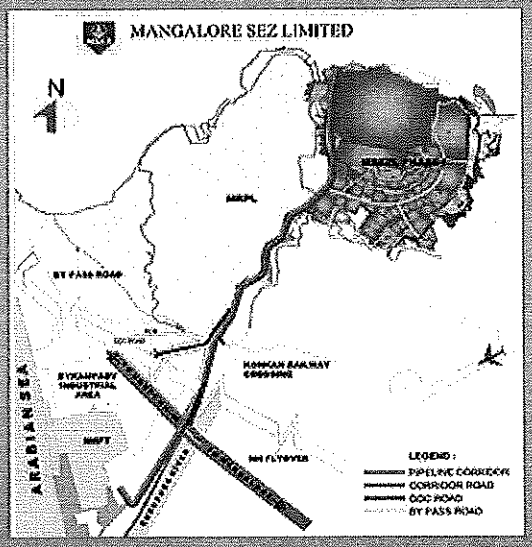
Sl.No	Environmental Attributes monitored	Parameters analyzed and presented in analysis Report	Monitoring requirement
1	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, O_3, NH_3, Pb, As, Ni, Benzene, B(α)P	Two Locations/Month, 24 hrs/day
2	Surface/ Ground Water Quality	Colour, pH (at 25 °C), Odour, Taste, Turbidity, Total Dissolved Solids, Alkalinity as $CaCO_3$, Total Hardness, Calcium as Ca, Magnesium as Mg, Iron as Fe, Sulphate as SO_4, Chloride as Cl, Boron as B, Residual free chlorine, Fluoride, Phenolic Compounds, Carbon monoxide, Manganese as Mn, Zinc as Zn, Arsenic as As, Cyanide as CN, Cadmium as Cd, Chromium as Cr, Aluminium as Al, Selenium as Se, Lead as Pb, Mercury as Hg, Nitrate Nitrogen NO_3, *E.Coli*	Ten Locations, Seasons (Summer, Winter, Post monsoon), By using Grab Sampling technique
3	Ambient Noise Level	Noise Level (db) in Day and Night	Two Locations, Seasons (Summer, Winter, Post monsoon), Fortnightly interval

Mangalore SEZ Limited

ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY
REPORT FOR THE MONTH OF JANUARY 2019

Submitted to



Submitted By

M/s Hubert Enviro Care Systems Private Limited
(NABL Accredited & MOEF Recognized Laboratory)
7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka - 575011
Email: krom@hecs.in; kro@hecs.in

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AMBIENT AIR QUALITY MONITORING REPORT - JANUARY 2019

1. INTRODUCTION

Mangalore Special Economic Zone, known as MSEZ is spread across 1638 acres, located 15 km from Mangalore city, off Cochin-Mumbai NH 66, 5 km from Mangalore International Airport and 8 km from all-weather deep draft sea port, New Mangalore Port in Mangalore, Karnataka, India. MSEZ limited is jointly promoted by Oil and Natural Gas Corporation (ONGC), a fortune 500 company & infrastructure leasing & finance services, one of India's leading infrastructure development and finance companies, Karnataka Industrial Area Development Board (KIADB) and Kanara Chamber of Commerce and Industry (KCCI). A unique combination of Government entities, a large financial institution and an apex chamber brings in the expertise to develop MSEZL with world-class industrial infrastructure.

2. ENVIRONMENTAL MONITORING

Environmental monitoring is being carried out at Mangalore SEZ, following guidelines and regulations of MoEF/CPCB and KSPCB statutory norms. In this regard, MSEZL has awarded the work to M/s Hubert EnviroCare Systems Pvt Ltd. and to monitor air quality, water quality & noise level for the three years. As per work order, during January 2019, we have conducted ambient air quality monitoring at 2 locations, namely CETP and WTP area.

3. SCOPE AND METHODOLOGY

The scope of work carried out and methodology adopted for the survey are described below:

3.1. Ambient Air Quality

Ambient air quality monitoring was carried out at each location on 24 hour basis on two consecutive days per month. The identified monitoring stations are: A_1-CETP & A_2-WTP Area. To assess the ambient air quality status, monitoring stations are identified on the basis of meteorology in the upwind and downwind direction as well as to represent the cross sectional scenario of the MSEZ. Based on the activities the parameters chosen for assessment of air quality are $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2-Nitrogen-di-oxide; CO-Carbon Mono Oxide (DL 0.1 mg/m^3); O_3-Ozone (DL 10 µg/m^3); NH_3-Ammonia (DL 5 µg/m^3); Pb-Lead (DL 0.05 µg/m^3); As-Arsenic (DL 0.1 ng/m^3); Ni- (DL 0.5 ng/m^3); Benzene-(DL 1 µg/m^3); B(α)P- Benzo-α-pyrene (DL0.1 ng/m^3) as per CPCB stipulation.

3.1.1. Sampling and analysis of $PM_{2.5}$ and PM_{10} in ambient air (Gravimetric Method)

i. Condition a filter paper in oven (i.e. 10 or 2.5 µm diameter)
ii. Prepare a sampling assembly by uncorking screws of the bracket
iii. Take a tare (initial) weight of the filter paper (w_i *mg*)
iv. Place the filter in the sampling system securely and tighten the screws of the bracket
v. Set the timer for the period of sampling
vi. Start the sampler and adjust flow rate to about 2L/ min for 24 hrs sampling
vii. Note the flow rate at the end of the desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions
ix. Condition the filter paper again for the same period as was done prior to sampling.

Laboratory analysis:

Weighing of exposed samples:

i. Take final weight of the exposed filter with a standard balance (*wf, mg*)

Calculations:

i. Average flow rate (initial and final flow rates) in L/ min
   = (Initial flow rate + final flow rate)/ 2
ii. Total vol. of air sampled (TVA) in m^3
   = Avg. flow rate (*L/min*) * 10^{-3} (m^3/L) * sampling time (*hr*) * 60 (*min/hr*)
iii. Concentration of SPM in $\mu g/m^3$
   = $(w_f - w_i)$ *(mg)*/ TVA (m^3) * 10^6 $\mu g/m^3$

3.1.2. Sampling and analysis of Sulphur dioxide

i. Prepare absorbing reagent (sodium tetra-chloromecurate) by dissolving 27.2 g mercuric chloride and 11.7 g sodium chloride in 1 lit of water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for 24 hours sampling)
v. To eliminate interference of traces metals, if any ,1 drop of 0.01% EDTA solution to be added to the reagent prior to sampling ;similarly, effect of oxide of nitrogen also be eliminated by adding 1 ml of 0.06% sulphamic acid to the reagent at site
vi. Start the sampler and adjust flow rate to 2 lit/ min.
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of SO_2 concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (μgSO_2) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
iii. $\mu gSO_2/TVA$

3.1.3. Sampling and analysis of Nitrogen-di-oxide

i. Prepare absorbing reagent (a solution of sodium hydroxide and arsenite) by dissolving 4 g sodium hydroxide and 1 g of sodium arsenite in 1 lit of distilled water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried .
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for hours sampling)
v. To eliminate interference of sulphur dioxide, drop of hydrogen peroxide could be added to the reagents to convert sulphur dioxide into sulphate during analysis
vi. Start the sampler and adjust flow rate to about 0.2 lit/ min for 24 hours sampling
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of NO_x concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µg NO_x) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
µgNO_x/TVA

3.1.4. Sampling and analysis of Carbon Mono Oxide

Preparation of sample train:

i. Sampling begins with conditioning a sampling train and then gas analyzer
ii. Pressure system is preferred to condition the sampling train by installing pump before the analyzer. Reducing valve needs to be fitted between the analyser and pump to eliminate the pulsing effect of pump on the analyzer
iii. Flow meter is to be installed just before the analyzer
iv. A fibre filter is used to capture the particulate matter prior to the optical cell to prevent its interference. As it often accumulates on the optical cell reducing the efficiency
v. To eliminate the interference of water vapour, refrigeration or desiccant with magnesium perchlorate could be used

Mode of operation:

i. Continuous analysis is carried out at the flow rate of about 100 ml/min to 1000 ml/min (depending upon the level of pollution near the location) for the desired sampling period
ii. Discrete sampling is also possible with infra red analyzer. It however requires proper cleaning of the sampling train.

Steps:

i. Calibration of analyzer can be carried out if required using standard gases
ii. Sampler is allowed to warm up for some time before actual readings are taken till the sampler gives steady response and temperature stability

3.1.5. Sampling and analysis of Ozone

Dynamic calibration:

i. Dynamic calibration could be performed by preparing a large mixture of ozone in air
ii. The output of an ozonizer is fed into the intake of a small blower delivering air. The mixture of gas however emerges through a short length of pipe
iii. One portion of this mixture is analyzed in the recorder.
iv. Another portion is analyzed through a faintly blue iodine solution containing starch and potassium iodide.
v. Titrated this solution with sodium thiosulphate(0.1N)
vi. The end point established by comparison with the blue starch- iodine solution
vii. Mixture of ozone and air in polyester film bag could be prepared and admitted to the analyzer.
viii. The mixture is analyzed at the time it is used since the ozone decomposes gradually
ix. Analysis is then performed by passing a measured volume through an impinge containing buffered KI solution and determined the released iodine by spectrometer method
x. Make the second mixture about midscale concentration and adjust sample or reagent flow rates until the recorder reading agrees with the absorbance scale according to the analytically determined concentration of ozone
xi. Check several other points on the curve if desired and liner or logarithmic chart to be prepared followed by a calibration curve to read in ppm

Laboratory analysis:

Calibration curve:

i. Plot graph of absorbance v/s concentration

Procedure:

i. Place a fresh absorbent solution in the storage bottle and operate the solution pump until the liquid are full
ii. After the flow has stabilized itself, zero the recorder and start the air pump
iii. Set the flow at convenient rates such as 4 ml/ min of solution and 4 l/min of air
iv. Check and adjust the flow rates daily.
v. Adjust the pH of the solution once or twice a week ,at time the solution shall be brought up to volume by addition of distilled water
vi. Change the carbon filter about once a month. Also change the absorbing solution at the same time

3.1.6. Sampling and analysis of Ammonia:

Ammonia is collected in dilute Sulphuric acid solution in midget impingers to form Ammonium Sulphate. The solution is treated with Nesselers reagent to produce a yellow brown complex. The Ammonia concentration is determined by reading the absorption of the complex at 440 nm and comparing with a standard curve.

3.1.7. Sampling and analysis of Lead, Nickel, Arsenic:

1. Sampling procedure:

Tilt back the inlet and secure it according to manufacturer's instructions. Loosen the face-plate wing-nuts and remove the face plate. Remove the filter from its jacket and centre it on the support screen with the rough side of the filter facing upwards. Replace the face-plate and tighten the wing-nuts to secure the rubber gasket against the filter edge. Gently lower the inlet. For automatically flow-controlled units, record the designated flow rate on the data sheet. Record the reading of the elapsed time meter. The specified length of sampling is commonly 8 hours or 24 hours. During this period, several reading (hourly) of flow rate should be taken. After the required time of sampling, record the flow meter reading and take out the filter media from the sampler and put in a container or envelope

2. Analysis:

i. Hot plate procedure:

Cut a 1" x 8" strip or half the filter from the 8" x 10" filter using a stainless steel pizza cutter. Place the filter in a beaker using vinyl gloves or plastic forceps. Cover the filter with the extraction solution (3% HNO_3 & 8% HCl). Place beaker on the hotplate, contained in a fume hood, and reflux gently while covered with a watch glass for 30 min. Do not allow sample to dry. Remove the beakers from the hot-plate and allow to cool. Rinse the beaker walls and wash with distilled water. Add approximately 10 mL reagent water to the remaining filter material in the beaker and allow to stand for at least 30 min. Transfer the extraction fluid in the beaker to a 100 mL volumetric flask or other graduated vessel. Rinse the beaker and any remaining solid material with distilled water and add the rinses to the flask. Dilute to the mark with distilled water (Type I) water and shake. The final extraction solution concentration is 3 % HNO3/8% HCl. The filtered sample is now ready for analysis

2.1. Analysis of samples:

i. Instrument / Equipment:

A light beam containing the corresponding wavelength of the energy required to raise the atoms of the analyte from the ground state to the excited state is directed through the flame or furnace. This wavelength is observed by a monochromator and a detector that measure the amount of light absorbed by the element, hence the number of atoms in the ground state in the flame or furnace. A hollow cathode lamp for the element being determined provides a source of that metal's particular absorption wavelength. The method describes both flame atomic absorption (FAA) spectroscopy and graphite furnace atomic absorption (GFAA) spectroscopy. Atomic Absorption Spectrophotometer - analyze the metals by Flame, if results are below detection limit then go for GTA. Arsenic is analyzed by Flame – VGA.

ii. Flame Procedure:

Set the atomic absorption spectrophotometer for the standard condition as follows: choose the correct hollow cathode lamp, align the instrument, position the monochromator at the value recommended by the manufacturer, select the proper monochromator slit width, set the light source current, ignite the flame, regulate the flow of fuel and oxidant, adjust the burner for maximum absorption and stability and balance the meter. Run a series of standards of the metal of interest and construct a calibration curve. Aspirate the blanks and samples. Dilute samples that exceed the calibration range. For Lead (Pb) and Nickel (Ni), the wavelength required for analysis is 217nm and 232nm respectively. Where as in case of Arsenic (As), the VGA should attach with Flame and the wavelength required for analysis is 193.7nm.

3. Calibration:

Prepare standard solutions from the stock solutions. Select at least three standards to cover linear range as recommended by method. Aspirate the standards into the flame or inject the standards into the furnace and record the absorbance. Prepare the calibration graph by plotting absorbance and concentration in µg/ml.

i. Preparation of Standards:

For each metal that is to be determined, standards of known concentration must be acquired commercially certified standards.

ii. Standard Curve:

Standard curve is prepared by using standard solutions of known concentration.

4. Calculations:

i. Sample Air Volume:

Sample air volume can be calculated by using the following equation:

$V = (Q)\ (t)$

Where,

V = volume of air, m^3

Q = average sampling rate, m3/min.

t = time in minutes.

ii. Metal Concentration:

$C = (Ms - Mb) \times Vs \times Fa/V \times Ft$

Where,

C = concentration, µg metal/m^3

Ms = metal concentration µg/mL

Mb = blank concentration µg/mL

Vs = total volume of extraction in mL

Fa = total area of exposed filter in cm^2

V = Volume of air sampled in m^3

Ft = Area of filter taken for digestion in cm^2

3.1.8. Sampling and analysis of Benzo-α-pyrene:

Benzo (a) Pyrene (BaP) is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo (a) Pyrene in the particulate phase. The molecular formula of B(a)P is C_2OH_{12} having molecular weight 252.

It is based on BIS method IS 5182 (Part 12):2004 and USEPA method (TO-13). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary gas chromatograph equipped with flame ionization detector. It is a high volume ($1.2m^3$/min) sampling method capable of detecting sub.ng/m3 concentration of PAH in 24 hours sample (i.e. collected in 3 shifts of 8 hour each with 480 m3 sampling volume of air).

i. Sampling:

i. Instrument/Filter Selection:

24 hr. sampling using PM_{10} high volume sampler with 8 hourly samples using EPM-2000 glass fibre or equivalent filter

ii. Sample Processing

a. Extraction:

Filter papers (half of all the filters papers collected in a day) are cut into strips using scissors and transfer to 250 ml beaker. Add ~50 ml. of Toluene (GC/HPLC grade). These samples are extracted with toluene using ultra sonic sample can be extracted using soxhlet bath for about 30 minutes. Repeat the procedure twice (50ml x 2 times) for complete extraction. Alternatively, extraction apparatus for about 8 hr. with Toluene and repeat it twice.

b. Filtration:

Filter the extracted samples with Whatman filter paper No. 41 containing 2 gm of Anhydrous Sodium Sulphate (to remove moisture).

c. Concentration:

After filtration, the filtrate is concentrated using Rotary vacuum evaporator to 2ml final volume.

d. Clean-up with silica Gel:

To clean up the impurities, pass 2 ml of concentrated sample through silica gel column (pre conditioned, 60-80 mesh, and 200-250mm×10 mm with Teflon stopcock). After cleaning add 5ml cyclohexane and collect the elute in 25 ml beaker. Repeat the process for at least 3 times and collect it in the same beaker. Alternatively Solid Phase Extraction (SPE) could be used for clean up the impurities of sample.

e. Re-concentration with rotary vacuum evaporator:

The Cleaned up extract/filtrate (approximately 17 ml) is further concentrated using rotary evaporator and it is evaporated to nearly dryness with Nitrogen.

f. Final Sample volume:

The dried sample is re-dissolved in 1ml of toluene and transfer into 4 or 5 ml amber vials final analysis.

ii. Calculations:

Calculate the concentration in ng/µl of each identified analyte or B(a)P in the sample extract (Cs) as follows:

Calculate the air volume from the periodic flow reading taken during sampling using the following equation:

V =Q x T

Where,

Q =Average flow rate of sampling m3/min

T = sampling time, in min.

V = total sample volume at ambient conditions in m3

Concentration of analyte i.e B(a)P:

The concentration of PAH compound or Benzo(a)pyrene in ng /m3 in the air sampled is given by:

C (ng /m3) = Cs * Ve / Vi *Vs

Where,

Cs : Concentration of Benzo (a) pyrene in ng / µl in the sample extract recorded by GC.

Ve : Final volume of extract in µl (i.e 1000)

Vi : Injection Volume (i.e 1µl)

Vs : Volume of air sample in m3

4.0 Results

4.1 Ambient Air Quality

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: JANUARY 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP
Sampling Date	30.01.2019
Report Date	09.02.2019
Report No	HECS/AA/001/090219

CONSOLIDATED TEST RESULTS: JANUARY 2019

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	25
PM_{10} ($\mu g/m^3$)	100*	58
SO_2 ($\mu g/m^3$)	80*	14
NO_2 ($\mu g/m^3$)	80*	18
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: *: 24 hours average; **: 8 hours average; ***: Annual average

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo - α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: JANUARY 2019

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	WTP
Sampling Date	31.01.2019
Report Date	09.02.2019
Report No	HECS/AA/001/090219

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	26
PM_{10} ($\mu g/m^3$)	100*	56
SO_2 ($\mu g/m^3$)	80*	15
NO_2 ($\mu g/m^3$)	80*	19
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: * 24 hours average; ** : 8 hours average; * : Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
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CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
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HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

5. MONITORING SCHEDULE OF MANGALORE SEZ LIMITED
ENVIRONMENTAL MONITORING

Sl.No	Environmental Attributes monitored	Parameters analyzed and presented in analysis Report	Monitoring requirement
1	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, O_3, NH_3, Pb, As, Ni, Benzene, B(α)P	Two Locations/Month, 24 hrs/day
2	Surface/ Ground Water Quality	Colour, pH (at 25 °C), Odour, Taste, Turbidity, Total Dissolved Solids, Alkalinity as $CaCO_3$, Total Hardness, Calcium as Ca, Magnesium as Mg, Iron as Fe, Sulphate as SO_4, Chloride as Cl, Boron as B, Residual free chlorine, Fluoride, Phenolic Compounds, Carbon monoxide, Manganese as Mn, Zinc as Zn, Arsenic as As, Cyanide as CN, Cadmium as Cd, Chromium as Cr, Aluminium as Al, Selenium as Se, Lead as Pb, Mercury as Hg, Nitrate Nitrogen NO_3, *E.Coli*	Ten Locations, Seasons (Summer, Winter, Post monsoon), By using Grab Sampling technique
3	Ambient Noise Level	Noise Level (db) in Day and Night	Two Locations, Seasons (Summer, Winter, Post monsoon), Fortnightly interval

National Accreditation Board for Testing and Calibration Laboratories
(A Constituent Board of Quality Council of India)

CERTIFICATE OF ACCREDITATION

HUBERT ENVIRO CARE SYSTEMS PRIVATE LIMITED

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka

in the field of

TESTING

Certificate Number TC-7920 *(in lieu of T-3180)*

Issue Date 31/10/2018 **Valid Until** 30/10/2020

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL

8907697010003000 2021

Anil Relia
Chief Executive Officer

National Accreditation Board for Testing and Calibration Laboratories
(A Constituent Board of Quality Council of India)

CERTIFICATE OF ACCREDITATION

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

has been assessed and accredited in accordance with the standard

ISO/IEC 17025:2005

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at

No. 18, 92nd Street, Ashok Nagar, Chennai, Tamil Nadu

in the field of

TESTING

Certificate Number TC-5786 *(in lieu of T-0985 & T-2528)*

Issue Date 30/04/2017 **Valid Until** 29/04/2019

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.

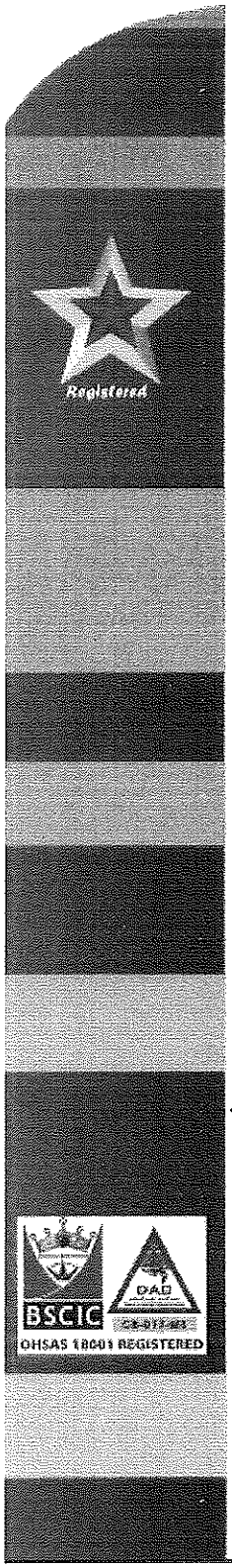
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Signed for and on behalf of NABL

N. Venkateswaran
Program Director

8907697010003000043

Anil Relia
Chief Executive Officer



BSCIC

BSCIC

CERTIFICATE OF REGISTRATION

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM

This is to certify that:

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

LOCATION-I: # 18, 92ND STREET, ASHOK NAGAR
CHENNAI – 600 083, TAMIL NADU, INDIA
LOCATION-II: # C-45 INDUSTRIAL ESTATE, BAIKAMPADI
MANGALORE – 575 011, KARNATAKA, INDIA

Hereby granted the certificate number : **BN7480/6888:0713**

Subsequent to the **Re-Assessment** conducted on **06-Jul-2016** and the organization has been found to be operating a Occupational Health & Safety Management System which complies with the requirements of

OHSAS 18001:2007

For the following scope:

Provision of Environmental Management Consultancy, Turnkey Environmental Management Projects, Operation and Maintenance of ETP/STP/WTP and Other Environmental Installations, Laboratory Testing Covering Chemical/ Microbiological/ Environmental Fields and Allied Activities

Originally Registered: **13-Jul-2013** Latest issue: **13-Jul-2016** Expiry Date: **12-Jul-2019**

For BSCIC CERTIFICATIONS PVT.LTD.

Page 1 of 1

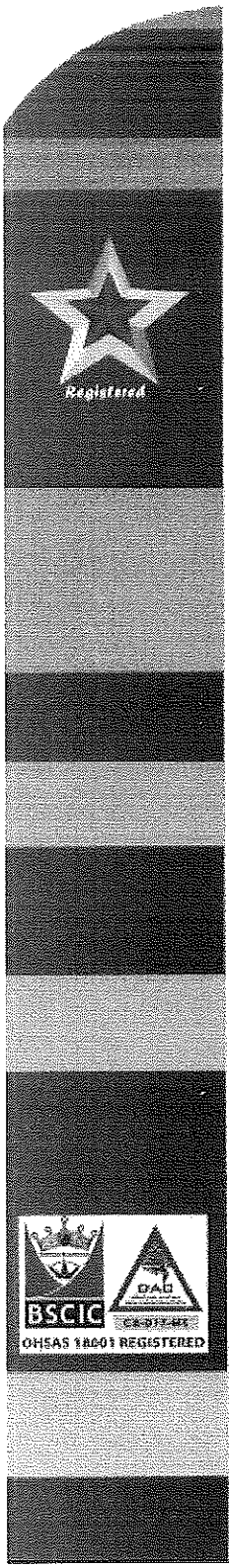
Sanjay Seth
Managing Director

Validity of this Certificate is subject to Annual Surveillance Audits to be done Successfully on or before 06-Jul-2017 and 06-Jul-2018 resp.

(In case if Surveillance Audit is not allowed to be conducted; this Certificate shall be Suspended/Withdrawn).

Please Re-validate this certificate's status at http://bscic.com/admincontrol/certificatestatus.php or www.bsc-icc.com at REGISTRATION STATUS.
This Certificate of Registration is granted subject to relevant provisions of the BSCIC Certifications Pvt. Ltd. Contract Terms & Scheme for Registration Form B 018 (Latest version). Please see B 018 at our website www.bsc-icc.com
The certificate of Registration remains the property of BSCIC Certifications Pvt. Ltd. and shall be returned immediately upon request.
BSCIC Headquarters: 22nd Floor, SCO 150, Sector - 21 C, Faridabad 121001 Haryana, India.

BSCIC CB-077-04
OHSAS 18001 REGISTERED



BSCIC

BSCIC

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The certificate of registration remains the property of BSCIC Certifications Pvt. Ltd. and shall be returned immediately upon request.
BSCIC Headquarters: 2nd Floor, SCO 150, Sector - 21 C, Faridabad 121001 Haryana, India.

CERTIFICATE

QUALITY MANAGEMENT SYSTEM

kfq® Korean Foundation for Quality

Hubert Enviro Care Systems (P) Ltd.

- HO : #18, 92nd Street, Ashok Nagar, Chennai, Tamilnadu, India (Zip code : 600083)
- Mangalore site : #C-45 Industrial Estate, Baikampadi, Mangalore, Karnataka, India (Zip code : 575011)

Registration Date	2018-09-17
Expiration Date	2021-09-16
Initial Registration Date	2018-09-17
Revision Date	2018-09-17
Certificate Number	AC-07045

Korean Foundation for Quality certifies that
The Quality Management System of
the above organization has been audited and
has complied with the requirements of
the following standard

Standard

ISO 9001:2015/KS Q ISO 9001:2015

Scope of certification

PROVISION OF ENVIRONMENTAL MANAGEMENT CONSULTANCY,TURNKEY ENVIRONMENTAL MANAGEMENT PROJECTS, OPERATION AND MAINTENANCE OF ETP / STP / WTP AND OTHER ENVIRONMENTAL INSTALLATION LABORATORY TESTING COVERING CHEMICAL / MICROBIOLOGICAL / ENVIRONMENTAL / FOOD AND AGRI PRODUCTS / WATER / CONSUMER PRODUCTS AND ALLIED ACTIVITIES

▸ PERMITTED EXEMPTION [8.3 DESIGN & DEVELOPMENT OF PRODUCTS AND SERVICES]

IQNet

KAB [KAB-QC-01]

IAF

KFQ has been accredited in respect of ISO 9001 covered by the KAB(Accreditation Certificate Number KAB-QC-01)

Dae Hyeon Nam
President & CEO of KFQ

www.kfq.or.kr
13F, Woolim Lion's Valley Bldg.B,168,Gasan digital 1-ro,Geumcheon-gu,Seoul,08507,Korea

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

KFQ has issued an IQNet recognized certificate that the organization:

Hubert Enviro Care Systems (P) Ltd.

- **HO : #18, 92nd Street, Ashok Nagar, Chennai, Tamilnadu, India (Zip code : 600083)**
- **Mangalore site : #C-45 Industrial Estate, Baikampadi, Mangalore, Karnataka, India (Zip code : 575011)**

for the following scope

PROVISION OF ENVIRONMENTAL MANAGEMENT CONSULTANCY,TURNKEY ENVIRONMENTAL MANAGEMENT PROJECTS, OPERATION AND MAINTENANCE OF ETP / STP / WTP AND OTHER ENVIRONMENTAL INSTALLATION
LABORATORY TESTING COVERING CHEMICAL / MICROBIOLOGICAL / ENVIRONMENTAL / FOOD AND AGRI PRODUCTS / WATER / CONSUMER PRODUCTS AND ALLIED ACTIVITIES

has implemented and maintains a
Environmental Management System
which fulfils the requirements of the following standard
ISO 14001:2015
Issued on : 2018-09-20
First Issued on : 2018-09-20
For the validity date, please refer to the original certificate issued by KFQ*
Registration Number : KR - 07043

Alex Stoichitoiu
President of IQNet

Dae Hyeoun Nam
President & CEO of KFQ

IQNet Partners*:
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CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany FCAV Brazil
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IRAM Argentina JQA Japan KFQ Korea MIRTEC Greece MSZT Hungary Nemko AS Norway NSAI Ireland
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IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

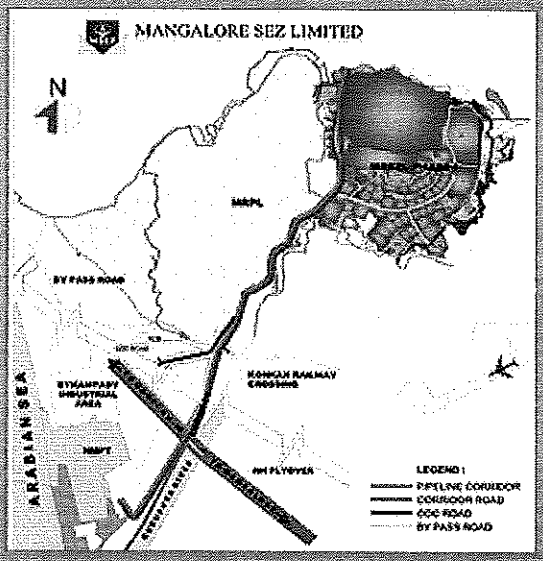
* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

Mangalore SEZ Limited

ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY, WATER QUALITY AND NOISE LEVEL MONITORING REPORT FOR THE MONTH OF DECEMBER 2018

Submitted to



Submitted By

M/s Hubert Enviro Care Systems Private Limited
(NABL Accredited & MOEF&CC Recognized Laboratory)
7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka - 575011
Email: krom@hecs.in; kro@hecs.in

INDEX

AMBIENT AIR, WATER QUALITY AND NOISE MONITORING REPORT - DECEMBER 2018

1. INTRODUCTION

Mangalore Special Economic Zone, known as MSEZ is spread across 1638 acres, located 15 km from Mangalore city, off Cochin-Mumbai NH 66, 5 km from Mangalore International Airport and 8 km from all-weather deep draft sea port, New Mangalore Port in Mangalore, Karnataka, India. MSEZ limited is jointly promoted by Oil and Natural Gas Corporation (ONGC), a fortune 500 company & infrastructure leasing & finance services, one of India's leading infrastructure development and finance companies, Karnataka Industrial Area Development Board (KIADB) and Kanara Chamber of Commerce and Industry (KCCI). A unique combination of Government entities, a large financial institution and an apex chamber brings in the expertise to develop MSEZL with world-class industrial infrastructure.

2. ENVIRONMENT MONITORING

Environmental monitoring is being carried out at Mangalore SEZ, following guidelines and regulations of MoEF/CPCB and KSPCB statutory norms. In this regard, MSEZL has awarded the work to M/s Hubert EnviroCare Systems Pvt Ltd. and to monitor air quality, water quality & noise level for the three years. As per work order, during December 2018, we have conducted ambient air quality, ground water quality and noise level monitoring at 2, 10 and 2 locations respectively.

3. SCOPE AND METHODOLOGY

The scope of work carried out and methodology adopted for the survey are described below:

3.1. Ambient Air Quality

Ambient air quality monitoring was carried out at each location on 24 hour basis on two consecutive days per month. The identified monitoring stations are: A_1-CETP & A_2-WTP Area. To assess the ambient air quality status, monitoring stations are identified on the basis of meteorology in the upwind and downwind direction as well as to represent the cross sectional scenario of the MSEZ. Based on the activities the parameters chosen for assessment of air quality are $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2-Nitrogen-di-oxide; CO-Carbon Mono Oxide (DL 0.1 mg/m^3); O_3-Ozone (DL 10 µg/m^3); NH_3-Ammonia (DL 5 µg/m^3); Pb-Lead (DL 0.05 µg/m^3); As-Arsenic (DL 0.1 ng/m^3); Ni- (DL 0.5 ng/m^3); Benzene-(DL 1 µg/m^3); B(α)P- Benzo-α-pyrene (DL0.1 ng/m^3) as per CPCB stipulation.

3.1.1. Sampling and analysis of $PM_{2.5}$ and PM_{10} in ambient air (Gravimetric Method)

i. Condition a filter paper in oven (i.e. 10 or 2.5 µm diameter)
ii. Prepare a sampling assembly by uncorking screws of the bracket
iii. Take a tare (initial) weight of the filter paper (w_i, *mg*)
iv. Place the filter in the sampling system securely and tighten the screws of the bracket
v. Set the timer for the period of sampling
vi. Start the sampler and adjust flow rate to about 2L/ min for 24 hrs sampling
vii. Note the flow rate at the end of the desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions
ix. Condition the filter paper again for the same period as was done prior to sampling.

Laboratory analysis:

Weighing of exposed samples:

i. Take final weight of the exposed filter with a standard balance (*wf, mg*)

Calculations:

i. Average flow rate (initial and final flow rates) in L/ min
= (Initial flow rate + final flow rate)/ 2
ii. Total vol. of air sampled (TVA) in m^3
= Avg. flow rate (*L/min*) * 10^{-3} (m^3/*L*) * sampling time (*hr*) * 60 (*min/hr*)
iii. Concentration of SPM in $\mu g/m^3$
= $(w_f\text{-}w_i)$ *(mg)*/ TVA $(m^3) * 10^6$ $\mu g/m^3$

3.1.2. Sampling and analysis of Sulphur dioxide

i. Prepare absorbing reagent (sodium tetra-chloromecurate) by dissolving 27.2 g mercuric chloride and 11.7 g sodium chloride in 1 lit of water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for 24 hours sampling)
v. To eliminate interference of traces metals, if any ,1 drop of 0.01% EDTA solution could be added to the reagent prior to sampling ;similarly, effect of oxide of nitrogen could also be eliminated by adding 1 ml of 0.06% sulphamic acid to the reagent at site
vi. Start the sampler and adjust flow rate to 2 lit/ min.
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of SO_2 concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µgSO_2) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
iii. *µgSO_2/TVA*

3.1.3. Sampling and analysis of Nitrogen-di-oxide

i. Prepare absorbing reagent (a solution of sodium hydroxide and arsenite) by dissolving 4 g sodium hydroxide and 1 g of sodium arsenite in 1 lit of distilled water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for hours sampling)
v. To eliminate interference of sulphur dioxide , drop of hydrogen peroxide to be added to the reagents to convert sulphur dioxide into sulphate during analysis
vi. Start the sampler and adjust flow rate to about 0.2 lit/ min for 24 hours sampling
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of NO_x concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µg NO_x) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
$\mu gNO_x/TVA$

3.1.4. Sampling and analysis of Carbon Mono Oxide

Preparation of sample train:

i. Sampling begins with conditioning a sampling train and then gas analyzer
ii. Pressure system is preferred to condition the sampling train by installing pump before the analyzer. Reducing valve needs to be fitted between the analyser and pump to eliminate the pulsing effect of pump on the analyzer
iii. Flow meter is to be installed just before the analyzer
iv. A fibre filter is used to capture the particulate matter prior to the optical cell to prevent its interference. As it often accumulates on the optical cell reducing the efficiency
v. To eliminate the interference of water vapour ,refrigeration or desiccant with magnesium perchlorate DECEMBER be used

Mode of operation:

i. Continuous analysis is carried out at the flow rate of about 100 ml/min to 1000 ml/min (depending upon the level of pollution near the location) for the desired sampling period
ii. Discrete sampling DECEMBER also be possible with infra red analyzer. It however requires proper cleaning of the sampling train.

Steps:

i. Calibration of analyzer can be carried out if required using standard gases
ii. Sampler is allowed to warm up for some time before actual readings are taken till the sampler gives steady response and temperature stability

3.1.5. Sampling and analysis of Ozone

Dynamic calibration:

i. Dynamic calibration be performed by preparing a large mixture of ozone in air
ii. The output of an ozonizer is fed into the intake of a small blower delivering air. The mixture of gas however emerges through a short length of pipe
iii. One portion of this mixture is analyzed in the recorder.
iv. Another portion is analyzed through a faintly blue iodine solution containing starch and potassium iodide.
v. Titrated this solution with sodium thiosulphate(0.1N)
vi. The end point established by comparison with the blue starch- iodine solution
vii. Mixture of ozone and air in polyester film bag to be prepared and admitted to the analyzer.
viii. The mixture is analyzed at the time it is used since the ozone decomposes gradually
ix. Analysis is then performed by passing a measured volume through an impinge containing buffered KI solution and determined the released iodine by spectrometer method
x. Make the second mixture about midscale concentration and adjust sample or reagent flow rates until the recorder reading agrees with the absorbance scale according to the analytically determined concentration of ozone
xi. Check several other points on the curve if desired and liner or logarithmic chart to be prepared followed by a calibration curve to read in ppm

Laboratory analysis:

Calibration curve:

i. Plot graph of absorbance v/s concentration

Procedure:

i. Place a fresh absorbent solution in the storage bottle and operate the solution pump until the liquid are full
ii. After the flow has stabilized itself, zero the recorder and start the air pump
iii. Set the flow at convenient rates such as 4 ml/ min of solution and 4 l/min of air
iv. Check and adjust the flow rates daily.
v. Adjust the pH of the solution once or twice a week ,at time the solution shall be brought up to volume by addition of distilled water
vi. Change the carbon filter about once a month. Also change the absorbing solution at the same time

3.1.6. Sampling and analysis of Ammonia:

Ammonia is collected in dilute Sulphuric acid solution in midget impingers to form Ammonium Sulphate. The solution is treated with Nesselers reagent to produce a yellow brown complex. The Ammonia concentration is determined by reading the absorption of the complex at 440 nm and comparing with a standard curve.

3.1.7. Sampling and analysis of Lead, Nickel, Arsenic:

1. Sampling procedure:

Tilt back the inlet and secure it according to manufacturer's instructions. Loosen the face-plate wing-nuts and remove the face plate. Remove the filter from its jacket and centre it on the support screen with the rough side of the filter facing upwards. Replace the face-plate and tighten the wing-nuts to secure the rubber gasket against the filter edge. Gently lower the inlet. For automatically flow-controlled units, record the designated flow rate on the data sheet. Record the reading of the elapsed time meter. The specified length of sampling is commonly 8 hours or 24 hours. During this period, several reading (hourly) of flow rate should be taken. After the required time of sampling, record the flow meter reading and take out the filter media from the sampler and put in a container or envelope

2. Analysis:

i. Hot plate procedure:

Cut a 1" x 8" strip or half the filter from the 8" x 10" filter using a stainless steel pizza cutter. Place the filter in a beaker using vinyl gloves or plastic forceps. Cover the filter with the extraction solution (3% HNO_3 & 8% HCl). Place beaker on the hotplate, contained in a fume hood, and reflux gently while covered with a watch glass for 30 min. Do not allow sample to dry. Remove the beakers from the hot-plate and allow to cool. Rinse the beaker walls and wash with distilled water. Add approximately 10 mL reagent water to the remaining filter material in the beaker and allow to stand for at least 30 min. Transfer the extraction fluid in the beaker to a 100 mL volumetric flask or other graduated vessel. Rinse the beaker and any remaining solid material with distilled water and add the rinses to the flask. Dilute to the mark with distilled water (Type I) water and shake. The final extraction solution concentration is 3 % HNO3/8% HCl. The filtered sample is now ready for analysis

2.1. Analysis of samples:

i. Instrument / Equipment:

A light beam containing the corresponding wavelength of the energy required to raise the atoms of the analyte from the ground state to the excited state is directed through the flame or furnace. This wavelength is observed by a monochromator and a detector that measure the amount of light absorbed by the element, hence the number of atoms in the ground state in the flame or furnace. A hollow cathode lamp for the element being determined provides a source of that metal's particular absorption wavelength. The method describes both flame atomic absorption (FAA) spectroscopy and graphite furnace atomic absorption (GFAA) spectroscopy. Atomic Absorption Spectrophotometer - analyze the metals by Flame; if results are below detection limit then go for GTA. Arsenic is analyzed by Flame – VGA.

ii. Flame Procedure:

Set the atomic absorption spectrophotometer for the standard condition as follows: choose the correct hollow cathode lamp, align the instrument, position the monochromator at the value recommended by the manufacturer, select the proper monochromator slit width, set the light source current, ignite the flame, regulate the flow of fuel and oxidant, adjust the burner for maximum absorption and stability and balance the meter. Run a series of standards of the metal of interest and construct a calibration curve. Aspirate the blanks and samples. Dilute samples that exceed the calibration range. For Lead (Pb) and Nickel (Ni), the wavelength required for analysis is 217nm and 232nm respectively. Where as in case of Arsenic (As), the VGA should attach with Flame and the wavelength required for analysis is 193.7nm.

3. Calibration:

Prepare standard solutions from the stock solutions. Select at least three standards to cover linear range as recommended by method. Aspirate the standards into the flame or inject the standards into the furnace and record the absorbance. Prepare the calibration graph by plotting absorbance and concentration in µg/ml.

i. Preparation of Standards:

For each metal that is to be determined, standards of known concentration must be acquired commercially certified standards.

ii. Standard Curve:

Standard curve is prepared by using standard solutions of known concentration.

4. Calculations:

i. Sample Air Volume:

Sample air volume can be calculated by using the following equation:

$V = (Q) (t)$

Where,

V = volume of air, m^3

Q = average sampling rate, m3/min.

t = time in minutes.

ii. Metal Concentration:

$C = (Ms – Mb) \times Vs \times Fa/V \times Ft$

Where,

C = concentration, µg metal/m^3

Ms = metal concentration µg/mL

Mb = blank concentration µg/mL

Vs = total volume of extraction in mL

Fa = total area of exposed filter in cm^2

V = Volume of air sampled in m^3

Ft = Area of filter taken for digestion in cm^2

3.1.8. Sampling and analysis of Benzo-α-pyrene:

Benzo (a) Pyrene (BaP) is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo (a) Pyrene in the particulate phase. The molecular formula of B(a)P is C_20H_{12} having molecular weight 252.

It is based on BIS method IS 5182 (Part 12):2004 and USEPA method (TO-13). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary gas chromatograph equipped with flame ionization detector. It is a high volume (1.2m3/min) sampling method capable of detecting sub.ng/m3 concentration of PAH in 24 hours sample (i.e. collected in 3 shifts of 8 hour each with 480 m3 sampling volume of air).

i. Sampling:

i. Instrument/Filter Selection:

24 hr. sampling using PM_{10} high volume sampler with 8 hourly samples using EPM-2000 glass fibre or equivalent filter

ii. Sample Processing

a. Extraction:

Filter papers (half of all the filters papers collected in a day) are cut into strips using scissors and transfer to 250 ml beaker. Add ~50 ml. of Toluene (GC/HPLC grade). These samples are extracted with toluene using ultra sonic sample can be extracted using Soxhlet bath for about 30 minutes. Repeat the procedure twice (50ml x 2 times) for complete extraction. Alternatively, extraction apparatus for about 8 hr. with Toluene and repeat it twice.

b. Filtration:

Filter the extracted samples with Whatman filter paper No. 41 containing 2 gm of Anhydrous Sodium Sulphate (to remove moisture).

c. Concentration:

After filtration, the filtrate is concentrated using Rotary vacuum evaporator to 2ml final volume.

d. Clean-up with silica Gel:

To clean up the impurities, pass 2 ml of concentrated sample through silica gel column (pre conditioned, 60-80 mesh, and 200-250mm×10 mm with Teflon stopcock). After cleaning add 5ml cyclohexane and collect the elute in 25 ml beaker. Repeat the process for at least 3 times and collect it in the same beaker. Alternatively Solid Phase Extraction (SPE) could be used for clean up the impurities of sample.

e. Re-concentration with rotary vacuum evaporator:

The Cleaned up extract/filtrate (approximately 17 ml) is further concentrated using rotary evaporator and it is evaporated to nearly dryness with Nitrogen.

f. Final Sample volume:

The dried sample is re-dissolved in 1ml of toluene and transfer into 4 or 5 ml amber vials final analysis.

ii. Calculations:

Calculate the concentration in ng/µL of each identified analyte or B(a)P in the sample extract (Cs) as follows:

Calculate the air volume from the periodic flow reading taken during sampling using the following equation:

$V = Q \times T$

Where,

Q =Average flow rate of sampling m3/min

T = sampling time, in min.

V = total sample volume at ambient conditions in m3

Concentration of analyte i.e B(a)P:

The concentration of PAH compound or Benzo(a)pyrene in ng /m3 in the air sampled is given by:

$C\ (ng/m3) = Cs * Ve / Vi * Vs$

Where,

Cs : Concentration of Benzo (a) pyrene in ng / µl in the sample extract recorded by GC.

Ve : Final volume of extract in µl (i.e 1000)

Vi : Injection Volume (i.e 1µl)

Vs : Volume of air sample in m3

3.2 Noise Levels

In general, noise is sound which is composed of many frequency components of various loudness distributed over the audible frequency range. Various noise scales have been introduced to describe, in a single number, the response of an average human to a complex sound made up of various frequencies at different loudness levels. The most common and universally accepted scale is the A weighted scale which is measured as decibel (dB). This is more suitable for audible range of 20 to 20000 HZ and has been designed to weigh various components of noise according to the response of human ear.

The impact of noise can be undertaken by taking in to consideration various factors like potential damage to hearing. Physiological responses, annoyance and general community responses, which have several effects, like Noise Induced Hearing Loss (NIHL). Noise generating sources are identified based on the activities like vehicle movement & associated construction activities. Accordingly, about 2 locations were identified to assess the noise levels The identified locations are:

N_1-CETP and **N_2-WTP**

Noise measurements were carried out using Lutron SL 4001 model. The sound level meter used was in accordance with IS: 9779 and IEC 651 standards for noise survey. Instrument calibration was done in NABL accredited.

Noise measurements were undertaken at all locations, with duration of 10 minutes per hour (as per Order one minute per hour) continuously for 24 hours in a day for two days in a week for four weeks in the month. The day noise levels were monitored during 6 am to 10 pm and night levels during 10 pm to 6 am at all locations.

For noise levels measured over a given period of time interval, it is possible to describe important features of noise using statistical quantities. This is calculated using the percent of the time certain noise levels are exceeded during the time interval. The notation for the statistical quantities of noise levels are:
L10 is the noise level exceeded 10 percent of the time,
L50 is the noise level exceeded 50 percent of the time and
L90 is the noise level exceeded 90 percent of the time.
Leq is the Equivalent sound pressure level, which is equivalent to the same sound energy as the actual fluctuating sound.

This is necessary because sound from noise source often fluctuates widely during a given period of time. Leq is calculated from the following equation:
$Leq\ (hrly) = L50 + [(L10-L90)^2/60]$

The noise rating developed for community noise from all sources is the Day-Night sound Level (Ldn). It is similar to a 24 hrs, equivalent sound level except that during night time period a 10 dB(A) weighting penalty is added to the instantaneous sound level before computing the 24 hourly average. This nighttime penalty is added to account for the fact that noise during night when people usually sleep is judged as more annoying than the same noise during the daytime.

The Ldn for a given location in a community is calculated from the hourly Leq values by the following equation: $Ldn= 10 \log (1/24\ (16[10^{Ld/10}]+[10^{Ln-10/10}]))$
Where Ld is the equivalent sound level during the day time (6 am to 10 pm) and Ln is the equivalent Sound level during the night time (10 pm to 6 am).

Ambient Noise standards have been notified by the Ministry of environment and Forests vide Gazette notification dated 18th April, 2009 based on the 'A' weighted equivalent noise level (Leq). The standards are given in the Annexure.

Noise measurements were made at 1.5 m above the ground level and a suitable distance from the corridor. The basic Unit of measurements was taken in the fast mode and was sampled to yield statistical information's such as Leq (equivalent noise level), L 10 and L9, those exceeded for 10 and 90 percent of the time respectively. The noise level L10 can be considered as long term noise L90 can be considered as the background noise.

Calibration: The monitoring and analytical instruments are being calibrated by ETDC periodically. The correction factors, if any, are being used in computation of the data.

3.3 Water Quality

Any adverse impact or pollution water will have serious effect on the environment. Hence, it becomes important to monitor the water quality periodically in the port project area. The samples were analysed as per IS: 3025 and compared to the specifications of IS: 10500 norms. The locations identified for collection of samples were

W_1-Oddidakal (GW)
W_2-Shantigudde (GW)
W_3-Chandrahas Nagar (GW)
W_4- Permude (GW)
W_5- CETP (GW)
W_6- Non Processing Area (GW)
W_7- Permude Bajpe Village Bandary (GW)
W_8- Kalavar (GW)
W_9- 10 mL water Reservoir (GW)
W_{10}- Permude Surface Water

4.0 Results

4.1 Ambient Air Quality

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: DECEMBER 2018

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP
Sampling Date	12.12.2018
Report Date	07.01.2019
Report No	HECS/AA/001/070119

CONSOLIDATED TEST RESULTS: DECEMBER 2018

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	28
PM_{10} ($\mu g/m^3$)	100*	57
SO_2 ($\mu g/m^3$)	80*	15
NO_2 ($\mu g/m^3$)	80*	19
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: *: 24 hours average; **: 8 hours average; ***: Annual average

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo -α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)

Authorized Signatory

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: DECEMBER 2018

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	WTP
Sampling Date	12.12.2018
Report Date	07.01.2019
Report No	HECS/AA/002/070119

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	30
PM_{10} ($\mu g/m^3$)	100*	59
SO_2 ($\mu g/m^3$)	80*	17
NO_2 ($\mu g/m^3$)	80*	20
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: * 24 hours average; ** : 8 hours average; * : Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3- Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo - α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

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4.2 Noise level:

TEST REPORT: NOISE MONITORING: DECEMBER 2018

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP & WTP areas
Sampling Date	10-11.12.2018 & 11-12.12.2018
Report Date	07.01.2019
Report No.	HECS/N/001-004/070119

Time (Hrs)	CETP AREA (10-11.12.2018)	WTP AREA (11-12.12.2018)
06.00	50.6	50.1
07.00	50.0	51.3
08.00	50.4	51.7
09.00	51.4	53.2
10.00	53.5	54.5
11.00	54.7	54.8
12.00	55.3	57.4
13.00	56.8	58.3
14.00	57.1	57.8
15.00	58.3	58.0
16.00	59.9	56.7
17.00	58.7	57.4
18.00	57.8	57.2
19.00	56.6	57.7
20.00	56.3	58.0
21.00	55.8	57.3
22.00	55.5	56.8
23.00	55.1	56.2
00.00	55.0	54.8
01.00	54.1	54.0
02.00	51.4	52.9
03.00	49.7	52.5
04.00	44.8	45.5
05.00	43.6	47.8
MIN	**43.6**	**45.5**
MAX	**59.9**	**58.3**
Day dB(A)	**55.22**	**55.78**
Night dB(A)	**50.53**	**51.96**

Limits: Industrial Area: Day Time-75 dB (A), Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Monitoring Date represents 24 hours from 6:00 am to 6:00am next day. Legend: Leq- Equivalent Noise Level (hourly); Ld-Day Time Equivalent Noise Level (06:00-22:00 hrs); Ln-Night Time Equivalent Noise Level (22:00-06:00 hrs); and Ldn-24 hourly Equivalent Noise Level. Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

CONCLUSION: All the parameters meet MoEF Standards

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT: NOISE MONITORING: DECEMBER 2018

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP & WTP areas
Sampling Date	26-27.12.2018 & 27-28.12.2018
Report Date	07.01.2019
Report No.	HECS/N/001-002/070119

Time (Hrs)	CETP AREA (26-27.12.2018)	WTP AREA (27-28.12.2018)
06.00	50.9	51.2
07.00	49.7	50.4
08.00	50.1	51.3
09.00	50.9	51.9
10.00	52.6	53.3
11.00	53.8	55.2
12.00	54.6	55.6
13.00	55.7	56.5
14.00	55.8	57.1
15.00	56.3	57.7
16.00	57.2	56.9
17.00	58.1	58.3
18.00	58.4	57.6
19.00	57.8	56.2
20.00	56.5	56.2
21.00	57.3	56.9
22.00	54.7	57.0
23.00	54.5	55.5
00.00	54.7	54.1
01.00	54.3	54.3
02.00	52.8	51.9
03.00	51.5	52.2
04.00	50.6	49.7
05.00	49.6	51.4
MIN	**49.6**	**49.7**
MAX	**58.4**	**58.3**
Day dB(A)	**54.73**	**55.25**
Night dB(A)	**52.57**	**52.73**

Limits: Industrial Area: Day Time-75 dB (A), Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Monitoring Date represents 24 hours from 6:00 am to 6:00am next day. Legend: Leq- Equivalent Noise Level (hourly); Ld-Day Time Equivalent Noise Level (06:00-22:00 hrs); Ln-Night Time Equivalent Noise Level (22:00-06:00 hrs); and Ldn-24 hourly Equivalent Noise Level. Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

CONCLUSION: All the parameters meet MoEF Standards

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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4.3 Water Analysis Results

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Oddidakal (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/001/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.80	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	250	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	210.0	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	65.28	200	600
9.	Total Hardness	mg/L	159.08	200	600
10.	Calcium as Ca	mg/L	40.43	75	200
11.	Magnesium as Mg	mg/L	14.14	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	25.03	200	400
14.	Chloride as Cl	mg/L	4.89	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.15	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.73	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Shantigudde (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/002/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	8.22	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	260	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	220.0	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	72.0	200	600
9.	Total Hardness	mg/L	213.4	200	600
10.	Calcium as Ca	mg/L	50.54	75	200
11.	Magnesium as Mg	mg/L	21.21	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	26.12	200	400
14.	Chloride as Cl	mg/L	7.34	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.25	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	1.3	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Chandrahas Nagar (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/003/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.27	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	114	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	97	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	21.12	200	600
9.	Total Hardness	mg/L	50.44	200	600
10.	Calcium as Ca	mg/L	15.55	75	200
11.	Magnesium as Mg	mg/L	2.82	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	BDL(DL 5)	200	400
14.	Chloride as Cl	mg/L	9.57	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.17	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	1.9	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Permude (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/004/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.03	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	81	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	69	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	19.2	200	600
9.	Total Hardness	mg/L	38.8	200	600
10.	Calcium as Ca	mg/L	9.33	75	200
11.	Magnesium as Mg	mg/L	3.77	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	BDL(DL 5)	200	400
14.	Chloride as Cl	mg/L	5.87	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.23	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.61	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	CETP (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/005/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	6.81	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	79	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	67	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	11.52	200	600
9.	Total Hardness	mg/L	38.8	200	600
10.	Calcium as Ca	mg/L	9.33	75	200
11.	Magnesium as Mg	mg/L	3.77	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	9.33	200	400
14.	Chloride as Cl	mg/L	4.89	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.48	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.3	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Non Processing Area(GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/006/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.83	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	300	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	260	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	62.4	200	600
9.	Total Hardness	mg/L	203.7	200	600
10.	Calcium as Ca	mg/L	42.77	75	200
11.	Magnesium as Mg	mg/L	23.57	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	15.70	200	400
14.	Chloride as Cl	mg/L	24.46	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.15	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.20	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Permude Bajpe Village Boundary (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/007/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	6.85	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	110	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	94	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	19.2	200	600
9.	Total Hardness	mg/L	42.68	200	600
10.	Calcium as Ca	mg/L	13.99	75	200
11.	Magnesium as Mg	mg/L	1.89	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	BDL(DL 5)	200	400
14.	Chloride as Cl	mg/L	9.79	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.22	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.19	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Kalavar (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/008/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	6.80	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	116	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL (DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	99	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	19.2	200	600
9.	Total Hardness	mg/L	38.8	200	600
10.	Calcium as Ca	mg/L	13.99	75	200
11.	Magnesium as Mg	mg/L	0.94	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	BDL(DL 5)	200	400
14.	Chloride as Cl	mg/L	11.74	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.17	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.13	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	10 mL water Reservoir (GW)
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/009/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	7.51	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	310	Nil	Nil
4.	Odour	-	Unobjectionable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL(DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	360	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	60.4	200	600
9.	Total Hardness	mg/L	272.1	200	600
10.	Calcium as Ca	mg/L	97.3	75	200
11.	Magnesium as Mg	mg/L	10.8	30	100
12.	Iron as Fe	mg/L	0.11	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	20.4	200	400
14.	Chloride as Cl	mg/L	4.6	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.16	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	0.12	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

TEST REPORT

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Permude Surface Water
Date of Sampling	23.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	07.01.2019
Report No	HECS/W/010/070119

Sl.No.	Parameters monitored	Units	Results	As per IS 10500:2012 standard limit	
				Acceptable (max)	Permissible (max)
1.	Colour	Hazen	Colourless	5	15
2.	pH (at 25 °C)	-	6.97	6.5-8.5	No Relaxation
3.	Electrical Conductivity	µS/cm	140	Nil	Nil
4.	Odour	-	Agreeable	Agreeable	
5.	Taste	-	Agreeable	Agreeable	
6.	Turbidity	NTU	BDL(DL 0.1)	1	5
7.	Total Dissolved Solids	mg/L	119	500	2000
8.	Alkalinity as $CaCO_3$	mg/L	19.2	200	600
9.	Total Hardness	mg/L	62.08	200	600
10.	Calcium as Ca	mg/L	17.11	75	200
11.	Magnesium as Mg	mg/L	4.71	30	100
12.	Iron as Fe	mg/L	BDL(DL 0.02)	0.3	No Relaxation
13.	Sulphate as SO_4	mg/L	BDL(DL 5)	200	400
14.	Chloride as Cl	mg/L	16.63	250	1000
15.	Boron as B	mg/L	BDL(DL 0.1)	0.5	1.0
16.	Residual free chlorine	mg/L	BDL (DL 0.1)	0.2	1
17.	Fluoride	mg/L	0.11	1.0	1.5
18.	Phenolic Compounds	mg/L	BDL(DL 0.001)	0.001	0.002
19.	Manganese as Mn	mg/L	BDL(DL 0.01)	0.1	0.3
20.	Zinc as Zn	mg/L	BDL(DL 0.01)	5	15
21.	Arsenic as As	mg/L	BDL(DL 0.005)	0.01	0.05
22.	Cyanide as CN	mg/L	BDL (DL 0.01)	0.05	No Relaxation
23.	Cadmium as Cd	mg/L	BDL(DL 0.01)	0.003	No Relaxation
24.	Chromium as Cr	mg/L	BDL(DL 0.01)	0.05	No Relaxation
25.	Aluminium	mg/L	BDL(DL 0.02)	0.03	0.2
26.	Selenium as Se	mg/L	BDL(DL 0.005)	0.01	No Relaxation
27.	Lead as Pb	mg/L	BDL(DL 0.01)	0.01	No Relaxation
28.	Mercury as Hg	mg/L	BDL(DL 0.001)	0.001	No Relaxation
29.	Nitrate Nitrogen NO_3	mg/L	BDL (DL 0.1)	45	No Relaxation
30.	*E.Coli*	MPN/100mL	Nil	Shall not be detectable in any 100 mL sample	

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory

5. MONITORING SCHEDULE OF MANGALORE SEZ LIMITED
ENVIRONMENTAL MONITORING

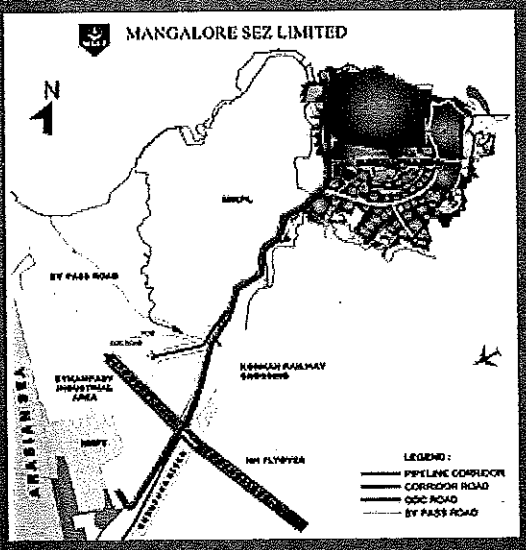
Sl.No	Environmental Attributes monitored	Parameters analyzed and presented in analysis Report	Monitoring requirement
1	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, O_3, NH_3, Pb, As, Ni, Benzene, B(α)P	Two Locations/Month, 24 hrs/day
2	Surface/ Ground Water Quality	Colour, pH (at 25 °C), Odour, Taste, Turbidity, Total Dissolved Solids, Alkalinity as $CaCO_3$, Total Hardness, Calcium as Ca, Magnesium as Mg, Iron as Fe, Sulphate as SO_4, Chloride as Cl, Boron as B, Residual free chlorine, Fluoride, Phenolic Compounds, Carbon monoxide, Manganese as Mn, Zinc as Zn, Arsenic as As, Cyanide as CN, Cadmium as Cd, Chromium as Cr, Aluminium as Al, Selenium as Se, Lead as Pb, Mercury as Hg, Nitrate Nitrogen NO_3, *E.Coli*	Ten Locations, Seasons (Summer, Winter, Post monsoon), By using Grab Sampling technique
3	Ambient Noise Level	Noise Level (db) in Day and Night	Two Locations, Seasons (Summer, Winter, Post monsoon), Fortnightly interval

Mangalore SEZ Limited

ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY
REPORT FOR THE MONTH OF NOVEMBER 2018

Submitted to



Submitted By

M/s Hubert Enviro Care Systems Private Limited
(NABL Accredited & MOEF Recognized Laboratory)
7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka - 575011
Email: krom@hecs.in; kro@hecs.in

HUBERT ENVIRO CARE SYSTEMS (P) LTD

(An associate of Hubert Stavoren B.V., Holland)

HECS-MSEZ/001-12/2018

24th December 2018
Baikampady, Mangalore

To

Mr Vinaya Kumar
Senior Engineer
Mangalore SEZ Limited
3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore - 575 006.

Sub: Submission of **November 2018** Environmental Monitoring Report - Reg.
WO No.: MSEZL/1252/17-18 dt. 27 July 2017

Sir,

Please find enclosed herewith 2 copies of Environmental monitoring report of MSEZ Ltd., for the months of **November 2018**. This report consists detailed monthly data on ambient air quality.

It may kindly note that the AAQ levels of the MSEZ Ltd., are well within those stipulated by MoEFCC/ CPCB and KSPCB.

Thanking you,

Yours Sincerely,

For HUBERT ENVIRO CARE SYSTEMS (P) LTD.,

24.12.18

Dr K GANESAN
Lab Manager - Environment

Enc: *As above*

HUBERT ENVIRO CARE SYSTEMS (P) LTD

HUBERT ENVIRO CARE SYSTEMS (P) LTD
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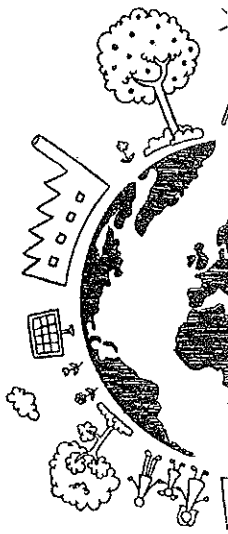
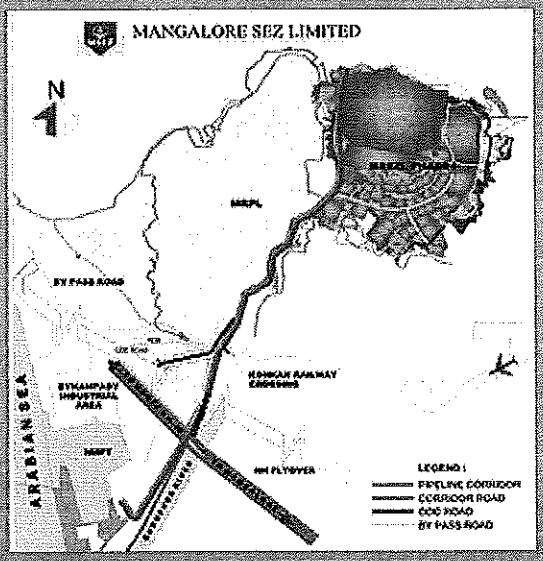


Mangalore SEZ Limited

ENVIRONMENTAL MONITORING REPORT

AMBIENT AIR QUALITY
REPORT FOR THE MONTH OF NOVEMBER 2018

Submitted to



Submitted By

M/s Hubert Enviro Care Systems Private Limited
(NABL Accredited & MOEF Recognized Laboratory)
7/C-45, Baikampady Industrial Estate, Mangaluru, Karnataka - 575011
Email: krom@hecs.in; kro@hecs.in

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AMBIENT AIR QUALITY MONITORING REPORT - NOVEMBER 2018

1. INTRODUCTION

Mangalore Special Economic Zone, known as MSEZ is spread across 1638 acres, located 15 km from Mangalore city, off Cochin-Mumbai NH 66, 5 km from Mangalore International Airport and 8 km from all-weather deep draft sea port, New Mangalore Port in Mangalore, Karnataka, India. MSEZ limited is jointly promoted by Oil and Natural Gas Corporation (ONGC), a fortune 500 company & infrastructure leasing & finance services, one of India's leading infrastructure development and finance companies, Karnataka Industrial Area Development Board (KIADB) and Kanara Chamber of Commerce and Industry (KCCI). A unique combination of Government entities, a large financial institution and an apex chamber brings in the expertise to develop MSEZL with world-class industrial infrastructure.

2. ENVIRONMENTAL MONITORING

Environmental monitoring is being carried out at Mangalore SEZ, following guidelines and regulations of MoEF/CPCB and KSPCB statutory norms. In this regard, MSEZL has awarded the work to M/s Hubert EnviroCare Systems Pvt Ltd. and to monitor air quality, water quality & noise level for the three years. As per work order, during November 2018, we have conducted ambient air quality, ground water quality and noise level monitoring at 2, 9 and 2 locations respectively.

3. SCOPE AND METHODOLOGY

The scope of work carried out and methodology adopted for the survey are described below:

3.1. Ambient Air Quality

Ambient air quality monitoring was carried out at each location on 24 hour basis on two consecutive days per month. The identified monitoring stations are: A_1-CETP & A_2-WTP Area. To assess the ambient air quality status, monitoring stations are identified on the basis of meteorology in the upwind and downwind direction as well as to represent the cross sectional scenario of the MSEZ. Based on the activities the parameters chosen for assessment of air quality are $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2-Nitrogen-di-oxide; CO-Carbon Mono Oxide (DL 0.1 mg/m^3); O_3-Ozone (DL 10 µg/m^3); NH_3-Ammonia (DL 5 µg/m^3); Pb-Lead (DL 0.05 µg/m^3); As-Arsenic (DL 0.1 ng/m^3); Ni- (DL 0.5 ng/m^3); Benzene-(DL 1 µg/m^3); B(α)P- Benzo-α-pyrene (DL0.1 ng/m^3) as per CPCB stipulation.

3.1.1. Sampling and analysis of $PM_{2.5}$ and PM_{10} in ambient air (Gravimetric Method)

i. Condition a filter paper in oven (i.e. 10 or 2.5 µm diameter)
ii. Prepare a sampling assembly by uncorking screws of the bracket
iii. Take a tare (initial) weight of the filter paper (w_i, *mg*)
iv. Place the filter in the sampling system securely and tighten the screws of the bracket
v. Set the timer for the period of sampling
vi. Start the sampler and adjust flow rate to about 2L/ min for 24 hrs sampling
vii. Note the flow rate at the end of the desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions
ix. Condition the filter paper again for the same period as was done prior to sampling.

Laboratory analysis:

Weighing of exposed samples:

i. Take final weight of the exposed filter with a standard balance (*wf, mg*)

Calculations:

i. Average flow rate (initial and final flow rates) in L/ min
   = (Initial flow rate + final flow rate)/ 2
ii. Total vol. of air sampled (TVA) in m^3
   = Avg. flow rate (*L/min*) * 10^{-3} (m^3/*L*) * sampling time (*hr*) * 60 (*min/hr*)
iii. Concentration of SPM in $\mu g/m^3$
   = $(w_f\text{-}w_i)$ *(mg)*/ TVA (m^3) * 10^6 $\mu g/m^3$

3.1.2. Sampling and analysis of Sulphur dioxide

i. Prepare absorbing reagent (sodium tetra-chloromecurate) by dissolving 27.2 g mercuric chloride and 11.7 g sodium chloride in 1 lit of water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried.
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for 24 hours sampling)
v. To eliminate interference of traces metals, if any ,1 drop of 0.01% EDTA solution to be added to the reagent prior to sampling ;similarly, effect of oxide of nitrogen also be eliminated by adding 1 ml of 0.06% sulphamic acid to the reagent at site
vi. Start the sampler and adjust flow rate to 2 lit/ min.
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of SO_2 concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (μgSO_2) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3
= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)
iii. $\mu gSO_2/TVA$

3.1.3. Sampling and analysis of Nitrogen-di-oxide

i. Prepare absorbing reagent (a solution of sodium hydroxide and arsenite) by dissolving 4 g sodium hydroxide and 1 g of sodium arsenite in 1 lit of distilled water
ii. Prepare a sampling train of at least 2 gas bubblers (for average reading) properly washed with distilled water and air dried .
iii. Place bubblers in the sampling system securely connecting to the manifold. Check the connections of bubblers with the manifold and the inlet and outlet
iv. Fill the bubblers with an absorbing reagent with an amount sufficient to last for 24 hours (approximately 15 ml for 8 hours sampling to 50 ml for hours sampling)
v. To eliminate interference of sulphur dioxide , drop of hydrogen peroxide NOVEMBER be added to the reagents to convert sulphur dioxide into sulphate during analysis
vi. Start the sampler and adjust flow rate to about 0.2 lit/ min for 24 hours sampling
vii. Note the flow rate at the end of desired sampling period and stop the sampler
viii. Transit the sampling train to environmental laboratory carefully with scientific precautions and preserve the sample tubes in a controlled environmental conditions

Laboratory analysis:

Calibration curve:

i. Prepare a standard solution of NO_x concentrations ranging from 0 to 25 µg SO_2 by taking definite amount of std. sulphur dioxide solution in a 25 ml volumetric flasks
ii. Add 14 ml of absorbing reagent and 1 ml of pararosaniline hydrochloride to each of the flasks making a total volume of 20 ml.
iii. Measure absorbance for each flasks by spectrophotometer at 540 nm wavelength
iv. Plot graph of absorbance v/s concentration

Absorbance in samples:

i. Transfer samples to a 25 ml flask and develop colour as done in calibration curve
ii. Measure absorbance at 540 nm
iii. Find out the concentration (µg NO_x) corresponding to the measured absorbance from the calibration curve

Calculations:

i. Average flow rate (if there is a significant difference in initial and final flow rates)
ii. Total volume of air sampled (TVA) in m^3

= Avg. flow rate (*lit*) * 10^{-3} (m^3/*lit*) * sampling time (*hr*) * 60 (*min/hr*)

µgNO_x/TVA

3.1.4. Sampling and analysis of Carbon Mono Oxide

Preparation of sample train:

i. Sampling begins with conditioning a sampling train and then gas analyzer
ii. Pressure system is preferred to condition the sampling train by installing pump before the analyzer. Reducing valve needs to be fitted between the analyser and pump to eliminate the pulsing effect of pump on the analyzer
iii. Flow meter is to be installed just before the analyzer
iv. A fibre filter is used to capture the particulate matter prior to the optical cell to prevent its interference. As it often accumulates on the optical cell reducing the efficiency
v. To eliminate the interference of water vapour ,refrigeration or desiccant with magnesium perchlorate NOVEMBER be used

Mode of operation:

i. Continuous analysis is carried out at the flow rate of about 100 ml/min to 1000 ml/min (depending upon the level of pollution near the location) for the desired sampling period
ii. Discrete sampling is also be possible with infra red analyzer. It however requires proper cleaning of the sampling train.

Steps:

i. Calibration of analyzer can be carried out if required using standard gases
ii. Sampler is allowed to warm up for some time before actual readings are taken till the sampler gives steady response and temperature stability

3.1.5. Sampling and analysis of Ozone

Dynamic calibration:

i. Dynamic calibration November be performed by preparing a large mixture of ozone in air
ii. The output of an ozonizer is fed into the intake of a small blower delivering air. The mixture of gas however emerges through a short length of pipe
iii. One portion of this mixture is analyzed in the recorder.
iv. Another portion is analyzed through a faintly blue iodine solution containing starch and potassium iodide.
v. Titrated this solution with sodium thiosulphate(0.1N)
vi. The end point established by comparison with the blue starch- iodine solution
vii. Mixture of ozone and air in polyester film bag NOVEMBER be prepared and admitted to the analyzer.
viii. The mixture is analyzed at the time it is used since the ozone decomposes gradually
ix. Analysis is then performed by passing a measured volume through an impinge containing buffered KI solution and determined the released iodine by spectrometer method
x. Make the second mixture about midscale concentration and adjust sample or reagent flow rates until the recorder reading agrees with the absorbance scale according to the analytically determined concentration of ozone
xi. Check several other points on the curve if desired and liner or logarithmic chart to be prepared followed by a calibration curve to read in ppm

Laboratory analysis:

Calibration curve:

i. Plot graph of absorbance v/s concentration

Procedure:

i. Place a fresh absorbent solution in the storage bottle and operate the solution pump until the liquid are full
ii. After the flow has stabilized itself, zero the recorder and start the air pump
iii. Set the flow at convenient rates such as 4 ml/ min of solution and 4 l/min of air
iv. Check and adjust the flow rates daily.
v. Adjust the pH of the solution once or twice a week ,at time the solution shall be brought up to volume by addition of distilled water
vi. Change the carbon filter about once a month. Also change the absorbing solution at the same time

3.1.6. Sampling and analysis of Ammonia:

Ammonia is collected in dilute Sulphuric acid solution in midget impingers to form Ammonium Sulphate. The solution is treated with Nesselers reagent to produce a yellow brown complex. The Ammonia concentration is determined by reading the absorption of the complex at 440 nm and comparing with a standard curve.

3.1.7. Sampling and analysis of Lead, Nickel, Arsenic:

1. Sampling procedure:

Tilt back the inlet and secure it according to manufacturer's instructions. Loosen the face-plate wing-nuts and remove the face plate. Remove the filter from its jacket and centre it on the support screen with the rough side of the filter facing upwards. Replace the face-plate and tighten the wing-nuts to secure the rubber gasket against the filter edge. Gently lower the inlet. For automatically flow-controlled units, record the designated flow rate on the data sheet. Record the reading of the elapsed time meter. The specified length of sampling is commonly 8 hours or 24 hours. During this period, several reading (hourly) of flow rate should be taken. After the required time of sampling, record the flow meter reading and take out the filter media from the sampler and put in a container or envelope

2. Analysis:

i. Hot plate procedure:

Cut a 1" x 8" strip or half the filter from the 8" x 10" filter using a stainless steel pizza cutter. Place the filter in a beaker using vinyl gloves or plastic forceps. Cover the filter with the extraction solution (3% HNO_3 & 8% HCl). Place beaker on the hotplate, contained in a fume hood, and reflux gently while covered with a watch glass for 30 min. Do not allow sample to dry. Remove the beakers from the hot-plate and allow to cool. Rinse the beaker walls and wash with distilled water. Add approximately 10 mL reagent water to the remaining filter material in the beaker and allow to stand for at least 30 min. Transfer the extraction fluid in the beaker to a 100 mL volumetric flask or other graduated vessel. Rinse the beaker and any remaining solid material with distilled water and add the rinses to the flask. Dilute to the mark with distilled water (Type I) water and shake. The final extraction solution concentration is 3 % HNO3/8% HCl. The filtered sample is now ready for analysis

2.1. Analysis of samples:

i. Instrument / Equipment:

A light beam containing the corresponding wavelength of the energy required to raise the atoms of the analyte from the ground state to the excited state is directed through the flame or furnace. This wavelength is observed by a monochromator and a detector that measure the amount of light absorbed by the element, hence the number of atoms in the ground state in the flame or furnace. A hollow cathode lamp for the element being determined provides a source of that metal's particular absorption wavelength. The method describes both flame atomic absorption (FAA) spectroscopy and graphite furnace atomic absorption (GFAA) spectroscopy. Atomic Absorption Spectrophotometer - analyze the metals by Flame, if results are below detection limit then go for GTA. Arsenic is analyzed by Flame – VGA.

ii. Flame Procedure:

Set the atomic absorption spectrophotometer for the standard condition as follows: choose the correct hollow cathode lamp, align the instrument, position the monochromator at the value recommended by the manufacturer, select the proper monochromator slit width, set the light source current, ignite the flame, regulate the flow of fuel and oxidant, adjust the burner for maximum absorption and stability and balance the meter. Run a series of standards of the metal of interest and construct a calibration curve. Aspirate the blanks and samples. Dilute samples that exceed the calibration range. For Lead (Pb) and Nickel (Ni), the wavelength required for analysis is 217nm and 232nm respectively. Where as in case of Arsenic (As), the VGA should attach with Flame and the wavelength required for analysis is 193.7nm.

3. Calibration:

Prepare standard solutions from the stock solutions. Select at least three standards to cover linear range as recommended by method. Aspirate the standards into the flame or inject the standards into the furnace and record the absorbance. Prepare the calibration graph by plotting absorbance and concentration in µg/ml.

i. Preparation of Standards:

For each metal that is to be determined, standards of known concentration must be acquired commercially certified standards.

ii. Standard Curve:

Standard curve is prepared by using standard solutions of known concentration.

4. Calculations:

i. Sample Air Volume:

Sample air volume can be calculated by using the following equation:

$V = (Q)\ (t)$

Where,

V = volume of air, m^3

Q = average sampling rate, m3/min.

t = time in minutes.

ii. Metal Concentration:

$C = (Ms - Mb) \times Vs \times Fa/V \times Ft$

Where,

C = concentration, µg metal/m^3

Ms = metal concentration µg/mL

Mb = blank concentration µg/mL

Vs = total volume of extraction in mL

Fa = total area of exposed filter in cm^2

V = Volume of air sampled in m^3

Ft = Area of filter taken for digestion in cm^2

3.1.8. Sampling and analysis of Benzo-α-pyrene:

Benzo (a) Pyrene (BaP) is one of the most important constituent of PAH compounds and also one of the most potent carcinogens. This can be measured in both particulate phase and vapour phase. In the vapour phase the concentration of B(a)P is significantly less than the particulate phase. Therefore, more care to be taken for the measurement of Benzo (a) Pyrene in the particulate phase. The molecular formula of B(a)P is $C_2 0H_{12}$ having molecular weight 252.

It is based on BIS method IS 5182 (Part 12):2004 and USEPA method (TO-13). This method is designed to collect particulate phase PAHs in ambient air and fugitive emissions and to determine individual PAH compounds using capillary gas chromatograph equipped with flame ionization detector. It is a high volume (1.2m3/min) sampling method capable of detecting sub.ng/m3 concentration of PAH in 24 hours sample (i.e. collected in 3 shifts of 8 hour each with 480 m3 sampling volume of air).

i. Sampling:

i. Instrument/Filter Selection:

24 hr. sampling using PM_{10} high volume sampler with 8 hourly samples using EPM-2000 glass fibre or equivalent filter

ii. Sample Processing

a. Extraction:

Filter papers (half of all the filters papers collected in a day) are cut into strips using scissors and transfer to 250 ml beaker. Add ~50 ml. of Toluene (GC/HPLC grade). These samples are extracted with toluene using ultra sonic sample can be extracted using soxhlet bath for about 30 minutes. Repeat the procedure twice (50ml x 2 times) for complete extraction. Alternatively, extraction apparatus for about 8 hr. with Toluene and repeat it twice.

b. Filtration:

Filter the extracted samples with Whatman filter paper No. 41 containing 2 gm of Anhydrous Sodium Sulphate (to remove moisture).

c. Concentration:

After filtration, the filtrate is concentrated using Rotary vacuum evaporator to 2ml final volume.

d. Clean-up with silica Gel:

To clean up the impurities, pass 2 ml of concentrated sample through silica gel column (pre conditioned, 60-80 mesh, and 200-250mm×10 mm with Teflon stopcock). After cleaning add 5ml cyclohexane and collect the elute in 25 ml beaker. Repeat the process for at least 3 times and collect it in the same beaker. Alternatively Solid Phase Extraction (SPE) NOVEMBER be used for clean up the impurities of sample.

e. Re-concentration with rotary vacuum evaporator:

The Cleaned up extract/filtrate (approximately 17 ml) is further concentrated using rotary evaporator and it is evaporated to nearly dryness with Nitrogen.

f. Final Sample volume:

The dried sample is re-dissolved in 1ml of toluene and transfer into 4 or 5 ml amber vials final analysis.

ii. Calculations:

Calculate the concentration in ng/µl of each identified analyte or B(a)P in the sample extract (Cs) as follows:

Calculate the air volume from the periodic flow reading taken during sampling using the following equation:

V =Q x T

Where,

Q =Average flow rate of sampling m3/min

T = sampling time, in min.

V = total sample volume at ambient conditions in m3

Concentration of analyte i.e B(a)P:

The concentration of PAH compound or Benzo(a)pyrene in ng /m3 in the air sampled is given by:

C (ng /m3) = Cs * Ve / Vi *Vs

Where,

Cs : Concentration of Benzo (a) pyrene in ng / µl in the sample extract recorded by GC.

Ve : Final volume of extract in µl (i.e 1000)

Vi : Injection Volume (i.e 1µl)

Vs : Volume of air sample in m3

4.0 Results

4.1 Ambient Air Quality

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: NOVEMBER 2018

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	CETP
Sampling Date	12.11.2018
Report Date	08.12.2018
Report No	HECS/AA/001/131118

CONSOLIDATED TEST RESULTS: NOVEMBER 2018

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	23
PM_{10} ($\mu g/m^3$)	100*	54
SO_2 ($\mu g/m^3$)	80*	12
NO_2 ($\mu g/m^3$)	80*	16
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: *: 24 hours average; **: 8 hours average; ***: Annual average

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than10 Micron; SO_2 Sulphur dioxide; NO_2 – Nitrogen-di-oxide; CO - Carbon Mono Oxide(DL 0.1 mg/m^3); O_3-Ozone(DL 10 $\mu g/m^3$); NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$); As-Arsenic (DL 0.1 ng/m^3); Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$); B(α)P- Benzo -α-pyrene (DL0.1 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

AMBIENT AIR QUALITY (AAQ) MONITORING TEST REPORT: NOVEMBER 2018

Name of the Industry	M/s. Mangalore SEZ Limited
Address of the Industry	3rd Floor, MUDA Building, Ashok Nagar, Urwa Stores, Mangalore- 575006
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	WTP
Sampling Date	12.11.2018
Report Date	08.12.2018
Report No	HECS/AA/002/131118

Parameter Monitored	NAAQ Standard, 2009	Results
$PM_{2.5}$ ($\mu g/m^3$)	60*	22
PM_{10} ($\mu g/m^3$)	100*	53
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NO_2 ($\mu g/m^3$)	80*	18
CO (mg/m^3)	2**	BDL
O_3 ($\mu g/m^3$)	100**	BDL
NH_3 ($\mu g/m^3$)	400*	BDL
Pb ($\mu g/m^3$)	1*	BDL
As (ng/m^3)	6***	BDL
Ni (ng/m^3)	20***	BDL
Benzene ($\mu g/m^3$)	5***	BDL
B(α)P (ng/m^3)	1***	BDL

Note: * 24 hours average; ** : 8 hours average; * : Annual average**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
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HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

5. MONITORING SCHEDULE OF MANGALORE SEZ LIMITED
ENVIRONMENTAL MONITORING

Sl.No	Environmental Attributes monitored	Parameters analyzed and presented in analysis Report	Monitoring requirement
1	Ambient Air Quality	$PM_{2.5}$, PM_{10}, SO_2, NO_2, CO, O_3, NH_3, Pb, As, Ni, Benzene, B(α)P	Two Locations/Month, 24 hrs/day
2	Surface/ Ground Water Quality	Colour, pH (at 25 °C), Odour, Taste, Turbidity, Total Dissolved Solids, Alkalinity as $CaCO_3$, Total Hardness, Calcium as Ca, Magnesium as Mg, Iron as Fe, Sulphate as SO_4, Chloride as Cl, Boron as B, Residual free chlorine, Fluoride, Phenolic Compounds, Carbon monoxide, Manganese as Mn, Zinc as Zn, Arsenic as As, Cyanide as CN, Cadmium as Cd, Chromium as Cr, Aluminium as Al, Selenium as Se, Lead as Pb, Mercury as Hg, Nitrate Nitrogen NO_3, *E.Coli*	Ten Locations, Seasons (Summer, Winter, Post monsoon), By using Grab Sampling technique
3	Ambient Noise Level	Noise Level (db) in Day and Night	Two Locations, Seasons (Summer, Winter, Post monsoon), Fortnightly interval

ओ एन जी सी मंगलूर पेट्रोकेमिकल्स लिमिटेड

(मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड की सहायक कंपनी)

ONGC Mangalore Petrochemicals Ltd.

(A Subsidiary of Mangalore Refinery & Petrochemicals Ltd.)

एमएसईज़ेड पेर्मुदे, मंगलूरु – ५७४ ५०९ MSEZ, Permude, Mangaluru - 574 509.

CIN : U40107KA2006GOI041258 दूरभाष Direct Line: 0824-2872000, फैक्स Fax: 0824-2872005. Website: www.ompl.co.in

Ref.: OMPL/MoEF/HRP/2019-20/

Date: 27.05.2019

To:

The Head- Technical
MSEZL, Mangalore

Mangalore SEZ Ltd. - 4083 -
Documents & Contents subject to verifi...
Received date: 31.5.2019
Received by : V. Prabhu

Dear Sir,

Sub: Submission of Half Yearly Compliance Reports of OMPL under Environmental Clearance for Phase-I, MSEZ project, (Including Aromatic Complex) for the period from October, 2018 to March, 2019

With reference to the above, please find enclosed herewith, Half Yearly Compliance Reports of OMPL, for compilation at your end and submission to the concerned Authority under intimation to our office.

Thanking You,

H R Prabhu
Chief Manager - Env

Vinay Kumar
for Narendra
31/5/19

Cc:- 1. **CEO, OMPL** for info.
2. **COO, OMPL** for info.

Compliance to Environmental Clearance

issued by MoEF vide letter No. 21-383/2007-IA-III dated 3rd April, 2008

Sl. No.	Consent Condition	Compliance
2	The Mangalore Special Economic Zone (MSEZ) Phase-I involves a) MRPL Phase -III Refinery b) Aromatic Complex and e) Olefin Complex are proposed to be developed by the anchor promoter of MSEZ I,e M/s ONGC-MRPL in the already acquired land of about 1800 acres. The proposed MSEZ is planned adjacent to the existing MRPL refinery complex on north & eastern sides and proposed to connect NMPT with a dedicated 70/100 meter wide road-cum-pipeline (total approx. 15 km long) corridor for movement of cargo, crude and products between New Mangalore Port and MSEZ. The proposed layout has one main entry from the proposed Mangalore MSEZ corridor connected to the existing New Mangalore Port & National Highway (NH-17). The primary, Secondary and Tertiary roads are planned to give access to the industries falling in the MSEZ Phase -I. Industrial Zones for locating the olefin complex, aromatic complex, D/S Petrochemicals, ISPRCL underground crude oil storage and land for MRPL Phase-III Refinery are effectively placed in the central and southwest part of the proposed MSEZ premises. Further, the SEZ will have necessary road alignment between NMPT, SEZ and network of roads within, including service roads for inspection of pipelines on elevated corridors. The pipelines shall be built at elevated corridor locations. Pipelines will be laid on sleepers and pipe racks with sufficient ground clearance. The preferred corridor alignment avoids Coastal Regulation Zone -I & II portion along the Gurupur River and it will have elevated roadway over structures (railways / minor bridges) and reinforced earth walls. However the corridor passes over CRZ-III zone along the banks of the Kudumbur rivulet (South of ELF gas) in the form of a bridge. The proposed industrial units in MSEZ phase -1	*info.*
II	To meet the objective of producing paraxylene, aromatic complex has been considered. To maximize paraxylene, broad cut heavy naptha streams are selected as feedstock to NHT/ CCR. Aromatics precursors to new reformer include constituents that produce toluene, C8-aromatics mix & C9+ aromatics. Whereas a xylene isomerization unit has been considered to convert other C8 - aromatics into paraxylene, a transalkylation & disproportionation (TADP) unit has also been included to convert toluene & C9+ aromatics into C8-aromatics mix. simulated moving bed adsorption for paraxylene recovery (PAREX) has been incorporated.	*info.*
1	NHT/ CCR : 0.95 MMTPA	*Complied*
2	Isomerization Unit (ISOMER) : 3.16 MMTPA	*Complied*
3	Transalkylation & Disproportionation Unit (TADP) :1.71 MMTPA	*Complied*
4	Paraxylene Recovery (PXREC) :4.07 MMTPA	*Complied*
5	Xylene Fractionation Unit : 4.64 MMTPA	*Complied*
6	Aromatics Extraction Unit : 0.79 MMTPA	*Complied*
7	Benzene Toluene Fractionation Unit : 2.2 MMTPA	*Complied*
8	Captive Power Plant (CPP) : 60 MW	*Please note that normal requirement will be in the range of 50- 55 MW, but Gas Turbine is more prone to Maintainance requirements & hence to ensure continuous supply of power to the plant, installed capacity is 72 MW*
3. A Specific Conditions:-		

1	No objection Certificate from the Karnataka State Pollution Control Board shall be obtained before initiating the project	*Please note that MZEZ has obtained Consent for Establishment (CFE) from the Karnataka State Pollution Control Board (KSPCB) letter No. CFE-CELL/MSEZ/EIA-574/08/20 dated 30th April, 2008 and OMPL on its part has obtained CFE from the KSPCB, vide letter No. PCB/559/CFE/08/252 dated 12th August, 2008 & Extension of validity of CFE vide letter No. PCB/HPI/245/2013-14/1002 dated 5th October, 2013 upto 10.8.2014 from KSPCB, Bangalore*
2	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 & Forests only after receipt of all requisite documents\ information as laid down in the Environment Impact Assessment Notification, 2006 and Coastal Regulation Zone Notification, 1991 as applicable	*NA*
3	All development in the Coastal Regulation Zone area shall be in accordance with coastal regulation zone notification, 1991. No destruction of mangroves shall be undertaken except while undertaking the permissible activities in the coastal regulation zone-I areas	*NA*
4	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	*NA*
5	With regard to the containing the suspected contamination of the groundwater near Athurkodi area of Kuthethoor village, MRPL has given an undertaking vide letter dated 19.3.2008 which is as follows:-	*NA*
6	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	*Please note report from Wildlife Department was submitted to the MoEF by MSEZ*
7	The R & R package shall be strictly in accordance with the laid down norms of the state Government	*NA. However, OMPL has recruited around 302 displaced people and provided employment, till date (31.03.2019)*
8	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 Regulation Zone and the marine areas	*NA*
9	Project proponent shall put up a dedicated website and a display panel to inform the public regarding the Ambient Air Quality along with SO2, Nox and other parameters as prescribed by central Pollution Control Board (CPCB)	*OMPL has put up a dedicated website 'www.ompl.co.in', wherein Environment Monitoring Parameters are uploaded and also has installed a display panel at the entrance of Main Gate for public information*
10	The gaseous emissions (SO2, Nox, 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	*Please note online Monitoring Instruments of relevant parameters are installed for stacks and the readings are made available at DCS, for continuous monitoring , further uplinked to CPCB server. Corrective action will be taken for any deviation, however, plant will be run as per Standard Operating Process (SOP), prepared considering, Standards prescribed by the Regulatory Body. Further Online detectors are available for HC, benzene, and to take up 'Containment work' and 'Repair work' on detection of leak, on priority basis.*
11	The emission levels of the other pollutants shall also remain within the permissible levels	*Please note apart from the relevant parameters as from Sl. No. '10', online instruments such as for CO & SPM are also installed to stacks, so as to ensure pollutants within the permissible limits*
12	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	*Agreed*

13	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 atleast 5 % shall be for mangrove afforestation. The local Forest Department shall be associated for this purpose and requisite budget earmarked	*Karnataka Forest Dept., GOK is executing Green Belt Development program at OMPL, with WO value being RS 1.2 Crore. Development & Maintenance phase of GBD is approximately 4 years upto 2020. Around 13, 050 plants are planted by Karnataka Forest Department and watered through Drip Irrigation. The species selected for Green Belt are having good amount of 'Crown Width' as recommended in EIA by NEERI, that was subsequently approved by MoEF while giving Environment Clearance.Some of the species recommended are, Acacia ferruginea DC (Mimosaceae), Acacia nilotica* (Mimosaceae), Ailanthus excelsa* (Simaroubiaceae), Albizia amara (Mimosaceae) Albizia labbeck* (Mimosaceae), Albizia doratissima(Mimosaceae), Alstonia scholaris* (Apocynaceae) Annogeissus latifolia (Combretaceae), Artocarpus integrifolia (Moraceae), Artocarpus lacucha (Moraceae), Azadirachta indica# (Meliaceae), Bauhinia malabarica (Fabaceae), Bauhinia racemosa* (Caesalpiniaceae), Butea monosperma (Fabaceae), Caesalpinia pulcherrima* (Caesalpiniaceae), Calophylum tomentosum, Cane sp. (Palmae), Canna orientalis (Cannaceae) Cassia fistula# (Caesalpiniaceae), Cassia siamea(Caesalpiniaceae), Casuarina equisetifolia# (Casurinaceae), Chlorophytum tuberosum (Liliaceae) Dalbergia sissoo (Fabaceaae), Dalbergia latifolia# (Fabaceaae)*
14	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	*Please note, OMPL, on its part has taken up following measures to conserve water. 1. UF RO plant is specifically incorporated to recycle treated water. 2. The complex Cooling Tower system is designed to use STP water, as make up from MSEZ, apart from the river water. 3. Chemical Treatment Program with Modern Technology has been institutionalised to save water in Cooling Tower Plant 4. Condensate Recovery unit is being installed to conserve water and resources such as chemicals 5. OMPL has under taken rain water harvesting measures for its buildings 6 Further, treated CRWS will be explored for usage into CT system . The current ~ Average water consumption is 268.48 m3/ hr as against design of 571 m3/ hr*
15	The project proponent shall ensure that during construction and operation of the project the traffic in the city is not affected	*Please note OMPL site is at a distance of ~ 15 KM from the Highway. Hence inconvenience to traffic movement in the city doesn't arise*

16	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 programme shall be designed and the information provided to the public through display and dedicated website by means of online monitoring	*Please note following measures are taken to have a check on Emission/ leakage as, *All heaters are installed with LOW NOx Burners* **Heaters stacks are fitted with following Online analyzers* *Carbon monoxide.* *Sulphur Dioxide* *Nitrogen Oxides* *Suspended Particulate matters (SPM)* **Benzene Tanks – Internal Floating Roof Tank with Nitrogen Blanket* **Paraffinic Raffinate (Volatile material) designed with Vapor recovery unit to recover vapor* **Dispersion Model Analysis was done by Bell Energy India and following Online detectors are being installed* *Benzene Detectors 27* *H2S Detector 21* *Hydrocarbon Detectors 193* *Hydrogen Detectors 68* *Fire Detectors (In case of Fire) 26* **Sample Points are closed system to stop local venting and draining* **Hydrocarbons drains are connected to closed Blow down system to recover hydrocarbon.* ** OMPL has put up a dedicated website 'www.ompl.co.in' and installed a display panel at the entrance of Main Gate for public information*
17	Low sulphur internal fuel oil and fuel gas shall be fired in process heaters and boilers	*OMPL has gone for Low Sulphur content fuels in LSHS, HSD & FG fuels. Please note 'SO2' emmission from EIA report for the project is estimated as 13.68 TPD. However, Avg SOx emmission per day is ~ 1.77 MTPD*
18	Quarterly monitoring of fugitive emissions shall be carried out by Fugitive Emision 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	*Please note Quarterly monitoring of fugitive emissions is being carried out by M/s Netel India Ltd, since 2016. Further based on, Dispersion Model Analysis by Bell Energy India, following Online detectors are installed* *Benzene Detectors 27* *Hydrocarbon Detectors 193* **Flare system is designed for smokeless burning by M/s AirOil*
19	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 occurance of maximum ground level concentration and downwingd 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 & in Down - wind direction along with those in other directions	*AAQM monitoring is carried out as per NAAQM rules, 2009 at 5 locations (since Jan, 2015), at a frequency of weekly twice per location, all the year round and Monitoring is done for all parameters as per the rules, as suggested by KSPCB & Monthly Reports are submitted to KSPCB . The values are found to be within the NAAQM Norms.*
20	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	*Online monitoring Devices have been installed to measure Heater Stack emmissions to all 10 number of stacks & are uplinked to CPCB server since April, 2016*
21	The practise of acoustic plant design shall be adopted to limit noise exposure for personnel to an 8 hour time weighted average of 90 db(A)	*Please note, as a first step, identified the sources of noise & then taken up Attenuation measures, at the design stage* *<u>Sources:</u> Pumps, Compressors & Turbines.* *<u>Attenuation measures:</u> It is ensured at design stage that Noise level at a distance of 1 mt from the equipment is < 90 db (A) & at plant boundry, it is less than 75 dB in daytime & 70 dB in night time as per the Legal requirement.*

22	All the pumps and other equipments, where there is a likihood 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	*Please note OMPL, as a first step in leak prevention, hired Bell Energy India, who carried out Dispersion Model Analysis and recommended following Online detectors which are installed at site such as,* *Benzene Detectors 27 nos* *Hydrocarbon Detectors 193 nos* ** Incase of leak, the first step is to contain the leak & simultaneously leak arresting work is carried out* ** Please note Quarterly monitoring of fugitive emissions are being carried out by M/s Netel India Ltd, since 2016.*
23	The product loading gantry shall be connected to the product sphere in closed circuit through the vapor arm connected to the tanker. Data on fugitive emissions shall be regularly monitored and records shall be maintained	*NA*
24	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	*Halogenated organic is used only for chloride dispersion on platinum catalyst and consumed. Halogenated compound is not sent to Flare Stack Chimney. Used catalyst will be disposed to KSPCB authorised recyclers*
25	The new standards/ norms that are being proposed by the CPCB for Petrochemical Plants and Refineries shall be applicable for the proposed expanson 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	*The new standards/ norms that are being proposed by the CPCB for Petrochemical Plants are complied.* *1. Online Monitoring system is provided to heater stacks 2. Online Detectors of HC, Benzene are installed, to check any fugitive emissions 3. The process vents are connected to flares through safety pop -up valves 4.HC sampling points closed loop systems 5. Storage of HC is in Floating roof tanks (as applicable) with double mechanical seals and Nitrogen blanketing*
26	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	*Please note Regular monitoring of groundwater is carried out at four locations surrounding the plant as advised by KSPCB & the reports are submitted to KSPCB. The frequency of sampling is once in a month, all the year round, at a location & compared with WHO Drinking Water Standards/ IS 10500 Norms. The values are found to be within Drinking water standards/ Norms.*
27	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	*Please note that the Industry has in place proper Solid Waste handling system to collect, treat and dispose off all solid waste generated from the process including Hazardous wastes and the basic Engineering by Toyo Engineering. Please note OMPL has obtained 'Authorization under Handling Hazardous Wastes' and is being disposed accordingly. Temporary Waste Storage facility is constructed of about ~ 2000 m2 area with impervious surface, closed shed and spillage collection (for any washings) & transfer (to ETP) system*
28	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	*No oily sludge is handled in OMPL*
29	The company shall strictly follow all the recommendations mentioned in the charter on Corporate Responsibility for Environmental Protection (CREP)	*Please refer compliance details for CREP enclosed herewith (ref.: Annexure- 1)*
30	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	*Rain water harvesting system is implemented for rooftop buildings. During initial project stage, all surface rain water was collected into open wells and the same was utilised for construction purpose*

31	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act	*Complied and is ongoing process*
32	The company shall implement all the recommendations made in the Environmental Impact Assessment / EMP report and risk assessment report	*Complied*
33	The company will undertake all relevant measures, as indicated during the Public Hearing for improving the socio-economic conditions of the surrounding area	*Complied*
34	With regard to R & R colony the project proponent shall obtain all requisite clearences as prescribed by the concerned agencies	*NA*
B General Conditions :		
1	The project authorities shall strictly adhere to the stipulations made by the concerned State Pollution Control Board (SPCB) and the State Government	*KSPCB stipulations will be adhered to*
2	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment and Forests	*Agreed*
3	At no time, the emisions shall be allowed to go beyond the precribed 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	*Agreed*
4	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	*Influent parameters & Effluent parameters will be measured through online measuring instruments installed at inlet & outlet of ETP. They include TOC, pH, COD, Oil, DO, Phenol, Benzene. Further regular Surface & Ground water is being monitored as advised by KSPCB. The Ground Water is monitored once in month, at four locations, for all the year round and compared with WHO Drinking Water Standards.*
5	Industrial Waste water 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	*Industrial Waste Water is collected in Slop Tank and then initially treated in EPTP plant to bring down Aromatics to < 20 ppm & Benzene to < 10 ppm, through Distillation & Adsorption methodology. It is treated in ETP comprising of Physical, Chemical, Biological & Tertiary Treatment Section. Treated water is recycled to cooling tower & the remaining, after ensuring Conformance to MINAS standards, will be disposed to sea through MSEZ CETP collection & Disposal system*
6	The overall noise levels in and 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)	*Sources: Pumps, Compressors & Turbines.* *Attenuation measures: It is ensured at design stage that Noise level at a distance of 1 mt from the equipment is < 90 db (A) by providing acoustic hoods, silencers, enclosures etc. as appropriate & at plant boundry is less than 75 dB in daytime & 70 dB in night time as per the Legal requirement*
7	The project authorities shall strictly cmply 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. Requisite On-site and Off - site Disaster Management Plans will be prepared and implemented	*Please note that necessary license/ clearance from statutory agencies have been taken such as Approval from Petroleum and Explosives Safety Organization, dated 16th June 2011, Clearance from Department of Factories of Karnataka, dated 19th June 2010. Requisite On-site and Off - site Disaster Management Plans will be adhered to as per Factories Act*
8	Authorization from the State Pollution Control Board must be obtained for collections/ treatment/ storage/ disposal of Hazardous wastes	*Please note OMPL has obtained 'Authorization under Handling Hazardous Wastes' is valid upto 30/6/2021*

9	The project authorities shall provide adequate funds both recuring 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	*Agreed. Further the Amount spent/budgeted on Environment Management requirement is approximately RS 1.6 Crore*
10	The stipulated conditions shall be monitored 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 shall be submitted to them regularly. It shall also be displayed on the website of the company	*Please note biannually compliance report is submitted on regular basis through MSEZ. The Environment monitored data are being uploaded in the OMPL website*
11	The project proponent shall inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearence letter are available with the State Pollution Control Board/ Committee and may also be seen at website of the MoEF at http://www.envfor.nic.in. This should be advertised within seven days from the date of issue of 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	*Please note, the same was ensured by MSEZ*
12	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 well as the commsiioning of the project shall be informed to the Ministry and its Regional Office	*NA*
13	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 atleast 30-40 years. Sufficient preventive measures shall be adopted to avoid direct exposure to emission and other hydrocarbons etc..	*Agreed*
14	A separate environment management cell with full fledge laboratory facilities to carry out various management and monitoring functions shall be set up under the control of a Senior Executive	*Complied*
15	The Ministry may revoke or suspend the clearence, if implementation of any of the above condition is not satisfactory	*info.*
16	The Ministry reserves the right to stipulate additional conditions if found necessary. The company shall implement these conditions in a time bound manner	*info.*
17	The above conditions will be enforced, inter - alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air Act, 1981, The Environment Act, 1986, The Public Liability Insurance Act, 1991, Hazardous Waste Rules 1989 and Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 along with their Amendments and Rules	*info.*

ANNEXURE - 1

Compliance to Charter on Corporate Responsibility for Environmental Protection (CREP)

Sl. No.	Conditions	Compliance
1	**Adoption of state-of- art technology** State of Art technology will be adopted for both process technology as well sound engineering practices required for control of emission, at the stage of design itself in case of new plants	*Please note Process technology is licensed from renowned expert in the field: UOP, America for NHT platforming units, High severity Cyclemax CCR unit for catalyst regeneration, Energy efficient column design for Xylene & BTF units, ISOMER & TADP units for getting high yield of paraxylene per unit of Naptha processed & an efficient, selective PAREX process for paraxylene recovery to get high purity product are considered in the design stage. Also Low NOx burner design for heaters, Low sulphur fuel including provision for usage of Natural Gas are considered.*
2	**Management of storm water** For the storm water generated from process area and tank farm area during initial hours of rain. An arrangement will be made for collection and oil separation including further treatment as required. Such arrangement will include provision for buffer tank (holding tank) and monitoring of effluent quality. This will be accomplished by June 2003.	*Please note OMPL has commissioned 2 numbers of collection tanks: one at ISBL area with capacity of 12,000 m3 & the other at OSBL area with 6000 m3 capacity for collection of initial hours of rain from process area & tank farm area respectively. This is then treated in ETP with an treatment capacity of 150 m3/ hr. The treatment section includes Physical treatment, chemical, Biological & Tertiary treatment sections*
3	**Effective detoxification and waste water treatment scheme** In order to control high COD and persistent organic pollution including toxic constituents, the industry will select appropriate unit operations for pre- treatment of effluent within inside battery limit (ISBL) before sending to the biological treatment system(BTS) for better functioning of ETPs. Action plan for the same will be submitted within 6 months and implemented within one year (March,2004)	*OMPL has installed Effluent Pre-Treatment Plant at a cost of RS 11.39 crores. The units consists of Distillation column & carbon adsorption beds to remove CODs, so that effluent entering BTS will be having Max. upto 20 ppm of aromatics*
4	**Control of emission from combustion** The industry will submit an action plan within six months for improving thermal efficiency and control of Nox	*OMPL has installed Low Nox burners for its heaters & flue gas is let out just above H2SO4 dew point after heating the incoming fuel, air or Steam production in HRSG as the case may be, for improving thermal inspection*
5	**Proper functioning of point source emission control systems** The industry will make efforts for proper operation of pollution control system (mostly scrubbers) and attainment of desired efficiency within six months. The will include backup of power supply to the control equipment and arrangement for frequent sampling and analysis of all critical pollution in the tail gases	*NA*
6	**Leak detection and repair (LDAR) programme** As a good operating, the industry will adopt periodically leak detection and repair (LDAR) programme to check fugitive emissions within six months. The frequency of the programme will be proportionate to the risk potential of carrying fluid. Based on leak detection as per LDAR programme, action will be taken to eliminate fugitive emissions, this will be a continuous activity.	*LDAR program is ongoing process since July, 2016. Please note OMPL as first step in leak prevention, hired Bell Energy India, who carried out Dispersion Model Analysis and recommended following Online detectors which are already installed at site such as, Benzene Detectors 27 nos, Hydrocarbon Detectors 193 nos*
7	**Handling of halogenated organics** The industry will submit an action plan within 6 months to ensure that no halogenated organics is sent to the flares in order to avoid formation of persistent organic pollutants. All HAPs had halongenated organics will be routed to the incineration system having end-on pollution control facility.	*Halogenated organic is used only for chloride dispersion on platinum catalyst and consumed. Used catalyst will be disposed to KSPCB authorised recyclers*
8	**Control of fugitive emissions of carcinogenic compounds** Fugitive emission of carcinogenic compounds (e.g Benzene) will be controlled by closed vapor collection and recovery system. Measures will be taken to monitor health of the workers	*Please note double mechanical seal is provided for the purpose & periodical health check up is being carried out as per the legal requirement through Occupational Health Centre, stagewise*
9	**Management of solid waste** Proper facilities will be provided for handling and storage of hazardous waste with manifest system in case transported to other places. For incinerable waste, properly designed incinerator will be installed within the premises or as a common facility. The non-incinerable hazardous waste should be disposed of in a secure-land fill.	*OMPL has installed Solid Waste Management facility at an estimated cost of RS 3.73 crore for handling and storage of hazardous waste until disposal & manifest system will be follwed during disposal of Hazardous Wastes. Temporary Waste Storage facility is constructed of about ~ 2000 m2 area with impervious surface, closed shed and spillage collection (for any washings) & transfer (to ETP) system*

10	**Proper operation of incinerator** Industry will check the design and will adopt sound engineering practices for proper operation of incinerators. Continuous monitoring will be done for operational parameters and specific parameters in tail gas to ensure the efficient functioning. This will be implemented within 3 months.	*NA*
11	**Optimising the inventory of hazardous chemicals** Efforts will be made to optimize the inventory, particularly of hazardous chemicals. Such information will be made available to the Regulatory Agencies (SBCBs) Inspector of Factory & District Collector	*Agreed. Further Petroleum & Explosives Safety Organization (PESO) approvals are being taken for bulk storage of Hazardous chemicals (Petroleum) wherein requirements of the MSIHC Rules, 1989 is considered*
12	**Self- regulation by industry through monitoring and environmental auditing** Industry will go for self- assessment and regulation by conducting environmental auditing regularly, besides having regular monitoring of pollutants in air emission, liquid effluent and receiving environment.	*Environment Monitoring is ongoing process*
13	**Organizational restructuring and accreditation of environmental manager of industry.** For self- evaluation, organizational restructuring will be done and the environmental manager of the industry will be accredited to bring professionalism in environmental management.	*Agreed*

ओ एन जी सी मंगलूर पेट्रोकेमिकल्स लिमिटेड
(मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड की सहायक कंपनी)
ONGC Mangalore Petrochemicals Ltd.
(A Subsidiary of Mangalore Refinery and Petrochemicals Ltd.)
एमएसईज़ेड, पेर्मुदे, मंगलूरू -५७४ ५०९ MSEZ, Permude, Mangaluru – 574 509.
CIN : U40107KA2006GOI041258 दूरभाष Direct Line :- 0824–2872000, फैक्स Fax:- 0824-2872005, Website: www.ompl.co.in

REF: OMPL/PCB/SP/2018-19/ Date: 15/01/2019

To:
The Environmental Officer
Regional Office
KSPCB
Baikampady, Mangalore-11

MANGALORE SEZ LTD RECEIVED 23 JAN 2019 3106 MANGALURU SEZ

23/01/19

Dear Sir,

Sub: Submission of Environmental Monitoring Report for the Month of December, 2018 and Production Report for December, 2018

Ref: KSPCB Combined Consent Order No. AW-301949 dated 27th January, 2017

With respect to the above subject; we are herewith submitting the following Environmental Monitoring Reports and Production Report for the Month of November, 2018 respectively, enclosed herewith.

1. Ambient Air Quality Monitoring at 5 different locations in and around OMPL, enclosed as Annexure- A
2. Water Analysis Reports at 9 different locations in and around OMPL, as Annexure-B
3. Noise Level Monitoring Report at OMPL, as Annexure-C
4. Treated Effluent Analysis Report, Annexure–D
5. Returns Regarding Water Consumed, for the Month of December, 2018, as Annexure-E
6. Production Report as Annexure-F

Thanking You,

Shivaprakash
Manager (Env)

CC: **Member Secretary**, KSPCB, Bangalore
CC: **Head (Technical)**, MSEZ
CC: **CEO**, OMPL for info
CC: **COO**, OMPL for info

ANNEXURE-A

Hubert Enviro Care Systems (P) Ltd.

C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
Ph: 0824 - 2408111, Email: kro@hecs.in, Website: www.hecs.in

H.O.: # 18, 92nd Street, Ashok Nagar, Chennai - 600 083.
Ph: 42985555 Fax : 42985500 E-mail : labsales@hecs.in

Laboratory Services Division

Accredited by NABL in the fields of Chemical
ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. T-3180

AMBIENT AIR QUALITY MONITORING TEST REPORT - DECEMBER 2018

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - East Side
Report Date	08.01.2019
Report No	HECS/AA/001/080119

CONSOLIDATED TEST RESULTS

DECEMBER '18 - Week		49-Week		30-Week		51-Week		52-Week		1-Week	Avg
Parameters	NAAQ	03.12.18	07.12.18	10.12.18	14.12.18	17.12.18	21.12.18	24.12.18	28.12.18	31.12.18	Value
PM $_{2.5}$ ($\mu g/m^3$)	60	20.5	19.2	20.6	19.3	19.8	18.9	19.7	20.5	19.7	**19.80**
PM $_{10}$ ($\mu g/m^3$)	100	38.7	38.9	42.1	42.9	43.2	40.1	42.9	41.2	40.9	**41.21**
SO_2 ($\mu g/m^3$)	80	4.1	4.5	4.3	4.9	4.2	4.6	4.7	4.3	4.8	**4.49**
NO_2 ($\mu g/m^3$)	80	4.9	5.3	5.2	5.7	5.3	5.6	5.7	5.7	5.0	**5.38**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM $_{10}$: IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
PM $_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2 Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene (DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(D. Ganesan - Lab Manager)

1. The report in full or part shall not be used for any promotional or publicity purpose without written consent by HECS organization 2. Samples are not drawn by HECS unless or otherwise mentioned 3. Unless specifically requested by customer the test items will not be retained more than 15 days from the date of issue of test report. 4. Under no circumstances lab accepts any liability or loss / damage caused by use or misuse of test report after invoicing or issue of test report. 5. The test results relate only to the test items. 6. # not under scope of accreditation.

Hubert Enviro Care Systems (P) Ltd.
C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
Ph: 0824 - 2408111, Email: kro@hecs.in, Website: www.hecs.in
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Certificate No. T-3180

AMBIENT AIR QUALITY MONITORING TEST REPORT - DECEMBER 2018

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Shantigudda
Report Date	08.01.2019
Report No	HECS/AA/002/080119

DECEMBER '18 - Week		49-Week		50-Week		51-Week		52-Week		1-Week	Avg
Parameters	NAAQ	03.12.18	07.12.18	10.12.18	14.12.18	17.12.18	21.12.18	24.12.18	28.12.18	31.12.18	Value
$PM_{2.5}$ ($\mu g/m^3$)	60	18.1	17.9	17.7	18.3	18.0	17.9	18.1	18.5	17.9	18.04
PM_{10} ($\mu g/m^3$)	100	40.2	39.9	40.3	40.8	41.0	39.9	41.1	40.0	41.1	40.48
SO_2 ($\mu g/m^3$)	80	2.9	2.7	2.8	3.2	3.0	3.2	2.7	3.1	2.8	2.93
NO_2 ($\mu g/m^3$)	80	3.2	3.1	3.4	3.2	3.0	3.4	3.6	3.3	3.3	3.28
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

CONSOLIDATED TEST RESULTS

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2 Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene (DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. T-3180

AMBIENT AIR QUALITY MONITORING TEST REPORT–DECEMBER 2018

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Tenka Ekkar
Report Date	08.01.2019
Report No	HECS/AA/003/080119

CONSOLIDATED TEST RESULTS

DECEMBER '18 - Week		49-Week		50-Week		51-Week		52-Week		1-Week	Avg Value
Parameters	NAAQ	03.12.18	07.12.18	10.12.18	14.12.18	17.12.18	21.12.18	24.12.18	28.12.18	31.12.18	
$PM_{2.5}$ ($\mu g/m^3$)	60	19.8	19.5	19.9	19.6	19.9	20.2	20.7	20.2	19.7	**19.94**
PM_{10} ($\mu g/m^3$)	100	41.2	39.3	41.1	42.1	40.7	40.2	40.9	40.1	41.8	**40.82**
SO_2 ($\mu g/m^3$)	80	4.4	4.1	4.3	4.2	4.3	4.5	4.0	4.5	4.1	**4.27**
NO_2 ($\mu g/m^3$)	80	5.2	5.3	5.4	5.5	5.2	5.0	4.9	5.8	5.0	**5.26**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2 Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene (DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. T-3180

AMBIENT AIR QUALITY MONITORING TEST REPORT - DECEMBER 2018

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Permude Village
Report Date	08.01.2019
Report No	HECS/AA/004/080119

CONSOLIDATED TEST RESULTS

DECEMBER '18 - Week		49-Week		50-Week		51-Week		52-Week		1-Week	Avg Value
Parameters	NAAQS	03.12.18	07.12.18	10.12.18	14.12.18	17.12.18	21.12.18	24.12.18	28.12.18	31.12.18	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.1	19.6	19.5	19.1	19.2	19.4	19.8	19.7	18.4	**19.42**
PM_{10} ($\mu g/m^3$)	100	41.3	41.9	41.2	40.9	41.4	41.6	41.3	40.3	40.8	**41.19**
SO_2 ($\mu g/m^3$)	80	4.7	4.9	4.8	5.1	4.8	5.2	4.9	4.7	5.0	**4.90**
NO_2 ($\mu g/m^3$)	80	5.2	5.8	5.9	5.7	5.5	5.7	5.9	5.3	5.3	**5.70**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2 Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene (DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. T-3180

AMBIENT AIR QUALITY MONITORING TEST REPORT - DECEMBER 2018

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - West Side
Report Date	08.01.2019
Report No	HECS/AA/005/080119

CONSOLIDATED TEST RESULTS

DECEMBER '18 - Week		49-Week		50-Week		51-Week		52-Week		1-Week	Avg Value
Parameters	NAAQ	03.12.18	07.12.18	10.12.18	14.12.18	17.12.18	21.12.18	24.12.18	28.12.18	31.12.18	
$PM_{2.5}$ ($\mu g/m^3$)	60	19.4	18.8	19.4	19.7	19.5	19.8	20.2	20.3	19.7	**19.64**
PM_{10} ($\mu g/m^3$)	100	39.9	41.2	41.3	41.7	42.2	40.8	41.9	41.8	41.6	**41.38**
SO_2 ($\mu g/m^3$)	80	3.9	4.3	4.4	4.1	4.0	4.6	4.8	5.2	4.3	**4.40**
NO_2 ($\mu g/m^3$)	80	4.4	6.1	6.3	6.4	5.9	6.0	6.5	5.9	6.2	**6.40**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt. 13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2 Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene (DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-B

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Certificate No. T-3180

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	GW1 - Ground Water collected from Narayana Guru Community Hall, Permude
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/001/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.81	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	69.84	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	10.89	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	21.12	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	27.35	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	10.37	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	168	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.7	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	8.1	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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(Dr K Ganesan - Lab Manager)

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Certificate No. T-3180

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW2 - Ground Water collected from Gagtel Labour Colony
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/002/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.63	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	71.83	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	12.86	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	23.21	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	31.23	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	11.38	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	177	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Laboratory Services Division
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ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. T-3180

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW3- Ground Water collected from L&T New Labor Colony
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/003/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.58	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	67.62	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	14.72	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	22.13	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	27.32	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	11.60	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	157	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.1	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW4-Ground Water collected Near OMPL – ETP
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/004/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.74	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	159.08	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	38.87	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	13.44	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	4.89	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	15.08	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	210	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	39.51	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW1- Open Water collected from Tenka Ekkar
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/005/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.02	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	54.32	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	12.44	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	19.2	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	12.74	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	5.66	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	107.0	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.1	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW2 - Open Water collected from Shantigudda Village
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/006/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.01	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	203.7	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	42.76	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	62.4	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	24.46	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	38.87	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	260	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	12.31	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.4	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW3 - Open Water collected from Permude Village
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/007/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.20	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	50.44	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	9.33	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	5.76	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	19.57	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	6.60	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	120	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	6.90	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.9	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW1 - Surface Water collected Near OMPL - Flare Area
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/008/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.21	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	203.7	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	54.43	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	62.4	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	34.24	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	16.50	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	250	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	11.91	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.32	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.4	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per liter; NA-Not Available

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
Dr K Ganesan - Lab Manager)

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW2 - Surface Water collected Near OMPL - Near Central Warehouse
Date of Sampling	22.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/009/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS 10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.12	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	184.3	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	54.42	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	67.2	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	26.91	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	11.78	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	250	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	15.29	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.6	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per liter

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-C

Hubert Enviro Care Systems (P) Ltd.
C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
Ph: 0824 - 2408111, Email: kro@hecs.in, Website: www.hecs.in
H.O.: # 18, 92nd Street, Ashok Nagar, Chennai - 600 083.
Ph: 42985555 Fax : 42985500 E-mail : labsales@hecs.in

Laboratory Services Division
Accredited by NABL in the fields of Chemical
ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. T-3180

NOISE MONITORING TEST REPORT – DECEMBER 2018

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL – North, South, East and West sides
Sampling Date	08.12.2018
Report Date	08.01.2019
Report No.	HECS/N/001/080119

RESULTS

S.No.	Sampling Location	MoEF requirements in dB		Avg. Noise level observed in dB	
		Day	Night	Day	Night
1.	OMPL-North	75	70	68.9	67.3
2.	OMPL-South			68.6	66.0
3.	OMPL-East			69.1	67.2
4.	OMPL-West			70.3	67.4

Note: dB: Decibel

Limits: **Industrial Area: Day Time-75 dB (A),** Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Leq- Equivalent Noise Level (hourly); Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

INFERENCE: The observed noise levels are within the limits as per The Noise Pollution (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-D

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Certificate No. T-3180

TEST REPORT OF ETP EFFULENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	07.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/011/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983 (Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983, Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	BDL (DL 4)	100
4.	pH	IS:3025:(Pt 11):1983 (Reaff 2006)	-	7.53	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983 (Reaff:2006)	°C	29	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	BDL (DL 2)	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986 (Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS 3025 Part (34)1988	mg/L	7.6	50
9.	Total Kjeldhal Nitrogen as N	IS 3025 Part (34)1988	mg/L	28.7	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL(DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993 (Reaff 2009)	mg/L	5.1	30
12.	COD as O_2	IS 3025 Part (58)2006	mg/L	31.64	125
13.	Lead as Pb	IS:3025 (Pt 47)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS 3025 Part (52):2003	mg/L	BDL(DL 0.01)	0.1
15.	Total Chromium as Cr	IS 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL(DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	5.0

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Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	07.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/011/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL(DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL(DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22nd Edition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL(DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL(DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL(DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL(DL 0.005)	0.05
26	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL(DL 0.01)	0.2
27.	Phenols as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL(DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	0.071	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL(DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL(DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL(DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL(DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENT WATER AS ABOVE PARAMETERS ARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OF ETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	18.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/015/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983 (Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983, Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	BDL(DL 4)	100
4.	pH	IS:3025:(Pt 11):1983 (Reaff 2006)	-	7.55	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983 (Reaff:2006)	°C	30	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS: 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	BDL (DL 2)	5
7.	Total Residual Chlorine as Cl_2	IS: 3025 (Pt26)1986 (Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS: 3025 Part (34)1988	mg/L	4.2	50
9.	Total Kjeldhal Nitrogen as N	IS: 3025 Part (34)1988	mg/L	9.98	100
10.	Free Ammonia as NH_3	IS: 3025 (Part34)1998 Reaff. 2003	mg/L	BDL(DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS: 3025 (Pt 44)1993 (Reaff 2009)	mg/L	5.2	30
12.	COD as O_2	IS: 3025 Part (58)2006	mg/L	31.74	125
13.	Lead as Pb	IS: 3025 (Pt 47)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS: 3025 Part (52):2003	mg/L	BDL(DL 0.01)	0.1
15.	Total Chromium as Cr	IS: 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL(DL 0.01)	2.0
16.	Copper as Cu	IS: 3025:5,(Pt 42)1992 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
17.	Zinc as Zn	IS: 3025 (Part49)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	5.0

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Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	18.12.2018
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	09.01.2019
Report No	HECS/W/015/090119

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
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23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL(DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL(DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL(DL 0.005)	0.05
26.	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL(DL 0.01)	0.2
27.	Phenolic Compounds as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL(DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	0.079	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL(DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL(DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL(DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL(DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENT WATER AS ABOVE PARAMETERS ARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Form-1 (Rule 4)

Returns Regarding Water Consumed during the Month of December, 2018

Name and address of the Consu	Purpose for which water consumed	Reading at the begining of the first day of the calendar month under report	Reading at the end of the last day of the calendar month under report	Quantity of Water Consumed in Kilo Leters	If the meter was out of order, the monthly average consumption of water for the previous 3 months of the working period	Quantity of water qualifying for rebate according to the assessee	Remarks
M/s ONGC Mangalore Petrochemicals Limited, Mangalore Special Economic Zone, Permude, Mangalore -574 509	**Industrial cooling, spraying in mine pits or boiler feed**						
	Cooling Water	0	54,913	54913			
	Boiler Feed Water	0	74020	74020			
	Fire Water	0	32794	32794			
	Domestic purpose						
	Drinking Water & Sanitation	0	5304	5304			
	Processing whereby water gets polluted and the pollutants are easily bio-degradable						
	Service Water		5775	5775			
Total Consumption				**1,72,806**			

Signature of the Consumer :

Name Shivaprakash, Manager(Env)

Address M/s ONGC Mangalore Petrochemicals Limited, Mangalore Special Economic Zone, Permude, Mangalore -574 509

ANNEXURE-E

ANNEXURE-F

ONGC Mangalore Petrochemicals Limited

Production Details for December, 2018

Net Naptha Processed –1,26,939 MT

Sl. No.	Name of the Product	Quantity, MT
1	Paraxylene (Product)	62,727
2	Benzene (Co product)	16,466

ओ एन जी सी मंगलूर पेट्रोकेमिकल्स लिमिटेड
(मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड की सहायक कंपनी)
ONGC Mangalore Petrochemicals Ltd.
(A Subsidiary of Mangalore Refinery and Petrochemicals Ltd.)
एमएसईज़ेड, पेर्मुदे, मंगलूरू -५७४ ५०९ MSEZ, Permude, Mangaluru – 574 509.
CIN : U40107KA2006GOI041258, दूरभाष Direct Line :- 0824–2872000, फैक्स Fax:- 0824-2872005, Website: www.ompl.co.in

REF: OMPL/PCB/SP/2018-19/

Date: 15/02/2019

To:
The Environmental Officer
Regional Office
KSPCB
Baikampady, Mangalore-11

MANGALORE SEZ LTD. RECEIVED 22 FEB 2019 MANGALURU-575 011
3356
22/2/19

Dear Sir,

Sub: Submission of Environmental Monitoring Report for the Month of January, 2019 and Production Report for January, 2019

Ref: KSPCB Combined Consent Order No. AW-301949 dated 27th January, 2017

With respect to the above subject; we are herewith submitting the following Environmental Monitoring Reports and Production Report for the Month of January, 2019 respectively, enclosed herewith.

1. Ambient Air Quality Monitoring at 5 different locations in and around OMPL, enclosed as Annexure- A
2. Water Analysis Reports at 9 different locations in and around OMPL, as Annexure-B
3. Noise Level Monitoring Report at OMPL, as Annexure-C
4. Treated Effluent Analysis Report, Annexure–D
5. Stack Monitoring Analysis Report, Annexure-E
6. SO2 report as Annexure-F
7. Returns Regarding Water Consumed, for the Month of January, 2019, as Annexure-G
8. Production Report as Annexure-H

Thanking You,

Shivaprakash
Manager (Env)

CC: **Member Secretary,** KSPCB, Bangalore
CC: **Head (Technical)**, MSEZ
CC: **CEO**, OMPL for info
CC: **COO**, OMPL for info

ANNEXURE-A

Hubert Enviro Care Systems (P) Ltd.
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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT - JANUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - East Side
Report Date	06.02.2019
Report No	HECS/AA/001/060219

CONSOLIDATED TEST RESULTS

JANUARY '19- Week		1-Week	2-Week		3-Week		4-Week		5-Week		Avg Value
Parameters	NAAQ	04.01.19	07.01.19	11.01.19	14.01.19	18.01.19	21.01.19	25.01.19	28.01.19	31.01.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.1	21.4	20.2	20.6	19.7	20.5	21.4	20.6	20.3	**20.6**
PM_{10} ($\mu g/m^3$)	100	39.8	43.1	43.7	44.1	45.1	43.6	42.1	41.7	44.5	**42.71**
SO_2 ($\mu g/m^3$)	80	4.7	4.6	5.1	4.5	4.8	4.9	4.6	5.2	4.4	**4.71**
NO_2 ($\mu g/m^3$)	80	5.9	5.5	6.1	5.5	5.9	6.0	6.2	5.4	5.3	**5.74**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT - JANUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Shantigudda
Report Date	06.02.2019
Report No	HECS/AA/002/060219

CONSOLIDATED TEST RESULTS

JANUARY '19- Week		1-Week	2-Week		3-Week		4-Week		5-Week		Avg Value
Parameters	NAAQ	04.01.19	07.01.19	11.01.19	14.01.19	18.01.19	21.01.19	25.01.19	28.01.19	31.01.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	18.1	18.8	18.4	19.2	18.8	19.3	19.4	18.9	20.0	**19.01**
PM_{10} ($\mu g/m^3$)	100	40.1	41.2	41.5	42.1	40.3	42.2	41.2	41.4	41.6	**41.29**
SO_2 ($\mu g/m^3$)	80	3.1	3.2	3.5	3.4	3.6	2.9	3.4	3.1	3.3	**3.27**
NO_2 ($\mu g/m^3$)	80	3.4	3.7	3.5	3.5	3.8	3.8	3.6	3.7	3.9	**3.64**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT–JANUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	TenkaEkkar
Report Date	06.02.2019
Report No	HECS/AA/003/060219

CONSOLIDATED TEST RESULTS

JANUARY '19- Week		1-Week	2-Week		3-Week		4-Week		5-Week		Avg Value
Parameters	NAAQ	04.01.19	07.01.19	11.01.19	14.01.19	18.01.19	21.01.19	25.01.19	28.01.19	31.01.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.6	20.2	20.7	20.3	20.5	20.8	20.5	20.8	20.9	20.54
PM_{10} ($\mu g/m^3$)	100	40.4	42.2	43.3	41.8	41.3	41.8	41.2	42.9	42.5	41.96
SO_2 ($\mu g/m^3$)	80	4.5	4.7	4.5	4.8	4.9	4.4	4.8	4.4	4.3	4.61
NO_2 ($\mu g/m^3$)	80	5.8	5.7	5.9	5.5	5.4	5.3	6.1	5.5	5.9	5.67
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report*****

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(Dr K Ganesan - Lab Manager)

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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT - JANUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Permude Village
Report Date	06.02.2019
Report No	HECS/AA/004/060219

CONSOLIDATED TEST RESULTS

JANUARY '19- Week		1-Week	2-Week		3-Week		4-Week		5-Week		Avg Value
Parameters	NAAQS	04.01.19	07.01.19	11.01.19	14.01.19	18.01.19	21.01.19	25.01.19	28.01.19	31.01.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.5	20.4	20.2	20.3	20.5	20.9	20.8	19.5	19.8	20.41
PM_{10} ($\mu g/m^3$)	100	42.2	42.4	41.5	42.6	42.5	42.6	41.7	41.9	41.5	42.13
SO_2 ($\mu g/m^3$)	80	5.3	5.4	5.6	5.3	5.6	5.3	5.0	5.6	5.2	5.34
NO_2 ($\mu g/m^3$)	80	6.3	6.2	5.9	6.1	6.2	6.4	5.6	5.7	5.8	5.98
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
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Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

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AMBIENT AIR QUALITY MONITORING TEST REPORT - JANUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - West Side
Report Date	06.02.2019
Report No	HECS/AA/005/060219

CONSOLIDATED TEST RESULTS

JANUARY '19- Week		1-Week	2-Week		3-Week		4-Week		5-Week		Avg
Parameters	NAAQ	04.01.19	07.01.19	11.01.19	14.01.19	18.01.19	21.01.19	25.01.19	28.01.19	31.01.19	Value
$PM_{2.5}$ ($\mu g/m^3$)	60	19.9	20.6	20.5	20.4	20.8	20.6	21.4	20.8	20.3	**20.58**
PM_{10} ($\mu g/m^3$)	100	42.4	42.4	42.8	42.4	41.7	42.5	42.7	42.8	41.9	**42.18**
SO_2 ($\mu g/m^3$)	80	4.7	4.8	4.4	4.3	5.0	5.3	5.5	4.7	4.9	**4.78**
NO_2 ($\mu g/m^3$)	80	6.6	6.5	6.7	6.3	6.4	6.8	6.4	6.3	5.7	**6.22**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-B

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Certificate No. TC-7920

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	GW1 - Ground Water collected from Narayana Guru Community Hall, Permude
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/001/060219

RESULTS

S.No.	Parametersmonitored	Test method followed	Units	Results	IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.73	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	135.8	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	23.32	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	48	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	58.70	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	18.85	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	230	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	11.24	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.9	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	8.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-7920

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW2 - Ground Water collected from Gagtel Labour Colony
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/002/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.81	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	67.9	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	19.44	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	14.4	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	29.35	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	4.71	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	210	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	16.37	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.5	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW3- Ground Water collected from L&T New Labor Colony
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/003/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.20	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	81.48	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	13.99	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	32.64	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	9.78	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	11.31	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	116.0	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW1- Open Well Water collected from TenkaEkkar
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/005/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.16	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	93.12	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	20.21	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	49.92	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	12.71	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	10.37	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	117	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	4.60	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW2 - Open Well Water collected from Shantigudda Village
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/006/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.29	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	116.4	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	37.32	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	55.68	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	8.81	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	5.66	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	160	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.6	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW3 – Open Well Water collected from Permude Village
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/007/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.10	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	139.68	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	38.88	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	57.6	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	7.83	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	10.37	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	153.0	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.1	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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(Dr K Ganesan - Lab Manager)

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW1 - Surface Water collected Near OMPL - Flare Area
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/008/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.46	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	58.2	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	15.55	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	26.88	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	6.85	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	4.71	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	89	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.36	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.7	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-NephelometricTurbidity Unit; mg/L - Milligrams per liter; NA-Not Available

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW2 - Surface Water collected Near OMPL - Near Central Warehouse
Date of Sampling	21.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/009/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.33	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	77.6	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	17.1	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	36.48	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	7.83	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	8.49	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	89	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.8	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per liter

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-C

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Certificate No. TC-7920

NOISE MONITORING TEST REPORT – JANUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL – North, South, East and West sides
Sampling Date	10.01.2019
Report Date	06.02.2019
Report No.	HECS/N/001/060219

RESULTS

S.No.	Sampling Location	MoEF requirements in dB		Avg. Noise level observed in dB	
		Day	Night	Day	Night
1.	OMPL-North	75	70	69.7	68.5
2.	OMPL-South			69.4	66.2
3.	OMPL-East			70.5	67.8
4.	OMPL-West			71.6	68.1

Note: dB: Decibel

Limits: **Industrial Area: Day Time-75 dB (A),** Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Leq- Equivalent Noise Level (hourly); Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

INFERENCE: The observed noise levels are within the limits as per The Noise Pollution (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OF ETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	11.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/011/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983(Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983,Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	22.0	100
4.	pH	IS:3025:(Pt 11):1983(Reaff 2006)	-	6.55	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983(Reaff:2006)	°C	30	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	3.2	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986(Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS 3025 Part (34)1988	mg/L	7.8	50
	Total Kjeldhal Nitrogen as N	IS 3025 Part (34)1988	mg/L	29.8	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL(DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993(Reaff 2009)	mg/L	BDL (DL 2)	30
12.	COD as O_2	IS 3025 Part (58)2006	mg/L	7.90	125
13.	Lead as Pb	IS:3025 (Pt 47)1994(Reaff 2009)	mg/L	BDL(DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS 3025 Part (52):2003	mg/L	BDL(DL 0.01)	0.1
15.	Total Chromium as Cr	IS 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL(DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992(Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994(Reaff 2009)	mg/L	BDL(DL 0.1)	5.0

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TEST REPORT OF ETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	11.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/011/060219

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL(DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL(DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22nd Edition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL(DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL(DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL(DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL(DL 0.005)	0.05
26	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL(DL 0.01)	0.2
27.	Phenols as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL(DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	1.31	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL(DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL(DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL(DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL(DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENTWATER AS ABOVE PARAMETERSARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OF ETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	23.01.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS/W/015/060219

RESULTS

No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983 (Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983, Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	23.02	100
4.	pH	IS:3025:(Pt 11):1983 (Reaff 2006)	-	6.57	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983 (Reaff:2006)	°C	30	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS: 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	3.1	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986 (Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS: 3025 Part (34)1988	mg/L	4.3	50
9.	Total Kjeldhal Nitrogen as N	IS: 3025 Part (34)1988	mg/L	9.89	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL(DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993 (Reaff 2009)	mg/L	BDL (DL 2)	30
12.	COD as O_2	IS: 3025 Part (58)2006	mg/L	7.98	125
13.	Lead as Pb	IS:3025 (Pt 47)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS: 3025 Part (52):2003	mg/L	BDL(DL 0.01)	0.1
15.	Total Chromium as Cr	IS: 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL(DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	5.0

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ANNEXURE-E

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	NHT Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	21.01.2019
Sample Receipt	22.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/001/060219

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	1.96
Stack Height (m)	65
Stack Temperature (°C)	254
Flue Gas Velocity (m/s)	10.2
Flue gas flow rate (Nm^3/hr)	54568.0

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255 (Part 1)-1985	4.3	5
Sulphur Dioxide (SO_2)	IS 11255 (Part 3)-1985	45	50
Oxides of Nitrogen (NO_X)	IS 11255 (Part 7)-2005	76	250
Carbon monoxide (CO)	IS 5182 (Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

Inference: - STACK EMSSIONS AS ABOVE PARAMETERS ARE WITHIN STANDARDS

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Isomer Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	23.01.2019
Sample Receipt	24.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/002/060219

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	2.4
Stack Height (m)	66
Stack Temperature (°C)	182
Flue Gas Velocity (m/s)	4.9
Flue gas flow rate (Nm^3/hr)	40072.4

Parameter monitored	Protocol	Results(mg/Nm^3)	Standard Norms(mg/Nm^3)
SPM	IS 11255(Part 1)-1985	4.1	5
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	27	50
Oxides of Nitrogen (NO_x)	IS 11255(Part 7)-2005	182	250
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	CPP (GTG-HRSG) – 1
Sample Description	Manual Stack Emission Monitoring
Sampling Date	23.01.2019
Sample Receipt	24.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/003/060219

General Details	
Ambient Temperature (°C)	29
Stack Diameter (m)	2.9
Stack Height (m)	70
Stack Temperature (°C)	114
Flue Gas Velocity (m/s)	13.4
Flue gas flow rate (Nm^3/hr)	19158.4

Parameter monitored	Protocol	Results(mg/Nm^3)	Standard Norms(mg/Nm^3)
SPM	IS 11255(Part 1)-1985	35.2	50
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	149	850
Oxides of Nitrogen(NO_X)	IS 11255(Part 7)-2005	209	350
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

Inference: - STACK EMSSIONS AS ABOVE PARAMETERS ARE WITHIN STANDARDS

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Plat former Unit Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	21.01.2019
Sample Receipt	22.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/004/060219

General Details	
Ambient Temperature (°C)	29
Stack Diameter (m)	4.2
Stack Height (m)	95
Stack Temperature (°C)	168
Flue Gas Velocity (m/s)	5.9
Flue gas flow rate (Nm^3/hr)	180448.0

Parameter monitored	Protocol	Results(mg/Nm^3)	Standard Norms(mg/Nm^3)
SPM	IS 11255(Part 1)-1985	3.5	5
Sulphur Dioxide (SO_2)	IS 11255(Part 3)-1985	36.8	50
Oxides of Nitrogen(NO_x)	IS 11255(Part 7)-2005	126	250
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

Inference: - STACK EMSSIONS AS ABOVE PARAMETERS ARE WITHIN STANDARDS,

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	CPP Utility Boiler
Sample Description	Manual Stack Emission Monitoring
Sampling Date	25.01.2019
Sample Receipt	26.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/005/060219

General Details	
Ambient Temperature (°C)	28
Stack Diameter (m)	2.75
Stack Height (m)	70
Stack Temperature (°C)	171
Flue Gas Velocity (m/s)	14.5
Flue gas flow rate (Nm^3/hr)	195539.0

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255(Part 1)-1985	24.7	50
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	69.8	850
Oxides of Nitrogen(NO_X)	IS 11255(Part 7)-2005	158	350
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

Inference: - STACK EMSSIONS AS ABOVE PARAMETERS ARE WITHIN STANDARDS

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

1. The report in full or part shall not be used for any promotional or publicity purpose without written consent by HECS organization 2. Samples are not drawn by HECS unless or otherwise mentioned 3. Unless specifically requested by customer the test items will not be retained more than 15 days from the date of issue of test report. 4. Under no circumstances lab accepts any liability or loss/damage caused by use or misuse of test report after invoicing or issue of test report. 5. The test results relate only to the test items. 6. # not under scope of accreditation.

Hubert Enviro Care Systems (P) Ltd.
C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
Ph: 0824 - 2408111, Email: kro@hecs.in, Website: www.hecs.in
H.O.: # 18, 92nd Street, Ashok Nagar, Chennai - 600 083.
Ph: 42985555 Fax : 42985500 E-mail : labsales@hecs.in

Laboratory Services Division
Accredited by NABL in the fields of Chemical
ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. TC-7920

EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Tatory Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	23.01.2019
Sample Receipt	24.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/006/060219

General Details	
Ambient Temperature (°C)	28
Stack Diameter (m)	1.75
Stack Height (m)	65
Stack Temperature (°C)	168
Flue Gas Velocity (m/s)	5.9
Flue gas flow rate (Nm^3/hr)	31171.4

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255(Part 1)-1985	3.9	5
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	21.2	50
Oxides of Nitrogen(NO_X)	IS 11255(Part 7)-2005	193	250
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Xylene Column Reboiler Heater (Part A)
Sample Description	Manual Stack Emission Monitoring
Sampling Date	22.01.2019
Sample Receipt	23.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/007/060219

General Details	
Ambient Temperature (°C)	29
Stack Diameter (m)	3.69
Stack Height (m)	98
Stack Temperature (°C)	201
Flue Gas Velocity (m/s)	6.1
Flue gas flow rate (Nm^3/hr)	146749.8

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255 (Part 1)-1985	8.3	50
Sulphur Dioxide(SO_2)	IS 11255 (Part 3)-1985	15	850
Oxides of Nitrogen(NO_x)	IS 11255 (Part 7)-2005	55	350
Carbon monoxide (CO)	IS 5182 (Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

Inference: - STACK EMSSIONS AS ABOVE PARAMETERS ARE WITHIN STANDARDS

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Xylene Column Reboiler Heater (Part B)
Sample Description	Manual Stack Emission Monitoring
Sampling Date	22.01.2019
Sample Receipt	23.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/008/060219

General Details	
Ambient Temperature (°C)	29
Stack Diameter (m)	3.69
Stack Height (m)	98
Stack Temperature (°C)	196
Flue Gas Velocity (m/s)	6.8
Flue gas flow rate (Nm^3/hr)	148738.6

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255 (Part 1)-1985	8.1	50
Sulphur Dioxide (SO_2)	IS 11255 (Part 3)-1985	15	850
Oxides of Nitrogen (NO_x)	IS 11255 (Part 7)-2005	51	350
Carbon monoxide (CO)	IS 5182 (Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF JANUARY 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	BTF (Toluene Column Reboiler Heater)
Sample Description	Manual Stack Emission Monitoring
Sampling Date	23.01.2019
Sample Receipt	24.01.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	06.02.2019
Report No	HECS-OMPL/SEM/009/060219

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	3.29
Stack Height (m)	80
Stack Temperature (°C)	165
Flue Gas Velocity (m/s)	6.2
Flue gas flow rate (Nm^3/hr)	89668.7

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255(Part 1)-1985	7.1	50
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	9.5	850
Oxides of Nitrogen(NO_X)	IS 11255(Part 7)-2005	38	350
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

Inference: - STACK EMSSIONS AS ABOVE PARAMETERS ARE WITHIN STANDARDS

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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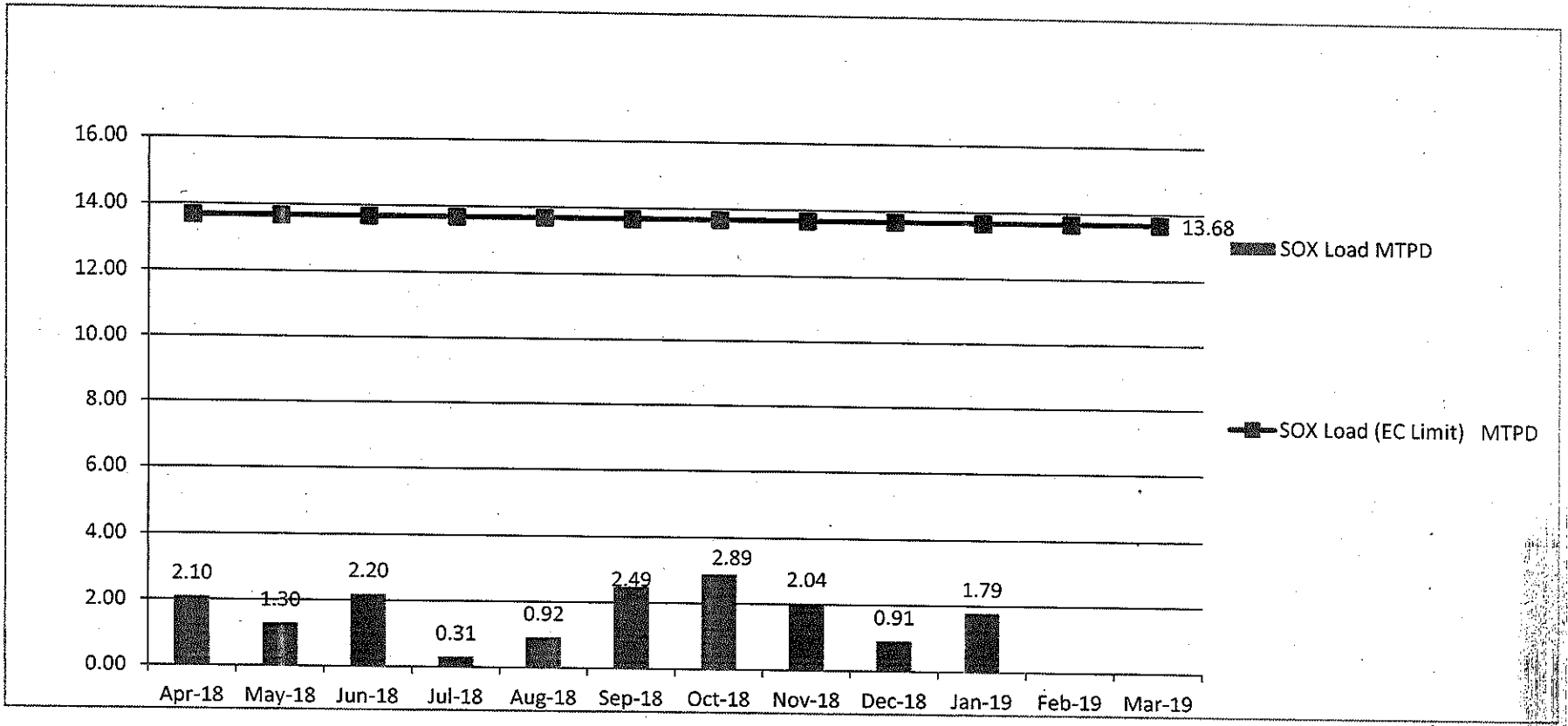
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Nov-18
Dec-18
Jan-19
Feb-19
Mar-19
SOX Load MTPD
SOX Load (EC Limit) MTPD

ANNEXURE - 1

Form-1 (Rule 4)

Returns Regarding Water Consumed during the Month of January, 2019

Name and address of the Consu	Purpose for which water consumed	Reading at the begining of the first day of the calendar month under report	Reading at the end of the last day of the calendar month under report	Quantity of Water Consumed in Kilo Leters	If the meter was out of order, the monthly average consumption of water for the previous 3 months of the working period	Quantity of water qualifying for rebate according to the assessee	Remarks
M/s ONGC Mangalore Petrochemicals Limited, Mangalore Special Economic Zone, Permude, Mangalore -574 509	**Industrial cooling, spraying in mine pits or boiler feed**						
	Cooling Water	0	85,747	85747			
	Boiler Feed Water	0	73274	73274			
	Fire Water	0	35217	35217			
	Domestic purpose						
	Drinking Water & Sanitation	0	6443	6443			
	Processing whereby water gets polluted and the pollutants are easily bio-degradable						
	Service Water		4880	4880			
Total Consumption				**2,05,561**			

Signature of the Consumer :

Name : Shivaprakash, Manager(Env)

Address : M/s ONGC Mangalore Petrochemicals Limited, Mangalore Special Economic Zone, Permude, Mangalore -574 509

ANNEXURE 1 G1

ANNEXURE-H

ONGC Mangalore Petrochemicals Limited

Production Details for January, 2019
Net Naptha Processed –1,50,680 MT

Sl. No.	Name of the Product	Quantity, MT
1	Paraxylene (Product)	75,356
2	Benzene (Co product)	20,849

ओ एन जी सी मंगलूर पेट्रोकेमिकल्स लिमिटेड
(मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड की सहायक कंपनी)
ONGC Mangalore Petrochemicals Ltd.
(A Subsidiary of Mangalore Refinery & Petrochemicals Ltd.)
(भारत सरकार का एक उद्यम)
(A Government of India Enterprise)
एमएसईज़ेड पेर्मुदे, मंगलूरु - ५७४ ५०९ MSEZ, Permude, Mangaluru - 574 509.
CIN : U40107KA2006GOI041258 दूरभाष Direct Line: 0824-2872000, फैक्स Fax: 0824-2872005. Website: www.ompl.co.in

REF: OMPL/PCB/SP/2018-19/ Date: 15/03/2019

To:
The Environmental Officer
Regional Office
KSPCB
Baikampady, Mangalore-11

MANGALORE SEZ LTD. RECEIVED 3626 28/3/19

Dear Sir,

Sub: Submission of Environmental Monitoring Report for the Month of February, 2019 and Production Report for February, 2019

Ref: KSPCB Combined Consent Order No. AW-301949 dated 27th January, 2017

With respect to the above subject; we are herewith submitting the following Environmental Monitoring Reports and Production Report for the Month of February, 2019 respectively, enclosed herewith.

1. Ambient Air Quality Monitoring at 5 different locations in and around OMPL, enclosed as Annexure- A
2. Water Analysis Reports at 9 different locations in and around OMPL, as Annexure-B
3. Noise Level Monitoring Report at OMPL, as Annexure-C
4. Treated Effluent Analysis Report, Annexure–D
5. Returns Regarding Water Consumed, for the Month of February, 2019, as Annexure-E
6. Production Report as Annexure-F
7. Manifest Report as Annexure- G

Thanking You,

Shivaprakash
Manager (Env)

Vinay Kumar
Checked

CC: **Member Secretary**, KSPCB, Bangalore
CC: **Head (Technical)**, MSEZ
CC: **CEO**, OMPL for info
CC: **COO**, OMPL for info

ANNEXURE - A

Hubert Enviro Care Systems (P) Ltd.
C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
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AMBIENT AIR QUALITY MONITORING TEST REPORT - FEBRUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - East Side
Report Date	06.03.2019
Report No	HECS/AA/001/060319

CONSOLIDATED TEST RESULTS

FEBRUARY '19 - Week		6-Week		7-Week		8-Week		9-Week		Avg. Value
Parameters	NAAQ	04.02.19	07.02.19	11.02.19	14.02.19	18.02.19	22.02.19	25.02.19	28.02.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	21.6	20.4	20.8	19.9	20.7	21.6	20.8	20.5	**20.79**
PM_{10} ($\mu g/m^3$)	100	43.3	43.9	44.3	45.4	43.8	42.3	41.9	44.7	**43.70**
SO_2 ($\mu g/m^3$)	80	4.7	5.2	4.6	4.9	5.1	4.7	5.3	4.5	**4.88**
NO_2 ($\mu g/m^3$)	80	5.6	6.3	5.6	6.0	6.1	6.3	5.5	5.4	**5.85**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr. K Ganesan - Lab Manager)

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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT - FEBRUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Shantigudda
Report Date	06.03.2019
Report No	HECS/AA/002/060319

CONSOLIDATED TEST RESULTS

FEBRUARY '19 - Week		6-Week		7-Week		8-Week		9-Week		Avg. Value
Parameters	NAAQ	04.02.19	07.02.19	11.02.19	14.02.19	18.02.19	22.02.19	25.02.19	28.02.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	19.1	18.6	19.4	19.1	19.5	19.6	19.2	20.2	**19.34**
PM_{10} ($\mu g/m^3$)	100	41.5	41.7	42.3	40.5	42.4	41.4	41.6	41.8	**41.65**
SO_2 ($\mu g/m^3$)	80	3.3	3.6	3.5	3.7	3.1	3.5	3.2	3.4	**3.41**
NO_2 ($\mu g/m^3$)	80	3.8	3.7	3.6	3.9	3.8	3.7	3.8	4.1	**3.80**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT–FEBRUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Tenka Ekkar
Report Date	06.03.2019
Report No	HECS/AA/003/060319

CONSOLIDATED TEST RESULTS

FEBRUARY '19 - Week		6-Week		7-Week		8-Week		9-Week		Avg. Value
Parameters	NAAQ	04.02.19	07.02.19	11.02.19	14.02.19	18.02.19	22.02.19	25.02.19	28.02.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.4	20.9	20.5	20.7	21.0	20.6	21.1	21.2	20.80
PM_{10} ($\mu g/m^3$)	100	42.5	43.6	42.0	41.5	42.1	41.3	43.2	42.7	42.36
SO_2 ($\mu g/m^3$)	80	4.8	4.6	5.0	5.0	4.5	5.0	4.5	4.4	4.73
NO_2 ($\mu g/m^3$)	80	5.8	6.0	5.7	5.5	5.4	6.3	5.6	6.1	5.80
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT - FEBRUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Permude Village
Report Date	06.03.2019
Report No	HECS/AA/004/060319

CONSOLIDATED TEST RESULTS

FEBRUARY '19 - Week		6-Week		7-Week		8-Week		9-Week		Avg. Value
Parameters	NAAQS	04.02.19	07.02.19	11.02.19	14.02.19	18.02.19	22.02.19	25.02.19	28.02.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.6	20.4	20.5	20.7	21.2	21.0	19.7	20.0	**20.51**
PM_{10} ($\mu g/m^3$)	100	42.7	41.7	42.7	42.8	42.8	41.9	42.1	41.7	**42.30**
SO_2 ($\mu g/m^3$)	80	5.6	5.7	5.5	5.7	5.4	5.2	5.7	5.4	**5.53**
NO_2 ($\mu g/m^3$)	80	6.4	6.1	6.3	6.3	6.6	5.7	5.8	5.9	**6.14**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-7920

AMBIENT AIR QUALITY MONITORING TEST REPORT - FEBRUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - West Side
Report Date	06.03.2019
Report No	HECS/AA/005/060319

CONSOLIDATED TEST RESULTS

FEBRUARY '19 - Week		6-Week		7-Week		8-Week		9-Week		Avg. Value
Parameters	NAAQ	04.02.19	07.02.19	11.02.19	14.02.19	18.02.19	22.02.19	25.02.19	28.02.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.8	20.7	20.6	21.0	20.8	21.6	21.0	20.5	**20.88**
PM_{10} ($\mu g/m^3$)	100	42.6	43.0	42.6	41.9	42.7	42.9	43.0	42.2	**42.61**
SO_2 ($\mu g/m^3$)	80	4.9	4.6	4.4	5.2	5.4	5.7	4.8	5.2	**5.03**
NO_2 ($\mu g/m^3$)	80	6.6	6.8	6.5	6.6	6.9	6.6	6.5	5.9	**6.55**
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE - B

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Certificate No. TC-7920

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	GW1 - Ground Water collected from Narayana Guru Community Hall, Permude
Date of Sampling	09.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/001/080319

RESULTS

S.No.	Parametersmonitored	Test method followed	Units	Results	IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.36	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	100.88	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	29.54	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	36.48	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	12.72	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	6.60	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	180	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	7.58	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.11	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	8.6	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW2 - Ground Water collected from Gagtel Labour Colony
Date of Sampling	09.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/002/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.26	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	62.08	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	17.11	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	11.52	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	21.53	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	4.71	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	127	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	8.25	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.8	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW3- Ground Water collected from L&T New Labor Colony
Date of Sampling	09.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/003/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.79	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	93.12	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	10.76	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	21.12	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	10.76	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	3.77	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	170.0	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	6.90	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.5	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-7920

TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW1- Open Well Water collected from Tenka Ekkar
Date of Sampling	09.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/004/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.09	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	89.24	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	17.11	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	17.28	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	16.63	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	11.32	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	133	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	9.07	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.6	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW2 - Open Well Water collected from Shantigudda Village
Date of Sampling	09.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/005/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.57	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	120.28	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	38.88	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	57.6	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	10.76	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	5.65	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	131	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	10.01	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	2.8	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL- Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW3 – Open Well Water collected from Permude Village
Date of Sampling	09.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/006/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.97	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	112.52	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	34.21	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	49.92	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	4.89	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	6.59	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	114.0	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	10.55	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.4	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW1 - Surface Water collected Near OMPL - Flare Area
Date of Sampling	27.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/007/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.83	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	266	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	91.38	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	48	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	215.25	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	9.23	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	960	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	18.94	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.35	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.9	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.098	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-NephelometricTurbidity Unit; mg/L - Milligrams per liter; NA-Not Available

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW2 - Surface Water collected Near OMPL - Near Central Warehouse
Date of Sampling	27.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/008/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.33	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	BDL (DL 1)	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	380	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	106.6	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	57.6	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	205.5	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	27.70	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	910	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.9	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.16	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per liter

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-C

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NOISE MONITORING TEST REPORT – FEBRUARY 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL – North, South, East and West sides
Sampling Date	21.02.2019
Report Date	04.03.2019
Report No.	HECS/N/001/040319

RESULTS

S.No.	Sampling Location	MoEF requirements in dB		Avg. Noise level observed in dB	
		Day	Night	Day	Night
1.	OMPL-North	75	70	68.9	67.7
2.	OMPL-South			69.1	65.6
3.	OMPL-East			70.0	67.8
4.	OMPL-West			71.1	67.7

Note: dB: Decibel

Limits: **Industrial Area: Day Time-75 dB (A),** Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Leq- Equivalent Noise Level (hourly); Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

INFERENCE: The observed noise levels are within the limits as per The Noise Pollution (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-D

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Certificate No. TC-7920

TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	13.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/010/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983(Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983,Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	4.95	100
4.	pH	IS:3025:(Pt 11):1983(Reaff 2006)	-	6.53	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983(Reaff:2006)	°C	30	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	3.4	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986(Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS 3025 Part (34)1988	mg/L	7.5	50
9.	Total Kjeldhal Nitrogen as N	IS 3025 Part (34)1988	mg/L	31.2	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL(DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993(Reaff 2009)	mg/L	BDL (DL 2)	30
12.	COD as O_2	IS 3025 Part (58)2006	mg/L	7.89	125
13.	Lead as Pb	IS:3025 (Pt 47)1994(Reaff 2009)	mg/L	BDL(DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS 3025 Part (52):2003	mg/L	BDL(DL 0.01)	0.1
15.	Total Chromium as Cr	IS 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL(DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992(Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994(Reaff 2009)	mg/L	BDL(DL 0.1)	5.0

1. The report in full or part shall not be used for any promotional or publicity purpose without written consent by HECS organization 2. Samples are not drawn by HECS unless or otherwise mentioned 3. Unless specifically requested by customer the test items will not be retained more than 15 days from the date of issue of test report. 4. Under no circumstances lab accepts any liability or loss / damage caused by use or misuse of test report after invoicing or issue of test report. 5. The test results relate only to the test items. 6. # not under scope of accreditation.

Hubert Enviro Care Systems (P) Ltd.
C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
Ph: 0824 - 2408111, Email: kro@hecs.in, Website: www.hecs.in
H.O.: # 18, 92nd Street, Ashok Nagar, Chennai - 600 083.
Ph: 42985555 Fax : 42985500 E-mail : labsales@hecs.in

Laboratory Services Division
Accredited by NABL in the fields of Chemical
ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. TC-7920

TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	13.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/010/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL(DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL(DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22nd Edition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL(DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL(DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL(DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL(DL 0.005)	0.05
26	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL(DL 0.01)	0.2
27.	Phenols as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL(DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	0.62	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL(DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL(DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL(DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL(DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENTWATER AS ABOVE PARAMETERSARE WITHIN STANDARDS

End of Report

Authorized Signatory
(Dr K Ganesan - Lab Manager)

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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Certificate No. TC-7920

TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	27.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/014/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983 (Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983, Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	4.00	100
4.	pH	IS:3025:(Pt 11):1983 (Reaff 2006)	-	6.57	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983 (Reaff:2006)	°C	30	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS: 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	3.6	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986 (Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS: 3025 Part (34)1988	mg/L	4.5	50
9.	Total Kjeldhal Nitrogen as N	IS: 3025 Part (34)1988	mg/L	9.95	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL(DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993 (Reaff 2009)	mg/L	BDL (DL 2)	30
12.	COD as O_2	IS: 3025 Part (58)2006	mg/L	7.94	125
13.	Lead as Pb	IS:3025 (Pt 47)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS: 3025 Part (52):2003	mg/L	BDL(DL 0.01)	0.1
15.	Total Chromium as Cr	IS: 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL(DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994 (Reaff 2009)	mg/L	BDL(DL 0.1)	5.0

1. The report in full or part shall not be used for any promotional or publicity purpose without written consent by HECS organization 2. Samples are not drawn by HECS unless or otherwise mentioned 3. Unless specifically requested by customer the test items will not be retained more than 15 days from the date of issue of test report. 4. Under no circumstances lab accepts any liability or loss / damage caused by use or misuse of test report after invoicing or issue of test report. 5. The test results relate only to the test items. 6. # not under scope of accreditation.

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Certificate No. TC-7920

TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	27.02.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	08.03.2019
Report No	HECS/W/014/080319

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL(DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL(DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL(DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22ndEdition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL(DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL(DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL(DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL(DL 0.005)	0.05
26.	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL(DL 0.01)	0.2
27.	Phenolic Compounds as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL(DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	0.52	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL(DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL(DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL(DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL(DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL(DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENT WATER AS ABOVE PARAMETERS ARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

1. The report in full or part shall not be used for any promotional or publicity purpose without written consent by HECS organization 2. Samples are not drawn by HECS unless or otherwise mentioned 3. Unless specifically requested by customer the test items will not be retained more than 15 days from the date of issue of test report. 4. Under no circumstances lab accepts any liability or loss / damage caused by use or misuse of test report after invoicing or issue of test report. 5. The test results relate only to the test items. 6. # not under scope of accreditation.

ANNEXURE - F

ONGC Mangalore Petrochemicals Limited

Production Details for February, 2019
Net Naptha Processed – 1,13,937 MT

Sl. No.	Name of the Product	Quantity, MT
1	Paraxylene (Product)	68,756
2	Benzene (Co product)	16,680

ANNEXURE-G

P 1/4

TO BE RETURNED BY THE OPERATOR TO PCB

FORM 13

[See rule 21 (4)]

1272

HAZARDOUS WASTE MANIFEST

1.	Occupiers Name & Mailing Address (including Phone No.) :	Indian Oil Corporation Ltd Guwahati Refinery PO Jawaharnagar
2.	Occupier's Registration No. :	CPCB/URD/103(04)/32627
3.	Mainfest Document No. :	1272
4.	Transporter's Name & Address (Including Phone No.) :	ONGC MANGLORE PETRO CHEMICALS LIMITED MANGLORE - 575006
5.	Type of Vehicle :	(Truck/Tanker/Special Vehicle)
6.	Transporter's Registration No. :	
7.	Vehicle Registration No. :	KA 20 A 5024
8.	Designated Facility Name & Site Address :	ONGC MANGLORE - 575006
9.	Facility's Registration No. :	305569/27788/23/11/18
10.	Facility's Phone :	0824- 2872000
11.	Waste Decription :	Spent catalyst
12.	Total Quantity :	10.500 MT m³ or MT
13.	Consistency :	(solid-semi-solid/Oily/Tarry/Slurry)
14.	Transport Deseription of Wastes :	Spent catalyst
15.	Containers :	Number: 59 NOS; Type: Spent catalyst
16.	Total Quality :	10.500 MT m³ or MT
17.	Unit Wt/Vol. :	10.500 MT m³ or MT
18.	Waste Category Number :	
19.	Special Handling Instructions & Additional Information :	PPE TO BE USED
20.	OCCUPIER'S CERTIFICATE	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and arc in all respects in proper condition for transport by road according to applicable national government regulations.
	Typed Name & Stamp : Signature:	Month Day Year
21.	Transporter Acknowledgement of Receipt of Wastes Typed Name & Stamp : Signature :	Deputy General Manager (HSE) Refinery, IOCL, Vadodara Month Day Year
22.	Discrepancy Note Space :	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp : Signature :	Month Day Year

04/12/18

P 2/3

TO BE RETURNED BY THE OPERATOR TO PCB

FORM 13

[See rule 21 (1)]

1273

HAZARDOUS WASTE MANIFEST

1.	Occupiers Name & Mailing Address (including Phone No.) :	Indian Oil Corpn. Ltd. GP P.O. Jawahar Nagar Vadodara
2.	Occupier's Registration No. :	GPCB/VDR/102(us)/32622 1273
3.	Mainfest Document No. :	
4.	Transporter's Name & Address (including Phone No.) :	M/S ONGC MANGALORE-575006 CHEMICALS LIMITED MANGALORE - 575006
5.	Type of Vehicle :	(Truck/Tanker/Special Vehicle)
6.	Transporter's Registration No. :	
7.	Vehicle Registration No. :	MP 07 HB 0563
8.	Designated Facility Name & Site Address :	ONGC MANGALORE-575006
9.	Facility's Registration No. :	308569/27788/23/11/18
10.	Facility's Phone :	0824-2872000
11.	Waste Decription :	Spent catalyst
12.	Total Quantity :	13.010 MT ..... m^3 or MT
13.	Consistency :	(soild-semi-solid/Oily/Tarry/Slurry)
14.	Transport Deseription of Wastes :	Spent catalyst
15.	Containers :	Number: 71 NOS; Type: Spent catalyst
16.	Total Quality	13.010 MT ..... m^3 or MT
17.	Unit Wt/Vol.	13.010 MT ..... m^3 or MT
18.	Waste Category Number	
19.	Special Handling Instructions & Additional Information	PPE To be Used
20.	OCCUPIER'S CERTIFICATE	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and arc in all respects in proper condition for transport by road according to applicable national government regulations.
	Typed Name & Stamp : SOUMITRA ROY CHOUDHURI Deputy General Manager (HSE) IOC Refinery, IOCL, Vadodara	Signature : सौमित्र रे चौधरी Month 1 2 Day 0 5 Year 2 0 1 8
21.	Transporter Acknowledgement of Receipt of Wastes Typed Name & Stamp :	Signature : Month 1 2 Day 0 5 Year 2 0 1 8
22.	Discrepancy Note Space	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp :	Signature : Month 1 2 Day 0 5 Year 2 0 1 8

05/12/18 MTM

P 3/4

TO BE RETURNED BY THE OPERATOR TO PCB

FORM 13

[See rule 21(1)]

HAZARDOUS WASTE MANIFEST

1274

1.	Occupiers Name & Mailing Address (including Phone No.)	Indian Oil Corpn. Ltd. GR. P.O. Jawahar Nagar-Vadodara.
2.	Occupier's Registration No.	GPCB/VAD/103(4)/22627
3.	Manifest Document No.	1274
4.	Transporter's Name & Address (including Phone No.)	M/S. ONGC Manaqolore-575006 Chemicals Limited Manaqolore - 575006
5.	Type of Vehicle	(Truck/Tanker/Special Vehicle)
6.	Transporter's Registration No.	
7.	Vehicle Registration No.	KA 32 A 4062
8.	Designated Facility Name & Site Address	ONGC MANAGLORE-575006
9.	Facility's Registration No.	308569/27788/23/11/18
10.	Facility's Phone	0824-2872000
11.	Waste Decription	Spent catalyst
12.	Total Quantity	11.260 m T ..... m^3 or MT
13.	Consistency	(solid-semi-solid/Oily/Tarry/Slurry)
14.	Transport Deseription of Wastes	Spent catalyst
15.	Containers	Number: 62 Drums; Type: 11.260 MT
16.	Total Quantity	11.260 m T ..... m^3 or MT
17.	Unit Wt/Vol.	11.260 m T ..... m^3 or MT
18.	Waste Category Number	
19.	Special Handling Instructions & Additional Information	PPE To be Used
20.	OCCUPIER'S CERTIFICATE	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and arc in all respects in proper condition for transport by road according to applicable national government regulations.
	Typed Name & Stamp: भरत प्रसाद BHARAT PRASAD सहायक प्रबंधक (सामग्री) Asst. Manager (Materials) गु.रि., आई.ओ.सी.ल., वडोदरा Gujarat Refinery, IOCL, Vadodara Signature:	Month / Day / Year: 1 2 0 6 2018
21.	Transporter Acknowledgement of Receipt of Wastes Typed Name & Stamp: MITRA RAY CHOUDHURI उप महाप्रबंधक (एचएसई) Deputy General Manager (HSE) गुजरात रिफाइनरी, आई.ओ.सी.एल., वडोदरा Gujarat Refinery, IOCL, Vadodara Signature:	Month / Day / Year: 1 2 0 6 2018
22.	Discrepancy Note Space	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp : Signature :	Month / Day / Year: 1 2 0 6 2018

P 4/

TO BE RETURNED BY THE OPERATOR TO PCB

FORM 13

[See rule 21 (1)]

1275

HAZARDOUS WASTE MANIFEST

1.	Occupiers Name & Mailing Address (including Phone No.)	Indian oil corporation LTD. Gujarat refinery po. jawaharnagar Vadodara
2.	Occupier's Registration No.	GIPCB/HRO/103(04)/32627
3.	Mainfest Document No.	1275
4.	Transporter's Name & Address (including Phone No.)	ONGC MANGALORE PETROCHEMICALS LIMITED MANGALORE - 575006
5.	Type of Vehicle	(Truck/Tanker/Special Vehicle)
6.	Transporter's Registration No.	
7.	Vehicle Registration No.	KA30 - 8155
8.	Designated Facility Name & Site Address	ONGC MANGALORE - 575006
9.	Facility's Registration No.	308569/27788/23/11/13
10.	Facility's Phone	0824 - 2872000
11.	Waste Decription	Spent catalyst
12.	Total Quantity	10.135 mt m³ or MT
13.	Consistency	(solid-semi-solid/Oily/Tarry/Slurry)
14.	Transport Deseription of Wastes	
15.	Containers	Number: 56 Drums; Type: spent catalyst
16.	Total Quality	10.135 MT m³ or MT
17.	Unit Wt/Vol.	10.135 MT m³ or MT
18.	Waste Category Number	
19.	Special Handling Instructions & Additional Information	PPE TO BE USED
20.	OCCUPIER'S CERTIFICATE	I hereby declare that the contents of the consignment are fully and accurately described above by proper shipping name and are categorised, packed, marked, and labeled, and arc in all respects in proper condition for transport by road according to applicable national government regulations.
	Typed Name & Stamp: SOUMITRA RAY CHOUDHURI Deputy General Manager (HSE) Gujarat Refinery, IOCL, Vadodara	Signature: Month 1 2 Day 0 6 Year 2 0 1 8
21.	Transporter Acknowledgement of Receipt of Wastes Typed Name & Stamp:	Signature: Month 1 2 Day 0 6 Year 2 0 1 8
22.	Discrepancy Note Space	
23.	Facility Owner or Operator's Certification of Receipt of Hazardous Waste	
	Typed Name & Stamp :	Signature : Month 1 2 Day 0 6 Year 2 0 1 8

ओ एन जी सी मंगलूर पेट्रोकेमिकल्स लिमिटेड
(मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड की सहायक कंपनी)
ONGC Mangalore Petrochemicals Ltd.
(A Subsidiary of Mangalore Refinery & Petrochemicals Ltd.)
एमएसईज़ेड पेर्मुदे, मंगलूरु - ५७४ ५०९ MSEZ, Permude, Mangaluru - 574 509.
CIN : U40107KA2006GOI041258 दूरभाष Direct Line: 0824-2872000, फैक्स Fax: 0824-2872005. Website: www.ompl.co.in

OMPL/PCB/RP/2019-20/

Date : 20/4/2019

To:

The Environment Officer
Regional Office
Karnataka State Pollution Control Board
Bykampady

Mangalore SEZ Ltd. -4081-
Documents & Contents subject to verification
Received date : 30.04.2019
Received by : V.Rshetty

Dear Sir,

Sub: Submission of Environmental Monitoring Report for the Month of March ,2019 and Production Report for March,2019

Ref: KSPCB Combined Consent Order No.AW-301949 dated 27th January, 2017

With respect to the above subject: we are herewith submitting the following Environmental Monitoring Reports and Production Report for the Month of March ,2019 respectively ,enclosed herewith.

1. Ambient Air Quality Monitoring at 5 different locations and around OMPL, enclosed as Annexure-A

2. Water Analysis Reports at 9 different locations in and around OMPL, as Annexure-B

3. Noise Level Monitoring Report at OMPL, as Annexure –C

4. Treated Effluent Analysis Report , Annexure-D

5. Stack Monitoring Report as Annexure- E

6. Production Report as Annexure-F

Thanking You,

Ramakanth Prabhu
Chief Manager – (Env)

Vinay Kumar
Chief Manager (Env)
3/6/19

CC: 1. Member Secretary, KSPCB, Bangalore
2. Head Technical – MSEZ
3. CEO, OMPL for info only
4. COO , OMPL for info only

ANNEXURE - A

Hubert Enviro Care Systems (P) Ltd.
C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
Ph: 0824 - 2408111, Email: kro@hecs.in, Website: www.hecs.in
H.O.: # 18, 92nd Street, Ashok Nagar, Chennai - 600 083.
Ph: 42985555 Fax : 42985500 E-mail : labsales@hecs.in

Laboratory Services Division
Accredited by NABL in the fields of Chemical
ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - MARCH 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - East Side
Report Date	03.04.2019
Report No	HECS/AA/001/030419

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		10-Week		11-Week		12-Week		13-Week		Avg. Value
Parameters	NAAQ	04.03.19	07.03.19	11.03.19	14.03.19	18.03.19	21.03.19	25.03.19	28.03.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	22.4	21.2	21.3	20.4	21.3	22.5	21.3	21.6	21.50
PM_{10} ($\mu g/m^3$)	100	44.3	44.8	45.2	46.4	44.2	42.4	42.8	45.8	44.49
SO_2 ($\mu g/m^3$)	80	5.2	5.6	5.2	5.4	6.2	5.3	6.1	4.9	5.49
NO_2 ($\mu g/m^3$)	80	6.2	6.9	6.3	7.5	6.7	6.5	5.6	5.8	6.44
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	**BDL**

Test Methods Followed:

PM_{10}	: IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$	: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2	: IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2	: IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3	: HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3	: HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO	: IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni	: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6	: GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P	: In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - MARCH 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Shantigudda
Report Date	03.04.2019
Report No	HECS/AA/002/030419

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		10-Week		11-Week		12-Week		13-Week		Avg. Value
Parameters	NAAQ	04.03.19	07.03.19	11.03.19	14.03.19	18.03.19	21.03.19	25.03.19	28.03.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.4	19.4	20.8	20.7	20.7	20.3	20.4	21.6	20.54
PM_{10} ($\mu g/m^3$)	100	42.6	42.5	43.2	41.6	43.6	42.5	42.8	42.4	42.65
SO_2 ($\mu g/m^3$)	80	3.7	4.2	4.4	4.8	4.3	3.7	4.8	4.1	4.25
NO_2 ($\mu g/m^3$)	80	4.3	4.6	4.2	4.6	4.5	4.1	4.2	5.2	4.46
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

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Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT–MARCH 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Tenka Ekkar
Report Date	03.04.2019
Report No	HECS/AA/003/030419

MARCH '19 - Week		10-Week		11-Week		12-Week		13-Week		Avg. Value
Parameters	NAAQ	04.03.19	07.03.19	11.03.19	14.03.19	18.03.19	21.03.19	25.03.19	28.03.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	21.5	21.7	21.7	21.8	22.7	21.8	22.8	22.8	22.10
PM_{10} ($\mu g/m^3$)	100	43.6	44.8	43.4	42.6	43.8	42.5	44.6	43.9	43.65
SO_2 ($\mu g/m^3$)	80	5.5	5.2	5.7	5.7	5.2	5.6	4.7	5.2	5.35
NO_2 ($\mu g/m^3$)	80	6.3	6.9	6.2	6.3	6.1	7.1	5.9	7.2	6.50
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

ENVIRO CARE SYSTEMS

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(Dr K Ganesan - Lab Manager)

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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - MARCH 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Permude Village
Report Date	03.04.2019
Report No	HECS/AA/004/030419

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		10-Week		11-Week		12-Week		13-Week		Avg. Value
Parameters	NAAQS	04.03.19	07.03.19	11.03.19	14.03.19	18.03.19	21.03.19	25.03.19	28.03.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	21.7	21.6	21.5	21.8	22.5	22.1	20.8	21.3	21.66
PM_{10} ($\mu g/m^3$)	100	43.6	42.5	43.4	43.7	43.3	42.8	43.2	42.1	43.08
SO_2 ($\mu g/m^3$)	80	6.4	6.3	6.6	6.2	6.1	6.3	6.1	6.3	6.29
NO_2 ($\mu g/m^3$)	80	7.2	7.4	7.2	6.8	7.2	6.6	6.4	6.7	6.94
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

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(Dr K Ganesan - Lab Manager)

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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - MARCH 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - West Side
Report Date	03.04.2019
Report No	HECS/AA/005/030419

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		10-Week		11-Week		12-Week		13-Week		Avg. Value
Parameters	NAAQ	04.03.19	07.03.19	11.03.19	14.03.19	18.03.19	21.03.19	25.03.19	28.03.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	21.3	21.4	21.6	22.1	21.7	22.3	22.6	21.6	21.83
PM_{10} ($\mu g/m^3$)	100	43.5	43.9	43.6	42.3	43.6	43.4	43.4	43.7	43.43
SO_2 ($\mu g/m^3$)	80	5.2	5.1	4.8	5.4	5.8	6.2	5.3	5.9	5.46
NO_2 ($\mu g/m^3$)	80	7.1	7.3	7.5	7.0	7.4	7.3	7.1	6.7	7.18
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE - B

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Certificate No. TC-5786

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	GW1 - Ground Water collected from Narayana Guru Community Hall, Permude
Date of Sampling	18.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/001/030419

RESULTS

S.No.	Parametersmonitored	Test method followed	Units	Results	IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.23	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	174.24	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	52.38	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	85.14	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	7.83	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	10.59	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	190.0	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.13	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	8.9	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.17	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Laboratory Services Division
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Certificate No. TC-5786

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW2 - Ground Water collected from Gagtel Labour Colony
Date of Sampling	18.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/002/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.02	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	83.16	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	20.63	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	19.8	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	9.78	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	7.69	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	124	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	2.84	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.146	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW3 - Ground Water collected from L&T New Labor Colony
Date of Sampling	18.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/003/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.93	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	198	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	10.76	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	21.12	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	19.57	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	12.03	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	290	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	5.01	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.9	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.034	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW4-Ground Water collected Near OMPL - ETP
Date of Sampling	18.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/004/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.22	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	71.28	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	20.63	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	71.28	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	10.76	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	4.81	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	126.0	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	5.55	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.7	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW1- Open Well Water collected from TenkaEkkar
Date of Sampling	18.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/005/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.44	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	198	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	47.61	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	103.95	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	53.81	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	19.245	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	220	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	15.29	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.2	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW2 - Open Well Water collected from Shantigudda Village
Date of Sampling	18.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/006/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.52	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	63.36	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	19.05	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	25.75	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	11.74	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	3.85	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	123	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	8.66	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.0	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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HUBERT ENVIRO CARE SYSTEM (P) LTD.

Authorized Signatory
(Dr. K Ganesan - Lab Manager)

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW3 – Open Well Water collected from Permude Village
Date of Sampling	18.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/007/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	8.47	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	138.6	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	43.65	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	79.2	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	4.89	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	7.22	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	210	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	56.80	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.6	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.03	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

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(Dr K Ganesan - Lab Manager)

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW1 - Surface Water collected Near OMPL - Flare Area
Date of Sampling	15.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/008/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	8.06	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	60.8	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	13.71	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	23.76	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	11.74	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	6.46	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	105	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.39	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.7	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.021	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-NephelometricTurbidity Unit; mg/L - Milligrams per liter; NA-Not Available

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW2 - Surface Water collected Near OMPL - Near Central Warehouse
Date of Sampling	15.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/009/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	8.12	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	41.8	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	12.18	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	23.76	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	12.72	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	2.77	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	107	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.5	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per liter

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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ANNEXURE-C

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NOISE MONITORING TEST REPORT – MARCH 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - North, South, East and West sides
Sampling Date	14.03.2019
Report Date	03.04.2019
Report No.	HECS/N/001/030419

RESULTS

S.No.	Sampling Location	MoEF requirements in dB		Avg. Noise level observed in dB	
		Day	Night	Day	Night
1.	OMPL-North	75	70	69.3	67.9
2.	OMPL-South			69.7	66.3
3.	OMPL-East			70.4	68.4
4.	OMPL-West			71.6	68.2

Note: dB: Decibel

Limits: **Industrial Area: Day Time-75 dB (A),** Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Leq- Equivalent Noise Level (hourly); Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

INFERENCE: The observed noise levels are within the limits as per The Noise Pollution (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	15.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/011/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983(Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983,Reaff 2006	-	Agreeable	
3.	Total Suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	BDL (DL 4)	100
4.	pH	IS:3025:(Pt 11):1983(Reaff 2006)	-	7.29	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983(Reaff:2006)	°C	32	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	BDL (DL 2)	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986(Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS 3025 Part (34)1988	mg/L	7.5	50
9.	Total Kjeldhal Nitrogen as N	IS 3025 Part (34)1988	mg/L	31.2	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL (DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993(Reaff 2009)	mg/L	BDL (DL 2)	30
12.	COD as O_2	IS 3025 Part (58)2006	mg/L	11.71	125
13.	Lead as Pb	IS:3025 (Pt 47)1994(Reaff 2009)	mg/L	BDL (DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS 3025 Part (52):2003	mg/L	BDL (DL 0.01)	0.1
15.	Total Chromium as Cr	IS 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL (DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992(Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994(Reaff 2009)	mg/L	BDL (DL 0.1)	5.0

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	15.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/011/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL (DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL (DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22nd Edition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL (DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL (DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL (DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL (DL 0.005)	0.05
26	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL (DL 0.01)	0.2
27.	Phenols as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL (DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	0.58	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL (DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL (DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL (DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL (DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENTWATER AS ABOVE PARAMETERSARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	28.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/015/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983 (Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983, Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	4.00	100
4.	pH	IS:3025:(Pt 11):1983 (Reaff 2006)	-	7.32	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983 (Reaff:2006)	°C	33	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS: 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	BDL (DL 2)	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986 (Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS: 3025 Part (34)1988	mg/L	4.2	50
9.	Total Kjeldhal Nitrogen as N	IS: 3025 Part (34)1988	mg/L	9.72	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL (DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993 (Reaff 2009)	mg/L	BDL (DL 2)	30
12.	COD as O_2	IS: 3025 Part (58)2006	mg/L	11.2	125
13.	Lead as Pb	IS:3025 (Pt 47)1994 (Reaff 2009)	mg/L	BDL (DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS: 3025 Part (52):2003	mg/L	BDL (DL 0.01)	0.1
15.	Total Chromium as Cr	IS: 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL (DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992 (Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994 (Reaff 2009)	mg/L	BDL (DL 0.1)	5.0

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	28.03.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS/W/015/030419

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL (DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL (DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22ndEdition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL (DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL (DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL (DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL (DL 0.005)	0.05
26.	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL (DL 0.01)	0.2
27.	Phenolic Compounds as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL (DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	0.45	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL (DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL (DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL (DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL (DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENT WATER AS ABOVE PARAMETERS ARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr. K Ganesan - Lab Manager)

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ANNEXURE-E

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Certificate No. TC-5786

EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF MARCH 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	NHT Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	08.03.2019
Sample Receipt	09.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/001/030419

General Details	
Ambient Temperature (°C)	31
Stack Diameter (m)	1.96
Stack Height (m)	65
Stack Temperature (°C)	256
Flue Gas Velocity (m/s)	10.5
Flue gas flow rate (Nm^3/hr)	54642.0

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255 (Part 1)-1985	4.5	5
Sulphur Dioxide (SO_2)	IS 11255 (Part 3)-1985	46	50
Oxides of Nitrogen (NO_x)	IS 11255 (Part 7)-2005	78	250
Carbon monoxide (CO)	IS 5182 (Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

Inference: - STACK EMSSIONS AS ABOVE PARAMETERS ARE WITHIN STANDARDS

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

(Dr K GANESAN)
Authorized Signatory

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Laboratory Services Division
Accredited by NABL in the fields of Chemical
ISO 9001, 14001 & OHSAS 18001 Certified.

Certificate No. TC-5786

EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF MARCH 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Isomer Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	06.03.2019
Sample Receipt	07.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/002/030419

General Details	
Ambient Temperature (°C)	31
Stack Diameter (m)	2.4
Stack Height (m)	66
Stack Temperature (°C)	186
Flue Gas Velocity (m/s)	5.0
Flue gas flow rate (Nm^3/hr)	40168.3

Parameter monitored	Protocol	Results(mg/Nm^3)	Standard Norms(mg/Nm^3)
SPM	IS 11255(Part 1)-1985	4.3	5
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	28	50
Oxides of Nitrogen (NO_X)	IS 11255(Part 7)-2005	185	250
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	CPP (GTG-HRSG) – 1
Sample Description	Manual Stack Emission Monitoring
Sampling Date	11.03.2019
Sample Receipt	12.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/003/030419

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	2.9
Stack Height (m)	70
Stack Temperature (°C)	117
Flue Gas Velocity (m/s)	14.7
Flue gas flow rate (Nm^3/hr)	19269.3

Parameter monitored	Protocol	Results(mg/Nm^3)	Standard Norms(mg/Nm^3)
SPM	IS 11255(Part 1)-1985	36.5	50
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	152	850
Oxides of Nitrogen(NO_X)	IS 11255(Part 7)-2005	212	350
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Plat former Unit Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	07.03.2019
Sample Receipt	08.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/004/030419

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	4.2
Stack Height (m)	95
Stack Temperature (°C)	165
Flue Gas Velocity (m/s)	6.0
Flue gas flow rate (Nm^3/hr)	180562.2

Parameter monitored	Protocol	Results(mg/Nm^3)	Standard Norms(mg/Nm^3)
SPM	IS 11255(Part 1)-1985	3.7	5
Sulphur Dioxide (SO_2)	IS 11255(Part 3)-1985	37.5	50
Oxides of Nitrogen(NO_X)	IS 11255(Part 7)-2005	129	250
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
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Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	CPP Utility Boiler
Sample Description	Manual Stack Emission Monitoring
Sampling Date	11.03.2019
Sample Receipt	12.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/005/030419

General Details	
Ambient Temperature (°C)	29
Stack Diameter (m)	2.75
Stack Height (m)	70
Stack Temperature (°C)	174
Flue Gas Velocity (m/s)	15.6
Flue gas flow rate (Nm^3/hr)	195649.0

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255(Part 1)-1985	24.9	50
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	70.5	850
Oxides of Nitrogen(NO_X)	IS 11255(Part 7)-2005	163	350
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF MARCH 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Tatory Charge Heater
Sample Description	Manual Stack Emission Monitoring
Sampling Date	06.03.2019
Sample Receipt	06.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/006/030419

General Details	
Ambient Temperature (°C)	29
Stack Diameter (m)	1.75
Stack Height (m)	65
Stack Temperature (°C)	171
Flue Gas Velocity (m/s)	6.2
Flue gas flow rate (Nm^3/hr)	31267.5

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255(Part 1)-1985	4.1	5
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	21.7	50
Oxides of Nitrogen(NO_x)	IS 11255(Part 7)-2005	198	250
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	100

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF MARCH 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Xylene Column Reboiler Heater (Part A)
Sample Description	Manual Stack Emission Monitoring
Sampling Date	05.03.2019
Sample Receipt	06.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/007/030419

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	3.69
Stack Height (m)	98
Stack Temperature (°C)	204
Flue Gas Velocity (m/s)	6.5
Flue gas flow rate (Nm^3/hr)	146869.5

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255 (Part 1)-1985	8.7	50
Sulphur Dioxide(SO_2)	IS 11255 (Part 3)-1985	19	850
Oxides of Nitrogen(NO_x)	IS 11255 (Part 7)-2005	62	350
Carbon monoxide (CO)	IS 5182 (Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF MARCH 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	Xylene Column Reboiler Heater (Part B)
Sample Description	Manual Stack Emission Monitoring
Sampling Date	05.03.2019
Sample Receipt	06.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/008/030419

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	3.69
Stack Height (m)	98
Stack Temperature (°C)	199
Flue Gas Velocity (m/s)	7.2
Flue gas flow rate (Nm^3/hr)	148862.7

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255 (Part 1)-1985	8.3	50
Sulphur Dioxide (SO_2)	IS 11255 (Part 3)-1985	17	850
Oxides of Nitrogen (NO_X)	IS 11255 (Part 7)-2005	56	350
Carbon monoxide (CO)	IS 5182 (Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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EMISSION AIR FROM STACK/ CHIMNEY MONITORING TEST REPORT OF MARCH 2019

Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	BTF (Toluene Column Reboiler Heater)
Sample Description	Manual Stack Emission Monitoring
Sampling Date	07.03.2019
Sample Receipt	08.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/009/030419

General Details	
Ambient Temperature (°C)	31
Stack Diameter (m)	3.29
Stack Height (m)	80
Stack Temperature (°C)	169
Flue Gas Velocity (m/s)	6.7
Flue gas flow rate (Nm^3/hr)	89782.5

Parameter monitored	Protocol	Results (mg/Nm^3)	Standard Norms (mg/Nm^3)
SPM	IS 11255(Part 1)-1985	7.4	50
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	11	850
Oxides of Nitrogen(NO_x)	IS 11255(Part 7)-2005	42	350
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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Name of the Industry	M/s ONGC Mangalore Petrochemicals Limited
Address of the Industry	Mangalore SEZ, Permude Village, Mangalore-574509, Karnataka, India.
Stack ID	CPP (GTG-HRSG) – 2
Sample Description	Manual Stack Emission Monitoring
Sampling Date	08.03.2019
Sample Receipt	09.03.2019
Equipment Used	Vayubodhan VSS1
Method of Sampling & Analysis	IS 11255:1995 Methods for Measurement of Emission from Stationary Sources
Sample Drawn by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.04.2019
Report No	HECS-OMPL/SEM/010/030419

General Details	
Ambient Temperature (°C)	30
Stack Diameter (m)	2.9
Stack Height (m)	70
Stack Temperature (°C)	119
Flue Gas Velocity (m/s)	14.8
Flue gas flow rate (Nm^3/hr)	19267.2

Parameter monitored	Protocol	Results(mg/Nm^3)	Standard Norms(mg/Nm^3)
SPM	IS 11255(Part 1)-1985	36.6	50
Sulphur Dioxide(SO_2)	IS 11255(Part 3)-1985	153	850
Oxides of Nitrogen(NO_x)	IS 11255(Part 7)-2005	214	350
Carbon monoxide (CO)	IS 5182(Part 10)-1999	BDL (DL 1)	150

Note: mg/Nm^3: milligram per normal cubic meter; SPM: Suspended Particulate Matter;
m/s – Meter per second; Nm^3/hr – Normal cubic meter per hour

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ANNEXURE - F

ONGC Mangalore Petrochemicals Limited

Production Details for March, 2019
Net Naptha Processed –1,59,591 MT

Sl. No.	Name of the Product	Quantity, MT
1	Paraxylene (Product)	84,670
2	Benzene (Co product)	22,309

ओ एन जी सी मंगलूर पेट्रोकेमिकल्स लिमिटेड
(मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड की सहायक कंपनी)
ONGC Mangalore Petrochemicals Ltd.
(A Subsidiary of Mangalore Refinery & Petrochemicals Ltd.)
(भारत सरकार का एक उद्यम)
(A Government of India Enterprise)
एमएसईज़ेड पेर्मुदे, मंगलूरु – ५७४ ५०९ MSEZ, Permude, Mangaluru - 574 509.
CIN : U40107KA2006GOI041258 दूरभाष Direct Line: 0824-2872000, फैक्स Fax: 0824-2872005. Website: www.ompl.co.in

REF: OMPL/PCB/HRP/2019-20/

Date: 20/05/2019

Mangalore SEZ Ltd. -4082-
Documents & Contents subject to verification
Received date: 30.05.2019
Received by : V.Prabhu

To:
The Environmental Officer
Regional Office
KSPCB
Baikampady, Mangalore-11

Dear Sir,

Sub: Submission of Environmental Monitoring Report for the Month of April, 2019 and Production Report for April, 2019

Ref: KSPCB Combined Consent Order No. AW-301949 dated 27th January, 2017

With respect to the above subject; we are herewith submitting the following Environmental Monitoring Reports and Production Report for the Month of April, 2019 respectively, enclosed herewith.

1. Ambient Air Quality Monitoring at 5 different locations in and around OMPL, enclosed as Annexure-A
2. Water Analysis Reports at 9 different locations in and around OMPL, as Annexure-B
3. Noise Level Monitoring Report at OMPL, as Annexure-C
4. Treated Effluent Analysis Report, Annexure–D
5. Returns Regarding Water Consumed, for the Month of April, 2019, as Annexure-E
6. Production Report as Annexure-F

Thanking You,

H R Prabhu
Chief Manager (Env)

Vinay Kumar
Check Issues for my Use

3/6/19

CC: **Member Secretary**, KSPCB, Bangalore
CC: **Head (Technical)**, MSEZ
CC: **CEO**, OMPL for info
CC: **COO**, OMPL for info

ANNEXURE-A

Hubert Enviro Care Systems (P) Ltd.
C-45, Industrial Estate, Baikampady, Mangalore, Karnataka - 575011.
Ph: 0824 - 2408111, Email: kro@hecs.in, Website: www.hecs.in
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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - APRIL 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - East Side
Report Date	03.05.2019
Report No	HECS/AA/001/030519

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		14-Week		15-Week		16-Week		17-Week		18-Week	Avg. Value
Parameters	NAAQ	01.04.19	04.04.19	08.04.19	11.04.19	15.04.19	18.04.19	22.04.19	25.04.19	29.04.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	21.3	19.9	19.8	19.1	20	21.2	20.1	20.3	21.4	20.3
PM_{10} ($\mu g/m^3$)	100	43.0	43.5	43.9	45.1	42.9	41.1	41.5	44.5	43.6	43.2
SO_2 ($\mu g/m^3$)	80	3.8	4.3	3.9	4.1	4.9	4.0	4.8	3.6	4.2	4.2
NO_2 ($\mu g/m^3$)	80	4.9	5.6	5.0	6.2	5.4	5.2	4.3	4.5	5.0	5.1
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10}	: IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$	: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2	: IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2	: IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3	: HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3	: HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO	: IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni	: In-house method based on CPCB guidelines vol. I (2011)
C_6H_6	: GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P	: In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - APRIL 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Shantigudda
Report Date	03.05.2019
Report No	HECS/AA/002/030519

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		14-Week		15-Week		16-Week		17-Week		18-Week	Avg. Value
Parameters	NAAQ	01.04.19	04.04.19	08.04.19	11.04.19	15.04.19	18.04.19	22.04.19	25.04.19	29.04.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	19.9	18.9	20.3	20.2	20.2	19.8	19.9	21.1	20.4	20.1
PM_{10} ($\mu g/m^3$)	100	42.1	42.0	42.7	41.1	43.1	42	42.3	41.9	42.6	42.2
SO_2 ($\mu g/m^3$)	80	3.2	3.7	3.9	4.3	3.8	3.2	4.3	3.6	3.5	3.7
NO_2 ($\mu g/m^3$)	80	3.8	4.1	3.7	4.1	4.0	3.6	3.7	4.7	4.2	4.0
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

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Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT–APRIL 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Tenka Ekkar
Report Date	03.05.2019
Report No	HECS/AA/003/030519

MARCH '19 - Week		14-Week		15-Week		16-Week		17-Week		18-Week	Avg.
Parameters	NAAQ	01.04.19	04.04.19	08.04.19	11.04.19	15.04.19	18.04.19	22.04.19	25.04.19	29.04.19	Value
$PM_{2.5}$ ($\mu g/m^3$)	60	21.1	21.4	21.3	21.4	22.3	21.4	22.3	22.4	21.5	21.7
PM_{10} ($\mu g/m^3$)	100	43.2	44.4	43.0	42.2	43.4	42.1	44.2	43.5	42.8	43.2
SO_2 ($\mu g/m^3$)	80	5.1	4.8	5.3	5.3	4.8	5.2	4.3	4.8	5.1	5.0
NO_2 ($\mu g/m^3$)	80	5.9	6.5	5.8	5.9	5.7	6.7	5.5	6.8	6	6.1
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene ($\mu g/m^3$)	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
SO_2 : IS 5182 (Pt 2): 2001 (RA 2017) (Improved west and Geake method)
NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
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Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

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Authorized Signatory
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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - APRIL 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	Permude Village
Report Date	03.05.2019
Report No	HECS/AA/004/030519

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		14-Week		15-Week		16-Week		17-Week		18-Week	Avg. Value
Parameters	NAAQS	01.04.19	04.04.19	08.04.19	11.04.19	15.04.19	18.04.19	22.04.19	25.04.19	29.04.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	21.2	21.1	21.0	21.3	22	21.6	20.3	20.8	20.5	21.1
PM_{10} ($\mu g/m^3$)	100	43.1	42.0	42.9	43.2	42.8	42.3	42.7	41.6	42.6	42.6
SO_2 ($\mu g/m^3$)	80	5.9	5.8	6.1	5.7	5.6	5.8	5.6	5.8	6.0	5.8
NO_2 ($\mu g/m^3$)	80	6.7	6.9	6.7	6.3	6.7	6.1	5.9	6.2	6.5	6.4
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

PM_{10} : IS 5182 (Pt 23): 2006 (RA 2017) (Gravimetric)
$PM_{2.5}$: HECS/AIR/SOP/002 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
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NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
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Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

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Authorized Signatory
(Dr K Ganesan - Lab Manager)

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Certificate No. TC-5786

AMBIENT AIR QUALITY MONITORING TEST REPORT - APRIL 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Ambient Air Quality Monitoring (AAQ)
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - West Side
Report Date	03.05.2019
Report No	HECS/AA/005/030519

CONSOLIDATED TEST RESULTS

MARCH '19 - Week		14-Week		15-Week		16-Week		17-Week		18-Week	Avg. Value
Parameters	NAAQ	01.04.19	04.04.19	08.04.19	11.04.19	15.04.19	18.04.19	22.04.19	25.04.19	29.04.19	
$PM_{2.5}$ ($\mu g/m^3$)	60	20.9	21.0	21.2	21.7	21.3	21.9	22.2	21.2	21.1	21.4
PM_{10} ($\mu g/m^3$)	100	43.1	43.5	43.2	41.9	43.2	42.9	43.1	43.3	42.5	43.0
SO_2 ($\mu g/m^3$)	80	4.8	4.7	4.4	5	5.4	5.8	4.9	5.5	4.9	5.0
NO_2 ($\mu g/m^3$)	80	6.7	6.9	7.1	6.6	7.0	6.8	6.7	6.4	6.8	6.9
CO (mg/m^3)	2.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
O_3 ($\mu g/m^3$)	100	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
NH_3 ($\mu g/m^3$)	400	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Pb ($\mu g/m^3$)	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
As (ng/m^3)	6.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ni (ng/m^3)	20	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	05	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
B(α)P (ng/m^3)	01	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

Test Methods Followed:

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NO_2 : IS 5182 (Pt 6): 2006 (RA 2017) (Jacob and Hochheiser modified method)
O_3 : HECS/AIR/SOP/005 Issue 02 dt. 13.06.2018 based on CPCB guidelines vol. I (2011)
NH_3 : HECS/AIR/SOP/006 Issue 02 dt.13.06.2018 as per CPCB guidelines vol. I (2011)
CO : IS 5182 (Pt 10): 1999 (RA 2013)
Pb, As, Ni : In-house method based on CPCB guidelines vol. I (2011)
C_6H_6 : GC FID/ GC MS based on IS: 5182 (Pt 11) based on CPCB guidelines vol. I (2011)
B(α)P : In-house validated method based on CPCB guidelines vol. I (2011)

Note: BDL =Below detection limit; DL - Detection Limit; $PM_{2.5}$-Particulate matter size less than 2.5 Micron, PM_{10}-Particulate matter size less than 10 Micron; SO_2Sulphur dioxide; NO_2 - Nitrogen-di-oxide; CO - Carbon Mono Oxide (DL 0.1 mg/m^3);O_3-Ozone(DL 10 $\mu g/m^3$);NH_3-Ammonia (DL 5 $\mu g/m^3$); Pb-Lead (DL 0.05 $\mu g/m^3$);As-Arsenic (DL 0.1 ng/m^3);Ni-Nickel (DL 0.5 ng/m^3); Benzene-(DL 1 $\mu g/m^3$);B(α)P- Benzo -α-pyrene(DL0.5 ng/m^3); ng/m^3: nanogram per cubic meter; $\mu g/m^3$ - microgram per cubic meter.

CONCLUSION: ALL THE PARAMETERS MEET THE NAAQ STANDARDS

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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ANNEXURE-B

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Certificate No. TC-5786

TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	GW1 - Ground Water collected from Narayana Guru Community Hall, Permude
Date of Sampling	11.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/001/030519

RESULTS

S.No.	Parametersmonitored	Test method followed	Units	Results	IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.96	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	158.4	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	39.68	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	94.05	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	14.57	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	14.43	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	190	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	5.29	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.11	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	8.7	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.16	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW2 - Ground Water collected from Gagtel Labour Colony
Date of Sampling	11.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/002/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.83	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	186.12	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	46.03	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	93.06	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	9.71	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	17.32	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	180	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	5.29	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.1	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.148	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW3 - Ground Water collected from L&T New Labour Colony
Date of Sampling	11.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/003/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.21	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	148.5	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	31.74	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	54.45	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	7.77	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	16.83	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	190	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	5.06	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.7	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.032	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF GROUND WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	GW4-Ground Water collected Near OMPL - ETP
Date of Sampling	11.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/004/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.53	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	130.68	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	30.16	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	53.46	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	23.31	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	13.47	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	190	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.4	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	Escherichia coli	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: GROUND WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW1- Open Well Water collected from TenkaEkkar
Date of Sampling	11.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/005/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.31	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	178.2	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	47.62	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	99	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	14.57	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	14.43	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	210	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	6	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.1	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW2 - Open Well Water collected from Shantigudda Village
Date of Sampling	11.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/006/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.76	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	207.9	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	39.67	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	103.95	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	14.59	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	46.97	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	200	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	5.88	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.2	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

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TEST REPORT OF OPEN WELL WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	OW3 – Open Well Water collected from Permude Village
Date of Sampling	11.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/007/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	6.60	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	83.16	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	19.05	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	35.64	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	25.25	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	14.28	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	160	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	5.76	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.02	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per Liter; MPN- Most Probable Number; mL-Milliliter

CONCLUSION: OPENWELL WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW1 - Surface Water collected Near OMPL - Flare Area
Date of Sampling	06.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/008/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.48	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	59.4	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	14.28	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	25.74	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	16.51	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	5.77	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	101	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	0.36	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	3.5	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	0.023	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-NephelometricTurbidity Unit; mg/L - Milligrams per liter; NA-Not Available

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr K Ganesan - Lab Manager)

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TEST REPORT OF SURFACE WATER QUALITY MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	SW2 - Surface Water collected Near OMPL - Near Central Warehouse
Date of Sampling	06.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/009/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	As per IS10500:2012 Permissible Limit
1.	pH (at 25°C)	IS 3025 (Part-11) 1983	-	7.91	6.5-8.5
2.	Colour	IS 3025 (Part-4) 1983	Hazen unit	Colourless	15
3.	Turbidity	IS 3025 (Part-10) 1984	NTU	BDL (DL 0.1)	5 max
4.	Odour	IS 3025 (Part-5) 1983	-	Agreeable	Agreeable
5.	Taste	IS 3025 (Part-8) 1984	-	Agreeable	Agreeable
6.	Total Hardness as $CaCo_3$	IS 3025 (Part-21) 1983	mg/L	75.24	600 max
7.	Calcium as Ca	IS 3025 (Part-40) 1991	mg/L	14.28	200 max
8.	Total Alkalinity as $CaCO_3$	IS 3025 (Part-23) 1986	mg/L	25.74	200 max
9.	Chloride as Cl	IS 3025 (Part-32) 1988	mg/L	16.51	1000 max
10.	Magnesium as Mg	IS 3025 (Part-46) 1994	mg/L	9.62	100 max
11.	Total Dissolved Solids	IS 3025 (Part-16) 1984	mg/L	100	2000 max
12.	Sulphate as SO_4	IS 3025 (Part-24) 1986	mg/L	BDL (DL 5)	400 max
13.	Fluoride	IS 3025 (Part-60) 2008	mg/L	BDL (DL 0.2)	1.5 max
14.	Nitrate as NO_3	ASTM (Part-31) 1978	mg/L	4.3	45 max
15.	Iron as Fe	IS3025 (Part-53) 2003	mg/L	BDL (DL 0.02)	0.3 max
16.	Hexavalent Chromium Cr^{6+}	IS3025 (Part-52) 2003	mg/L	BDL (DL 0.01)	0.05 max
17.	Total coli form Bacteria	IS1622:1981(R.aff 2009)	MPN/100mL	Absent	Not Detectable
18.	*Escherichia coli*	IS1622:1981(R.aff 2009)	Per 100mL	Absent	Not Detectable

Note:-BDL - Below Detection Limit; D.L- Detection Limit; NTU-Nephelometric Turbidity Unit; mg/L - Milligrams per liter

CONCLUSION: SURFACE WATER AS ABOVE PARAMETERS MEETS DRINKING WATER GUIDELINES OF IS: 10500:2012

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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ANNEXURE-C

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NOISE MONITORING TEST REPORT - APRIL 2019

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore - 574509
Sample Description	Noise Monitoring
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Sampling Location	OMPL - North, South, East and West sides
Sampling Date	12.04.2019
Report Date	03.05.2019
Report No.	HECS/N/001/030519

RESULTS

S.No.	Sampling Location	MoEF requirements in dB		Avg. Noise level observed in dB	
		Day	Night	Day	Night
1.	OMPL-North	75	70	69.5	67.6
2.	OMPL-South			69.4	65.9
3.	OMPL-East			70.1	67.7
4.	OMPL-West			70.8	67.9

Note: dB: Decibel

Limits: **Industrial Area: Day Time-75 dB (A),** Night Time-70 dB (A). Commercial Area: Day Time-65 dB (A), Night Time-55 dB (A). Residential Area: Day Time-55 dB (A), Night Time-45 dB (A).Silence Zone: Day Time-50 dB (A), Night Time-40 dB (A).

Note: Leq- Equivalent Noise Level (hourly); Reference: The Noise Pollution (Regulation and Control) Rules, 2000, CPCB, New Delhi

INFERENCE: The observed noise levels are within the limits as per The Noise Pollution (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986

*****End of Report *****

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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(Dr K Ganesan - Lab Manager)

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	06.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/011/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983(Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983,Reaff 2006	-	Agreeable	
3.	Total Suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	26	100
4.	pH	IS:3025:(Pt 11):1983(Reaff 2006)	-	7.00	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983(Reaff:2006)	°C	32	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	BDL (DL 2)	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986(Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS 3025 Part (34)1988	mg/L	7.2	50
9.	Total Kjeldhal Nitrogen as N	IS 3025 Part (34)1988	mg/L	32.4	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL (DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993(Reaff 2009)	mg/L	8.6	30
12.	COD as O_2	IS 3025 Part (58)2006	mg/L	66.36	125
13.	Lead as Pb	IS:3025 (Pt 47)1994(Reaff 2009)	mg/L	BDL (DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS 3025 Part (52):2003	mg/L	BDL (DL 0.01)	0.1
15.	Total Chromium as Cr	IS 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL (DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992(Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994(Reaff 2009)	mg/L	BDL (DL 0.1)	5.0

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	06.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/011/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL (DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL (DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22nd Edition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL (DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL (DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL (DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL (DL 0.005)	0.05
26	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL (DL 0.01)	0.2
27.	Phenols as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL (DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	2.5	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL (DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL (DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL (DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL (DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENTWATER AS ABOVE PARAMETERSARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	20.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/015/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
1.	Color	IS:3025:(Pt 4)1983 (Reaff 2006)	Hazen Units	Colourless	All efforts should be made to remove colour and unpleasant odour as far as practicable
2.	Odour	IS 3025 (Part5)-1983, Reaff 2006	-	Agreeable	
3.	Total suspended Solids	2540D APHA 22nd Edn.. 2012	mg/L	26	100
4.	pH	IS:3025:(Pt 11):1983 (Reaff 2006)	-	7.02	6.0-8.5
5.	Temperature	IS 3025 (Pt 9):1983 (Reaff:2006)	°C	32	Shall not exceed 5 degree Centigrade above the receiving water temperature
6.	Oil & Grease	IS: 3025,4(Pt 39):2000 (Reaff 2009)	mg/L	BDL (DL 2)	5
7.	Total Residual Chlorine as Cl_2	IS:3025 (Pt26)1986 (Reaff 2009)	mg/L	BDL (DL 0.1)	1
8.	Ammonical Nitrogen as N	IS: 3025 Part (34)1988	mg/L	7	50
9.	Total Kjeldhal Nitrogen as N	IS: 3025 Part (34)1988	mg/L	32.1	100
10.	Free Ammonia as NH_3	IS:3025 (Part34)1998 Reaff. 2003	mg/L	BDL (DL 0.02)	5
11.	BOD, 3 days @ 27°C as O_2	IS:3025 (Pt 44)1993 (Reaff 2009)	mg/L	BDL (DL 2)	30
12.	COD as O_2	IS: 3025 Part (58)2006	mg/L	66.21	125
13.	Lead as Pb	IS:3025 (Pt 47)1994 (Reaff 2009)	mg/L	BDL (DL 0.1)	0.1
14.	Chromium (Hexavalent) as Cr^{6+}	IS: 3025 Part (52):2003	mg/L	BDL (DL 0.01)	0.1
15.	Total Chromium as Cr	IS: 3025(Pt52):2003 (Reaff 2009)	mg/L	BDL (DL 0.01)	2.0
16.	Copper as Cu	IS:3025:5,(Pt 42)1992 (Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
17.	Zinc as Zn	IS:3025 (Part49)1994 (Reaff 2009)	mg/L	BDL (DL 0.1)	5.0

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TEST REPORT OFETP EFFLUENT MONITORING

Name of the Industry	M/s. ONGC Mangalore Petrochemicals Limited (OMPL)
Address of the Industry	Mangalore SEZ, Premude Village, Mangalore – 574509
Sample Description	**Guard Pond Pump Discharge (ETP Effluent)**
Date of Sampling	20.04.2019
Sample Collected by	Hubert Enviro Care Systems (P) Ltd
Report Date	03.05.2019
Report No	HECS/W/015/030519

RESULTS

S.No.	Parameters monitored	Test method followed	Units	Results	Permissible Limit
18.	Nickel as Ni	IS:3025 (Part54)2003 (Reaff 2009)	mg/L	BDL (DL 0.05)	1.0
19.	Fluoride as F-	IS 3025 part (60):2008	mg/L	BDL (DL 0.2)	1.0
20.	Sulphide as S^{2-}	IS:3025 (Pt 29)1986 (Reaff 2009)	mg/L	BDL (DL 0.04)	2.0
21.	Particle Size of Suspended solids	APHA 22ndEdition	-	Passed through 850 micron	850 micron
22.	Arsenic as As	IS:3025 (Part37)1988(Reaff 2009)	mg/L	BDL (DL 0.005)	0.2
23.	Mercury as Hg	IS:3025 (Part48)1994 RA 1999	mg/L	BDL (DL 0.001)	0.01
24.	Cadmium as Cd	IS:3025 (Part41)1991	mg/L	BDL (DL 0.01)	0.1
25.	Selenium as Se	IS:3025 (Part56)2003	mg/L	BDL (DL 0.005)	0.05
26.	Cyanide as CN	IS:3025 (Part27)1986 Reaff. 2009	mg/L	BDL (DL 0.01)	0.2
27.	Phenolic Compounds as C6H5OH	IS 3025 Part (43)1992,RA 2009	mg/L	BDL (DL 0.001)	0.35
28.	Total Iron as Fe	IS 3025(Pt 53):2003(Reaff 2009)	mg/L	2.52	3
29.	Manganese	IS:3025:(Pt-59):2006	mg/L	BDL (DL 0.01)	2
30.	Total Phosphorous as P	IS 3025(Pt 31):1988(Reaff 2009)	mg/L	BDL (DL 0.01)	3
31.	Nitrate	IS 3025 (Pt 34):1988 (Reaff 2009)	mg/L	BDL (DL 1)	20
32.	Vanadium as V	IS:3025 (Part56)2003	mg/L	BDL (DL 0.01)	0.1
33.	Benzo(a)pyrene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.2
34.	Benzene	USEPA 8270C	mg/L	BDL (DL 0.0001)	0.1
35.	Bioassay Test	IS 6582(Part 2):2001	Tf	9:1	90% survival of fish after 96 hrs in 100% effluent

Note:-BDL - Below Detection Limit; D.L- Detection Limit; mg/L - Milligrams per liter

CONCLUSION: ETP OUTLET EFFULENT WATER AS ABOVE PARAMETERS ARE WITHIN STANDARDS

End of Report

HUBERT ENVIRO CARE SYSTEMS (P) LTD.

Authorized Signatory
(Dr.K.Ganesan, Lab Manager)

1. The report in full or part shall not be used for any promotional or publicity purpose without written consent by HECS organisation 2. Samples are drawn by HECS unless otherwise mentioned 3. Unless specifically requested by customer the test items will not be retained more than 15 days from the date of issue of test report, 4. Under no circumstances lab accepts any liability or loss / damage caused by use or misuse of test report after invoicing or issue of test report. 5. The test results relate only to the test items. 6. # not under scope of accreditation.

Form-1 (Rule 4)

Returns Regarding Water Consumed during the Month of April, 2019

Name and address of the Consu	Purpose for which water consumed	Reading at the begining of the first day of the calendar month under report	Reading at the end of the last day of the calendar month under report	Quantity of Water Consumed in Kilo Leters	If the meter was out of order, the monthly average consumption of water for the previous 3 months of the working period	Quantity of water qualifying for rebate according to the assessee	Remarks
M/s ONGC Mangalore Petrochemicals Limited, Mangalore Special Economic Zone, Permude, Mangalore -574 509	**Industrial cooling, spraying in mine pits or boiler feed**						
	Cooling Water	0	1,11,422	111422			
	Boiler Feed Water	0	78531	78531			
	Fire Water	0	37640	37640			
	Domestic purpose						
	Drinking Water & Sanitation	0	5924	5924			
	Processing whereby water gets polluted and the pollutants are easily bio-degradable						
	Service Water		5558	5558			
Total Consumption				**2,39,075**			

Signature of the Consumer :

Name Shivaprakash, Sr. Mgr (EN)

Address M/s ONGC Mangalore Petrochemicals Limited, Mangalore Special Economic Zone, Permude, Mangalore -574 509

ANNEXURE - E1

ANNEXURE -7

ONGC Mangalore Petrochemicals Limited

Production Details for April, 2019
Net Naptha Processed – 81,345 MT

Sl. No.	Name of the Product	Quantity, MT
1	Paraxylene (Product)	43,901
2	Benzene (Co product)	10,916