KR.HSE.ENV.05.HSSE.HECCR/02/2022/EC No: J-11011/369/2005-IA II (I)
15.12.2022

To
The Additional Principal Chief conservator of Forests (C)
Ministry of Environment, Forest & Climate Change
4th Floor, E&F Wings, Kendriya sadan, Koramangala, Bangalore-560 034

Dear Sir,

Sub: Submission of Half yearly Compliance report – Environmental Clearance issued by the Ministry of Environment, Forests and Climate Change.

Ref: EC No: J-11011/369/2005-IA II (I) dated 2nd February 2006, granting environmental clearance for **Capacity Expansion cum Modernisation Project (Phase-II).**

Please find enclosed the compliance report on the various conditions laid down by MoEF &CC, pertaining to the half year period from **1st April 2022 to 30th September 2022** for the Project mentioned in above reference.

Thanking you

Very truly yours
For BPCL Kochi Refinery

Ramachandran, M.K
General Manager - in - Charge (HSE)

Encl:
1. Six Monthly Compliance Report
2. Annexure - I — Emission Details
3. Annexure - II — Ambient Air Details
4. Annexure - III — Quality of Effluent discharged
5. Annexure - IV — Bore-well Analysis Report.
6. Annexure - V — Noise Surveillance Data.
7. Annexure - VI — Health Surveillance Data.
8. Annexure - VII — CREP Compliance

CC:

1.
The Member Secretary
Central Pollution Control Board
Parivesh Bhawan
East Arjun Nagar, New Delhi- 110032

2.
The Member Secretary
Kerala State Pollution Control Board
Plamoodu Junction
Pattom Palace, Thiruvananthapuram - 695 004

Compliance status of Environmental clearance conditions for CAPACITY EXPANSION CUM MODERNISATION PROJECT (PHASE-II) accorded by J-11011/369/2005-IA II (I) dated 2nd February 2006

Status of the project: Project commissioned in 2010 -11

Sl No	Conditions	Status as on 30.09.2022
A.	**SPECIFIC CONDITIONS**	
1.	The gaseous emissions from various process units shall conform to the standards prescribed by the concerned authorities from time to time. The KSPCB may specify more stringent standards for the relevant parameters keeping in view the nature of the industry and its size and location. At no time, the emissions levels should go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit should not be restarted until the control measures are rectified to achieve the desired efficiency.	All emissions within the prescribed standards. No failures of any pollution control system.
2.	On-line continuous monitoring facilities shall be provided on all the stacks of adequate height as per CPCB guidelines. SO_2, CO, HC, NOx etc. shall be maintained within the CPCB limits. Low sulphur fuels shall be used for heaters. Sulphur Recovery Unit (SRU) shall be installed and SO_2 emissions from the plant shall not exceed existing 1607 kg/h and further efforts shall be made to further reduce SO_2 emissions. Low NO_X burners shall be installed to control the NO_X emissions.	Online continuous monitoring facilities are provided on all operational stacks. SO2, CO, NO_X, PM, H2S and Ni/Vanadium are being monitored as per consent and are within limits BPCL Kochi Refinery is using de-sulfurized fuel gas and low sulphur fuel oil (Sulphur content less than 1%) in old heaters and less than 0.5% in newly installed heaters boilers. Total SO_2 emission from the refinery is within the limit. The allowable limit as per latest CTO is 1579 kg/hr. ; maintaining well below this value. For reducing the sulphur content of fuel gas used in heaters, sulphur recovery unit (SRU) of capacity 80 TPD, has been installed as part of CEMP Phase-II project. Heaters and boilers installed as part of CEMP Phase-II project are provided with low NOx burners.

Sl No	Conditions	Status as on 30.09.2022
3.	Continuous ambient air quality monitoring stations for SO_2, SPM, and H.C. shall be installed in all the 4 directions in consultation with the KSPCB. Data shall be regularly monitored and records maintained and report submitted to the Ministry/CPCB/KSPCB once in six months.	In consultation with KSPCB, the refinery has installed CAAQMS stations in all the four directions. Data on ambient air quality for the period from **1st April 2022 to 30th September 2022** is attached as **Annexure-II.**
4.	As indicated in the EIA/EMP reports, out of total 1700 m^3/d industrial effluent generated, 360 m^3/d sour water will be recycled in the plant after stripping of Ammonia and Hydrogen Sulphide and will be used for desalting of crude in de-salters and as wash water in air fin condensates etc. Besides, 300 KL /day, treated waste water will be used for fire fighting, process area cleaning, cooling water make up and for green belt development. Remaining treated effluent will be discharged to Chitrapuzha river after conforming to the prescribed standards. Generation of waste water shall be reduced by installation of sour water stripper unit; use of closed blow down system for all hydrocarbon liquid discharge from the process units, proper segregation and collection of various effluents; paving the process area to avoid contamination of soil, ground water, comprehensive waste water management etc.	A new Sour water Stripping unit (SWS) of capacity 412.8 m^3/d was installed along with the project. The stripped water is recycled in the plant. Stripped water is used in De-salters in Crude Distillation units Closed blow down (CBD) system is provided in all units. Proper collection /segregation facilities are installed for effluent streams. The effluent treatment plant (ETP) put up as part of CEMP-Phase II project is running continuously. The treated effluent discharge discharged to Chithrappuzha conforms to the standards. Treated water is recycled through RO based DM plant, more than 300 KL/day of this treated effluent is being used for fire fighting, process area cleaning and green belt development. Process areas are paved to avoid contamination of the soil.
5.	No ground water contamination in and around factory premises shall be ensured by making all the underground lines carrying hydrocarbons, closed drainage system, storage tank etc. leak proof in order to avoid any leakages. Regular monitoring of ground water in and around factory premises shall be carried out by installing piezometer wells and six monthly reports shall be submitted to the Regional Office of this Ministry at Bangalore/CPCB/KSPCB.	Around sixty borewells are dug inside the refinery premises and the water sample from the wells are monitored regularly, to assess the ground water quality, 14 nos of Piezometer wells are also provided for the same. Hydrocarbon storage tanks are provided with MS plates at the bottom to avoid leaching of oil to land. Moreover LDPE lining is also provided on the tank pad of new tanks as an additional precaution to prevent oil seepage to underground water. In addition, closed drainage system is provided for all storage tanks, to avoid any possible land/ ground water contamination during tank draining.

Sl No	Conditions	Status as on 30.09.2022
6.	The domestic waste water shall be treated in the sewage treatment plant and treated waste water conforming to the standards for land application shall be reused for green belt development.	STP of 250 m3/day capacity has been installed and running continuously for treating the domestic waste water. The treated effluent is being used for green belt development.
7.	Regular monitoring of the quality of effluent discharged and at river water intake point shall be ensured to ensure no pollution of the Chitrapuzha river.	Quality of treated effluent water discharged to the Chitrapuzha river is being analysed and monitored on regular basis to ensure the stipulated standards. The river water intake to refinery is located at Periyar river and the quality of the same is also monitored.
8.	In-plant control measures for checking fugitive emissions from spillage/raw materials handling etc. should be provided. Proper maintenance of equipment shall be ensured to reduce fugitive emissions.	Closed Blow Down (CBD) systems are provided in all process plants to enable closed loop recycling of all hydrocarbon drains, without fugitive emissions. Double seal floating roof are provided for all the Crude tanks Hydro carbon detectors are provided as per requirement. Proper maintenance of equipment (including preventive maintenance) is carried out on a regular basis. Quarterly based fugitive emission monitoring and maintenance system (LDAR) has been followed and is being attended any identified emissions / leaks.
9.	Solid waste generated in the form of oil sludge, chemical sludge, catalyst, spent molecular sieves and bio-sludge shall be properly treated / reprocessed / reused or properly disposed-off. Spent catalyst, a hazardous waste shall either be sent back to supplier(s) for reprocessing or disposed-off in the secured landfill. Oil sludge shall be subjected to maximum recovery followed by bio-remediation. Bio-sludge for ETP shall be used as manure after ensuring all the parameters within the permissible limits whereas chemical sludge from ETP shall be collected and disposed in Secured Landfill (SLF).	Post IREP, ETP chemical sludge is processed in DCU. Oily sludge to the maximum possible is processed in DCU. BPCL Kochi Refinery has implemented a scheme for recovery of oil from oily sludge, solids after oil recovery is bio remediated and disposed in TSDF. Spent catalyst is disposed by either returning to the original supplier or selling to the recycler or is disposed in secured land fill. Bio sludge from effluent treatment plant is used as manure.

Sl No	Conditions	Status as on 30.09.2022
10.	Green belt of adequate width and density shall be provided to mitigate the effects of fugitive emissions all around the plant. Green belt shall be developed in 116 hectares out of total 461.7 hectares land with local species in consultation with the DFO and as per the CPCB guidelines.	A full-fledged greenbelt is developed and maintained in the refinery premises. Part of the green belt that has been disturbed for IREP construction is restored by planting 25000 saplings in the refinery premises and are under various stages of growth. More numbers are added to the list every year.
11.	Occupational health surveillance of the workers shall be done on a regular basis and records maintained as per the Factories Act.	Health surveillance done regularly and records maintained. Reported as Annexure-VI
12.	As committed in the EIA/EMP report, the company shall earmark Rs.78.30 crores for environment protection measures and Rs.51.00crores for community development activities.	CREP reported as Annexure-VII
13.	All the other recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Refinery sector shall be implemented. CREP guidelines regarding discharge of treated effluent within 0.4 m^3/MT of crude shall be strictly followed.	Complied. The discharge of treated effluent was 0.17 m^3/MT of crude for the half year period from **1st April 2022 to 30th September 2022.**
B.	**GENERAL CONDITIONS:**	
1.	The project authorities must strictly adhere to the stipulations made by the KSPCB and the State Government.	Complied.
2.	No expansion or modification in the plant shall be carried out without prior approval of the Ministry of Environment & Forests.	Complied.

Sl No	Conditions	Status as on 30.09.2022
3.	Adequate AAQMS should be established in the downward direction as well as where maximum ground level concentration of SPM, SO_2 and NOx are anticipated in consultation with the KSPCB. Data on ambient air quality, fugitive emission and stack emissions shall be regularly submitted to this Ministry including its Regional Office at Bangalore once in six months and monthly to KSPCB.	In consultation with KSPCB, the refinery has installed Six continuous AAQM Stations. Online data are being continuously transferred to CPCB from all AAQMS stations. Data on ambient air quality during the half yearly period from **1st April 2022 to 30th September 2022** is attached as **Annexure-II**. Data on stack emissions during the half yearly period from **1st April 2022 to 30th September 2022** is attached as **Annexure- I.**
4.	The overall noise levels in and around the plant area should be kept well within the 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 (daytime) and 70 dBA (night time).	Complied. Noise level data attached as Annexure - V Continuous Noise monitoring station also installed in the boundary area as part of latest MSB project.
5.	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 condition stipulated herein. The funds so provided should not be diverted for any other purposes.	Complied.
6.	The Regional Office of this Ministry at Bangalore/CPCB/ KSPCB will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.	Complied.

Sl No	Conditions	Status as on 30.09.2022
7.	The company 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 KSPCB / Committee and may also be seen at Website of the MoEF &CC at http:/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 Regional Office.	Complied.
8.	The project authorities shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	The final approval for the implementation of the project was obtained on 27.04.06. The same was informed MoEF & CC vide letter No. 10/MPT/CEMP-II/04 dated 18th May, 2006. The project has been commissioned.

DATA ON STACK EMISSIONS FROM BPCL KOCHI REFINERY (IREP Units)														
PERIOD - 1st April 2022 to 30th September 2022														
Sl.no.	STACK / UNIT	No. of samples analysed	Permitted emission Nm3/hr.	Particulate matter mg/Nm3			Sulphur dioxide mg/Nm3			Emission rate Nm3/hr.			Percentage compliance	
				min	max	Avg.	min	max	Avg.	min	max	Avg.	SPCB	MoEF
1	SRU III Train A	3	92500				18.30	966.21	636.3	82247	90836	88342	100	100
2	SRU III Train B	3	92500				15.70	859.68	563.6	89759	252659	90242	100	100
3	CDU III	4	254000	5.8	37.68	25.6	176.62	251.30	203.8	223672	60542	244257	100	100
4	DHDT	3	59000	21.2	28.91	24.4	13.10	96.32	54.7	52409	61735	57210	100	100
5	VGO-HDT	4	55000	19.5	32.71	27.5	18.30	29.43	22.5	48923	25521	54701	100	100
6	PFCCU Heater	4	22400	19.3	33.81	24.9	34.67	68.00	48.7	20366	170940	22236	100	100
7	PFCCU. Regnrtr.	4	235250	22.8	31.20	25.9	10.40	110.00	54.9	18477	93265	108766	100	100
8	DCU- I	4	80000	3.27	19.20	10.6	18.30	24.45	20.9	71278	105614	79726	100	100
9	DCU -2	3	80000	3.28	13.70	6.8	23.50	27.61	25.3	74136	161009	85587	100	100
10	HRSG 3	2	1095907	24.85	27.36	26.1	41.56	47.68	44.6	159495	148659	160252	100	100
11	HRSG 4	2	1095907	29.86	33.72	31.8	67.53	74.17	70.9	142276	147796	145468	100	100
12	HRSG-5	2	1095907	42.15	47.52	44.8	61.33	69.80	65.6	143306	122932	145551	100	100
13	UB12	2	1095907	23.54	29.80	26.7	59.83	261.70	160.8	113585	126260	118259	100	100
14	UB 13	2	1095907	27.4	30.82	29.1	78.93	392.60	235.8	123507	126260	124884	100	100

DATA ON STACK EMISSIONS FROM BPCL KOCHI REFINERY (Old Refinery including CEMP - II)														
PERIOD - 1st April 2022 to 30th September 20222022														
Sl.no.	STACK / UNIT	No. of samples analysed	Permitted emission Nm3/hr.	Particulate matter mg/Nm3			Sulphur dioxide mg/Nm3			Emission rate Nm3/hr.			Percentage compliance	
				min	max	Avg.	min	max	avg	min	max	avg	SPCB	MoEF
1	KH 1 B	4	45000	7.3	64.21	36.55	22.30	360.83	191.23	22953	35250	28424.5	100	100
2	NH2/HH1	3	102000	8.2	72.19	49.07	226.28	234.31	230.30	48438	72221	57888.0	100	100
3	FH1	4	25000	6.5	37.25	21.04	204.42	212.27	208.35	22719	24235	23728.0	100	100
4	FH3/COB	4	150000	9.4	60.28	37.41	49.70	141.70	108.82	83261	99308	90688.8	100	100
5	UB10	4	136000	22.7	63.82	42.09	598.31	822.00	727.83	21825	92643	45984.8	100	100
6	UB9	4	70000	20.5	67.23	45.42	521.37	823.66	672.52	28870	61493	40328.3	100	100
7	DSX 002	4	35000	19.4	63.84	43.75	293.20	841.93	587.49	25171	29613	27934.5	100	100
8	DDH I	4	27000	17.6	40.41	30.31	345.50	688.02	572.31	23336	26447	25260.3	100	100
9	CH21	4	130000	9.2	30.27	18.63	180.60	375.96	278.48	11478	100688	73204.3	100	100
10	CH22	4	35000	7.9	71.34	37.60	103.60	312.55	203.18	25924	34017	30115.8	100	100
11	UB7	2	150000	23.6	46.95	35.28	5.20	195.36	100.28	111963	113958	112960.5	100	100
12	CPP/HRSG	2	277900	23.2	47.38	35.29	44.50	263.99	154.25	151717	161184	156450.5	100	100
13	BITUROX	3	23000	12.3	30.24	21.85	44.50	271.08	190.04	14174	18726	15804.3	100	100
14	CH 223	4	51000	6.2	35.86	19.68	125.80	357.79	240.64	46378	68555	53869.8	100	100
15	GT2 HRSG	3	427000	20.4	45.88	33.69	7.80	74.17	31.69	122021	254712	176200.0	100	100
16	UB 11	4	158000	23.84	33.20	27.10	586.00	813.94	693.70	68787	110376	85715.3	100	100
17	NHTCCR	2	118000	15.4	59.82	37.61	2.61	232.00	117.31	104483	119375	111929.0	100	100
18	VHH 02	3	72000	20.82	28.32	24.25	310.33	327.35	318.84	48356	70327	56972.0	100	100
19	DSX-301	4	22000	24.8	58.17	43.15	83.80	1127.35	691.46	12668	14310	13784.3	100	100
20	UB8	4	70000	31.4	70.34	53.30	416.20	890.61	689.18	29524	52588	39999.8	100	100

AMBIENT AIRQUALITY DATA FOR THE HALF YEAR PERIOD
1st April 2022 to 30th September 2022

AAQMS - Marketing							
Parameter	unit	Apr. 22	May. 22	Jun 22	July 22	Aug. 22	Sept.22
SO2	µg/m3	35.81	41.25	20.03	10.21	24.32	49.69
NOx	µg/m3	1.28	0.99	1.29	2.87	7.09	22.74
NH3	ug/m3	0.00	0.10	0.45	4.25	10.52	4.51
CO	mg/m3	0.91	0.83	0.89	0.96	0.56	0.56
Benzene	µg/m3	0.11	0.10	0.09	0.08	0.09	0.13
Methane	ppm	0.00	0.00	0.00	0.00	0.02	0.00
NMHC	ppm	0.00	0.00	0.00	0.00	0.00	0.00
PM 10	µg/m3	56.20	48.14	34.80	36.42	37.03	41.74
PM 2.5	µg/m3	32.97	27.69	20.39	18.84	17.40	20.65

AAQMS - Colony							
Parameter	unit	Apr. 22	May. 22	Jun 22	July 22	Aug. 22	Sept.22
SO2	µg/m3	15.01	16.78	18.73	19.92	19.35	22.82
NOx	µg/m3	23.47	21.04	17.70	15.15	19.92	18.71
NH3	ug/m3	34.13	25.17	14.87	4.77	2.37	2.10
CO	mg/m3	0.48	1.02	1.33	1.27	1.30	1.36
Benzene	µg/m3	0.10	0.05	0.00	0.00	0.00	0.00
Methane	ppm	1.71	0.00	0.04	0.02	0.02	0.02
NMHC	ppm	1.71	0.00	0.01	0.00	0.00	0.01
PM 10	µg/m3	52.61	45.95	33.14	30.18	33.78	40.38
PM 2.5	µg/m3	27.82	20.86	15.69	15.47	17.09	20.02

DHDS							
Parameter	unit	Apr. 22	May. 22	Jun 22	July 22	Aug. 22	Sept.22
SO2	µg/m3	5.06	4.82	8.81	11.34	14.30	16.91
NOx	µg/m3	5.50	3.13	4.77	7.33	8.65	11.03
NH3	ug/m3	0.00	0.03	0.00	0.00	0.29	0.00
CO	mg/m3	0.61	0.64	0.74	0.57	0.80	1.24
Benzene	µg/m3	0.01	0.03	0.03	0.05	0.06	0.07
Methane	ppm	0.03	0.03	0.01	0.00	0.02	0.00
NMHC	ppm	0.01	0.02	0.04	0.00	0.00	0.00
PM 10	µg/m3	40.01	32.84	24.03	26.60	26.86	32.14
PM 2.5	µg/m3	26.45	21.88	13.38	15.15	14.87	20.40

AAQMS - CISF Township							
Parameter	**unit**	**Apr. 22**	**May. 22**	**Jun 22**	**July 22**	**Aug. 22**	**Sept.22**
SO2	µg/m3	6.19	4.40	9.25	10.96	11.77	13.39
NOx	µg/m3	23.26	20.02	26.07	18.33	22.81	17.01
NH3	ug/m3	13.86	12.38	17.54	12.17	15.43	9.65
CO	mg/m3	1.14	1.14	1.23	1.32	1.39	1.56
Benzene	µg/m3	0.07	0.04	0.04	0.05	0.03	0.01
Methane	ppm	0.06	0.18	0.19	0.06	0.00	0.00
NMHC	ppm	0.00	0.00	0.00	0.00	0.00	0.00
PM 10	µg/m3	53.32	48.72	37.41	37.10	35.42	41.24
PM 2.5	µg/m3	31.86	22.86	16.08	12.28	14.62	22.33

AAQMS - NHT CCR							
Parameter	**unit**	**Apr. 22**	**May. 22**	**Jun 22**	**July 22**	**Aug. 22**	**Sept.22**
SO2	µg/m3	1.05	1.05	3.17	2.53	2.79	1.60
NOx	µg/m3	10.00	10.01	10.00	9.99	10.00	10.00
NH3	ug/m3	1.43	0.00	0.00	0.00	faulty	faulty
CO	mg/m3	0.56	0.36	0.65	0.20	0.52	0.43
Benzene	µg/m3	0.00	0.00	0.00	faulty	faulty	faulty
Methane	ppm	0.01	0.01	0.00	0.01	0.04	0.03
NMHC	ppm	0.10	0.10	0.02	0.10	0.10	0.10
PM 10	µg/m3	36.03	31.35	30.26	30.88	31.00	30.36
PM 2.5	µg/m3	32.20	21.71	14.57	14.00	faulty	faulty

Annexure - III

TREATED EFLUENT QUALITY DATA FOR THE HALF YEAR PERIOD

1st April 2022 to 30th September 2022

Effluent _ Outlet - A (monthly average value)								
Parameter	**limit**	**unit**	**Apr. 22**	**May. 22**	**Jun 22**	**July 22**	**Aug. 22**	**Sept.22**
pH	6 - 8.5		7.83	7.94	7.9	7.7	7.5	7.35
TSS	100	ppm	11.7	10.3	12.2	10.5	9.45	11.77
Oil & Grease	5	ppm	3.3	3.28	3.4	3.3	3.31	3.37
BOD (3 day @27 C.)	15	ppm	11.3	11.5	13.2	12.1	12.4	13.47
Phenol	0.35	ppm	0.13	0.11	0.1	0.1	0.12	0.13
Sulphides	0.5	ppm	0.41	0.4	0.4	0.4	0.4	0.4
COD	125	ppm	33.14	32.5	47	38.6	48.77	46.91
Effluent _ Outlet - B (monthly average value)								
Parameter	**limit**	**unit**	**Apr. 22**	**May. 22**	**Jun 22**	**July 22**	**Aug. 22**	**Sept.22**
pH	6 - 8.5		7.15	7.2	7.2	7.2	7.0	7.25
TSS	100	ppm	12.5	15.2	12.2	10.5	9.6	12.5
Oil & Grease	5	ppm	3.2	3.5	3.2	3.3	3.3	3.2
BOD (3 day @27 C.)	30	ppm	13.5	12.5	12.6	12.5	12.0	12.5

Bharat Petroleum

QUALITY CONTROL DEPARTMENT
BPCL-KOCHI REFINERY, AMBALAMUGAL

BOREWELL WATER TEST REPORT

Bore well No. 7
Date of Sample: 30.7.2022
Date of Testing: 2.8.2022

KR.TECH.QC.26.DRINK.WATR

Sl No:	Test Parameters	Unit	Method	Result	Acceptable limit
5	pH		IS 3025 (P:11)	7.8	6.5 – 8.5
15	Oil	mg/L	IS 3025 (P:39)	nil	nil
	Metals				
16	Silver (as Ag)	mg/L	IS13428 Annexe J	BDL (MDL=0.005)	0.1 (Max)
17	Aluminium (as Al)	mg/L	IS 3025 (P:55)	BDL(MDL=0.002)	0.03 (Max)
18	Boron (as B)	mg/L	IS 3025 (P:57)	BDL(MDL=0.01)	0.5 (Max)
19	Barium (as Ba)	mg/L	IS13428 Annexe F	BDL(MDL=0.01)	0.7 (Max)
20	Calcium (as Ca)	mg/L	IS 3025 (P:40)	14	75 (Max)
21	Cadmium (as Cd)	mg/L	IS 3025 (P:41)	BDL(MDL=0.001)	0.003 (Max)
22	Chromium (as Cr)	mg/L	IS 3025 (P:52)	BDL(MDL=0.01)	0.05 (Max)
23	Copper (as Cu)	mg/L	IS 3025 (P:42)	BDL(MDL=0.01)	0.05 (Max)
24	Iron (as Fe)	mg/L	IS 3025 (P:53)	0.08	0.3 (Max)
25	Magnesium (as Mg)	mg/L	IS 3025 (P:46)	5	30 (Max)
26	Manganese (as Mn)	mg/L	IS 3025 (P:59)	BDL(MDL=0.01)	0.1 (Max)
27	Nickel (as Ni)	mg/L	IS 3025 (P:54)	BDL(MDL=0.01)	0.02 (Max)
28	Molybdenum (as Mo)	mg/L	IS 3025 (P:02)	BDL(MDL=0.002	0.07 (Max)
29	Lead (as Pb)	mg/L	IS 3025 (P:47)	BDL(MDL=0.01)	0.01 (Max)
30	Zinc (as Zn)	mg/L	IS 3025 (P:49)	0.1	5 (Max)
31	Arsenic (as As)	mg/L	IS 3025 (P:37)	BDL(MDL0.005)	0.01 (Max)
32	Mercury (as Hg)	mg/L	IS 3025 (P:48)	BDL(MDL0.0001)	0.001(Max)
33	Selenium (as Se)	mg/L	IS 3025 (P:56)	BDL(MDL=0.001)	0.1 (Max)
34	Antimony (as Sb)	mg/L	APHA:3113B	BDL(MDL=0.001)	Max0.1

BDL: Below Detection Limit
MDL: Minimum Detection Limit

S.Mahamed Iqbal
Manager (Quality Control)

QUALITY CONTROL DEPARTMENT
BPCL-KOCHI REFINERY, AMBALAMUGAL

BOREWELL WATER TEST REPORT

Bore well No. 24
Date of Sample: 19.8.2022
Date of Testing: 26.8.2022

KR.TECH.QC.26.DRINK.WATR

Sl No:	Test Parameters	Unit	Method	Result	Acceptable limit
5	pH		IS 3025 (P:11)	7.3	6.5 – 8.5
15	Oil	mg/L	IS 3025 (P:39)	nil	nil
	Metals				
16	Silver (as Ag)	mg/L	IS13428 Annexe J	BDL (MDL=0.005)	0.1 (Max)
17	Aluminium (as Al)	mg/L	IS 3025 (P:55)	BDL(MDL=0.002)	0.03 (Max)
18	Boron (as B)	mg/L	IS 3025 (P:57)	BDL(MDL=0.01)	0.5 (Max)
19	Barium (as Ba)	mg/L	IS13428 Annexe F	BDL(MDL=0.01)	0.7 (Max)
20	Calcium (as Ca)	mg/L	IS 3025 (P:40)	12	75 (Max)
21	Cadmium (as Cd)	mg/L	IS 3025 (P:41)	BDL(MDL=0.001)	0.003 (Max)
22	Chromium (as Cr)	mg/L	IS 3025 (P:52)	BDL(MDL=0.01)	0.05 (Max)
23	Copper (as Cu)	mg/L	IS 3025 (P:42)	BDL(MDL=0.01)	0.05 (Max)
24	Iron (as Fe)	mg/L	IS 3025 (P:53)	0.08	0.3 (Max)
25	Magnesium (as Mg)	mg/L	IS 3025 (P:46)	4	30 (Max)
26	Manganese (as Mn)	mg/L	IS 3025 (P:59)	BDL(MDL=0.01)	0.1 (Max)
27	Nickel (as Ni)	mg/L	IS 3025 (P:54)	BDL(MDL=0.01)	0.02 (Max)
28	Molybdenum (as Mo)	mg/L	IS 3025 (P:02)	BDL(MDL=0.002	0.07 (Max)
29	Lead (as Pb)	mg/L	IS 3025 (P:47)	BDL(MDL=0.01)	0.01 (Max)
30	Zinc (as Zn)	mg/L	IS 3025 (P:49)	0.1	5 (Max)
31	Arsenic (as As)	mg/L	IS 3025 (P:37)	BDL(MDL0.005)	0.01 (Max)
32	Mercury (as Hg)	mg/L	IS 3025 (P:48)	BDL(MDL0.0001)	0.001(Max)
33	Selenium (as Se)	mg/L	IS 3025 (P:56)	BDL(MDL=0.001)	0.1 (Max)
34	Antimony (as Sb)	mg/L	APHA:3113B	BDL(MDL=0.001)	Max0.1

BDL: Below Detection Limit
MDL: Minimum Detection Limit

S.Mahamed Iqbal
Manager (Quality Control)

BHARAT PETROLEUM CORPORATION LIMITED
KOCHI REFINERY

HSE DEPARTMENT

KR.HSE.SAFE.05.SLMR.SKP

02.07.2022

Sub: Noise level at Boundary Wall.

Noise level at various locations near the boundary wall inside the refinery was measured on 02.07.2022 at **NIGHT TIME**. The observed values are given below.

Sl. No.	Location	Sound level	Remarks
1.	South of tankYT-30 (Near to Parking)	56	-
2.	Near T T gate (PDPP gate)	61	-
3.	South of Project warehouse	59	-
4.	220 KV line crossing near rain water harvesting pond	52	-
5.	DHDS Tower No- 1	55	
6.	Rear side of DHDS fire station	53	-
7.	Near Chalikkara gate	56	-
8.	Near TK-25	55	
9.	East of MS Block	57	-
10.	South of DHDS Flare	59	-
11.	Near NHT-CCR-AAQMS (Near MSBP boundary)	60	
12.	West of tank YT-902(DHDS)	53	-
13.	Rear side of PIBU office(opp. IPTC)	50	-
14.	Bottling plant entrance from refinery(IPTC Road)	59	-
15.	North of LNG skid (GT-2 Road end)	61	-
16.	Near IREP gate	60	-
17.	DCU	63	-
18.	South of UB-12	63	-
19.	North of VGO labour amenity building	58	-
20.	Behind IREP site office	60	-
21.	Below Coke Conveyor area near railway gate(PWC 4)-offline	49	Conveyor Offline
22.	Below Coke Conveyor area near railway gate- RLS-1	45	Conveyor Offline
23.	Below Coke Conveyor area near outlet A –RLS-2	47	Conveyor Offline
24.	Drum Plant gate	56	-

Smit Kumar Pal
Manager (Safety)

To: DGM (F&S) (r) GM (HSE) I/C

BHARAT PETROLEUM CORPORATION LIMITED
KOCHI REFINERY

HSE DEPARTMENT

KR.HSE.SAFE.05.SLMR.SKP

14.07.2022

Sub: Noise level at Boundary Wall.

Noise level at various locations near the boundary wall inside the refinery was measured on 14.07.2022 at day time. The observed values are given below.

Sl. No.	Location	Sound level	Remarks
1.	South of tankYT-30 (Near to Parking)	61	-
2.	Near T T gate (PDPP gate)	62	-
3.	South of Project warehouse	61	-
4.	220 KV line crossing near rain water harvesting pond	59	-
5.	DHDS Tower No- 1	57	
6.	Rear side of DHDS fire station	58	-
7.	Near Chalikkara gate	59	-
8.	Near TK-25	62	
9.	East of MS Block	63	-
10.	South of DHDS Flare	62	-
11.	Near NHT-CCR-AAQMS (Near MSBP boundary)	64	
12.	West of tank YT-902(DHDS)	58	-
13.	Rear side of PIBU office(opp. IPTC)	56	-
14.	Bottling plant entrance from refinery(IPTC Road)	64	-
15.	North of LNG skid (GT-2 Road end)	62	-
16.	Near IREP gate	64	-
17.	DCU	64	-
18.	South of UB-12	61	-
19.	North of VGO labour amenity building	62	-
20.	Behind IREP site office	63	-
21.	Below Coke Conveyor area near railway gate(PWC 4)-offline	61	Conveyor Offline
22.	Below Coke Conveyor area near railway gate- RLS-1	62	Conveyor Offline
23.	Below Coke Conveyor area near outlet A –RLS-2	63	Conveyor Offline
24.	Drum Plant gate	62	-

Smit Kumar Pal
Manager (Safety)

To: DGM (F&S) (r) GM (HSE) I/C

BHARAT PETROLEUM CORPORATION LIMITED
KOCHI REFINERY

HSE DEPARTMENT

KR.HSE.SAFE.05.SLMR.SKP

06.08.2022

Sub: Noise level at Boundary Wall.

Noise level at various locations near the boundary wall inside the refinery was measured on 06.08.2022 at **NIGHT TIME**. The observed values are given below.

Sl. No.	Location	Sound level	Remarks
1.	South of tankYT-30 (Near to Parking)	55	-
2.	Near T T gate (PDPP gate)	60	-
3.	South of Project warehouse	58	-
4.	220 KV line crossing near rain water harvesting pond	51	-
5.	DHDS Tower No- 1	52	
6.	Rear side of DHDS fire station	55	-
7.	Near Chalikkara gate	53	-
8.	Near TK-25	56	
9.	East of MS Block	56	-
10.	South of DHDS Flare	57	-
11.	Near NHT-CCR-AAQMS (Near MSBP boundary)	59	
12.	West of tank YT-902(DHDS)	52	-
13.	Rear side of PIBU office(opp. IPTC)	51	-
14.	Bottling plant entrance from refinery(IPTC Road)	58	-
15.	North of LNG skid (GT-2 Road end)	60	-
16.	Near IREP gate	59	-
17.	DCU	59	-
18.	South of UB-12	59	-
19.	North of VGO labour amenity building	57	-
20.	Behind IREP site office	58	-
21.	Below Coke Conveyor area near railway gate(PWC 4)-offline	51	Conveyor Offline
22.	Below Coke Conveyor area near railway gate- RLS-1	52	Conveyor Offline
23.	Below Coke Conveyor area near outlet A –RLS-2	50	Conveyor Offline
24.	Drum Plant gate	55	-

Smit Kumar Pal
Manager (Safety)

To: DGM (F&S) (r) GM (HSE) I/C

BHARAT PETROLEUM CORPORATION LIMITED
KOCHI REFINERY

HSE DEPARTMENT

KR.HSE.SAFE.05.SLMR.SKP

12.08.2022

Sub: Noise level at Boundary Wall.

Noise level at various locations near the boundary wall inside the refinery was measured on 12.08.2022 at day time. The observed values are given below.

Sl. No.	Location	Sound level	Remarks
1.	South of tankYT-30 (Near to Parking)	62	-
2.	Near T T gate (PDPP gate)	63	-
3.	South of Project warehouse	60	-
4.	220 KV line crossing near rain water harvesting pond	59	-
5.	DHDS Tower No- 1	55	
6.	Rear side of DHDS fire station	56	-
7.	Near Chalikkara gate	58	-
8.	Near TK-25	60	
9.	East of MS Block	61	-
10.	South of DHDS Flare	60	-
11.	Near NHT-CCR-AAQMS (Near MSBP boundary)	61	
12.	West of tank YT-902(DHDS)	57	-
13.	Rear side of PIBU office(opp. IPTC)	57	-
14.	Bottling plant entrance from refinery(IPTC Road)	60	-
15.	North of LNG skid (GT-2 Road end)	59	-
16.	Near IREP gate	61	-
17.	DCU	62	-
18.	South of UB-12	60	-
19.	North of VGO labour amenity building	59	-
20.	Behind IREP site office	58	-
21.	Below Coke Conveyor area near railway gate(PWC 4)-offline	59	Conveyor Offline
22.	Below Coke Conveyor area near railway gate- RLS-1	60	Conveyor Offline
23.	Below Coke Conveyor area near outlet A –RLS-2	58	Conveyor Offline
24.	Drum Plant gate	63	-

Smit Kumar Pal
Manager (Safety)

To: DGM (F&S) (r) GM (HSE) I/C

BHARAT PETROLEUM CORPORATION LIMITED
KOCHI REFINERY

HSE DEPARTMENT

KR.HSE.SAFE.05.SLMR.SKP 21.09.2022

Sub: Noise level at Boundary Wall.

Noise level at various locations near the boundary wall inside the refinery was measured on 21.09.2022 at day time. The observed values are given below.

Sl. No.	Location	Sound level	Remarks
1.	South of tankYT-30 (Near to Parking)	62	-
2.	Near T T gate (PDPP gate)	63	-
3.	South of Project warehouse	59	-
4.	220 KV line crossing near rain water harvesting pond	57	-
5.	DHDS Tower No- 1	56	
6.	Rear side of DHDS fire station	59	-
7.	Near Chalikkara gate	61	-
8.	Near TK-25	60	
9.	East of MS Block	61	-
10.	South of DHDS Flare	60	-
11.	Near NHT-CCR-AAQMS (Near MSBP boundary)	61	
12.	West of tank YT-902(DHDS)	50	-
13.	Rear side of PIBU office(opp. IPTC)	57	-
14.	Bottling plant entrance from refinery(IPTC Road)	61	-
15.	North of LNG skid (GT-2 Road end)	64	-
16.	Near IREP gate	61	-
17.	DCU	63	-
18.	South of UB-12	60	-
19.	North of VGO labour amenity building	62	-
20.	Behind IREP site office	61	-
21.	Below Coke Conveyor area near railway gate(PWC 4)-offline	60	Conveyor Offline
22.	Below Coke Conveyor area near railway gate- RLS-1	63	Conveyor Offline
23.	Below Coke Conveyor area near outlet A –RLS-2	64	Conveyor Offline
24.	Drum Plant gate	60	-

Smit Kumar Pal
Manager (Safety)

To: DGM (F&S) (r) GM (HSE) I/C

BHARAT PETROLEUM CORPORATION LIMITED
KOCHI REFINERY

HSE DEPARTMENT

KR.HSE.SAFE.05.SLMR.SKP

24.09.2022

Sub: Noise level at Boundary Wall.

Noise level at various locations near the boundary wall inside the refinery was measured on 24.09.2022 at **NIGHT TIME**. The observed values are given below.

Sl. No.	Location	Sound level	Remarks
1.	South of tank YT-30 (Near to Parking)	52	-
2.	Near T T gate (PDPP gate)	59	-
3.	South of Project warehouse	56	-
4.	220 KV line crossing near rain water harvesting pond	50	-
5.	DHDS Tower No- 1	55	
6.	Rear side of DHDS fire station	54	-
7.	Near Chalikkara gate	55	-
8.	Near TK-25	52	
9.	East of MS Block	56	-
10.	South of DHDS Flare	58	-
11.	Near NHT-CCR-AAQMS (Near MSBP boundary)	59	
12.	West of tank YT-902(DHDS)	51	-
13.	Rear side of PIBU office(opp. IPTC)	53	-
14.	Bottling plant entrance from refinery(IPTC Road)	57	-
15.	North of LNG skid (GT-2 Road end)	60	-
16.	Near IREP gate	59	-
17.	DCU	59	-
18.	South of UB-12	60	-
19.	North of VGO labour amenity building	57	-
20.	Behind IREP site office	59	-
21.	Below Coke Conveyor area near railway gate(PWC 4)-offline	51	Conveyor Offline
22.	Below Coke Conveyor area near railway gate- RLS-1	52	Conveyor Offline
23.	Below Coke Conveyor area near outlet A –RLS-2	54	Conveyor Offline
24.	Drum Plant gate	57	-

Smit Kumar Pal
Manager (Safety)

To: DGM (F&S) (r) GM (HSE) I/C

Bharat Petroleum

QUALITY CONTROL DEPARTMENT
BPCL-KOCHI REFINERY, AMBALAMUGAL

BOREWELL WATER TEST REPORT

Bore well No. 70
Date of Sample: 12.4.2022
Date of Testing: 20.4.2022

KR.TECH.QC.26.DRINK.WATR

Sl No:	Test Parameters	Unit	Method	Result	Acceptable limit
5	pH		IS 3025 (P:11)	7.6	6.5 – 8.5
15	Oil	mg/L	IS 3025 (P:39)	nil	nil
	Metals				
16	Silver (as Ag)	mg/L	IS13428 Annexe J	BDL (MDL=0.005)	0.1 (Max)
17	Aluminium (as Al)	mg/L	IS 3025 (P:55)	BDL(MDL=0.002)	0.03 (Max)
18	Boron (as B)	mg/L	IS 3025 (P:57)	BDL(MDL=0.01)	0.5 (Max)
19	Barium (as Ba)	mg/L	IS13428 Annexe F	BDL(MDL=0.01)	0.7 (Max)
20	Calcium (as Ca)	mg/L	IS 3025 (P:40)	23	75 (Max)
21	Cadmium (as Cd)	mg/L	IS 3025 (P:41)	BDL(MDL=0.001)	0.003 (Max)
22	Chromium (as Cr)	mg/L	IS 3025 (P:52)	BDL(MDL=0.01)	0.05 (Max)
23	Copper (as Cu)	mg/L	IS 3025 (P:42)	BDL(MDL=0.01)	0.05 (Max)
24	Iron (as Fe)	mg/L	IS 3025 (P:53)	0.09	0.3 (Max)
25	Magnesium (as Mg)	mg/L	IS 3025 (P:46)	4	30 (Max)
26	Manganese (as Mn)	mg/L	IS 3025 (P:59)	BDL(MDL=0.01)	0.1 (Max)
27	Nickel (as Ni)	mg/L	IS 3025 (P:54)	BDL(MDL=0.01)	0.02 (Max)
28	Molybdenum (as Mo)	mg/L	IS 3025 (P:02)	BDL(MDL=0.002	0.07 (Max)
29	Lead (as Pb)	mg/L	IS 3025 (P:47)	BDL(MDL=0.01)	0.01 (Max)
30	Zinc (as Zn)	mg/L	IS 3025 (P:49)	0.2	5 (Max)
31	Arsenic (as As)	mg/L	IS 3025 (P:37)	BDL(MDL0.005)	0.01 (Max)
32	Mercury (as Hg)	mg/L	IS 3025 (P:48)	BDL(MDL0.0001)	0.001(Max)
33	Selenium (as Se)	mg/L	IS 3025 (P:56)	BDL(MDL=0.001)	0.1 (Max)
34	Antimony (as Sb)	mg/L	APHA:3113B	BDL(MDL=0.001)	Max0.1

BDL: Below Detection Limit
MDL: Minimum Detection Limit

S.Mahamed Iqbal
Manager (Quality Control)

QUALITY CONTROL DEPARTMENT
BPCL-KOCHI REFINERY, AMBALAMUGAL

BOREWELL WATER TEST REPORT

Bore well No. 43
Date of Sample: 20.5.2022
Date of Testing: 27.5.2022

KR.TECH.QC.26.DRINK.WATR

Sl No:	Test Parameters	Unit	Method	Result	Acceptable limit
5	pH		IS 3025 (P:11)	7.9	6.5 – 8.5
15	Oil	mg/L	IS 3025 (P:39)	nil	nil
	Metals				
16	Silver (as Ag)	mg/L	IS13428 Annexe J	BDL (MDL-0.005)	0.1 (Max)
17	Aluminium (as Al)	mg/L	IS 3025 (P:55)	BDL(MDL-0.002)	0.03 (Max)
18	Boron (as B)	mg/L	IS 3025 (P:57)	BDL(MDL=0.01)	0.5 (Max)
19	Barium (as Ba)	mg/L	IS13428 Annexe F	BDL(MDL=0.01)	0.7 (Max)
20	Calcium (as Ca)	mg/L	IS 3025 (P:40)	18	75 (Max)
21	Cadmium (as Cd)	mg/L	IS 3025 (P:41)	BDL(MDL=0.001)	0.003 (Max)
22	Chromium (as Cr)	mg/L	IS 3025 (P:52)	BDL(MDL=0.01)	0.05 (Max)
23	Copper (as Cu)	mg/L	IS 3025 (P:42)	BDL(MDL=0.01)	0.05 (Max)
24	Iron (as Fe)	mg/L	IS 3025 (P:53)	0.06	0.3 (Max)
25	Magnesium (as Mg)	mg/L	IS 3025 (P:46)	5	30 (Max)
26	Manganese (as Mn)	mg/L	IS 3025 (P:59)	BDL(MDL=0.01)	0.1 (Max)
27	Nickel (as Ni)	mg/L	IS 3025 (P:54)	BDL(MDL-0.01)	0.02 (Max)
28	Molybdenum (as Mo)	mg/L	IS 3025 (P:02)	BDL(MDL=0.002	0.07 (Max)
29	Lead (as Pb)	mg/L	IS 3025 (P:47)	BDL(MDL=0.01)	0.01 (Max)
30	Zinc (as Zn)	mg/L	IS 3025 (P:49)	0.1	5 (Max)
31	Arsenic (as As)	mg/L	IS 3025 (P:37)	BDL(MDL0.005)	0.01 (Max)
32	Mercury (as Hg)	mg/L	IS 3025 (P:48)	BDL(MDL0.0001)	0.001(Max)
33	Selenium (as Se)	mg/L	IS 3025 (P:56)	BDL(MDL=0.001)	0.1 (Max)
34	Antimony (as Sb)	mg/L	APHA:3113B	BDL(MDL=0.001)	Max0.1

BDL: Below Detection Limit
MDL: Minimum Detection Limit

S.Mahamed Iqbal
Manager (Quality Control)

Bharat Petroleum

QUALITY CONTROL DEPARTMENT
BPCL-KOCHI REFINERY, AMBALAMUGAL

BOREWELL WATER TEST REPORT

Bore well No. 57
Date of Sample: 11.6.2022
Date of Testing: 22.6.2022

KR.TECH.QC.26.DRINK.WATR

Sl No:	Test Parameters	Unit	Method	Result	Acceptable limit
5	pH		IS 3025 (P:11)	7.5	6.5 – 8.5
15	Oil	mg/L	IS 3025 (P:39)	nil	nil
	Metals				
16	Silver (as Ag)	mg/L	IS13428 Annexe J	BDL (MDL=0.005)	0.1 (Max)
17	Aluminium (as Al)	mg/L	IS 3025 (P:55)	BDL(MDL=0.002)	0.03 (Max)
18	Boron (as B)	mg/L	IS 3025 (P:57)	BDL(MDL=0.01)	0.5 (Max)
19	Barium (as Ba)	mg/L	IS13428 Annexe F	BDL(MDL=0.01)	0.7 (Max)
20	Calcium (as Ca)	mg/L	IS 3025 (P:40)	17	75 (Max)
21	Cadmium (as Cd)	mg/L	IS 3025 (P:41)	BDL(MDL=0.001)	0.003 (Max)
22	Chromium (as Cr)	mg/L	IS 3025 (P:52)	BDL(MDL=0.01)	0.05 (Max)
23	Copper (as Cu)	mg/L	IS 3025 (P:42)	BDL(MDL=0.01)	0.05 (Max)
24	Iron (as Fe)	mg/L	IS 3025 (P:53)	0.08	0.3 (Max)
25	Magnesium (as Mg)	mg/L	IS 3025 (P:46)	7	30 (Max)
26	Manganese (as Mn)	mg/L	IS 3025 (P:59)	BDL(MDL=0.01)	0.1 (Max)
27	Nickel (as Ni)	mg/L	IS 3025 (P:54)	BDL(MDL=0.01)	0.02 (Max)
28	Molybdenum (as Mo)	mg/L	IS 3025 (P:02)	BDL(MDL=0.002	0.07 (Max)
29	Lead (as Pb)	mg/L	IS 3025 (P:47)	BDL(MDL=0.01)	0.01 (Max)
30	Zinc (as Zn)	mg/L	IS 3025 (P:49)	0.1	5 (Max)
31	Arsenic (as As)	mg/L	IS 3025 (P:37)	BDL(MDL0.005)	0.01 (Max)
32	Mercury (as Hg)	mg/L	IS 3025 (P:48)	BDL(MDL0.0001)	0.001(Max)
33	Selenium (as Se)	mg/L	IS 3025 (P:56)	BDL(MDL=0.001)	0.1 (Max)
34	Antimony (as Sb)	mg/L	APHA:3113B	BDL(MDL=0.001)	Max0.1

BDL: Below Detection Limit
MDL: Minimum Detection Limit

S.Mahamed Iqbal
Manager (Quality Control)

Annexure – VII

CORPORATE RESPONSIBILITY FOR ENVIRONMENTAL PROTECTION (CREP)

PROGRESS REPORT ON ACTION PO

Sl. No.	Task	Remarks/Status
1	All the refineries provide on line emission and effluent monitoring systems and give linkages to SPCB and CPCB server and detailed note shall be submitted by individual refineries indicating number of sensors, make and type etc.	Online connectivity of all Six AAQMS given and intimated to CPCB/KSPCB. All the operating Stacks are being on-line connected to the CPCB site. Total 926 No's of Hydrocarbon (HC) detectors, 267 No's of Hydrogen sulphide (H2S) detectors and 42 No's of Hydrogen (H2) detectors are installed at different locations of refinery including product loading, storage tank farms and process plants etc. Most of sensors are made up of M/s Honeywell. HC sensors belong to Infra-red type and H2S/H2 sensors belong to electrochemical type.
2	The refineries shall submit action plan to achieve zero discharge (except once through cooling water in coastal region) within three months.	As part of integrated Refinery cum expansion project (IREP), an integrated ETP has been setup and the 100% treated effluent water is routed to RO plant for further processing and recycling as DM water
3	The HSE department of refineries shall co-ordinate with marketing divisions for submission of note on evaporation during loading, leakage possibilities, steps taken for fire safety, management of oily sludge	HSE department of BPCL has initiated coordination and various measures to control evaporation during loading, leakage, fire safety, management of oily sludge etc. It includes vapor recovery system, bottom loading, fugitive emission survey, LDAR etc. Separate scheme is adopted for the management of oily sludge which includes centrifuging, oil recovery and bio-remediation.
4	The refineries who have not completed the task of providing low NOx burners shall complete within six month and submit completion note without further delay.	All the heaters under CEMP phase-II/IREP have been provided with low NOx burners.

Status as on 30th September 2022

1. Air Pollution Management		
a)	All the Refineries located in the critically polluted areas, identified by CPCB, will submit an action plan for phase wise reduction of SO2 emission from the present level:	Total SO_2 emission from the refinery is within the limit. The allowable limit as per latest CTO is 1579 kg/hr.; maintaining well below this value. KR meets its average total SO_2 emission of 550 kg/hr. from the complex. It contributes to net reduction in SO2 emission by producing Euro- VI MS and Diesel. Following steps are taken to reduce SO2 emissions from the refinery. • Modifications to plant fuel system to facilitate usage of low sulfur liquid fuel. • Amine treatment of fuel gas • Sulfur Recovery Units with 99.9% efficiency as part of IREP with inclusion of TGTU (Tail Gas Treating Unit) • Low Pressure Amine treatment of vacuum column vent gas. • Employing Biturox technology for Bitumen production, where off gas is incinerated and further treated.
b)	Future Refineries will have sulphur recovery with minimum 99% efficiency	SRUs have more than 99% efficiency. New SRU have 99.9% efficiency.
c)	Road map to improve the efficiency of SRU:	BPCL Kochi refinery has been explored the possibility of Oxygen enrichment technology for enhancing the efficiency of SRU and the same has been commissioned.
d)	With regard to NOx emission, the new Refineries / process units will install low NOx burners. For retrofitting of low NOx burners in existing units the same expert committee will suggest the strategies and action plan within six months:	The expert committee, during their visit to Kochi Refinery, had suggested replacing the burners in heaters with more than 10 million Kcal/hr duty with low NOx type burners. We have installed low NOx in the existing Refinery. Moreover, all the new process heaters and steam boilers (total six numbers) installed as part of capacity expansion cum modernization project, CEMP - Phase II and all IREP units have been provided with low NOx burners.
e)	The Expert Committee will also suggest an action plan, within 6 months, for control and monitoring of hydrocarbon loss and VOC emissions, leak detection and repair (LDAR) program and vapor	Following provisions exists for VOC control a) Provision of mechanical seals on pumps for leak free operation. b) Use of submerged filling in product loading gantries.

	recovery systems (for loading and unloading operations within Refineries only):	c) Closed blow down system for process plants. d) Floating roof tanks for volatile product storage. e) Conversion of floating roof tanks to double seal arrangement. f) Closed loop sampling system in process plants. g) Covered facility for oily effluent storage. h) VOC control system is in place in new ETPs for treatment of VOCs generated during in the effluent treatment area. i) 926 No's of HC detectors, 267 No's of H2S detectors and 42 No's of H2 detectors are installed at different locations of refinery including product loading, storage tank farms and process plants etc. j) Benzene monitoring is carried out using "dragger" chip technique in the aromatic recovery unit on a daily basis. k) Six ambient air quality monitoring stations (AAQMS) are working online to monitor the ambient air quality on continuous basis. They provide eleven ambient air quality parameters, including hydrocarbons and the data is transferred online to CPCB/KSPCB. l) Vapor recovery system is being implemented in ISOM Naphtha tank farm. m) New vapor recovery system is being implemented for Benzene & Toluene truck loading area.
f)	The flare losses to be minimized and monitored regularly	Flare losses are monitored continuously through flare meters installed in the process units on a daily basis and are reviewed at the senior management level Further, the fuel gas flow to the pilot burner is maintained at the minimum level required to sustain the pilot flame. Various process schemes implemented to reduce flaring. Advanced process control (APC) system was implemented in hydrogen network for decreasing hydrogen flaring. Flare Gas recovery system is installed as part of IREP project and commissioned in December 2017.
g)	Refineries will install continuous emission monitoring systems for SO2 and NOx in major stacks. Action plan for this will be submitted within six months	Kochi Refinery has provided continuous SO_2 and NOx analyzing system for all the heater/boiler stacks and is connected to the CPCB server system.

h)	Refineries will also monitor total HC and Benzene in the premises (particularly in loading / unloading operations and ETP). The status and action plan will be submitted within six months	18 No's of HC detectors are installed in the truck loading/wagon loading area.2 No's of HC detectors and 2 No's of H2S detectors are installed in ETP-V area. Benzene monitoring is carried out using "dragger" chip technique in the aromatic recovery unit on a daily basis. 6 No's of ambient air quality monitoring stations (AAQMS) are installed at the peripheries of the refinery to enable close monitoring of ambient air quality near the refinery area. The ambient air quality information is also communicated to general public through an electronic display board.
2. **Waste Water Management:**		
a)	Refineries will prepare an action plan for conservation of water resources and maximizing reuse / recycle of treated effluent within six months. The treated effluent discharge quantity will be limited to 0.4 m3/tons (for 90% of time) except for the monsoon season:	The discharge of treated water from Kochi refinery is 0.17 m3 /MT of crude processed. Steam condensate in the process plants is being recycled back to the boilers as feed water for the steam generation, there by resulting in reduction in the fresh water consumption. Approximately 130-150 m^3/hr. steam condensate is being recycled to steam boilers in the refinery. The stripped water from the stripped water units is recycled as make up water to the desalting process in the crude unit. 150 m3/hr. of liquid effluent generation is avoided by recycle. Treated effluent water from the wastewater treatment plants are recycled in RO plant
3	Oil spill response facilities at Coastal Refineries will be in position within two years:	Oil spill response (OSR) facility at Cochin port is already in place. Additionally, BPCL Kochi refinery has procured oil containment booms as part of SBM facilities commissioning to augment the capabilities of oil spill response related facilities. We have also conducted a mock drill to build confidence for the safe operation of SBM facilities with the help of port trust/coast guard personnel. It was decided to further strengthen the oil spill response facilities at Cochin port through purchase and installation of additional equipment and the major share of the investment was shouldered by BPCL Kochi refinery.

3. **Solid Waste Management:** Refineries will explore new technologies for reduction in the generation of oily sludge. Strategy and action plan for liquidation of existing sludge will be submitted within six months

To reduce the sludge generation, Kochi Refinery follows the following best practices:

- ETP oily sludge is processed continuously in DCU. The oily sludge generated from tank cleaning is also processed in DCU.
- Any excess sludge generated have the provision for oil recovery through centrifuging.
- Switching of service of storage tanks between different crude oils (high wax and low wax) ensures minimum formation of sludge at the bottom of storage tanks.
- Using side entry mixers in the crude oil tank for minimization of sludge accumulation.

4. **Refineries will carry out monitoring and survey to assess HC loss and concentration of VOC in Ambient Air / Waste Water Treatment Plant.**

a) BPCL Kochi refinery has implemented leak detection and repair (LDAR) program using portable hydrocarbon detector instrument. These programs are carried out on continuous basis on a large number of valves, flanges etc.in all process units and offsite areas. The leaks identified are attended by maintenance crew immediately and are monitored on regular basis.

b) Secondary seals have been provided in all storage tanks storing volatile hydrocarbons to reduce fugitive hydrocarbon emissions.

c) HC detectors are installed in sufficient numbers at the storage tank farm areas, process plants, product loading areas and LPG bottling plants in order to identify any hydrocarbon leaks immediately.

d. Benzene monitoring is carried out using "dragger" chip technique in the aromatic recovery unit on daily basis.

e. Six ambient air quality monitoring stations (AAQMS) are working online to monitor the ambient air quality on continuous basis. The ambient air quality information is also communicated to public through an electronic display board.

f. Pressure relief valves for column and vessel are routed to flare to avoid fugitive emission during emergencies.

5. **Refineries will assess the quantity of flare gas (install the measurement system if the same is not possible)**

a. At BPCL Kochi refinery, flare losses are monitored continuously from different process units and are reviewed at the senior management level on a daily basis. Flare meters are installed in the process units for this purpose.

Further, the fuel gas flow to the pilot burner is maintained at the minimum level required to sustain the pilot flame.
Various process schemes implemented to reduce flaring

Advanced process control (APC) system was implemented in Hydrogen network for decreasing hydrogen flaring.
Flare gas recovery system is installed as part of IREP project and it can recover around **6.75 TPD** flare gas to fuel gas system.

6. Assessment of Potential leakages from petroleum storage tanks

Inspection of petroleum storage tanks is being carried out by following API 653 standard, OISD standard 129 and other relevant standards. Maintenance work is carried out as per the standard procedure when tank is taken for the outage.
Total 67 No's of bore wells have been constructed at various locations inside the refinery in order to monitor the ground water for any hydrocarbon leakages from the refinery storage tanks and processing plants. The ground water samples from the bore wells are tested periodically for presence of hydrocarbons. In addition, 14 piezometer wells have been installed for monitoring of ground water quality.

7. Cleaner Technology options and information to be provided to CPCB

Clean technologies adopted to combat Air Pollution includes:

1. BPCL Kochi refinery has consistently met all deadlines for up gradation of auto fuel quality, set by the Government of India. KR is producing MS and HSD of BS VI norms.

2. Hydro desulphurization of feed stock to fluid catalytic cracking unit (FCCU)

3. Modifications in plant fuel system facilitate to usage of low sulfur Bombay high vacuum residue as liquid fuel, to lower sulfur dioxide emissions during processing of crude.

4. Amine treatment of fuel gas for removal hydrogen sulfide to produce sweet fuel gas.

5. Installation five trains of sulfur recovery unit with more than 99.9% recovery.

6. Low pressure amine treatment of vacuum column vent gas. This is a unique environmental protection technology developed by BPCL KR for removing toxic hydrogen sulfide gas produced during vacuum distillation process. This technology has been developed exclusively with in-house expertise. The uniqueness of the technology lies in the fact that the process for hydrogen sulfide removal is carried out under extremely low pressure drop conditions.

7. Desulphurization of low pressure gas from crude unit overhead and kerosene unit fractionator utilizing amine absorption.

8. Reduction furnace for conversion of ammonia stream to nitrogen in order to reduce NOx emissions.

9. State of the art Biturox Technology has been adopted for production of Bitumen without any harmful emission. Unlike the traditional bitumen blowing technology, this technology helps for no odor or pollutants emissions. The off gases generated is subjected to incineration and caustic scrubbing in this technique. The waste water stream generated is also oxidized, thereby resulting in zero BOD for effluent. The fresh water consumption is also significantly reduced by the adoption of this technique.

10. An electrostatic precipitator has been installed downstream of CO boiler for minimizing particulate matter emission from FCCU regenerator flue gases. As part of PFCCU (part of IREP project) we have installed a tertiary cyclone separator and another ESP (Electrostatic precipitator) for particulate capture.

11. Closed loop sampling system in process plants.

b) Clean technologies adopted to improve effluent water quality:

1. We have 4 effluent treatment plants catering to the different process units.
2. Installation of 5 numbers of sour water strippers and recycling of stripped water in process units.
3. Provision of two stage API oil separation system for effluent streams.
4. Spent caustic treatment utilizing H2O2 and air oxidation methods for treatment in an in an environment friendly way.
5. Closed drainage system for tank farm drains.
6. Two stage biological treatment system for effluent streams including tricking filter and activated sludge process, automated Chemostat Treatment and sequential batch reactor.(SBR)
7. Hydrogen Peroxide is utilized in our ETP's instead of FeCl3 to avoid chemical sludge formation.
8. Chemical de-contamination technique is being adopted at BPCL KR during turnarounds. The vessels, columns etc. are decontaminated using specially formulated chemical which is environment friendly, non-hazardous and fully biodegradable. The Hydrocarbons are recovered in the form of slop after de-emulsification process.

c) Clean technologies implemented for optimal solid waste management

Mechanical oil recovery system for oil recovery from oily sludge.
Post IREP ETP sludge is processed in DCU.

1. In-situ recovery of oil from crude tank bottom sludge.
2. BPCL Kochi refinery constructed two secured landfills for the safe disposal of hazardous solid wastes as per the standard norms laid down by CPCB. The first landfill pit has a capacity of 590m3 and is dedicated to the disposal of FCC catalyst fines and spent molecular sieves. The second land fill pit with a capacity of 390 m3 is dedicated for the disposal of sludge from effluent treatment plants.

3. Installation of bio gas plant of capacity 1 T/day to convert canteen food waste into gas for use in canteen. The plant is developed based on the NISARGRUNA technology developed by Bhabha Atomic Research Centre. (BARC)
4. We have an agreement with KEIL (Kerala Enviro Infrastructure Limited) for disposing solid hazardous wastes at their TSD Facility.
5. Wherever possible, spent catalyst containing recoverable metals are disposed /sold to authorized recyclers only.
6. Recycle value e – waste materials are being sold to approved recyclers only.

Sustainable Development Projects and Activities added during 1st April 2022 to 30th September 2022

1. It was identified that required ATF production can be managed by producing ATF from DHDT and AFT merox whenever diesel hydotreating capacity is not limiting. KHDS which is an old inefficient unit was kept shutdown whenever opportunity exists. This saved 0.6 TPH Fuel, 1.5 TPH, and 0.6 MW Power. Assuming this unit remain shut down for 50% of time, the energy saving is equivalent to 3000 MTOE/yr
2. IREP demountable flare has 2 liquid ring compressors for flare gas recovery. It was not possible to operate both compressors in parallel as it was getting tripped in low suction pressure. On detailed analysis it was found that this is happening because of the pressure drop across suction NRV. The NRVs were removed after concurrence from the supplier M/s Garo. This has resulted in additional recovery of 0.7 TPH FG recovery which is equivalent to 6000 MTOE/yr
3. BPCL KR has a trap population of around 25000. Hence monitoring and ensuring healthiness was a tedious job in the vast offsite areas. A contract was lined up for trap survey, rectification and up keeping of minimum 95% healthiness. Another third party contract was lined up for performance verification of the maintenance contractor. This has resulted in reduction of offsite steam by around 10 TPH equivalent to 5700MTOE/yr
4. As a strategy 6 nos of heavy oil tanks were isolated by maximizing the hot/ direct feed from primary units to downstream units. This resulted in saving of steam in intermediate tanks with steam coils. Estimated saving of 6.5 TPH steam equivalent to 3900MTOE/yr
5. As CDU3 was running in full gas firing mode, it was observed that the risk of acid dew point corrosion in APH was low even with ambient air directly entering the gas APH. Hence SCAPH steam was stopped in operation on full gas firing mode. This saved 6 TPH LP Steam equivalent to 3424MTOE/Year
6. CEMP 2 flare purge fuel gas was replaced with nitrogen in a phased manner. This has reduced the purge gas requirement by 0.3 TPH FG equivalent to 2600MTOE/yr
7. CDU1 plant fuel system caters fuel oil to CDU2, UB7 and UB10. As CDU2 was operating in full gas mode and UB7 and 10 are operated rarely only, the entire plant fuel system was flushed and isolated. It saved around 3 TPH steam. Assuming that the system can remain isolated 50% of time the saving is 900 MTOE/yr
8. CDU2 crude heater APH was bypassed partially due to limitation in air flow. APH cleaning, general burner overhauling and refractory rectification was done in turn around. This saved around 45 Kg/Hr. of fuel saving by efficiency improvement equivalent to 400MTOE/yr

9. Packinox reactor in CCR had a high pressure drop which forced the stripper to operate at a higher pressure. A scheme in Packinox was implemented for the exchanger spray bars back purge to reduce DP. This has saved 0.5 TPH HP Steam in the stripper re-boiler equivalent to 330MTOE/yr
10. DCU CBD slop was being routed to crude slop. A scheme was implemented to reprocess CBD slop internally in DCU. This avoided the reprocessing in CDU again. Assuming 70 TPH slop processing in a week, this gives a saving of 175MTOE/yr
11. The loader valves of NHT RGC was always operating at 100%. During turn around, Loader valves adjustment option to operate at variable opening of 25%, 50%, 75% was made available. This has resulted in130 Kw/hr. Power equivalent to 160MTOE/yr

GREEN COVER AT KOCHI REFINERY

BPCL, Kochi Refinery has always given highest preference towards care for environment and their protection. The company has already incorporated pollution control measures in their design itself and has also grown an extensive Green cover on its periphery and within for which the refinery goes by the name **BPCL Green Kochi Refinery**. Recognizing the company's commitment towards environment care and protection, it has been certified for ISO 14001, which was first in the state of Kerala.

Total green cover area at BPCL, Kochi Refinery is around 315 acres.

Kochi Refinery maintains an Eco-park and many theme based parks such as Rainbow Park, Amrutha Sarass, Varshodyan, Kalpkodyan, Herbal Park, Bamboo Park, Miyawaki Forests etc. These were developed as a part of Greenbelt initiatives and they blend with the nature and is inhabited with diverse trees, flowering plants, herbal trees and fruit bearing trees. Three number of Butterfly parks were set up towards enhancement of Bio-diversity. As part of PDP Project green belt development, we have planted more than 20,000 saplings this year to make greenery in Petrochemical complex. A Mini Miyawaki forest was developed near coke dome and PDP Project area. Further, Kochi Refinery has other dense vegetation in the form of plantation and natural growth which constitutes to the green cover. The diversified Green belt within the Refinery has drawn attention from even seasonal migratory birds.

With the reference of Environmental clearance for the project of Expansion-cum-modernization of refinery unit (CEMP-II), as committed in the EIA/EMP report, the company shall earmark Rs: 78.30 crores for environment protection measures and Rs: 51.00 crores for community development activities.

Environment Protection Measures:

BPCL – KR has been spent huge amount on Environment management associated with CEMP-II and IREP as per commitment in Environment Management Plan (EMP) were:

- Waste water treatment system
- Tall Stacks for wide dispersion of pollutants
- A closed, automated coke transferring system aims for gains in environmental, economic and safety performance
- Stack gas monitoring (online facilities)
- Land acquisition for safety of the surrounding environment
- Green belt development

Community Development Activates:

The Various Community Development Activities associated with CEMP II were carried out under the following categories.

- **Education**
- **Water Supply for the nearby community**
- **Health Care**
- **Helping hand for Community Development activities**
- **Support for Development Programs in the nearby locality and Kochi City.**

Some of the major activities carried out are as below:

a. Infrastructure support like Buildings, Electricity, Water and Uninterrupted supply of Medical Oxygen needed for setting up a temporary hospital to combat Covid -19 to State Government.
b. Free Liquid Medical Oxygen Supply for Covid Care centers of State Government.
c. Rejuvenation of neighboring Thanneerchal Lake in Tripunithura.
d. Support for Gas Fired Crematoriums in Grama Panchayats.
e. House for poor (Urban & Rural): Vadavucode Puthencruz & Thiruvaniyoor Grama Panchayats and Kochi Corporation.
f. Construction/Renovation of Primary Health Centers and Anganwadis.
g. Construction/renovation of class rooms in Govt. Schools and Support for Special Schools.
h. Support for *Kudumbasree* Units – Building, vehicle for waste collection.
i. Promotion of science education in Govt. Schools.
j. Installation of Traffic Signal Systems and lighting at various junctions.
k. Development/renovation/repair of rural roads and lighting projects
l. Setting up and Up-keeping of public utilities, Public toilets & heritage monuments.

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