BEFORE THE NATIONAL GREEN TRIBUNAL

(SOUTHERN ZONE BENCH)

Original Application No. 265 of 2017 (SZ)

IN THE MATTER OF

N.G. Soman ... Applicant

Versus

M/s Bharat Petroleum Corporation Limited

And Others ... Respondents(s)

REPLY STATEMENT ALONG WITH ANNEXURES FILED BY THE 1ST RESPONDENT BPCL

M/s. King & Partridge
M.Vijayan
M.Kumaresan
Advocates for 1st Respondent- BPCL
MoB: 9942036873

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Certified that the documents filed in typed set are true copies of the originals.

Dated at Chennai on this 30th day of September 2021

KING AND PARTRIDGE

COUNSEL FOR 1ST RESPONDENT- BPCL

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

Original Application No. 265 of 2017 (SZ)

1. N G Soman
   Nenjammalil
   Ambalamedu P O
   Ernakulam – 682303
   Kerala ...Applicant

AND

1. M/s.Bharat Petroleum Corporation Limited
   Post Bag No.2, Ambalamugal - 682 302
   Ernakulam District, Kerala,

2. Prodair Air Products India Pvt Ltd
   BPCL Kochi Refinery
   Ambalamughal - 682302
   Ernakulam district, Kerala

3. Kerala State Pollution Control Board
   Rep. by its Member Secretary
   Office of the Kerala State Pollution Control Board
   Thiruvananthapuram-695 001

4. Environmental Engineer,
   Ernakulam District Office - II
   Kerala State Pollution Control Board
   1st floor, Mannalikudy Arcade (Manna Residency)
   M C Road, Perumbavoor,
   Ernakulam, Kerala – 683542

5. State of Kerala
   Represented by the secretary
   State Government
   Ministry of Environment, forest and climate change
   Governement Secretariat
   Thiruvananthapuram, Kerala – 695001

6. Union of India
   Represented by the secretary
   Central Government
   Ministry of Environment, forest and climate change
   New Delhi – 1100 ...Respondents

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BHARAT PETROLEUM CORPORATION LTD. * AMBALAMUGAL 682 302 * (KOCHI REFINERY)

कुरियन पी आलपाट्ट KURIAN P ALAPATT
मुख्य महाप्रबंधक (मानव संसाधन) कार्यभारी
Chief General Manager (Human Resources)I/C
भारत पेट्रोलियम कॉर्पोरेशन लिमिटेड
Bharat Petroleum Corporation Limited
कोच्चि रिफ़ाइनरी Kochi Refinery
अम्बलमुगल Ambalamugal-682 302
एरणाकुलम ज़िला Ernakulam Dist., केरल Kerala

REPLY STATEMENT FILED ON BEHALF OF BHARAT PETROLEUM CORPORATION LIMITED – 1st RESPONDENT

It is respectfully submitted as follows:

The address for service of all notices and processes on the 1st Respondent is that of its advocates M/s. King & Partridge, "Catholic Centre", 108, Armenian Street, Chennai 600 001.

1. This Respondent denies all the averments and allegations contained in the application except those that are specifically admitted hereunder as true and put the applicant to strict proof of the rest.

2. BPCL Kochi Refinery (KR) has completed Integrated Refinery Expansion Project (IREP) which was commissioned in the year 2017 at a cost of ₹14,656 crore. This project will integrate the Refinery with the downstream petrochemical unit at an investment ₹6000-crore. The PDPP project was conceptualized as a part of 'Make in India' initiative which will help the country to reduce imports of niche petrochemical products and will lead to valuable foreign exchange savings.

3. With regard to Point: 1 and 2 of O.A.No.265 of 2017, this respondent denies the allegation mentioned in the application. BPCL-KR has taken utmost care to incorporate all the necessary features which ensures safety during normal operations & emergency conditions. Before installation of any such complex Process Plants, detailed studies are conducted through agencies having expertise in the field of Environment and Safety and plants are built according to well established Design practices/codes incorporating outcome of such studies. The studies include

1. Environmental Impact Assessment (EIA) Study
2. Rapid Risk Assessment study (RRA)
3. Hazard and Operability study (HAZOP) and Assessment of Safety Integrity Level (SIL)
4. Quantitative Risk Assessment study (QRA)
5. Emergency Response and Disaster management study (ERDMP)

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4. Various clearances and approvals for IREP were obtained from regulatory/ Govt bodies which ensured compliance to applicable rules and standards are as follow:

- Environment clearance from MOEFCC - 22nd Nov 2012, F. No. J-11011/341/2011- IA II (I)
- Amendment to MOEFCC Clearance - 23rd May 2014, F. No. J-11011/341/2011- IA II (I)
- Consent to establish from KSPCB - 21/10/2013
- Consent to operate from KSPCB - PCB/HO/EKM-2/ICO/08/2017 dtd, 30/09/2020
- Site Appraisal committee clearance from Govt of Kerala – Labor Dept GOK. 10.06.2013, G.O.(Rt)No.1033/2013/LBR
- Approval from Dist administration - 21.05.2013 , NOC no. 18/2013, d Dis-22621/2013/M4
- State Fire Service NOC - 21-05-2013, D Dis-22621/2013/M4. & No.DI.1973/13, 23/04/2013
- Overall Plot Plan approval from PSEO approval (Initial) - 14th March 2013 (1st set)
- P-5(2)455/Refinery/I; Nagpur; 14/03/2013, 19th Feb 2014 (2nd set) P-5(2)455/Refinery/I
- NOC from Airport Authority of India for Demountable Flare - 31.05.2013 , AAI/SR/NOC/RHQ

5. Highly automated and integrated control networks and the qualified manpower ensure proper monitoring & control of the plants. Multilayer Mechanical & automated systems ensure safe handling of process emergency conditions. Refinery is having best of the kind fire emergency response unit to handle any unwanted situations. Various statutory agencies such as PESO, F&B & OISD conduct regular audit of the facilities.

6. As part of the Integrated Refinery Expansion Project (IREP), the Hydrogen, Nitrogen, Oxygen and Synthesis Gas (Syn Gas) requirements were outsourced to M/s Air Products and Chemicals Inc, USA (AP) through Build-Own-Operate (BOO) route. AP has assigned this work to its 100 % subsidiary M/s Prodair Air Products India Pvt Limited with parent

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company guarantee. BPCL has signed an agreement with M/s Prodair Air Products on 21st August 2013 for 15 Year period for the supply of these Gases to BPCL. As per the Agreement between BPCL & Prodair Air Products, BPCL has provided land required on lease, and will provide feed & utilities to Prodair Air products and in turn Prodair will transfer all the Products (Hydrogen, Nitrogen, Oxygen, Syn Gas & associated Steam produced) to BPCL through pipelines. M/s Prodair Air Products was responsible to take all the statutory clearances required for setting up such a facility in the leased land and has taken all the statutory clearances applicable. The MoEFCC clearance for BOO facility was included in the IREP MoEFCC clearance which was taken by BPCL. BPCL would like to submit the fact that M/s Prodair Air Products India Limited produces Hydrogen, Nitrogen, Oxygen, Synthesis Gas and associated Steam only in the production facility.

7. As part of our CSR initiative, BPCL & Prodair Air Products has been supplying free of cost the entire Liquid Oxygen produced at BOO facility (More than 400 MT as on date) to the Government Hospitals in Ernakulam District for meeting the oxygen demand to treat Covid Patients. This noble efforts of BPCL & Prodair Air Products has been highly appreciated by the entire State Government machinery. BPCL has also supported the Kerala State Government Health department by providing the infrastructure support like Building, Utilities and Precious Oxygen free of cost to maintain a 500 bed Covid Hospital in BPCL-KR colony premises.

8. With regard to point: 4 of O.A.No.265 of 2017, it is submitted that as per the direction of MoEF&CC – IREP Environment clearance **(Annexure – 1- IREP Environment clearance),** BPCL KR has developed green cover more than 33(%) of the plant area in and around the plant premises.

- The IREP project was proposed within the existing Refinery complex.
- BPCL Kochi Refinery has conducted an exclusive survey for calculating plant area and green belt area inside Refinery premises.
- With reference to that survey, it has been identified that the total area at Kochi Refinery is 1344.93 acres out of which plant area is 909.01 acres. The available green belt inside Refinery premises is 315.3 acres which is more than 33(%) of required green belt.

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Complainant himself points out that as per MoEFCC: under specific condition: XXIV that total greenbelt requirement is 33% of the plant area, which is very well met by BPCL-KR.

- The green belt is being maintained at various locations such as Eco parks, rainbow parks, Bird parks, Bamboo parks, Kalpakodan, Miyawaki forest etc. inside Refinery premises.
- All conditions and requirements related to green belt are fulfilled and being maintained as per EC and CPCB guidelines.
- The suitable native plant species were procured from the forest nurseries in consultation with Retired Dy Forest Conservator.

9. Further with regard to Point: 4 of O.A.No.265 of 2017, this Respondent submitted that all project Units and facilities are strictly constructed as per OISD / PESO guidelines and all distance criteria have been maintained and checked by the statutory agencies before the commissioning of units. **There are no existing statutes from regulatory bodies regarding maintenance of buffer zone for Refinery. The Environment Clearances (EC) obtained from MoEFCC for IREP project also do not stipulate any requirement of buffer zone.** The Environment Clearance (EC) for the Projects were issued only after scrutiny of the recommendations of different reports viz; Rapid Risk Analysis (RRA) Report, the Public Hearing etc.

10. This Respondent submitted that no forest land was converted to non-forest activity and no prime agriculture land was converted into Industrial site for IREP project. The following mitigations' taken towards air, water and land pollution.

Air Pollution Mitigation

- Continuous stack monitoring has been provided for all the major parameters and the data is available on line to statutory agencies like KSPCB / CPCB. In addition to this Monthly monitoring by a third party lab accredited by NABL is also done.
- Five Continuous Ambient Air Quality Monitoring Stations (AAQMS) are installed at the periphery of the refinery to enable close monitoring of ambient air quality near the refinery. Online data from all the five AAQMS is transmitted to statutory agencies on a continuous basis.

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- Hydrotreating units along with Sulphur Recovery Units are installed in the refinery to recover the Sulphur from the product and offgas streams. This ensures SO2 emissions are minimum from the internal fuels and also minimizes the vehicular emissions. Tail gas treatment unit (TGTU) which was installed along with the Sulphur Recovery unit of IREP helps to achieve 99.9% recovery.
- BPCL - KR employs tall Flares for safe disposal of gases generated from units during any emergency or unit upsets. BPCL-KR has also installed flare gas recovery unit to recover gases from flare system which helps to move one step closer towards 'Zero flaring' concept.
- Various measures are taken and maintained to minimizes VOC emissions from, storage, transport and Effluent handling facilities
- Double seal floating roofs ensure low vaporization and avoids escape of hydrocarbon vapours.
- Double mechanical seal are provided for pumps.
- Closed loop sample points are employed for sampling.
- VOC control and treatment system have been installed in ETP for VOC vapours generated in the effluent treatment area.
- A number of hydrocarbon detectors are installed at different locations of the Refinery including product loading, storage tank farms, process plants etc.

Liquid Effluent Mitigation

Several measures have been taken by Kochi Refinery to reduce water pollution and some of these are:

- Refinery has installed a RO based plant to ensure maximum recycle of the effluents.
- Refinery operates full-fledged Effluent treatment plants (ETPs) to meet all the standards stipulated by KSPCB and is stored in our fire ponds and the excess treated effluent meeting all MINAS standards is discharged.
- Treated effluent/ RO rejects water is used for fire fighting purposes, process area cleaning and for watering of plants and trees inside refinery premises.

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Rain Water harvesting System

Kochi Refinery has also installed rainwater harvesting schemes with a view to conserve water resources.

- KR is having 2 nos. of Rain Water Harvesting Pond inside refinery premises.
  - Rain water harvesting pond with an area of 18.83 acres and water storage capacity of 2, 87,340 (M3) which is one of the largest rain water harvesting system in Kerala.
  - Temple pond with an area of approx. 1.5 acres and has a approx. storage capacity of 10000 (M3).
- Roof top rain water harvesting systems with an area of 5500 (M^2) and Roof top rain water recharging wells with an area of 6500 (M^2) are also installed in different locations inside refinery premises.

Waste Management Mitigation

- BPCL KR in agreement with KEIL (Kerala Enviro Infrastructure Private Limited) at Ambalamugal for disposing hazardous waste at their KSPCB approved TSDF (Treatment, Storage and Disposal Facility).

11. With regard to Point: 5 of O.A.No.265 of 2017, BPCL KR denies the allegation mentioned in the application. The Hon'ble Tribunal may take note of the following:

i) The COVID First Line Treatment Centre (CFLTC) and Govt. COVID hospitals with 1500 beds are functioning right next to the plant in Refinery land and there are several hundreds of patients undergoing treatment and care with direct Oxygen supply from the Refinery. These facilities are under the supervision of the Govt. Health Dept. and District Administration with the help of nearly hundred nurses and Doctors **(Annexure – 2 - Letter from Chief Secretary for providing Oxygen beds- COVID).**

ii) Many families are living in the Refinery Quarters and have not been afflicted by any of the pollutions as alleged by the residents.

iii) Over 2000 Refinery employees and 5 times its number of contract employees are working round the year in the past so many years on various projects and they are totally safe. No extreme health issues

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were found as per the Medical examinations report in the investigations done as per directive of the Human Rights Commission.

iv) CISF officials total strength of 324 staff with 144 family accommodation and balance 180 bachelor accommodation totalling around 750 people are also staying in side Refinery land and many migrant labours are also staying near vicinity which are equally populated like outside.

12. With regard to point 7 of O.A.No.265 of 2017 and the reference of investigation report submitted by the department of Factories and Boilers (F&B) in respect to gas release on 29/09/2016 near Kuzhikad, Ambalamugal, the statutory body, F&B accepted that the activity carried out by BPCL KR was universally followed procedure and to avoid such incident in future they recommended best practices to be incorporated. All the recommendations / suggestions recommended by F&B were complied and the same was witnessed. **Post IREP units' commissioning and stabilization, we are not in receipt of any such complaints in recent past in this regard.**

13. With regard to the contents of Grounds 1 to 5 raised by the applicant, this Respondent completely denies all the averments / allegations. BPCL has complied with all applicable laws and regulations at all stages of the project.

14. Several petitions were brought to the notice of the Government of Kerala through various offices by residents near Kochi Refinery of Bharat Petroleum. The complaints were mainly on safety and health related issues owing to alleged pollution in the vicinity of the BPCL-Kochi Refinery due to expansion projects. The matter was brought to the notice of the Kerala State Legislative assembly Petition committee.

15. The Petition committee consists of 5 MLAs with officials from the legislative assembly. The petition committee conducted 2 public hearings with all petitioners, statutory authorities and the company. After the second hearing Petitions' Committee recommended the formation of an expert committee for the scientific study of health and safety of the residents living near BPCL Kochi Refinery and also to conduct a complete

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Refinery Quantitative Risk Assessment (QRA) study with an external independent agency. The Government of Kerala considered these recommendations of the Petitions Committee, of Kerala Legislative Assembly and MD, KSIDC vide GO (Ord) No:669/2020/Industries, Thiruvananthapuram Dated 20/08/2020 formed the expert committee presided over by the Principal Secretary (Industries).

16. The Expert committee was presided by Shri. APM Mohammed Hanish, IAS, Principal Secretary (Industries) Govt. of Kerala with the following memebers:

- Prof Shiva Nagendra, Professor, CIVIL engineering Dept, Indian Istitute of Technology (IIT), Chennai.
- Dr. R. Venugopal, IPESS, Dy Chief Controller, Petroleum & Safety Organization (PESO)
- Dr. T Mukundan, Scientist-G, Associate Director (Materials), Naval, Physical & Oceanographic Laboratory (NPOL)
- Dr. V Sivanandan Achary, Professor and Director, School of Environment Studies, CUSAT
- Shri. S Suhas IAS, District Collector, EKM (Rep. Revenue Dept)
- Shri. Santosh Koshy Thomas, Managing Director KINFRA.

The Expert Committee appointed by GoK visited Kochi Refinery and had site visit of projects and had three review meetings.

SNO	PROCEEDINGS	DATE
1	Kochi Refinery site visit & First sitting	06 November 2020
2	Second sitting at Kochi Refinery	04 December 2020
3	Third sitting at Kochi Refinery	22 January 2021
4	Report submitted by Expert committee to Govt. Of Kerala	

17. The Expert Committee also reviewed the independent Quantitative Risk Assessment study (QRA) report of the entire Refinery including PDPP and Motor Spirit Block Project (MSBP) submitted by M/s Bureau Veritas Industrial Services (I) Pvt. Ltd, Mumbai. This scientific QRA study was conducted as per the directive of the Govt. petitions' Committee. M/s Bureau Veritas Industrial Services (I) Pvt. Ltd, Mumbai was selected based on the tender floated as per the list given by Govt. of Kerala.

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18. The study extensively covered consequence analysis and considered hazard distances for all selected failure cases including explosions, major leaks etc. and concluded that the impact of all scenarios are contained within the boundary limits of BPCL Kochi Refinery. Further, with the safety measures, maintenance program and emergency response plans that are available with BPCL-KR, the risk falls in "As Low As Reasonably Practical" (ALARP) level. The expert committee has already submitted their report dated 15.02.2021 to the Government Petitions' Committee. ***This Expert Committee concluded that the health, Safety and Environment norms as applicable to a Refinery unit as per State and Central statutory stipulations have been met by BPCL Kochi Refinery.*** The copy of the Expert Committee Report dated 15.02.2021 which was received from district administration is attached **(Annexure – 3 - Expert Committee Report_BPCL KR)**.

It is therefore most respectfully prayed that this Hon'ble Tribunal may please dismiss the above application as against the 1st Respondent and thus render justice.

Dated at Kochi on this the 30th day of September 2021.

Advocates for 1st Respondent

BHARAT PETROLEUM CORPORATION LTD * (KOCHI REFINERY) * AMBALAMUGAL 682 302

1st Respondent

कुरियन पी आलपाट्ट KURIAN P ALAPATT
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VERIFICATION

I Kurian P Alapatt , Chief General Manager – Human Resources (HR) of the 1st Respondent herein, do hereby declare that what is stated in the above paragraphs are true and correct to the best of my knowledge, information and belief.

Verified at Kochi on this the 30th day of September, 2021.

NOTARY
30 SEP 2021
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Signed Before Me

1st Respondent

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एरणाकुलम जिला Ernakulam Dist., केरल Kerala

BHARAT PETROLEUM CORPORATION LTD * (KOCHI REFINERY) * AMBALAMUGAL 682 302

NOTARIAL REGISTER
Vol.No. 40 Page No. 189
Sl.No. 3854 Date 30 SEP 2021

F. No. J-11011/341/2011- IA II (I)
Government of India
Ministry of Environment and Forests
(I.A. Division)

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi – 110 003

E-mail : aditya.narayan@nic.in
Telefax : 011: 2436 0549
Dated: 22nd November, 2012

To,

Shri A. Unnikrishnan, Dy.GM (Project Technical)
M/s Bharat Petroleum Corporation Limited
Kochi Refinery, Post Bag No.2, Ambalamugal-682 302
District Ernakulam, Kerala

E-mail:unnikrishnana@bharatpetroleum.in;motilalmeena@bharatpetroleum.in; Fax No. 0484-2821301:

Subject: Expansion of Kochi Refinery (from 9.5 MMTPA to 15.5 MMTPA) at Sy. No. 206, Village Puthencruz, Taluka Kunnathanadu, Ambalamugal, District Ernakulam, Kerala by M/s Bharat Petroleum Corporation Limited – Environmental clearance reg.

Ref. : Your letter no.26/PT/EIA-CS/12 dated 14th March, 2012.

Sir,

This has reference to your letter dated 14th March, 2012 alongwith project documents including Form 1, Prefeasibility Report, Draft Terms of References, EIA/EMP report, Public Hearing report and subsequent communications vide letter dated 23rd May, 2012, 4th July, 2012 and 6th June, 2012 on the above mentioned subject.

2.0 The Ministry of Environment & Forests has examined your application. It is noted that the proposal is for expansion of Kochi Refinery from 9.5 MMTPA to 15.5 MMTPA at Sy. No. 206, Village Puthencruz, Taluka Kunnathanadu, Ambalamugal, District Ernakulam, Kerala by M/s Bharat Petroleum Corporation Limited. The capacity expansion by 6.0 MMTPA will be facilitated by installing a new state of art Crude Distillation Unit of 10.5 MMTPA so as to replace the existing old 4.5 MMTPA CDU-1 which is not energy efficient. During expansion, total capacity of the refinery will be enhanced to 15.5 MMTPA by addition of Crude Distillation. Associated process units like Delayed Coker Unit (DCU), Petrochemical Fluidised Catalytic Cracker Unit (PFCC), Vacuum Gas Oil Hydro Treater (VGO HDT), Diesel Hydro Treater (DHDT), Sulphur Recovery Unit (SRU), Hydrogen Generation Unit (HGU), Sour Water Stripper etc. Details of utilities to be installed are GT (2 x33 MW), HRSG (2x 110 TPH), STG (2 x27 MW), boilers (3x 230 TPH) etc. As a part of the IREP expansion, LPG wagon loading facility and additional tanks are proposed in the marketing terminal at Irumpanam. Fuel generated from the proposed expansion will meet Euro-IV/ V standards. Power requirement of 105 MW will be partly met from the captive generation and about 40 MVA of power would be drawn from the State Electricity Board grid as a back up facility. No national parks/wildlife sanctuary/ reserve forests are located within 10 Km from the project site. River Chitrapuzha is flowing at a distance of 1.0 Km from the project site. Total plot area of Cochin refinery is 1149 acres. Proposed expansion will be within existing premises and no additional land will be required. Total cost of the project is Rs.13,000 Crores. Major process units proposed under the selected configuration are as follows:

S.N.	Units	Capacity, MMTPA
1	Crude Distillation Unit	10.5
2	Delayed Coker Unit	3.84
3	VGO-HT	3.0

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4	DHDT	4.30
5	NHT/ISOM	0.25
6	PFCC	2.2
7	Hydrogen Unit (This unit comprising hydrogen, Syngas, Nitrogen and Oxygen being proposed to be set up on Built Own and Operate concept)	0.09
8	Sulphur Recovery Unit	2x340 Tons/day

Following products will be manufactured:

S.N.	Description	Quantity, TMTPA
1	LPG	1114
2	Propylene	502
3	Naphtha	1288
4	Euro-IV Gasoline (Domestic)	1525
5	ATF	600
6	Kerosene	240
7	Euro-IV Diesel	5369
8	Euro-V Diesel	1982
9	Bitumen	500
10	Sulphur	233
11	Coke	1246

3.0 Adequate stack height will be provided to heaters, furnaces, VGO, HSD and utility boilers for wider dispersion of pollutants. The overall sulphur recovery efficiency of Sulphur recovery unit with tail gas treating will be 99.9%. Tertiary stage separator/ESP will be provided in FCC to control particulate emissions. Heaters /furnaces will be provided with low NOx burners to reduce the emissions of Nitrogen Oxides (NOx). Low sulphur fuel will be used. Flare gas recovery system will be installed. Adequate height of flares will be provided. Fresh water requirement from River Periyar after expansion will be 3083.3 m^3/hr. Industrial effluent generation will be 1400 m^3/hr and treated in the effluent treatment plant (ETP) comprising primary, secondary and tertiary treatment facilities. Treated effluent will be recycled/reused within the factory premises and remaining treated effluent (410 m^3/hr) will be discharged into River Chitrapuzha. Domestic sewage shall be treated in sewage treatment plant (STP). Chemical/inorganic sludge will be sent to treatment storage disposal facility (TSDF) for hazardous waste. Filter back flush stream from Vacuum Gas Oil Hydrotreater (VGO HT) will be processed in DCU. Spent catalyst will be sent to authorized recyclers/re-processors.

4.0 All the Petroleum Refinery Plants are listed at S.N. 4(a) under Category 'A' and appraised at the Central level.

5.0 Public hearing/consultation was conducted by the State Pollution Control Board on 14th February, 2012.

6.0 The proposal was considered by the Expert Appraisal Committee (Industry-2) in its 27th and 34th meetings held during 21st – 22nd September, 2011 and 13th -14th April 2012 respectively as well as 1st reconstituted EAC (Industry) meeting held during 24th -25th September, 2012.

7.0 The Ministry of Environment and Forests hereby accords environmental clearance to the above project under the provisions of EIA Notification dated 14th September, 2006 subject to strict compliance of the following specific and general conditions:

A. SPECIFIC CONDITIONS :

i. Compliance to all the environmental conditions stipulated in the environmental clearance letter nos. J-11011/32/90-IA.II dated 20th August, 1991, J-11011/78/1996-IA.II (I) dated 5th March, 1997 [illegible]

and J-11011/238/2008-IA.II (I) dated 18th February, 2009 shall be satisfactorily implemented and compliance reports submitted to the Ministry's Regional Office at Bangalore.

ii. M/s BPCL shall comply with new standards/norms for Oil Refinery Industry notified under the Environment (Protection) Rules, 1986 vide G.S.R. 186(E) dated 18th March, 2008.

iii. Adequate stack height shall be provided to heaters, furnaces, VGO, HSD and utility boilers as per CPCB/ Kerala State Pollution Control Board (KSPCB) guidelines to disperse gases emissions into the atmosphere. Low NOx burners shall be provided to Heaters/furnaces with on-line analyzers. Low sulphur fuel shall be used.

iv. Continuous on-line stack monitoring for SO_2, NOx and CO of all the stacks shall be carried out.

v. The process emissions [SO_2, NOx, HC (Methane & Non-methane)], VOCs and Benzene from various units shall conform to the standards prescribed under the Environment (Protection) Act. At no time, the emission levels shall go beyond the stipulated standards. In the event of failure of pollution control system(s) adopted by the unit, the unit shall be immediately put out of operation and shall not be restarted until the desired efficiency of the pollution control device has been achieved.

vi. Leak Detection and Repair programme shall be prepared and implemented to control HC/VOC emissions. Focus shall be given to prevent fugitive emissions for which preventive maintenance of pumps, valves, pipelines are required. Proper maintenance of mechanical seals of pumps and valves shall be given. A preventive maintenance schedule for each unit shall be prepared and adhered to. Fugitive emissions of HC from product storage tank yards etc. must be regularly monitored. Sensors for detecting HC leakage shall be provided at strategic locations.

vii. SO_2 emissions after expansion from the plant shall not exceed 1582 kg/hr and further efforts shall be made for reduction of SO_2 load through use of low sulphur fuel. Sulphur recovery units shall be installed for control of H_2S emissions. The overall sulphur recovery efficiency of Sulphur recovery unit with tail gas treating shall not be less than 99.9%.

viii. As proposed, record of sulphur balance shall be maintained at the Refinery as part of the environmental data on regular basis. The basic component of sulphur balance include sulphur input through feed (sulphur content in crude oil), sulphur output from Refinery through products, byproduct (elemental sulphur), atmospheric emissions etc.

ix. Flare gas recovery system shall be installed.

x. Ambient air quality monitoring stations, [PM_{10}, $PM_{2.5}$, SO_2, NOx, H_2S, mercaptan, non-methane-HC and Benzene] shall be set up in the complex in consultation with Kerala State Pollution Control Board, based on occurrence of maximum ground level concentration and down-wind direction of wind. The monitoring network must be decided based on modeling exercise to represent short term GLCs.

xi. Ambient air quality data shall be collected as per NAAQES standards notified by the Ministry on 16th November, 2009 and trend analysis w.r.t past monitoring results shall also be carried out. Adequate measures based on the trend analysis shall be taken to improve the ambient air quality in the project area.

xii. The gaseous emissions from DG set shall be dispersed through adequate stack height as per CPCB standards. Acoustic enclosure shall be provided to the DG sets to mitigate the noise pollution. Besides, acoustic enclosure /silencer shall be installed wherever noise levels exceed the limit.

xiii. Total water requirement from River Periyar after expansion shall not exceed 3083.3 m^3/hr and prior permission shall be obtained from the competent authority. Industrial effluent generation will be 1400

m^3/hr and treated in the effluent treatment plant. Treated effluent shall be recycled/reused within the factory premises and remaining treated effluent shall be discharged into Chitrapuzha River after conforming to the standards prescribed for the effluent discharge and obtaining permission from the KSPCB, which shall not exceed 410 M^3/hr. Domestic sewage shall be treated in sewage treatment plant (STP).

xiv. All the effluents after treatment shall be routed to a properly lined guard pond for equalization and final control. In the guard pond, automatic monitoring system for flow rate, pH and TOC shall be provided.

xv. Oil catchers/oil traps shall be provided at all possible locations in rain/ storm water drainage system inside the factory premises.

xvi. A study shall be conducted to identify the source of odour and remedial measures to control the odour problem shall be taken. Study report shall be submitted to the Ministry's Regional office at Bangalore within 6 months from the date of issue of this letter.

xvii. Improvement in the sludge handling area is required and scheme for final disposal of sludge shall be prepared and submitted to the Ministry's Regional Office at Bangalore.

xviii. Oily sludge shall be disposed off into Coker. Annual Oily sludge generation and disposal data shall be submitted to the Ministry's Regional Office and CPCB.

xix. The Company should strictly comply with the rules and guidelines under Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 *as* amended in October, 1994 and January, 2000. Hazardous waste should be disposed of as per Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 and amended time to time.

xx. The membership of common TSDF should be obtained for the disposal of hazardous waste. Copy of authorization or membership of TSDF should be submitted to Ministry's Regional Office at Bangalore. Chemical/inorganic sludge shall be sent to treatment storage disposal facility (TSDF) for hazardous waste. Spent catalyst shall be sent to authorized recyclers/re-processors.

xxi. Proper oil spillage prevention management plan shall be prepared to avoid spillage/leakage of oil/petroleum products and ensure regular monitoring.

xxii. The company shall strictly follow all the recommendation mentioned in the Charter on Corporate Responsibility for Environmental Protection (CREP).

xxiii. To prevent fire and explosion at oil and gas facility, potential ignition sources shall be kept to a minimum and adequate separation distance between potential ignition sources and flammable materials shall be in place.

xxiv. Green belt shall be developed at least in 33 % of the plant area in and around the plant premises to mitigate the effects of fugitive emissions all around the plant as per the CPCB guidelines in consultation with DFO. Thick greenbelt with suitable plant species shall be developed around unit. Selection of plant species shall be as per the CPCB guidelines.

xxv. Company shall prepare project specific environmental manual and a copy shall be made available at the project site for the compliance.

xxvi. All the recommendations mentioned in the rapid risk assessment report, disaster management plan and safety guidelines shall be implemented.

xxvii. All the issues raised and commitment made during the public hearing/consultation meeting held on 14th February, 2013 shall be satisfactorily complied.

xxviii. Company shall adopt Corporate Environment Policy as per the Ministry's O.M. No. J 11013/41/2006-IA.II(I) dated 26th April, 2011 and implemented

xxix. Provision shall be made for the housing of construction labour within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, Safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.

B. GENERAL CONDITIONS:

i. The project authorities must strictly adhere to the stipulations made by the State Pollution Control Board (SPCB), State Government and any other statutory authority.

ii. No further expansion or modification in the project shall be carried out without prior approval of the Ministry of Environment & Forests. In case of deviations or alterations in the project proposal from those submitted to this Ministry for clearance, a fresh reference shall be made to the Ministry to assess the adequacy of conditions imposed and to add additional environmental protection measures required, if any.

iii. The project authorities must strictly comply with the rules and regulations under Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 as amended subsequently. Prior approvals from Chief Inspectorate of Factories, Chief Controller of Explosives, Fire Safety Inspectorate etc. must be obtained, wherever applicable.

iv. The overall noise levels in and around the plant area shall be kept well within the standards by providing noise control measures including acoustic hoods, silencers, enclosures etc. on all sources of noise generation. The ambient noise levels shall conform to the standards prescribed under EPA Rules, 1989 viz. 75 dBA (daytime) and 70 dBA (nighttime).

v. A separate Environmental Management Cell equipped with full fledged laboratory facilities must be set up to carry out the environmental management and monitoring functions.

vi. Adequate funds shall be earmarked towards capital cost and recurring cost/annum for environment pollution control measures and shall be used to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government alongwith the implementation schedule for all the conditions stipulated herein. The funds so provided shall not be diverted for any other purposes.

vii. The Regional Office of this Ministry/Central Pollution Control Board/State Pollution Control Board will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation shall be submitted to them regularly.

viii. A copy of clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad / Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions / representations, if any, were received while processing the proposal. The clearance letter shall also be put on the web site of the company by the proponent.

ix. The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; PM_{10}, $PM_{2.5}$, SO_2, NOx, HC (Methane & Non-methane), VOCs (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects shall be monitored and displayed at a convenient location near the main gate of the company in the public domain.

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x. The project proponent shall also submit six monthly reports on the status of the compliance of the stipulated environmental conditions including results of monitored data (both in hard copies as well as by e-mail) to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB. The Regional Office of this Ministry / CPCB / SPCB shall monitor the stipulated conditions.

xi. The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company alongwith the status of compliance of environmental conditions and shall also be sent to the respective Regional Offices of the MOEF by e-mail.

xii. 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 SPCB and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.nic.in. This shall 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 shall be forwarded to the Regional office.

xiii. 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.

8.0 The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory.

9.0 The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.

10.0 The above conditions will be enforced, inter-alia under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, Air (Prevention &. Control of Water Pollution) Act, 1981, the Environment (Protection) Act, 1986, Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 and the Public Liability Insurance Act, 1991 along with their amendments and rules.

(A.N. Singh)
Dy. Director (S)

Copy to :-

1. Principal Secretary, Department of Environment & Forest, Govt. of Kerala, Secretariat Annex Building, Room – 604, C Block, 6th Floor, Government Secretariat, Thiruvanathapuram.
2. Chairman, Kerala State Pollution Control Board, Pattom P.O., Thiruvananthapuram
3. Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD-cum-Office Complex, East Arjun Nagar, Delhi - 110032.
4. The Chief Conservator of Forests, Regional Office (Southern Zone, Bangalore) Kendriya Sadan, 4th Floor, E&F Wing, II Block Koramangala, Banglore-560034.
5. Monitoring Cell, Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, New Delhi.
6. Guard File/Record File.

(A.N. Singh)
Dy. Director (S)

ഡോ. വി പി ജോയ് IAS
ചീഫ് സെക്രട്ടറി
Dr. V P JOY IAS
Chief Secretary

കേരള സർക്കാർ
തിരുവനന്തപുരം-695 001
Government of Kerala
Thiruvananthapuram-695 001

D.O.No.127/CS/2021/CSO

29th April, 2021

Dear Shri.

As you are aware, Kerala is experiencing second phase of COVID pandemic surge. The State is taking concerted efforts to manage the situation as of now. However, surges are expected in the coming weeks.

2. During the discussion with the Secretary, Petroleum and Natural Gas, Government of India, it was discussed that a 1000 oxygen bedded facility could be set up within the refinery premises by the Bharat Petroleum Corporation Limited (BPCL). BPCL can assist in generating Oxygen as per the requirement.

3. In this regard, I request your esteemed organization for setting up of 1000 oxygen beds within your campus under your CSR initiative, which is permitted vide order no.40-3/2020 DM-1 (A), dtd. 24.03.2020 of the Ministry of Corporate Affairs, Govt. of India. The State will provide required human resources to make it functional and provide care and support to the COVID positive patients. I also request to set up compressors for oxygen refilling arrangements.

Looking forward to early actions in this regard.

Yours sincerely,

Dr. V P Joy

Shri. K Padmakar
Chairman & Managing Director,
Bharat Bhavan, 4 & 6 Currimbhoy Road,
Ballard Estate, Mumbai -400001.

Cc:

Shri. Sanjay Khanna
Executive Director,
Kochi Refinery, BPCL.

SCIENTIFIC STUDY RELATED TO HEALTH & SAFETY OF RESIDENTS NEAR BPCL-KOCHI REFINERY, KERALA, INDIA

STUDY REPORT SUBMITTED BY
EXPERT COMMITTEE

GOVERNMENT OF KERALA

15th FEBRUARY, 2021

GO (ORD) No:669/2020/Industries, Thiruvananthapuram, Dated 20/08/2020

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FORMATION OF EXPERT COMMITTEE

Over the past few months, several petitions were brought to the notice of the Government of Kerala through various offices by residents near Kochi Refinery of Bharat Petroleum. The complaints were mainly on safety and health related issues owing to alleged pollution in the vicinity of the BPCL-Kochi Refinery and at its new project sites.

The Government Petitions Committee recommended the formation of a committee for the scientific study of health and safety of the residents living near BPCL Kochi Refinery. The Kerala LA Secretary vide letter No:21206/ Petition A1/ 2018 dated 01/10/2019 and MD, KSIDC vide letter No: KSIDC/INFRA/63/272 dated 24.07.2020 has also recommended for the formation of the committee.

The Government of Kerala considered these recommendations of the Petitions Committee, of Kerala Legislative Assembly and MD, KSIDC and vide *GO (Ord) No:669/2020/Industries, Thiruvananthapuram Dated 20/08/2020* ***(Annexure-1)*** formed the expert committee presided over by the Secretary (Industries).

Members of the Expert Committee:

The committee was constituted with the following members:

1. **Shri. APM Mohammed Hanish**, IAS, Principal Secretary (Industries), Government of Kerala (CHAIRMAN)
2. **Prof. Shiva Nagendra**, Professor, Civil Engineering Department, Indian Institute of Technology (IIT), Chennai
3. **Dr. R Venugopal**, IPESS, Deputy Chief Controller, Petroleum & Safety Organisation (PESO), Government of India
4. **Dr. T Mukundan**, Retd. Scientist-G, Associate Director (Materials), Naval, Physical & Oceanographic Laboratory (NPOL)
5. **Prof. Dr. V Sivanandan Achari**, Professor and Director, School of Environment Studies, Cochin University of Science & Technology (CUSAT).
6. **Shri. S Suhas,** IAS, District Collector, Ernakulam (Representative Revenue Department)
7. **Shri. Santosh Koshy Thomas**, Managing Director, Kerala Industrial Infrastructure Development Corporation (KINFRA)

PROCEEDINGS

The committee decided to deliberate on the issues as per schedule below :

	Action	**Date**
1.	Kochi Refinery site visit & First sitting	06 November 2020
2.	Second sitting at Kochi Refinery	04 December 2020
3.	Third sitting at Kochi Refinery	22 January 2021
4.	Draft Report submission	01 February 2021
5.	Final Report submission	15 February 2021

FIRST SITTING OF EXPERT COMMITTEE: 06 NOVEMBER 2020

As part of the first review on 06thNovember 2020, the Expert Committee visited Kochi Refinery for detailed onsite verification and deliberations with various stake holders of the Refinery to initiate the *Scientific Study of the Health and Safety of the Residents near Kochi Refinery.*

Members present at the first sitting:

1. **Shri APM Mohammed Hanish**, IAS, Principal Secretary (Industries), Government of Kerala (CHAIRMAN)
2. **Shri S Suhas,** IAS, District Collector, Ernakulam (Representative Revenue Dept)
3. **Shri Santosh Koshy Thomas**, Managing Director KINFRA

Further to travel restrictions, few members joined the review on video conference. They are:

4. **Dr. R Venugopal**, IPESS, Deputy Chief Controller, Petroleum & Safety Organisation (PESO), Government of India
5. **Prof Shiva Nagendra**, Professor, CIVIL Engineering Dept, Indian Institute of Technology (IIT), Chennai
6. **Dr. T Mukundan**, Retd. Scientist-G, Associate Director (Materials), Naval, Physical & Oceanographic Laboratory (NPOL)

7. **Prof. Dr. V Sivanandan Achari**, Professor and Director, School of Environment Studies, Cochin University of Science & Technology (CUSAT)

BPCL Kochi Refinery was represented by team led by Head of Kochi Refinery:

1. **Shri. MR Subramoni Iyer**, Chief General Manager (i/c) & Head of Kochi Refinery
2. **Shri. Suresh John,** Chief General Manager (Engineering Projects & Contract Management)
3. **Shri. A N Sreeram**, Chief General Manager (Petchem)
4. **Shri. Kurian P Alapatt**, Chief General Manager (Human Resources)
5. **Shri. George Thomas**, General Manager (Public Relations &Administration)
6. **Shri. MK Ramachandran**, General Manager I/C (Health Safety & Environment)
7. **Shri. Sainath**, Deputy General Manager (HSE- Environment)

<u>Clarifications sought to BPCL Kochi Refinery :</u>

- Waste generated by KR
- Wind Data
- Air Quality Data
- VOC
- Distance
- Wind pattern
- Effluent quality
- Status of External Safety Audit
- Quantitative Risk Assessment

The following reports were also called for:

1. QRA report from M/s Bureau Veritas
2. MoEF Monitoring Report
3. PDPP Inspection Report by MoEF & CC, Integrated Regional Office Bengaluru
4. Hourly AAQMS report

Minutes of the meeting *is attached as* ***Annexure-2***

SECOND SITTING OF EXPERTCOMMITTEE:04 DECEMBER 2020.

The following members were present at the second sitting of the expert committee at BPCL Kochi Refinery, Kundannur Office:

1. **Shri. APM Mohammed Hanish**, IAS, Secretary (Industries), Government of Kerala (CHAIRMAN)
2. **Dr. R Venugopal**, IPESS, Deputy Chief Controller, Petroleum & Safety Organisation (PESO), Government of India
3. **Prof. Dr. V Sivanandan Achari,** Professor and Director, School of Environment Studies, Cochin University of Science & Technology (CUSAT)
4. **Shri. S Suhas,** IAS, District Collector, Ernakulam (Representative Revenue Department)
5. **Shri. Santosh Koshy Thomas**, Managing Director KINFRA

The following members joined the meeting online:

6. **Prof. Shiva Nagendra,** Professor, CIVIL Engineering Dept, Indian Institute of Technology (IIT), Chennai
7. **Dr. T. Mukundan**, Retd. Scientist-G, Associate Director (Materials), Naval, Physical & Oceanographic Laboratory (NPOL)

Also present at the meeting were:

8. **Shri. Jose Kurian**, Asst GM (KSIDC)
9. **Shri Suresh Kumar**, Deputy Collector (LA)

Kochi Refinery was represented by the team led by Head of Kochi Refinery :

1. **Shri MR Subramoni Iyer**, Chief General Manager (i/c) & Head (Kochi Refinery)
2. **Shri Suresh John**, Chief General Manager (Engineering Projects & Contract Management)
3. **Shri. AN Sreeram,** Chief General Manager (Petchem)
4. **Shri. Chacko M Jose**, Chief General Manager (Operations)
5. **Shri. Kurian P Alapatt**, Chief General Manager (Human Resources)
6. **Shri. George Thomas,** General Manager (Public Relations &Administration)
7. **Shri. MK Ramachandran**, General Manager I/C (Health Safety & Environment)
8. **Shri. Sainath**, Deputy General Manager (HSE- Environment)

Minutes of the meeting attached as ***Annexure 3***

THIRD & FINAL SITTING OF EXPERT COMMITTEE: 22 JANUARY 2021

The following members were present at the third and final sitting of the committee at BPCL Office, Kundannur, Maradu**:**

1. **Shri. APM Mohammed Hanish**, **IAS**, Principal Secretary (Industries), Government of Kerala (CHAIRMAN)
2. **Dr. R Venugopal,** IPESS, Deputy Chief Controller, Petroleum & Safety Organisation (PESO), Government of India
3. **Shri. S Suhas,** IAS, District Collector, Ernakulam (Representative Revenue Department)
4. **Shri. Santosh Koshy** Thomas, Managing Director KINFRA

The following members joined the meeting online:

5. **Prof. Dr. V Sivanandan Achari**, Professor and Director, School of Environment Studies, Cochin University of Science & Technology (CUSAT)
6. **Prof. Shiva Nagendra**, Professor, CIVIL Engineering Dept, Indian Institute of Technology (IIT), Chennai
7. **Dr. T. Mukundan**, Retd. Scientist-G, Associate Director (Materials), Naval, Physical & Oceanographic Laboratory (NPOL)

Also present at the meeting were:

8. **Shri. Jose Kurian**, Asst GM (KSIDC)
9. **Shri Suresh Kumar**, Deputy Collector (LA)

BPCL (Kochi Refinery) team was led by Executive Director of Kochi Refinery:

10. **Shri Sanjay Khanna**, Executive Director (Kochi Refinery)
11. **Shri Suresh John**, Chief General Manager (Projects Procurement)
12. **Shri Kurian P Alapatt**, Chief General Manager (Human Resources)
13. **Shri Sriram S**, Chief General Manager (Engg. Projects and Contracts Management)
14. **Shri George Thomas**, General Manager (Public Relations &Administration)
15. **Shri. MK Ramachandran**, General Manager I/C (Health Safety & Environment)
16. **Shri Ravi K**, General Manager (Reliability)
17. **Shri Sainath**, Deputy General Manager (HSE- Environment)

Minutes of the meeting attached as ***Annexure 4***

SITE VISIT

The committee visited the Refinery Units including the new project sites on **06th November 2020** to assess the statutory compliances and verify the current situation of the Refinery vis-a-vis the concerns raised in the petitions. After the site visit, the Refinery Management Committee made a presentation about Kochi Refinery, the ongoing projects and the measures taken to mitigate **Health, Safety and Environment issues**. The detailed findings and observations are presented in Chapter 3.

FINDINGS OF THE STUDY:

BPCL KOCHI REFINERY

Kochi Refinery, is a Petroleum Refinery of Bharat Petroleum Corporation Limited (BPCL), a Central Public Sector Undertaking, contributing to the State economy for over 5 decades from its inception in 1966, by ensuring the availability of petroleum fuels.

Presently, BPCL Kochi Refinery is at the centre of the petrochemical initiative of Government of Kerala (GoK) that envisages provision of feedstock for various units at the GoK's Petrochemical Park, a major *Make in India* project, which has the potential of transforming Ambalamugal as the petrochemical hub of South India.

Formerly known as Cochin Refineries Limited, Kochi Refinery was established in 1966 with a capacity of 50,000 barrels per day as a joint venture in collaboration with Phillips Petroleum Corporation, USA. Later renamed as Kochi Refineries Limited it was merged with Bharat Petroleum Corporation Limited (BPCL) in 2006. With a capacity of 310,000 barrels per day, Kochi Refinery is today the largest PSU refinery in India. It is Located at Ambalamugal, near Kochi. The product portfolio includes petrochemical feed-stocks and specialty products in addition to its range of fuels. Govt. of Kerala holds 0.83% stake in the company.

The products of this refinery include Liquefied Petroleum Gas, Naphtha, Motor Spirit, Kerosene, Aviation Turbine Fuel, High Speed Diesel and Asphalt. Specialty products for the domestic markets include Benzene, Toluene, Food Grade Hexane, Propylene, Special Boiling Point Spirit, Mineral Turpentine Oil, Sulphur, Petcoke and Hydrogen.

The Refinery is certified for its Integrated Management System (IMS) by M/s Bureau Veritas Certification for Quality Management System - ISO 9001:2015, Environment Management System - ISO 14001:2015 and Occupational Health & Safety Management System - ISO 45001:2018.

The Refinery has Crude Oil receipt facilities consisting of Single Point Mooring (SPM) and associated shore tank farm and is equipped to receive crude oil in

Very Large Crude Carriers (VLCCs). The refinery has facilities to evacuate products to the consuming centres through road, rail and ships through pipelines. All oil marketing companies in the area are fed from Kochi Refinery through pipelines. Kochi Refinery caters to the fuel demand of Kerala, parts of Tamil Nadu and Karnataka. The BPCL installation at Irumpanam is connected to the refinery via pipelines and is the major product distribution centre of the refinery. A 300 km long pipeline connects the refinery to various consumption points in Tamil Nadu such as Coimbatore and Karur. Pipeline facility is also available for supplying ATF to the terminal at Cochin International Airport.

With the availability of feedstock from the Petrochemical Units that are coming up at Kochi Refinery, the Kerala Government plans to set up a *Petrochemical Park* in the vicinity. The company embarked on petrochemical ventures following the recent expansion and modernization of the refinery at a cost of ₹16,500 Crores. KINFRA is setting up the *Petrochemical Park* where small/medium investors are expected to set up downstream industrial units.

The committee examined Health, Safety and Environment compliance of the Refinery and the findings are as given below:

1. STATUTORY COMPLIANCES

The committee verified the compliances to the statutory requirements from the regulatory authorities viz, PESO, F&B, CPCB, KSPCB, PNGRB and OISD norms related to health, safety and environment.

- Details of compliances, approvals and licenses is enclosed as ***Annexure 5***.
- Details of identification of HSE Hazards and mitigation measures adopted by the Refinery is enclosed as **Annexure -6**

2. INDUSTRY SPECIFIC IMPACT AND MANAGEMENT

2. 1 ENVIRONMENT

Potential sources for environmental impact associated with the operations of BPCL Kochi Refinery include the following:

a. Emissions to atmosphere
b. Handling and disposal of process water
c. Handling of hazardous materials and waste
d. Noise from machinery

2.1 (a) Emissions to Atmosphere

Flue Gases

Flue gas emissions of CO_2, NO_x, SO_x CO and Particulate Matter (PM) to the atmosphere during Petroleum refining results from the combustion of oil and gas in gas turbines, boilers, engines and process heaters for power, steam and heat generation. BPCL Kochi Refinery has taken earnest measures by installing combustion air pre-heaters to increase furnace efficiency, optimization of furnace operations, high thermal efficiency heater designs with control systems, prevention of condensation of exhaust gas on surface, regular cleaning of heating surface (soot blowing) for liquid fuel or mixed firing, stack monitoring, low NO_x burners etc.

The committee observed that as per the directive of KSPCB, the refinery has installed ***Continuous Ambient Air Quality Monitoring Stations (CAAQMS)*** at various locations. The CAAQMS are linked to Kerala State Pollution Control Board and CPCB servers for real-time monitoring of data. The furnace stacks of the Refinery are also directly connected to the CPCB & KSPCB servers for real time monitoring. Further, manual sampling is also done through a third party agency and regular reports are sent to the statutory bodies. The CAAQMS reports for the last three months were detailed at the presentation made to the committee.

- The locations of the AAQMS in and around the refinery has been enclosed as ***Annexure-7***
- Annual summary report of the CAAQMS is attached as **Annexure-8**

Venting and Flaring

Venting and flaring are important operational and safety measures used in the refinery particularly during non-routine operational periods such as start up or shutdown, malfunction or upsets as a means of safely disposing of vapours/gases. Hydrocarbons are emitted from emergency process vents and safe valve discharges in BPCL Kochi Refinery, these are routed through the Knockout drums and are flared.

For planned start-up and shutdown flare-gas recovery system is used. During non-emergency, releases excess gas from the process vent is recovered or controlled and the volume of gas to be flared is minimized.

Fugitive Emissions

Fugitive emissions in BPCL Kochi Refinery occurs from leaking of piping, valves, connections, flanges, pump seals, floating roofs, storage tanks, gas conveyance systems, compressor seals, pressure relief valves. A structured leak-detection prevention and repair programme (LDAR) is practiced in Kochi Refinery based on systematic reviews of P & IDs, identifying streams and equipment. BPCL-Kochi Refinery is prioritizing their monitoring with vapour detection followed by maintenance/replacement of components as required. Fugitive emission valves and seal-less, canned pumps and VOC meters (fixed type) are installed in critical areas.

On examination of the daily average readings, it was observed that data from one of the CAAQMS station, had exceeded the annual average limits a few times in 2019, **though it met the norms as per the annual average limits specified by the KSPCB**. BPCL confirmed that internal inspections were carried out when it exceeded the limits, however no specific cause was identified for the deviation. No deviations are reported by the station in the year 2020.

BPCL has confirmed that monitoring would be continued in 2021 also. They would look for any deviations during the dry season period ending in May 2021 and in case of any reported deviation, a study will be conducted internally and suitable corrections would be carried out if required.

Oxides of Sulphur (SO_x)

The elemental Sulphur generated in the Refinery is recovered through a Sulphur Recovery Unit which has an efficiency of 99.9%. Sulphur Oxide (SO_x)

and H_2S may be emitted from boilers, heaters and other process units such as SRU, FCCU, flares, waste water stripping units and uncondensable off-gas systems.

Table: Annual Average Air Quality Data From Designated Sampling Stations of BPCL, Kochi Refinery (Year-2019)

Parameter	**SO_2**	**NO_x**	**CO**	**Benzene**	**NMHC**	**PM 10**	**PM 2.5**
Units	**µg/m³**	**µg/m³**	**mg/m³**	**µg/m³**	**ppm**	**µg/m³**	**µg/m³**
Limits	**50.0**	**40.0**	**-**	**5.0**	**-**	**60.0**	**40.0**
DHDS	44.6	25.7	1.4	0.6	0.4	62.9	32.1
MO*	12.15	30.69	0.83	0.58	0.74	68.21	35.25
Colony	6.29	22.83	0.68	0.33	1.70	54.99	30.99
CCR	5.92	13.69	0.74	0.00	0.39	43.51	13.89
CISF Q*	24.43	19.75	0.86	2.20	1.32	66.21	22.77

MO*(Marketing Office), CISF Q*(CISF Quarters)

BPCL Kochi Refinery has adopted recovery of sulphur from tail gases using high-efficiency SRUs and they have installed scrubbers with caustic soda and amine solution to treat flue gases. The monitoring of SO_x in the Refinery premises reveals that the SO_x levels are within the permissible limits.

Particulate Matter

In large sources of particulate matter emissions, such as FCCU catalyst regeneration sections, BPCL KR has installed high-efficiency air pollution control devices like:

- Electrostatic precipitators
- Primary/Secondary cyclones
- Tertiary stage separators
- Closed Coke Handling systems

With the above technologies BPCL KR is able to control particulate matter to the permissible daily limit of 60 micro gram / m^3 for PM 2.5 and 100 microgram / m^3 for PM 10.

The committee observed variations in PM 10 and PM 2.5 in the data provided by BPCL for CAAQMS located at the periphery of the refinery. BPCL representatives clarified that the particulate matter emissions at the

CAAQMS located at the periphery of the refinery **is primarily on account of the heavy traffic near this CAAQMS**. **General traffic and LPG vehicles plying in that area contribute to this during dry season. Vehicular traffic at project sites is also a contributor to this variation.**

As a measure to reduce the LPG truck transport movement in refinery area, BPCL has undertaken a project for laying a pipeline up to Palakkad LPG Terminal and the work is in progress. The project is expected to be completed by October 2021. To control particulate matter, other additional measures deployed by BPCL include increasing frequency of watering and cleaning of the Roads to minimize the dust generation from traffic in the refinery area.

2.1 (b) Handling and Disposal of Process Water

The refinery has segregated effluent collections, treatment and RO based recycling facility. It has four effluent treatment plants where the process water is treated to meet the norms. The details submitted were scrutinized by the Committee and was found to be meeting with MOEF&CC norms.

2.1 (c) Handling of Hazardous Materials and Waste

Refinery generates hazardous waste that includes spent catalysts and oily sludge. Hazardous wastes are disposed through recyclers or through KSPCB approved common Treatment, Storage and Disposal facility (TSDF).

2.1 (d) Noise from Machinery

The principle sources of noise in the Petroleum Refining facilities include large rotating machines such as compressors and turbines, pumps, electric motors, air coolers, blowers, fans and heaters. Noises may be generated during pressure release through flaring or steam valves. In most of the areas acoustic dampening hoods are provided to control noise within the permissible limits. Noise level is being monitored regularly by Kochi Refinery and is found to be within the permissible limits.

Green Cover

During the site visit, the Refinery team expressed that efforts to increase the green cover is continuing with each expansion and new project as per stipulations. It is observed that Kochi Refinery is maintaining the required green cover of 33 % of plant area as per the Environment Clearance guidelines. The Refinery has 243 acres of green cover that includes the 40 acres of land earmarked in PDPP Project, and approx. 50 acres of land is being developed inside the Refinery as part of the IREP project.

Rainwater Harvesting Pond

The Refinery at Kochi is spread over thousand five hundred acres. The refinery area includes a rainwater harvesting pond approximately 20 acres with a water storage capacity of 3.0 Lakh M^3 and an eco-park spread over approximately 6.0 Acres with a multitude of fully grown trees, rare herbs and plants that attract migratory birds. There are 3 butterfly parks in the Refinery. Environment initiatives of the Refinery include storage, use and reuse of water. The effluent treatment plants meet the MINAS standards.

- Measures adopted by the Refinery for protection of environment and monitoring programs is attached as **Annexure-9**

2.2 HEALTH

The committee examined the complaints received on health grounds in the recent past. It was observed that very few complaints were received and they could not be linked directly to the operations of the Refinery. The committee also referred to the studies done by the District Medical Officer based on the directions of the Kerala State Human Rights Commission in 2018. The report of this study did not highlight any health / respiratory issues on account of pollution from the refinery. The committee also examined the medical reports of the employees working inside the Refinery as per the Factories Act & Rules. No adverse health issues were observed in the reports.

- Measures adopted by Kochi Refinery for protection of health of stakeholders is attached as ***Annexure 10.***
- Community welfare and CSR activities pertaining to Health care initiatives by Kochi Refinery are enclosed as ***Annexure11.***

2.3 SAFETY

Safety Measures Adopted in BPCL Kochi Refinery

Safety aspect of BPCL Kochi Refinery are considered during design stage, meeting the international standards with respect to safe separation distance, process safety management, proper selection of material of construction, safety relief system, proper handling, storage and dispatch system.

Emphasis is given for:

- Process Hazard Analysis (QRA, RRA, HAZOP etc), Work permit system, hot work, incident reporting and investigation, work at height, confined space entry, energy isolation, scaffold safety, behavior based safety, management of change, job safety analysis, etc.
- Mutual aid scheme is implemented with nearby industries.
- Emergency Response and Disaster Management Plan (ERDMP) is also in place and is approved by PNGRB. Mock drills (both onsite and offsite) are conducted.
- Safety measures in the Refinery is looked after by a dedicated group of personnel and headed by a senior management executive in the rank of GM, who in turn reports to the top management executive.
- The Refinery has its own dedicated fire-fighting facilities which include equipment, a well-trained fire-fighting crew available 24X7 inside the plant. The firefighting facilities have been designed in accordance with the OISD STD-116.
- Fire-fighting facilities of Kochi Refinery is designed for fighting two simultaneous major fires anywhere in the complex.
- Hydraulic Platform for fire-fighting and rescue operations at heights.
- Mandatory Personal Protective Equipment are provided and used inside the Refinery
- Automatic fire-fighting systems installed in the refinery include:
    - Automatic Actuated Rim seal Detection & Suppression System for external floating roof tanks
    - Automatic Water Spray for Pressurized storages including LPG / Hydrogen, Automatic deluge water spray system,
    - High Volume Long Range (HVLR) monitor in other parts of the facilities.
- Evaluation of potential for vapour accumulation in storage tank and implementation of prevention and control techniques (example Nitrogen blanketing in Benzene and Naphtha tanks).
- Providing early warning system such as pressure monitoring of gas and liquid conveyance systems in addition to smoke and heat detection of fires.
- Portable Equipment like Portable Gas detectors, Explosive meter, Oxygen meter, Hand operated siren, Safe walk roof top ladder, emergency

lighting, portable mega phone, various leak plugging gadgets, oil dispersants and oil adsorbents, lifting jacks (for rescue of trapped workers), are available in the Refinery.

- Based on the Government Petitions Committee recommendation, BPCL conducted the **Quantitative Risk Assessment (QRA)** Study was conducted by an independent Agency, *M/s Bureau Veritas Industrial Services (India) Pvt. Ltd.*
- The findings of the study indicate that the risks associated with the Industry are within the acceptable range and is confined within the Refinery boundary only. The QRA Report is attached as ***Annexure -12***

The committee has observed that the criteria stipulated by Petroleum Safety Explosives Organization (PESO), Oil Industry Safety Directorate (OISD), Factories & Boilers and State and Central Pollution Control Boards have been complied by the Refinery. The committee also sought confirmation whether the Refinery has taken requisite statutory approvals /amendments before implementing any modifications / alterations. The Company affirmed the same. Safety distances mentioned in Petroleum Rules 2002 and OISD norms are maintained by the Refinery and the statutory authorities verified the same before granting the respective licenses under various statutes.

External Safety Audits:

- PESO conducted **Safety Audit** of the Refinery in 2016 and the compliance has been submitted by BPCL. *Report attached as* ***Annexure -13***
- **Oil Industry Safety Directorate (OISD)** conducts audit every three years. OISD also conducts surprise safety checks in every year. Compliance reports are submitted regularly. *Report attached as* ***Annexure -14***
- The **Department of Factories and Boilers**, Govt. of Kerala conducts a priority inspection every year and recommendations are given to the refinery. Compliance reports are submitted regularly. *Report attached as* ***Annexure -15***
- **Internal Safety Audit** is carried out every year and the recommendations are implemented. Electrical and Non Electrical Safety audits and Fire audits are also carried out once in 3 years.
- **Compliances** of recommendations suggested by various statutory bodies are attached as **Annexure 16, 17 & 18**

Measures adopted by Kochi Refinery for ensuring safety of stakeholders is attached as **Annexure-19**

2.4. LAND ACQUISITION

Kochi Refinery has confirmed that land acquired so far has been for various developmental projects of Kochi Refinery on a need basis. The details of land acquisitions by Kochi Refinery are listed in ***Annexure 20***

Kochi Refinery has maintained natural boundaries. BPCL has submitted that they are not authorized to acquire land for any reason other than for approved projects and no new projects have been envisaged for BPCL at its Refinery at Kochi for the time being or in the near future.

The petitioners have repeatedly expressed that they are not against Kochi Refinery or against any expansion project of Kochi Refinery. The main concerns they have raised are on environment pollution and unsafe surroundings, due to lack of safety distance and green belt leading to difficulty of life and property, which they have explained as the premise for joint petitions for additional acquisition of an approximate area of 350 acres around the Refinery.

Google map of Refinery layout and infrastructure with boundary demarcations is attached as ***Annexure 21***

CONCLUSION& RECOMMENDATIONS

The committee has studied the points raised in the petitions in detail and had made a site visit of Refinery facilities. The committee also examined the reports and submissions made by BPCL in compliance to various stipulations of statutory/regulatory bodies for environment clearances and licenses.

As a Public Sector Undertaking BPCL has to submit and publish regular reports of compliance to various State and Central Statutory Authorities. For the Refinery to operate, these compliances and approvals have to be repeated as part of renewal of all licenses periodically after inspections by statutory bodies. Kochi Refinery maintains the statutory compliances as stipulated by various regulatory bodies.

BPCL authorities have shared all information as required by the committee and facilitated the committee's site visit to ascertain the facts. Copy of all the approvals and reports have been furnished by BPCL and these are attached along with this report as follows:

	Content	**Reference**
1.	GO for formation of Expert Committee	***Annexure-1***
2.	Minutes of the meeting of Expert Committee review at Kochi Refinery, 06 November 2020	***Annexure 2***
3.	Minutes of the meeting of Expert Committee review at Kochi Refinery, 04 December 2020	***Annexure 3***
4.	Minutes of the meeting of Expert Committee review at Kochi Refinery, 22 January 2021	***Annexure 4***.
5.	Details of compliances, approvals and licenses	**Annexure -5**
6.	Details of identification of HSE Hazards and mitigation measures adopted by the Refinery	***Annexure-6***
7.	The locations of the AAQMS in and around the refinery	***Annexure-7***
8.	Annual summary report of the CAAQMS	***Annexure-8***
9.	Measures adopted by the Refinery for protection of environment and monitoring programs	***Annexure -9***
10.	Measures adopted by Kochi Refinery for protection of health of stakeholders	***Annexure 10.***
11.	Community welfare and CSR activities pertaining to Health care initiatives by Kochi Refinery	***Annexure -11***
12.	The QRA Report	***Annexure -12***

13.	PESO Safety Audit Report	***Annexure -13***
14.	Oil Industry Safety Directorate (OISD) audit *Report*	***Annexure -14***
15.	Department Factories and Boilers, Govt. of Kerala priority inspection report	***Annexure-15***
16.	Compliances of recommendations suggested by F&B	***Annexure-16***
17.	Compliances of recommendations suggested by PESO	***Annexure-17***
18.	Compliances of recommendations suggested by OISD	***Annexure -18***
19.	Measures adopted by Kochi Refinery for ensuring safety of stakeholders	***Annexure -19***
20.	The details of land acquisitions by Kochi Refinery	***Annexure-20***
21.	Google map of Refinery layout and infrastructure with boundary demarcations	***Annexure-21***

Statutory bodies such as PESO, F&B, CPCB and KSPCB have verified the safety distances to be maintained as stipulated by the Petroleum Rules 2002, OISD norms and Environment Act & Rules. Safety distances were regulated by the concerned statutory bodies and the licenses have been issued as per the statutes.

The petitioners have put up a demand for acquisition of approximately 350 acres of land around the periphery of the Refinery for green belt development maintaining a natural boundary with the Refinery. The petitioners have put up claims that does not tally with the existing conditions. Inside the Refinery, 33% of the plant area is required to be maintained as green cover and it is observed that Green Cover is maintained at more than the required area. For new projects under development, the green cover is being developed and maintained as per the EC guidelines. The company has submitted the reports showing the same.

Recommendations:

- Surrounding population (including all strata of society) has to be made aware of the safety precautions to be taken in the event of any mishap within the Refinery
- BPCL Refinery team and the District Administration has to join hands for conducting targeted mass awareness programmes for the general public.
- Minimize SO_x emissions through desulphurization of fuels, to the extent feasible; or by directing the use of high-sulphur fuels to units equipped with SO_x emission controls.
- Benzene vapour recovery system shall be installed at the benzene truck loading facilities.

- Flare management plan to be prepared and implemented considering the following :
    - Implementing source gas reduction measures to the maximum extent possible
    - Using efficient flare tips
    - Avoiding malfunctions of flare due to flame-off
    - Optimization of size and number of burner nozzles
    - Maximum flare combustion efficiency by controlling and optimizing flare fuel/steam flow-rates.
    - Minimizing flaring from purges and pilots without compromising safety through measures including the installation of purge gas reduction devices, flare gas recovery systems (mainly for continuous and predictable releases, Upstream knock-out drum, soft seat valve technology – as appropriate; conservation of pilots, use of inert purge gas and diversion of flows into the Refinery gas distribution network.)
    - Using a reliable pilot auto ignition system
    - Installing high integrity pressure protection systems - where appropriate- to reduce over pressure events and avoid / reduce flaring situations
    - Minimize flame lift (flash-off) and flame-lick (flash-back)
    - Minimizing liquid carry over and entrainment in the gas –flare stream with suitable separation systems
    - Implementing burner maintenance plan and replacement programme to ensure continuous maximum flare efficiency
    - Metering flare gas on a monthly basis in the interest of pollution evaluation mainly in terms of CO_2 and SO_2 as well as released heat which is an indirect estimation of Green House Gas (GHG) emissions.

  With the implementation of the above recommendations the concerns about **light and heat radiation effects** will be taken care of.

- It has been verified that the emission monitoring is conducted by trained individuals following suitable and appropriate monitoring and record keeping. **It is recommended that :**
    - Monitoring data should be analyzed and reviewed at regular intervals and compared with operating standards so that any necessary corrective actions can be taken by the BPCL management.

- In order to improve the management of fugitive emissions from the entire petroleum refinery applicability and implementation of Fence-line monitoring of Benzene concentration may be examined at the confined area in ARU / Aromatic Storage Tank area according to internationally recognized methodologies (such as USEPA 40, CFR 63, Sub-part CC- National emissions standards for hazardous air-pollutants from Petroleum Refineries).

All recommendations stipulated from time to time by various statutory bodies namely Petroleum Explosives and Safety Organization, Oil Industry Safety Directorate, Central & State Pollution Control Board, Factories & Boilers Department, Government of Kerala shall be complied by BPCL and all reports thereof to be submitted within stipulated timelines.

Based on the licenses issued and the verifications during periodic renewals, the health, safety and environment norms as applicable to a Refinery unit as per State and Central statutory stipulations have been met by BPCL Kochi Refinery. Committee recommends that these shall be continuously maintained by BPCL without any deviations for ongoing / future projects.

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