

“Environment Impact Assessment Report of “Augmentation/Conversion of pumping/pigging facilities at Kadapa Depot”

EXECUTIVE SUMMARY

Project Description

Project proponent

Hindustan Petroleum Corporation Limited (HPCL), Public Sector “Navratna” Oil Company with its headquarters at Mumbai, is one of the major companies engaged in refining, marketing and distribution of Petroleum Products in India. HPCL operates two refineries - one at Mumbai and another at Visakhapatnam, and holds equity stake in Mangalore Refineries and Petrochemicals Limited. The company owns a wide network of distribution and marketing infrastructure throughout the country, comprising depots, terminals, pipeline networks, aviation service stations, LPG bottling plants, inland relay depots and retail outlets, lube and LPG distributorships, etc. Total cross country pipeline network of HPCL is around 2572 Kms with a capacity of 23.57 MMTPA.

HPCL operates Vizag - Vijayawada - Secunderabad pipeline for transportation of MS, HSD, SKO & ATF, with a name plate capacity of 5.38 MMTPA (especially to feed Andhra Pradesh & Telangana market). The company now proposes purposes to install a new pipeline of 4.48 MMTPA capacity from Vijayawada to Dharmapuri (VDPL) in Tamilnadu, which will pass through its existing POL Terminal at Kadapa.

Proposed Project

At present, Kadapa depot has facilities for receiving of petroleum products through railway tank wagons and their storage and dispatch through Tank truck. The storage and dispatch facilities at the depot are adequate and except minor storage enhancement, no change in these facilities is envisaged under the proposed project. The proposed project is for establishment of facilities for receiving of products from Viajayawada-Dharmapuri Pipeline (VDPL) and for pumping and pigging in the main pipeline. The proposed Augmentation/Conversion Project of existing Kadapa Depot includes:

- Tap off from Proposed Vijayawada – Dharmapuri Pipeline for receiving of products
- Centrifugal pumps: 2 working + 1 stand by for pipeline pumping towards Dharmapuri
- Basket filters 1 working + 1 stand by
- Pigging facilities in the main pipeline
- Flow meter and pressure control valves
- Pipeline control room with metering system, Pump house, & Electrical system
- Modification of existing fire fighting facilities
- DG Set: 1 x 250 KVA
- Admin Building

Project Location

The proposed augmentation/ expansion will be implemented in existing Kadapa Depot, located vill. Bhakarapet, Distt. Kadapa city in the state of Andhra Pradesh. Geographically, the depot is located between latitudes 14°25'0.74"N to 14°24'53.90.89"N and longitudes 78°53.90'41.58"E to

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78°53.90'13.74"E. The depot is approx. 15 km from Kadapa city. The nearest railway stations are Bhakarapet and Kanamalo palle – both approx. 3km from the Depot. The nearest domestic airport is at Kadapa.

Land Requirement

The total land area available in Kadapa Depot is around 53.90 Acres. The total land is under possession of HPCL, and additional 10 Acres is required for implementing the proposed project.

Water Requirement and Source

The existing water consumption in the depot is approx. 3 KLD, which includes domestic uses, washings, plantation, fire drills, etc. The source of water is ground water, extracted within premises through 4 tube wells. For operations of the proposed augmentation/expansion, approx. 2 KLD additional water will be required. Water conservation measures will be adopted to meet the additional requirements without increasing the withdrawal of ground water.

Technology and process description

The POL Terminal mainly has handling and storage facilities of different petroleum products. The brief process description is as follows:

- The Product is presently received through railway tank wagons, for which railway siding and unloading facilities have been provided. On implementation of the project, petroleum products will be received through the proposed VDPL.
- Routing of different products in their designated tanks through pumps, pipelines and manifolds.
- Storage in Tanks
- Dispatch of products through Truck Trucks to Retail outlets.
- Onward transfer of products to Dharmapuri Terminal.

Existing storage facilities

The POL terminal of HPCL at Kadapa is provided with storage tanks for Class A & B petroleum products. The tanks for Class A petroleum are floating roof tanks (FRV) while the tanks for Class B petroleum products are closed roof tanks (CRV). The design of the installation is in accordance with Indian standards OISD 117,118,141 and as contained in Petroleum Rules and approved by The Chief Controller of Explosives. The details of product storage tanka are as follows:

Tank No.	Product	Tank Breadth (m)	Tank Length (m)	Tank Roof Type
101-A	MS	17	14	FRV
101-B	MS	17	14	FRV
201-A	HSD	29	13.5	CRV
201-B	HSD	29	13.5	CRV
202-A	SKO	14	9	CRV

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202-B	SKO	14	9	CRV
301-A	Fuel Oil	20.5	14	CRV
301-B	Fuel Oil	20.5	14	CRV

The underground MS/HSD/SKO tanks are used for unloading products from sink tank trucks and removal of excess loaded products from the tank trucks. All the tanks have been installed in separate dyked enclosures as per OISD standards.

Preventive Measures for Leakages and Accidents

Fire protection and detection system has been provided in accordance with OISD 117. Fire detection and protection system, fire alarm system, fire extinguishers, fire water tank, Hydrocarbon Detectors and Emergency Shutdown System are installed within the POL terminal. High Volume Long Range (HVLR) monitors are being installed as per recommendations of M B Lal Committee.

Wastewater Treatment

Two numbers of effluent treatment plants, comprising Collection Sumps and Oil water Separator have been provided. Washings and storm water from Tank farm, Pump bays and loading gantry areas are routed into the Collection Sumps and passed through the Oil Water Separators for removal of oil from the contaminated water.

Project Cost

The total capital cost of the proposed augmentation/expansion project at existing Kadapa Depot is around Rs 86.55 Crores.

DESCRIPTION OF THE ENVIRONMENT

A brief description of study area, period, components and methodology adopted for establishing basekine characteristics of the environment are as follows:

- Study area: Area located within 10 km distance from the depot
- Study period: March to May, 2018 (Pre-monsoon or summer season)
- Components: All components and parameters of the environment, as required under the Standard Terms of Reference, published by Ministry of Environment, Forest & Climate Change.
- Methodology: As specified by Central Pollution Control Board and Bureau of Indian Standards and EIA Manual published by MOEF&CC.

Land Environment

Topography & Drainage: The area has predominantly undulated hilly topography and is situated in Rayalaseema region of Andhra Pradesh. Average elevation of the site is 163 m above mean sea level. The study area is drained by the river Penna, which is 5.5 Km to the north of the depot.

Land use/ land cover: Brief statement of the land use/ land cover of the study area is as follows:

- Open and agricultural land : 25.47%

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- Land under settlements : 2.13%
- Forest and vegetation : 67.86%
- Water bodies : 3.62%
- Waste land : 0.93%

Soil quality: Soils of Kadapa district are classified as red and black soil, existing in major parts of the district. To establish the baseline characteristics, soil samples from 8 locations in the study area were collected and analyzed. Soils in the study area are sandy loam with pH between 7.08 to 7.67. Poassium, nitrogeen and phosphorous were found in the range 0.9 to 2.8 mg/100 gm, 16.4 to 24.6 mg/100 gm, and 0.78 to 0.94 mg/100 gm, respectively.

Climate and Meteorology

The climate of Kadapa District is tropical. In winter, there is much less rainfall in Kadapa than in summer. According to Köppen and Geiger, this climate is classified as Aw. The period from June to October is wet and the average monthly rainfall is more than 70 mm. Annual average precipitation here averages 753 mm. In Kadapa, the average annual temperature is 29.2°C. The ambient temperature varies from a minimum of 20°C in December and January to a maximum of 40°C in April. To establish the baseline status, a meteorological station was established at the site, and hourly average values of wind speed, wind direction, ambient temperature, humidity and precipitation were recorded continuously from March to May, 2018.

Air Quality

- Summary of studies performed and observations made to establish the existing ambient air quality of the study area is as follows.
- No. of Monitoring stations for data collection: 8
- Period of Base Line Data Collection: March to May, 2018
- Frequency of sampling: twice/week at each location
- Averaging period: 24 hours (8 hours for CO)
- Season of study: Pre-monsoon (Summer) season
- Summary of observations:

Pollutants	Unit	Maximum value	Minimum value	98 th Percentile value (Max.)	Prescribed standard
PM ₁₀	µg/m ³	92	64	92	100
PM _{2.5}	µg/m ³	54	36	54	60
SO ₂	µg/m ³	13	6	12.5	80
NO ₂	µg/m ³	26	15	25.5	80
CO	mg/m ³	0.86	0.64	0.85	2
HC	Ppm	0.25	0.14	0.24	NA
VOC	Ppm	BDL	BDL	BDL	NA

Surface water Quality

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Water samples from the two important surface water bodies in the study area, viz. Penna River and Vontimitta Lake, were collected and analyzed with a frequency of once in a month (3 samples from each source during the study period). Important characteristics of the water samples are as follows.

Paramter	Unit	Penna River	Vontimitta Lake
Turbidity	NTU	1.5	1.7
pH	Units	7.5	7.6
Alkalinity as CaCO ₃	mg/l	210	222
Total dissolved solids	mg/l	457	454
Total hardness as CaCO ₃	mg/l	247	265
Calcium hardness as CaCO ₃	mg/l	148	159
Sulphate as SO ₄	mg/l	65	58
Chloride as Cl	mg/l	69	66
Nitrate as NO ₃	mg/l	22	22
Fluoride as F	mg/l	0.8	0.8
Iron as Fe	mg/l	0.13	0.14
Dissolved Oxygen	mg/l	6.7	6.6
B. O. D.	mg/l	9	8.7
C. O. D.	mg/l	26	25
Total Coliform	MPN/100ml	852	701
Faecal Coliform	MPN/100ml	154	133

Phenolic compounds and heavy metals were not detected in the samples.

Ground water quality

Water samples from 8 locations in the study area were collected and analyzed with a frequency of once in a month (3 samples from each source during the study period). Important characteristics of the water samples are as follows.

Paramter	Unit	Minimum	Maximum	Standard
pH	Units	7.25	7.95	6.5 - 8.5
Alkalinity as CaCO ₃	mg/l	292	403	200 / 600
Total dissolved solids	mg/l	539	1240	500 / 2000
Total hardness as CaCO ₃	mg/l	282	507	200 / 600
Calcium hardness as Ca	mg/l	79	102	75 / 200
Sulphate as SO ₄	mg/l	38	198	200 / 400
Chloride as Cl	mg/l	86	260	250 / 1000
Nitrate as NO ₃	mg/l	13	71	45
Fluoride as F	mg/l	0.62	0.98	1.0 / 1.5
Iron as Fe	mg/l	0.11	0.19	0.3
Total Coliform	MPN/100ml	Absent	Absent	Absent
Faecal Coliform	MPN/100ml	Absent	Absent	Absent

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Noise level

The existing levels of noise were monitored at 8 locations, where hourly average noise levels dB(A) were monitored continuously for 24 hours at each locations. Day time and night time noise levels were computed from the measured values. Noise levels at the two commercial areas were found as 60.2 to 61.4 dB(A) during day time and 50.6 to 52.8 dB(A) during night time. At the 6 monitoring locations in residential areas, noise levels were found as 48.6 to 52.8 dB(A) during day time and 38.2 to 41.6 dB(A) during night time. All the measured values are within Ambient Air Quality standards for Noise.

Ecological & Bio-diversity

The study area comes under “Eastern Ghats” bio-geographic zone of India (*India State of Forest Report, 2015*). There are 4 major ecosystems in the study area, viz. Forest ecosystem (Kondapalli RF, Lankamala RF and Kanamallopalle RF), River ecosystem (Penna River), Riparian ecosystem (along the banks of Pennar River), and agriculture ecosystem.

The top canopy of the forests are dominated by species like *Terminalia alata*, *Xylia xylocarpa*, *Haldinia cordifolia*, *Mangifera indica*, *Madhuca indica*, *Anogeissus latifolia*, *Pterocarpus marsupium*, *Oroxylum indicum*, *Shorea roxburghii*, *Shorea tumbaggaia*, *Syzygium alternifolium*, *Dalbergia latifolia* and *Sterculia urens*. The middle canopy comprises species like *Grewia tilifolia*, *Litsea deccanensis*, *Litsea glutinosa*, *Gmelina arborea*, *Glochidion zeylanicum*, *Holarrhena pubescens*, *Mallotus philippensis* along with bamboo species, *Dendrocalamus strictus* and *Bambusa arundinacea*. The lower canopy is seen with species like *Cycas beddomei*, *Memecylon umbellatum*, *Pleurostyliia opposita*, *Gardenia gummifera*, *Nyctanthus arbor-tristis*. The herbaceous ground flora is mixed with tall grass species such as *Apluda mutica*, *Pimpinella tirupatiensis*, *Stemona tuberosa*, *Piper trioicum*, and ferns like *Cyathea gigantea*, *Nephrolepis cordifolia*, *Angiopteris evecta*.

Analysis of trees data shows *Acacia sundra* is the most frequent species followed by *Manilkara hendra*, and *Vitex altissima*. It was also found that *Chomelia asiatica*, *Gymnosporia montana*, *Holarrhena antidysentrica*, *allmania nodiflora*, and *Woodfordia floribunda* are the most frequent and dominant shrub species. Data of herbaceous layer shows that the most frequent and dominant herb species are *Cynodon dactylon*, *Dactyloctenium aegypticum*, *Poa annua*, *Abrus precacorius* and *Cleome viscosa*.

The ecosystems surrounding the project site (reserve forest, agricultural lands and open scrub lands) support the presence of faunal species ranging from wild animals to domestic animals. Carnivores such as *Felis chaus* (Jungle cat), *Vulpes bengalensis* (Common fox), *Canis aureus* (Jackal) and *Canis lupus* (Wolf), herbivores such as *Axis axis* (Spotted deer), *Sus scrofa* (Wild pig), *Hystrix indica* (Indian crested porcupine), *Lepus nigricollis* (Black napped hare), *Semnopithecus entellus* (Common langur) and *Macaca maculata* (Rhesus macaque) etc are found in this region.

There is no Wildlife Sanctuary, National Park and Biosphere Reserve in the entire study area. No Endemic, Threatened or Endangered species are found or sited in the study area.

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Socio-economical Environment

Study of socio economic profile around the proposed project site has been carried out based on the Census of India 2011. The study area has been considered to be an area covered within a radius of 10 km around the proposed project site beyond which no appreciable impact due to the project is envisaged. The salient features of socioeconomic profile of the study area are as follows:

- The population in the study area is 55,588 with a population density of 490 persons per square kilometer.
- The Sex Ratio (Female per 1000 Male) is 974.
- Scheduled Castes (SC) as percentage of total population is 22.01%. Scheduled Tribes (ST) is as 2.0% percentage of total population in the study area.
- In the study area male literacy rate is 76.8% while female literacy is 52.7%.
- Percentage of main works in the study area is 80.2%. Percentage of marginal workers is 19.8 %.

ANTICIPATED ENVIRONMENT IMPACTS AND MITIGATION MEASURES

Appropriate environmental mitigative measures will be ensured to eliminate/minimize detrimental impacts during this phase. These measures include dust suppression by arranging mobile water sprinklers; in the parking area. Main aspects and activities during operation phase of the proposed project having potential for inducing environmental and/or social impacts are as follows:

- **Hydrology**

Required consumptive water for the existing plant is met from borewells available at the terminal. However, additional water requirement is envisaged for the proposed expansion shall be met from tanker supply. It is therefore expected that this drawl of water for the proposed project is expected to cause adverse impact of concern on ground water regime.

- **Air Environment**

As one 250KVA capacity of new emergency DG set is proposed for the augmentation, emission from the stacks of emergency DG sets is applicable for the proposed project. Additionally some hydrocarbon emission will take place as fugitive emission from leakages of gland, seals etc

- **Water Environment**

Only oily wastewater and domestic effluents will be generated during operation phase. The same will be treated suitably. The wastewater treatment philosophy is based on maximum recycling and re-use.

- **Physical Environment**

For the proposed augmentation no new land will be acquired since the total land (including the land required for proposed expansion) is under possession of HPCL. So the proposed expansion does not have any significant impact on the physical environment.

- **Impact of Solid Waste**

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The quantum of solid waste generated from the proposed plant is meager. Total tank bottom sludge generated during cleaning of oil storage tanks is kept in secured, covered impermeable sump vessels/sludge pit located within POL terminal at a central place earmarked for the purpose prior to safe disposal through effluent treatment plant.

- **Social Environment**

With further development of the area due to the addition of pumping and pigging facilities of the existing depot, it is expected that civic services in the locality will further improve. The project will have a positive beneficial effect on socioeconomic environment. For the present project, there is no R & R issues involved since the project is an expansion project for which the total land is under possession of HPCL.

Measures for Minimizing Adverse Impacts

- **Air Pollution Control**

Following steps will be taken to control air pollution:

- The emergency DG has stack of adequate height as specified by CPCB.
- 80% of hydrocarbon is stored in Floating Roof (FR) tank to minimize vapour losses.
- Greenery is already developed around the air pollution sources and also along plant boundary to restrict air pollution.

- **Water Pollution Control**

- The wastewater management philosophy is based on “Minimum Discharge” concept. All oily effluents are diverted to Oil Water Separator (OWS). The waste water from OWS after removal of oil & after testing is used for greenery development at the facility. The collected slop oil shall be disposed off to third party for off-site recovery or recycling. The domestic effluent is treated in septic tank followed by soak pit.

- **Solid Waste Management**

Tank bottom sludge is generated while cleaning of oil storage tanks. The cleaning of oil storage tanks is done once in five years as per practice of Oil Industry. Total tank bottom sludge thus generated is kept in secured, covered impermeable sludge pit located within POL Terminal at a central place earmarked for the purpose prior to safe disposal through effluent treatment plant. Other hazardous wastes like spent batteries, waste oil, empty drums of oil/chemicals, fluorescent tubing etc. is disposed off in accordance with approved safe procedures. All biodegradable waste (food and kitchen waste) at the POL Terminal is collected and disposed off as per well established practice.

- **Noise Mitigation**

All general equipment is procured with built-in noise abatement measures to restrict noise level not exceeding 85 dB(A) when measured 1 m away from the source surface. The entire plant is so installed so that the resultant noise level within the plant premises remains within 75 dB(A) during day time and 70 dB(A) during night time respectively.

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Assessment of Significant Impacts

- **Land**

Existing industrial land is going to be utilized for the augmentation of pumping and pigging facilities. Hence, no impact on land is envisaged

- **Water Source**

As 2KLD additional water requirement is envisaged for the proposed augmentation through tanker supply and recycling and re-use of effluent water have also been envisaged, this is not expected to be a problem of concern.

- **Water Quality**

Wastewater management is based on “Minimum Discharge” approach. Suitable treatment philosophy has been envisaged for washing and domestic effluents. No detrimental impact on the surface water quality is expected.

- **Air Quality**

The ambient air quality of the surrounding of the proposed site represents the expected scenario. The proposed project with the conceived pollution control measures are not expected to induce any impact beyond tolerable limit.

- **Ecology**

All emission and discharges from the proposed plant will be conforming to norms. Hence no detrimental impact on ecology is envisaged.

- **Rehabilitation**

No Resettlement and Rehabilitation (R & R) issue is involved with the proposed project, as the entire land is under possession of HPCL. It is barren and non-agricultural land free from human habitation.

- **Employment/Occupation**

Marginal workers constitute about 19.8 % of the total population in the study area. The proposed project will generate further indirect employment opportunity and further development of the area.

- **Housing**

The manpower required in the operation phase of the project is not high. The local housing will not be affected at all.

- **Education and Health**

Local literacy rate and educational facilities are fair. Reasonable medical facility is available for immediate attention. It is expected that existing medical and educational facilities will improve due to implementation of the project.

- **Services**

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The local villages have reasonable civic services. The immigration of people will not strain existing facilities. Thus the overall impact assessed has been found to be appreciably beneficial

ENVIRONMENTAL MONITORING PROGRAM

To ensure the environmental quality in the post project scenario, a monitoring system is proposed. The components of proposed environmental monitoring programme includes

- i. Water monitoring,
- ii. Land monitoring;
- iii. Air and noise monitoring;
- iv. Process and waste monitoring
- v. People and community monitoring and
- vi. Biological monitoring.

An Environmental Management Cell (EMC) is overall responsible for co-ordination of the actions required for environmental monitoring programme and environmental management plan.

ADDITIONAL STUDIES

In the proposed project scenario of emergency may arise due to the accidental release of petroleum products likeMS, HSD, and SKO. All safeguard measures as recommended by OISD, Dept of Explosive & statutory authorities are envisaged. No Resettlement and Rehabilitation (R & R) issue is involved with the proposed project.

For the present project, Public Consultation is recommended by SEIAA, Andhra Pradesh while prescribing the Terms of Reference of the EIA study.

PROJECT BENEFITS

The proposed project is expected to bring significant socio-economic and environmental benefits both at local and national level. The physical and social infrastructure will improve in a significant manner. The project will also create some long term and short-term direct /indirect employment. Thus, the proposed project has ushered in the social and economic up-liftment of the persons living in the vicinity of the project i.e. of society at large.

ENVIRONMENTAL MANAGEMENT PLAN

The EMP has been designed within the framework of various legislative and regulatory requirements on environmental and socio-economic aspects of different national and international bodies. EMP includes the following components:

Impact Mitigation Measures during Operation Phase includes Solid Waste Management, Air Pollution Control Measure, Water Pollution Control Measure, Noise Pollution Control Measure, Greenery Development, Socio – Economic Measures, Occupational Safety and Health, Emergency Preparedness (Disaster management Plan) and Audit.

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Construction Phase: During construction phase, all precautionary measures shall be taken for dust suppression, prevention of soil erosion and noise reduction. The effect due to construction activities will be temporary in nature and will have no permanent effect on the environment.

Operation Phase: The entire operation of receiving, storage and delivery is carried out under closed circuit and leak proof system so as to avoid emission of hydrocarbon vapours into the atmosphere. However, leakage of products during unloading and loading cannot be ruled out. For detection of leakages, HC Detectors shall be installed at suitable locations.

Air Emissions: There is practically no source of air pollution in the proposed facilities. All the storage tanks shall be leak proof and products shall be handled through closed pipes and adopting proven technological art and options. The sources of atmospheric emissions are limited to fugitive emission of HC vapours and the DG Set, which will be operated in case of power cut. Even when the DG set is operated, emissions of SO₂ and NO_x shall be within the threshold limit. The stack height of the existing DG sets has been kept as per prescribed standard. To detect any leakage during loading operations of MS, HC Detector shall be installed in TLF areas.

Wastewater Generation: There would be insignificant increase in quantity of wastewater after installation of proposed facilities. Sanitary waste water from canteen, wash rooms and toilets shall be treated in septic tank and disposed off through soak pits. Oily wastewater due to floor washing and contaminated surface run-offs shall be sent to existing Oil Water Separators for removing the oil content. The capacity of existing oil water separators is sufficient to sustain the increased load of oily wastewater, if any. The oil free wastewater shall be used in gardening of afforested areas.

Afforestation Program: HPCL and Kadapa Depot are conscious of importance of green belt. Different varieties of plants have been planted in vacant spaces and the area identified earlier for plantation. Suitable variety of flora species shall be planted in the available vacant spaces. Further, lawns and gardens will be developed with ornamental plants in vacant land within the depot. Out of 53.90 acres, about 12.3 acres area has already been brought under green belt development program.

Preventive Maintenance & Planned Inspection: Preventive maintenance and planned inspection of the facilities will be done in accordance with OISD and as per schedule. Record keeping for jobs done would be maintained. The intermittent inspection and maintenance schedule would be prepared as per directive and procedures laid down by OISD.

Energy Saving Programs: It involves installation of energy efficient lighting system which reduces indirectly the generation of green house gases, and other air pollutants. However, there shall not be any compromise with required illumination at working places. Use of energy efficient electrical appliances shall be encouraged.

Occupational safety and Health: HPCL endeavor to create and provide the Working Environment to fit the Workmen instead of forcing a workman to adopt the Working Environment. Occupational health and safety issues addressed in the depot have taken appropriate care against the potential of chemical hazards, fire & explosion, and confined spaces.

CONCLUSION

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Any adverse impact due to the proposed project on air, noise, water, land and ecological environment is insignificant and the socio-economic benefits are predominantly positive. It is also evident from the risk analysis study that acceptable individual risk level of 1.0×10^{-6} / year is mainly confined within the plant boundary. All the relevant safety norms with latest technology shall be incorporated to ensure safe operation of the depot. In view of the above, it may be opined that the proposed project in totality may be considered environmentally safe.