Pre- Feasibility Report

For

Capacity expansion at BPCL Aonla POL Depot from 16,804 KL to 17,862 KL capacity,

i.e. 1,058 KL additional capacity (858 KL capacity for Bio Diesel A/G based Cone roof tank and 200 KL capacity for Ethanol based U/G tank).

At

BHARAT PETROLEUM CORPORATION LIMITED (BPCL)

POL Bulk Depot., Near Aonla Railway station, Village – Noorpur, Tehsil Aonla, District :- Bareilly (Uttar Pradesh).

Project Proponent:

BHARAT PETROLEUM CORPORATION LIMITED (BPCL)

August 2017.

OVERALL CONTENT

Executive Summary

Bharat Petroleum Corporation Limited (BPCL) is a fortune 500 oil refining, exploration and marketing PSU with Navratna status. BPCL has multiple refinery units in Mumbai, Kochi, Numaligarh and Bina. BPCL has also many POL terminals spread across the country. In order to meet market demands, BPCL now proposes to expand the storage capacity of the existing POL Depot at Aonla, Uttar Pradesh by adding additional tankage.

The proposed project is an expansion project of the existing terminal with existing storage capacity 16,804 KL. After expansion, the combined storage capacity of different petroleum products at Aonla POL depot will be 17,862 KL. The depot mainly has facilities for storage & handling of different petroleum products.

The total land (including the land required for proposed expansion) is under possession of BPCL. The water requirement is met through bore wells. No additional water requirement is envisaged for the proposed expansion. In absence of power supply from the grid, the depot is operated through the captive DG sets of 545 KVA capacity in totality. The power requirement will remain same after the proposed expansion and will be operated through captive DG sets

All the mitigation measures will be in line with the existing practice to meet the environmental standards and environmental operating conditions for the expansion project. Fire fighting facilities will be as per the recommendations of OISD 117. No R & R issue is involved with this proposed expansion.

Since the proposed expansion is not a major one, it is envisaged to complete the whole expansion within twelve (12) months from the date of obtaining environmental clearance (EC) for the proposed project. The total project cost for the proposed expansion is around is 321 lacs.

1.0 BACKGROUND INFORMATION

1.1 Identification of Project and Project Proponent

Bharat Petroleum Corporation Limited (BPCL) is a fortune 500 oil refining, exploration and marketing PSU with Navaratna status. BPCL has multiple refinery units in Mumbai, Kochi, Numaligarh and Bina.

Bharat Petroleum's Mumbai Refinery is one of the most versatile Refineries in India. With successful implementation of various projects and de-bottlenecking, our Refineries currently process about 12 Million Metric Tons of crude oil per annum.

Kochi Refinery, a unit of Bharat Petroleum Corporation Limited, commissioned in 1966 with a capacity of 50,000 barrels per day. Formerly known as Cochin Refineries Limited and renamed as Kochi Refineries Limited, the refinery was originally established in collaboration with Phillips Petroleum Corporation, USA. Today it is a frontline entity as the unit of the Fortune 500 Company, BPCL.

Numaligarh Refinery Limited is a public sector oil company set up in the year 1993, with its 3 MMT refinery situated in Numaligarh, Assam. The Refinery is one of the most technologically advanced and environment friendly refineries in the country. BPCL is the major share holder with 61.65% of the Company's paid up equity capital.

Moreover, Bharat Oman Refineries Limited (BORL), a company promoted by Bharat Petroleum Corporation Limited (BPCL) and Oman Oil Company Limited (OOCL), has set up a 6 MMTPA grass root refinery at Bina, Madhya Pradesh along with crude supply system consisting of a Single Point Mooring system (SPM), Crude Oil Storage Terminal (COT) at Vadinar, District – Jamnagar, Gujrat and 935 Km long cross country crude pipeline from Vadinar to Bina.

BPCL has also many POL Terminals spread across the country. BPCL now proposes to expand the capacity of the existing POL Terminal at Aonla (Bareilly, U.P) by adding Two additional tanks for HSD and Ethanol storage.

1.2 Nature of the Project

The proposed project is an expansion project project for increasing storage capacity of the existing Depot by 1,058 KL. After implementation of the project, capacity of the Depot at Aonla will increase to 17,862 KL from the present capacity of 16,804 KL.

1.3 Need for the Project and Its Importance

Demand of petroleum products has increased with urbanization of the places around Aonla & Bareilly. In order to meet the demand, BPCL proposes to increase the storage capacity of their existing depot at Aonla.

The proposed project in Aonla is meant for improving supply position of POL products in the villages and small towns around Bareilly.

1.4 Employment Generation Potential

At present total 12 permanent staffs are available for the total operation of Aonla Depot. In addition to that contract persons are also engaged for the regular maintenance and operation of the Terminal. Operation of the Depot will be managed with the exiting staffs after installation of the tanks.

However, the proposed project has the potential of indirect employment generation.

2.0 PROJECT DESCRIPTION

2.1 Type of Project

The proposed project is an expansion project of the existing POL Depot with existing storage Capacity 16,804 KL. After installation of 2 additional tanks with aggregate capacity of 1,058 KL the capacity (i.e. 858 KL capacity Bio Diesel A/G Cone roof tank and 200 KL capacity Ethanol U/G tank). The BPCL Aonla POL Depot total storage capacity will be increased to 17,862 KL.

2.2 Need for The Project

With a view to meeting the demand supply gap, the project proponent proposes to enhance the storage capacity of the existing depot at Aonla. 1 Nos. tank for storage of Ethanol and 1 Nos. tank for storage of Bio-Diesel are proposed to be installed.

The new tanks will be fabricated as per the standard design practice and the guidelines of OISD 118.

2.3 Plant Location:.

Aonla depot is about 1 km away from Aonla railway station and 2 km away from Aonla township. The depot is well connected by road and by rail. Aonla is located within
Latitude: 28°17'38.21"N.
Longitude: 79° 9'55.02"E.

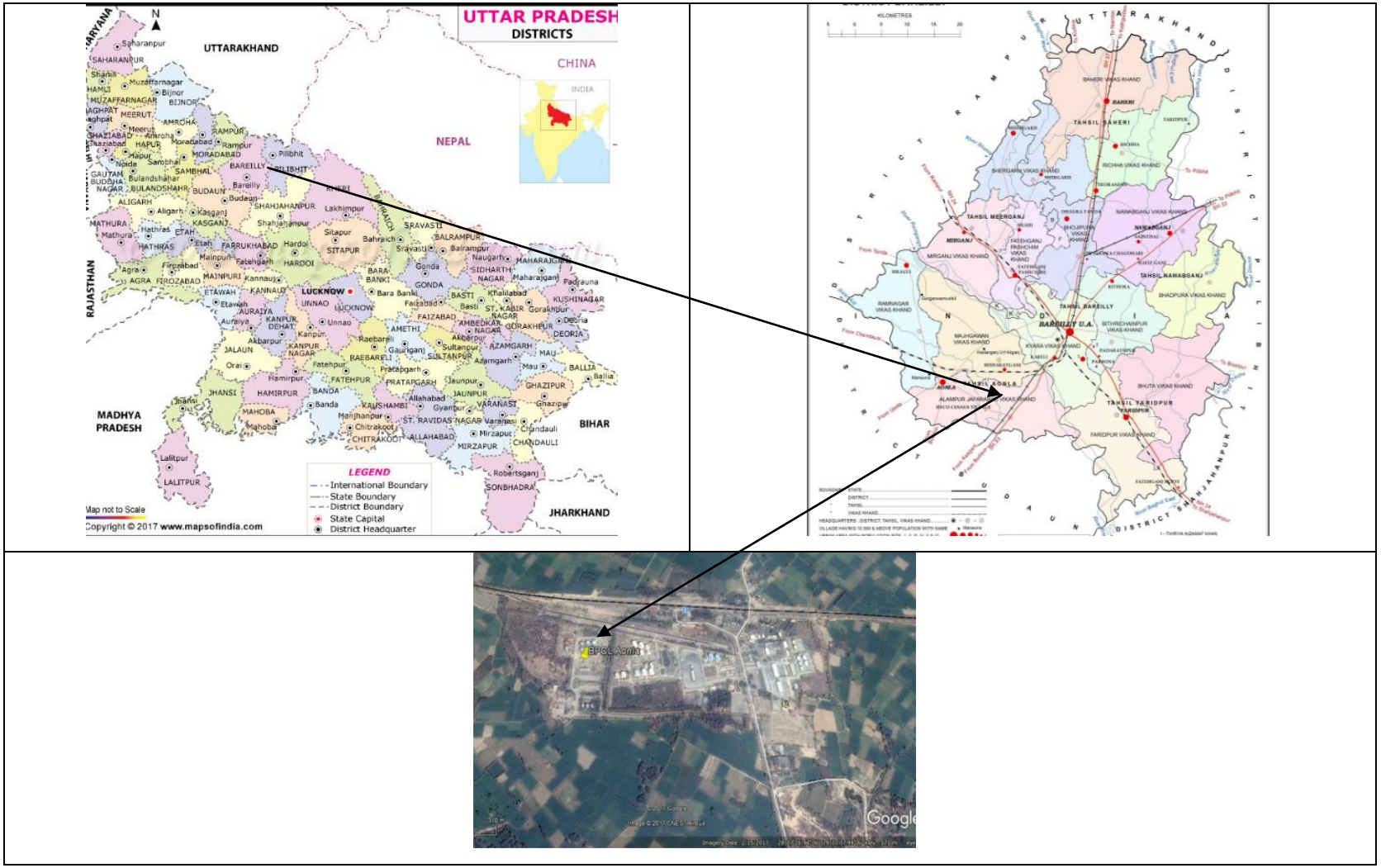

Figure 1: Project Site Marked on Map of Uttar Pradesh.

Figure 2: Satellite Image of Project Site- BPCL Aonla POL Depot, Uttar Pradesh.

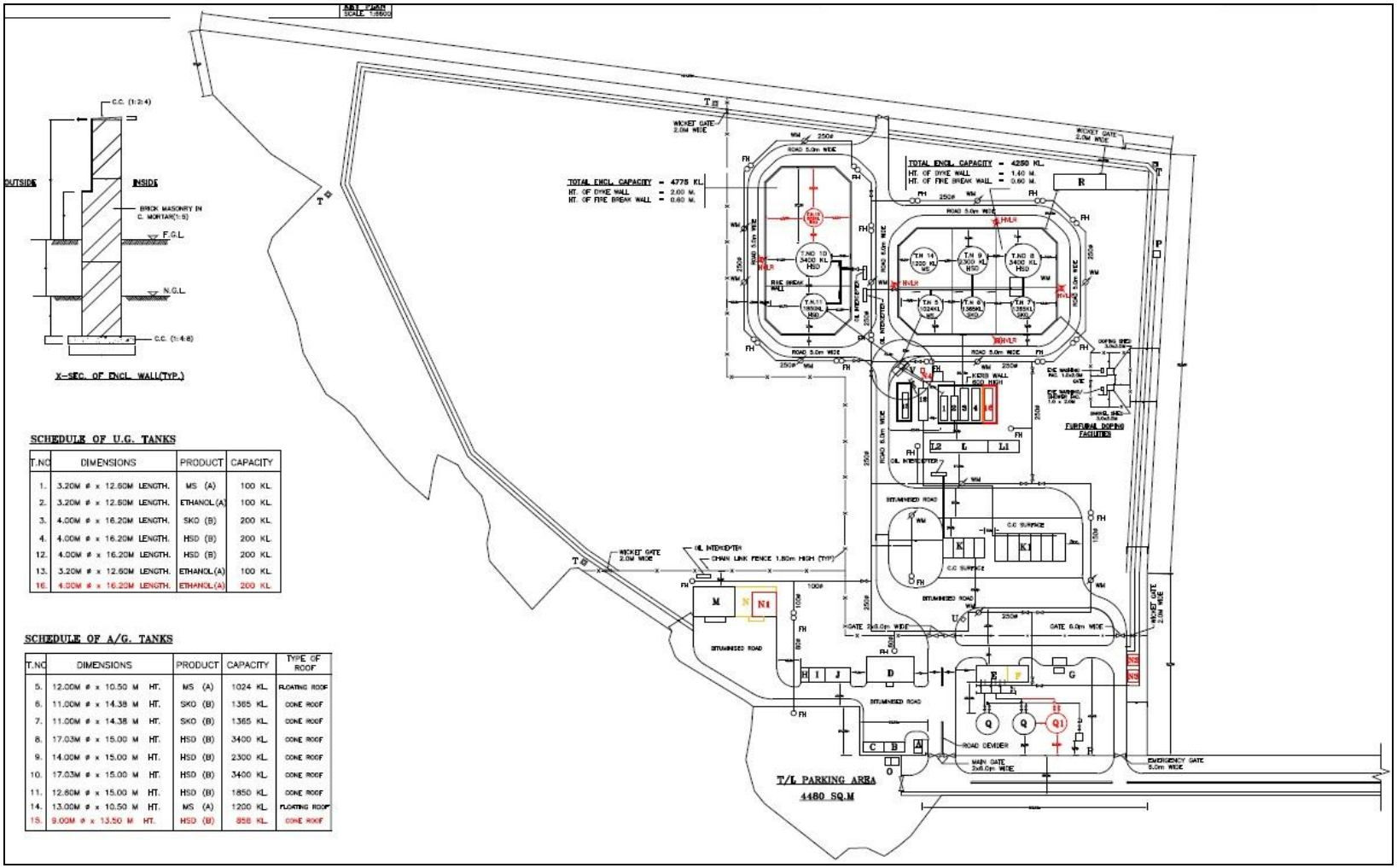

Figure 3: Project layout for proposed expansion at BPCL Aonla POL Depot

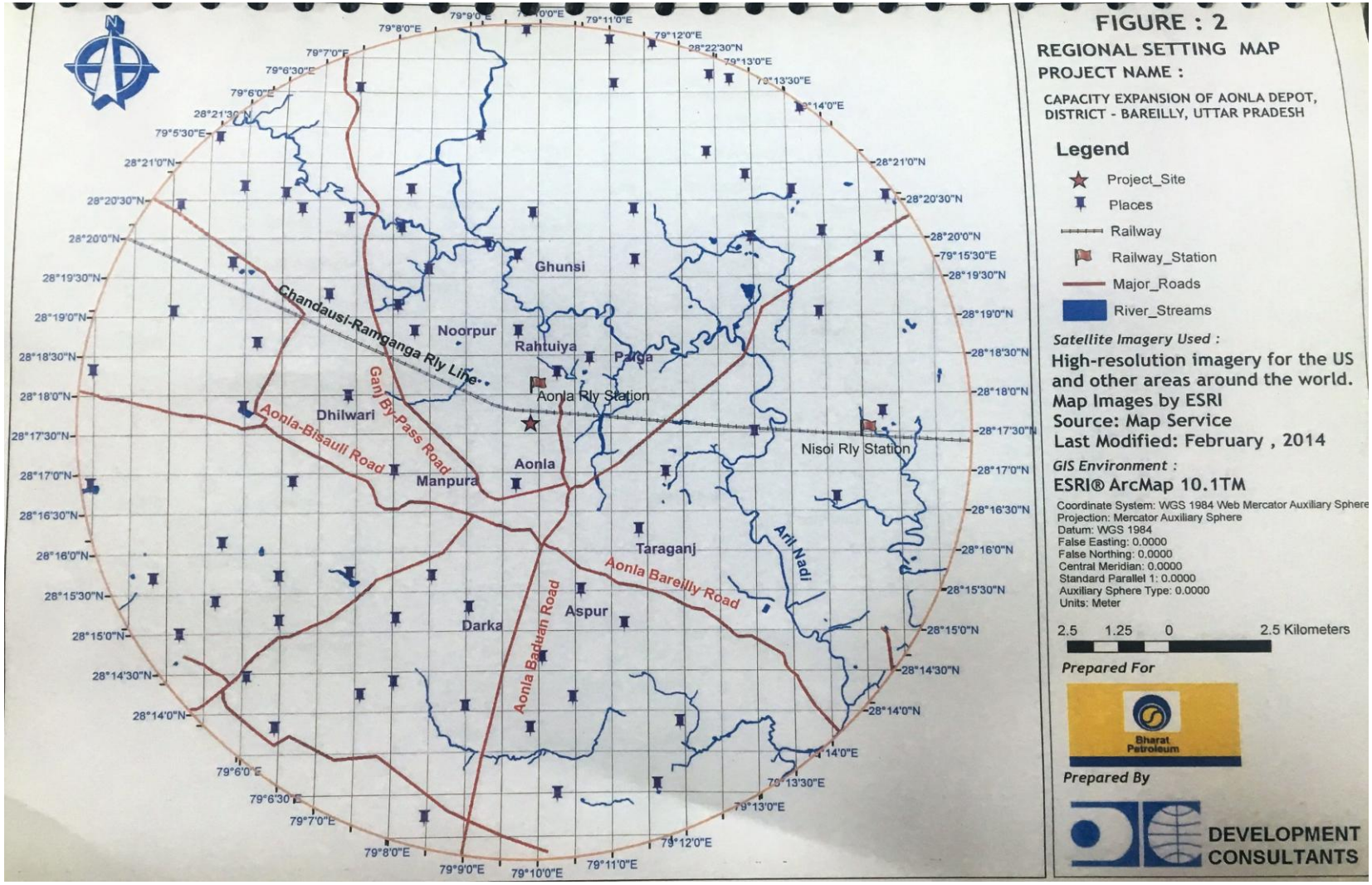

Figure 4: Toposheet Project layout for proposed expansion

2.4 Depot Profile

Gross storage capacity of the Depot is 16,804 KL and proposed to be increased to 17,862KL. The main Depot facilities comprise of product input through Tank Wagons, storage in aboveground & Underground Tanks, distribution to the retailers by tank lorries.

The main facilities are summarized as under:

Table 1 : Facilities Description at IOCL Aonla Plant

Storage	Existing 14 No's tank (Above Ground-8 & Under Ground -6). Installation of 1 above ground and 1 Under ground tanks proposed.
TLF Gantry	10 bay gantry with 20 loading points
Wagon unloading facility – TW Siding.	Single spur unloading facility with 113 x 3 nos. unloading points for MS,SKO & HSD.
DG Sets.	3 no's rating of which are 320 KVA -1 no. 160KVA -1no. 65 KVA - 1 no.
Fire Fighting Facilities	As per OISD 116 & 117
Fire Water Storage.	2 x1,425 KL & 1x1,178 KL.
Fire Water pumps.	2 x 410 m^3/hr
Fire Water pumps. (Stand by)	1 x 410 m^3/hr
Control panel	As per Standard
Storage Tank with active water protection.	I. Fixed Roof tanks are fitted with sprinkler System and foam system II. Floating Roof tanks are provided with Dome roof along with sprinkler & foam system. III. Hydrants Monitors are provided at all strategic point including TLF area, Tank farms, Pump House, Tank Truck parking area, etc.
Fire extinguishers.	As per OISD-117
Hydrants & Monitors.	As per OISD-116

2.5 Plant Capacity:

The existing capacity of the POL Terminal is furnished below.

Table 2 : Existing Capacity of IOCL Aonla Plant

Product	Storage Capacity Description (KL)	Total (KL)
MS	1x100+1x1,024+1x1200	2,324
HSD	2x 200+2x 3,400+1x 2,300+1x 1,850	11,350
SKO	1 x 200+ 2 x 1,365	2,930
Ethanol	2 x 100	200
TOTAL		**16.804**

2.6 Technology and Process Description:

The POL terminal mainly has handling and storage facilities of different petroleum products. The brief process description is as fallows.

- The product is received through Tank Wagon.
- Routing of different products in their designated tanks.
- Storage in Above Ground tanks & Underground Tanks
- Dispatch of Products: a) Through tank lorries to retail outlets

2.7 Project Description:

- PLANT LAYOUT: The layout is furnished as above in Figure 1: Layout of POL terminal at Aonla.
- Water Requirement and Source : 3 KLD of water will be required in the operational phase. Required quantity of water for domestic consumption, tank farm washing, fire fighting etc is taken from the bore well within the premises
- Power Requirement : In absence of supply from the power grid, requirement is met through DG sets of 545 KVA capacity.

- DG Set : The following generators have been installed for maintaining operation during power cut.

Table 3 : Power Requirement & Resources

Capacity (kVA)	NOs.
320	1
160	1
65	1
Total 545 kVA	**3**

The emergency DG have tall stack as specified by CPCB. All the DG sets are provided with acoustic enclosures.

- Details of Storage: The POL terminal of BPCL at Aonla is provided with storage tanks for class A & B Petroleum products. The Material safety Data sheets (MSDS) of all the products (MS, HSD, SKO,) are enclosed as attachment – 2 with this report. The classification of the products are summarized below for ready reference

Table 4: Product Classification

Name of the Product	Full Name	Class
MS	Motor Spirit	A
HSD	High Speed Diesel	B
SKO	Superior Kerosene Oil	B
Ethanol	Ethanol	A

Petroleum Class – A – Means Petroleum having a flash point below 23^0C

Petroleum Class – B – Means Petroleum having a flash of 23^0C and above but below 65^0C

Petroleum Class – C – Means Petroleum having a flash of 65^0C and above but below 93^0C

- The design of the Depot 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 / tank farm are as follows:

Table 5: TANK FARM DETAILS

Sl. No.	Product	Tank No.	Position	Total Tankage (KL)	Dimension of tanks (mtr)	Type of tank
1	**MS**	1	U/G	100	3.2 x 12.6	
		5	A/G	1,024	12 x 10.5	Floating roof
		14	A/G	1,200	13 x 10.5	Floating roof
2	***HSD***	4	U/G	200	4 x 16.20	
		8	A/G	3,400	17.03 x 15	Cone Roof
		9	A/G	2,300	14 x 15	Cone Roof
		10	A/G	3,400	17.03 x 15	Cone Roof
		11	A/G	1,850	12.6 x 15	Cone Roof
		12	U/G	200	4 x 16.20	
	Bio-Diesel	15	A/G	858 **(Proposed)**	9 x 13.50	Cone Roof
3	**SKO**	3	U/G	200	4 x 16.20	
		6	A/G	1,365	11 x 14.38	Cone Roof
		7	A/G	1,365	11 x 14.38	Cone Roof
4	**Ethanol**	2	U/G	100	3.2 x 12.60	
		13	U/G	100	3.2 x 12.60	
		16	U/G	200 **(Proposed)**	4 x 16.20	
TOTAL				**17,862**		

Unloading Pump Details:-

Table 6: TWD Pump House & Motor Details

TWD PUMP HOUSE					
Pump No.	**Product**	**Pump Details**			**Motor Details**
		RPM	**Discharge (m^3/hr)**	**RPM**	**HP**
1	MS	1450	120	1475	15
2	MS	1450	120	1475	15

3	SKO	1465	250	1475	30
4	SKO	1465	250	1475	30
5	HSD	1480	250	1475	30
6	HSD	1465	250	1470	30
7	HSD	1470	250	1470	30

Table 7: TLF Gantry Pump & Motor Details

TLF PUMP HOUSE				
Pump No.	**Product**	**Pump Details**		**Motor Details**
		Head	**FlowRate (KL/HR)**	**Rating (HP)**
1	MS	45	150	40
2	MS	45	100	25
3	MS	15	100	10
4	SKO	45	112	10
5	SKO	45	100	25
6	HSD	15	260	60
7	HSD	15	200	15
8	HSD	29	200	22
9	SKO	25	100	12.5
10	SKO	25	100	12.5
11	MS	23	50	5
12	ETHANOL	23	50	5
13	HSD	25	50	7.5
14	HSD	50	60	20
15	ETHANOL	70	30	12.5

2.8 The following pipeline systems are in existence:

2 dedicated pipe lines have been laid between the pumps and the storage tanks.

Pipelines within the terminal consists of the followings :

1. **Pipelines from Unloading pump house to the Tank Farm** : There are dedicated pipelines for individual products.

2. **Pipelines from Tanks to Loading pump house** : There are dedicated pipelines for individual products.

Pipelines from Loading pump house to the TLF Gantry. There are dedicated pipelines for individual products. Tank wise dedicated pipelines have been provided. The lines connecting the loading arms are of 3"NB Size. The loading arms and the metering assembly are of 3"NB Size.

Land Requirement

The total land area available in Aonla POL Depot is around 28 acres. The total land is under possession of BPCL.

Water Requirement and Source

The maximum consumption of water for the existing project will be 3 m^3/day.

capacity expansion) of the plant is as follows:

The maximum water consumption (m^3/day) during operation (considering)

Table 8: Daily Water Requirement

Sl. No.	Particulars	Quantity (m^3/day)
1	Cooling	1
2	Domestic Use	1
3	Greenery / landscape Development	1
Total		**3**

The water requirement is met through bore well water.

2.9 Fire detection and protection system

The fire protection and detection system are in accordance with OISD 117. Portable fire extinguishers of 10-75 kg are installed on pump stations, tank farms and buildings, the size depending on the object concerned. Electrical rooms are protected by Carbon dioxide (CO_2) fire extinguishers. Mobile fire fighting vehicles with foam monitors, hoses, etc.have been provided. Fixed fire fighting monitors are located at the pump station and truck loading gantries, each with a capacity

of 144 m3/hr. sufficient hydrants are installed in the POL Depot, with the hydrants spaced at a maximum distance of 30m.

The tanks are equipped with fixed cooling water and foam Depots and mobile vehicles and equipment (monitors, hoses, branch pipes, etc.) are provided to handle field fires. Table below will show fire water storage tank, fire water pumps:

Fire Water Pump

Table 9: Fire Water Requirement

Sr.No	Category	No's	Capacity
1	Main Pump (Engine Driven)	2	410 M^3/Hr
		1 Stand By	410 M^3/Hr

The salient features of the existing fire fighting system are furnished below:

The existing fire fighting facility will be upgraded during the proposed expansion of the Aonla Depot. There will be provision of following fire fighting equipments for the proposed expansion:

- Dry Chemical Powder Extinguisher
- CO_2 type Extinguisher
- Mechanical foam type Extinguisher
- Water CO_2 type Extinguisher
- Water and sand buckets
- Hose Reel
- PA system
- Hydrant system
- Foam Monitor
- Water monitor
- Fire alarm system
- Foam drum

✓ **Portable Fire Fighting Apparatus**

Following types of fire extinguishers and other fire fighting apparatus specified for Depot in vulnerable areas of the plant, administrative block, control room, fire water pump house. MCC etc as per OISD guidelines.

Following are the available firefighting equipment available in the Depot:

Table.10: Inventory of Fire Fighting Equipments

Sl No	Item description	Quantity
1	Fire Water Tanks	2 x 1,425 KL, 1x 1,178 KL
2	Fire Engines	3 Nos.
3	Fire Extinguishers :	
4	- DCP Type – 75 Kg	7
5	- DCP Type – 25 Kg	6
6	- DCP Type – 10 Kg	65
7	- CO2 Type – 6.5 Kg	2
8	- CO2 Type – 2 Kg	5
9	Foam (AFFF)	14,500 Ltrs
10	Foam Compound Stalls (at vulnerable points)	6
11	Water Sprinkler for MS Tank	2 nos on each FR tanks.
12	Sand Buckets	80
13	Double Headed Water Hydrants	29
14	Water Monitors	16
15	Fire Hose Reels including spares	68
16	Fire Hose Boxes	29
17	Jet Nozzles including Spares	25
18	Foam cum Water Nozzles (FB 10X)	2
19	FB 5X Nozzle	2
20	Fog Nozzle	2
21	Triple Purpose Nozzles (Diffuser)	5
22	Safety Shoes	22 pair
23	Safety Helmets	50
24	Safety Belts	40
25	Flame Proof Torch	6
26	Hand Operated Siren	8
27	Public Addressing System	2

28	First Aid Boxes	2
29	Stretcher	4
30	Wind Socks	4
31	Electrical Gloves	2 pairs

2.10 FIRE ALARM SYSTEM

Conventional type electric Fire alarm systems are provided in following areas:

a) Security/S&D room

b) DG room.

c) Railway siding.

d) Laboratory.

Source of Signaling

The source of signaling is considered as ESD. These are considered for the areas where manual warning is to be initiated on notice of fire. They are mostly provided for open areas or near to access doors, truck loading, pump house, tank farm, administrative building, etc.

Plant Automation System

VHF communication system containing a base station with antenna (1 set) and number of portable VHF Tran receivers (13 sets) with charger units are provided for providing communication within the plant premises. The base station is located in the administrative office. The communication system does not cause interference to the I & C system and existing communication system in the vicinity of operational areas. Public address system is at the security room in site The fire water pumps are activated automatically. When the fire-water header pressure is low, the jockey pump maintains the pressure automatically. The foam is sucked through Venturi system.

The major components of the TFMS system are as follows:

- Field Instruments
- Radar Level gauge
- Local Level Indicator

The installation/commissioning of the above TFMS instruments is in progress.

a. Automation System for Petroleum Product Loading Stations

The automation system for truck loading stations consists of the following sections: This system ensures optimization of economy and safety in operation.

- Volumetric Flow Meters
- Batch Controllers
- Plant control system Programmable Logic Controller (SMPS)
- Operator's Interface console
  - i. Metering System
  - ii Batch Controller
  - iii Plant control system Programmable Logic Controller (SMPS)
  - iv Control and Interlocking System
  - v Integrated Control System
  - vi Emergency Shutdown System

The installation/commissioning of the above automation instruments/systems is in progress.

Waste Water Treatment

Waste water is generated due to area cleaning /housekeeping and occasional tank farm washing operations at the POL Depot.

Oil contaminated waste water is generated mainly from pump areas, manifolds, truck loading, etc. only when spillage is washed with water as well as occasional tank washing.

The direct discharge areas i.e. those areas within the POL terminal where leakage is likely to occur during normal operations is to be provided with leak-proof curbing. These curbed areas are connected to the *Oil-Water Separator (OWS) system* for treatment of oily wastewater generated. Indirect discharge areas such as dykes, etc. are connected to the OWS. The capacity is adequate to take care of, the oily waste water to be handled from the facility during the monsoon season.

The separated oil consisting of a comparatively dry floating layer is removed and is drained into a common draw –off pipe discharge to the *oil pit*. This collected oil is sold to MoEF/CPCB approved third party for off-site *recovery or recycling*.

Separate Storm water drainage system is provided at the facility. The non-contaminated rain water is discharged directly to a drain However, particularly during the monsoon; any oil-contaminated rain water is led to the OWS for treatment prior to discharge.

Man Power :-

Table11: Manpower Details

Skillsets	Manpower
Mangerial	6
Worker/staff	6
Security guards	8
Security Supervisor	1
Total	*21*

At the existing plant 21 nos. of people are working as mentioned in the above table. Total strength of manpower is 12 out of which 6 members are managerial and rest are staff and workers. Beside above 8 security guards and 1 security supervisor are engaged through prudential security.

In construction phase 30 workers from nearby local areas will be hired on contract basis. While in the operational phase the existing plant manpower is sufficient to manage and handle the plant operations.

3.0 SITE ANALYSIS

3.1 Connectivity

The nearest railway station is Aonla which is about 1 km from the Project Site. Nearest domestic and international airport is at Delhi which is at a distance of about 250 km from Project Site.

3.2 Existing Land Use

The project is only for Depot of Two additional tanks within the existing premises, hence additional space is not required. Thus, no change in land use is envisaged.

There is no Reserve Forest, Protected Forest, National Parks and Sanctuary within the 10km of Project Site.

3.3 Land Ownership

The total land is and is under possession of BPCL.

3.4 Existing Infrastructure

All industrial infrastructural facilities like road, water, power, land, manpower are very well developed, this resources will be used from the existing project.

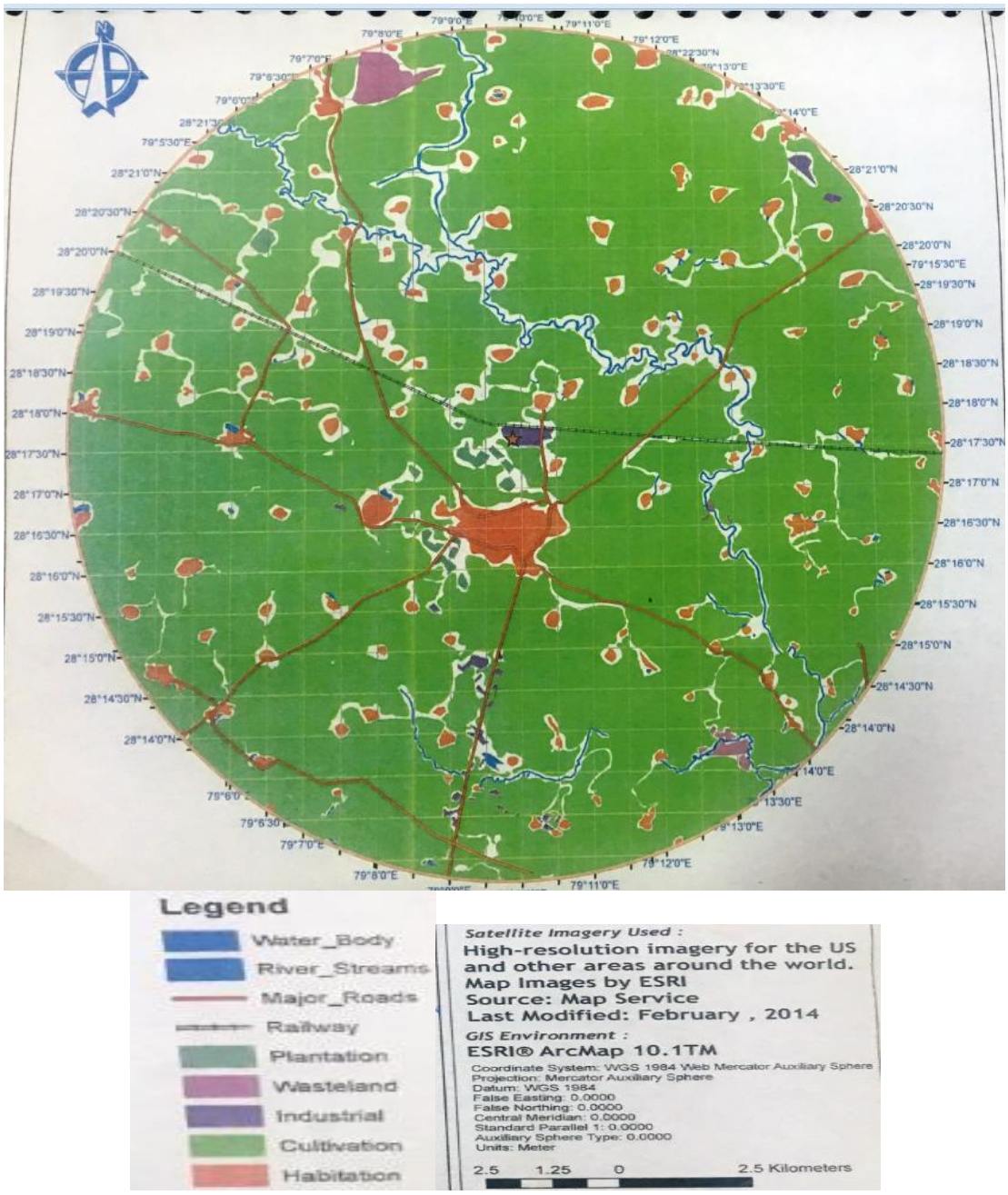

Figure 5: Land Use Map for BPCL Aonla POL Depot, Bareilly, Uttar Pradesh

4.0 POLLUTION CONTROL MEASURES

4.1 Infrastructural Facilities

Since the proposed Project is expansion project within the premises of the depot it will use all the infrastructural facilities of the existing POL Depot.

4.2 Industrial Waste Management

Following waste management measures which are in line with the existing practice are conceived in the design to meet the environmental standards and environmental operating conditions for the project,

4.3 Air Pollution Management

The air Pollution mitigative measures conceived for the project is summarized below:

- Water spraying is conceived to minimize dust Pollution during excavation and earth work (during construction phase).
- Hydrocarbons is stored in Floating Roof (FR) / Cone Roof / Underground Tank to minimize vapour loses.
- The DG sets have tall stack heights as specified by CPCB guidelines.
- Greenery has been developed along plant boundary to control air Pollution and act as noise barrier.

4.4 Water Pollution Management

Wastewater Management philosophy is based on following:

- The wastewater management philosophy is based on “Zero 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 within the Depot.
- The collected slop oil is disposed off to third party for off-site recovery or

recycling.

- Domestic Sewage generated at the terminal is treated in septic tank and disposed via soak pit.
- Separate storm water drainage system is provided at the facility.
- The non-contaminated rain water is discharged directly to rain water harvesting pit within the facility. However, particularly during the monsoon, any oil-contaminated rain water is led to the OWS for treatment prior to discharge.

4.5 Noise Pollution Management

The following noise abatement measures are practiced for the Aonla Depot:

- The equipment, which is the source of noise, have built-in type noise control abatement technology.
- A greenery is already developed around plant boundary and other strategic locations to reduce noise Pollution

4.6 Solid Waste Management

Following measure is followed for management of solid waste in Aonla Depot:

- 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/ spent oil along with filters contaminated with oil is kept in secured, covered impermeable sludge pit located within terminal at a central place earmarked for the purpose prior to disposal via incineration or bio-remediation. Also the sludge/spent oil & empty drums containing toxic chemicals is disposed through MoEF/ State UPPCB approved registered vendor.
- Other hazardous wastes if any like spent batteries, waste oil, fluorescent tubing etc. is disposed off in accordance with approved safe procedures.

5.0 REHABILITATION AND RESETTLEMENT (R & R) PLAN

No new land acquisition is involved with the proposed expansion of the POL Depot. The existing POL Depot at Aonla has enough space within its plant boundary to accommodate the expansion. Thus no R & R issue is involved with this proposed expansion.

Since, the proposed expansion is not a major one, it is envisaged to complete the whole expansion within twelve (12) months from the date of according Environmental Clearance (EC) for the proposed Project.

6.0 PROJECT SCHEDULE AND COST ESTIMATE

Project Schedule

Since the proposed expansion is not a major one, it is envisaged to complete the whole expansion within Twelve (12) months from the date of according Environmental Clearance (EC) for the proposed Project.

Project Cost

The total project cost for the proposed expansion is around **Rs 321 Lacs.**

7.0 PROJECT BENEFITS

The different benefits of the proposed Project are furnished below :

Meeting National as well as Regional Demand

The proposed project will improve supply position of the petroleum products in Uttar Pradesh which is vital for economic growth as well as improving the quality of life. The improved petroleum supply will have strong logistical support for delivering the products to customers without interruption. The project will also provide indirect employment to unskilled, semiskilled and skilled categories.

Physical Infrastructure

State Highway runs in close proximity of the proposed plant area. Establishment of large developmental projects of this category will improve the availability of the physical infrastructures like approach roads, drainage, communication and transportation facilities etc.

Social Infrastructure

Implementation of the project will indirectly boost up the social infrastructure of the surrounding, like local education, medical and communication of the whole surrounding area.

Employment Potential

The project implementation will indeed generate some indirect employment potential. In addition to this, additional jobs will be generated by local business in the supply of goods and services.

Thus, the proposed project has ushered in the social and economic up-liftmen of the persons living in the vicinity of the Project i.e. of society at large.

Annexure-I (Material Safety Data sheet for MS, HSD, Ethanol & SKO)

Annexure-I

MATERIAL SAFETY DATA SHEET

MOTOR SPIRIT

1 - Chemical Identity

Chemical Name :	Motor Spirit
Chemical Formula :	Complex mixture of hydrocarbons
Synonyms :	Gasoline, Petrol
General Use :	Motor Fuel
C A S No. :	Not Listed
U N No. :	1203
Regulated Identification:	Shipping Name: Gasoline Hazchem Code : 3 Y E

2 – Hazards Identification

Primary Entry Routes :	Ingestion, inhalation, skin and eyes
Acute Effects :	Inhalation: can cause dizziness, headache and nausea, depresses central nervous system and has an anesthetic effect. Breathing of liquid droplets may lead to chemical pneumonia. Ingestion : can lead to nausea, diarrhea and affect central nervous system.
Skin irritant :	Prolonged contact can result in skin drying and dermatitis.
Eye irritant: disturbances.	Contact with eye causes pain and slight transient corneal ephithelial
Carcinogenicity :	Benzene component is listed as carcinogenic
Chronic Effects :	No data available

3 – First Aid Measures

Eyes :	Flush with water for 15 min. Get medical attention.
Skin :	Wash with warm water & soap.
Inhalation :	Remove to fresh air. Consult a physician if irritation persists.
Ingestion :	Do not induce vomiting. Do not give liquids. Get medical help at once.

4 – Fire Fighting Measures

Flash Point :	< - 10 °C
Auto ignition Temperature :	250 °C to 280 °C (highly variable)
LEL :	1.4 %
UEL :	7.6 %
Flammability Classification :	Flammable
Extinguishing Media :	Foam, Dry Chemical Powder, CO2
Unusual Fire or Explosion Hazards :	Heat produces vapours and can cause violent rupture of containers. Vapours may travel long distance and can flash back.
Hazardous Combustion Products :	Carbon di oxide, carbon mono oxide, benzene
Fire-Fighting Instructions :	Small fires can be extinguished by hand held extinguishers. Major fires may require withdrawal and allowing the tank to burn. Fire fighters should wear self breathing apparatus while fighting fire

5 – Accidental Release Measures

Small Spills :	Shut off leaks without risk. Absorb on sand or earth.
Containment :	Prevent spillage from entering drains or water sources
Cleanup :	After spills wash area with soap and water preventing runoff from entering drains.

6 – Handling and Storage

Handling Precautions :	Do not use/store near heat/open flame. Avoid contact with liquid or vapours. Use gumboots, gloves while handling the product. Do not inhale. Stay upwind while handling the product. Product should never be used to remove oil or grease from skin. It should not be siphoned by mouth. Tanks and dispensing equipments should be grounded to reduce static charge fires. It should be stored in closed containers away from heat & source of ignition. Avoid contact with skin and eyes. Wash thoroughly after handling. Use flameproof electrical equipment only. Earth all equipment and pipelines properly. Store in an enclosed vessel in a cool, well ventilated area away from heat & flame. Gas free the tank before entering / cleaning. Change oil soaked clothings promptly. Storage Requirements : Do not use/store near heat/open flame/water/acids

7 – Exposure Controls / Personal Protection

Engineering Controls :	Provide proper ventilation for environment to be below Time Waited Average (TWA)
Respiratory Protection :	Use respiratory protection if ventilation is improper
Protective Clothing :	Use face shield, PVC gloves, safety boots while handling.
Equipment :	Contaminated clothing to be immediately removed

8 – Protection Physical and Chemical Properties

Physical State :	Liquid at 15oC & 1 atm
Appearance and Odour :	Water white liquid, dyed orange or red for detection. Characteristic hydrocarbon like odour
Vapor Pressure :	5.0 to 8.7 psi at 38 °C (RVP)
Specific Gravity :	0.71 to 0.77 gm / cc
Water Solubility :	Insoluble
Boiling Point :	35 °C to 215 °C
Freezing Point :	-40oC (Approx.)
Vapour Density :	3 to 4 (Air = 1)

9 – Stability and Reactivity

Stability :	Chemically stable.
Chemical Incompatibilities :	Incompatible with oxidizing agents & chlorine. Reacts vigorously with oxidising materials.
Conditions to Avoid :	Can undergo auto-oxidation in air & generate heat which can build up in a confined space to cause spontaneous combustion
Hazardous Decomposition Products :	Carbon di oxide, carbon mono oxide

MATERIAL SAFETY DATA SHEET

HIGH SPEED DIESEL

1 – Chemical Identity

Chemical Name :	High Speed Diesel
Chemical Formula :	Complex mixture of hydrocarbons
Synonyms :	Diesel, Gas oil, High Flash HSD (HF HSD)
General Use :	Motor Fuel and in Defence aircrafts
C A S No. :	Not listed
U N No. :	1202
Regulated Identification:	Shipping Name:High Speed Diesel, High Flash Diesel
Hazchem Code :	3 Z

2 – Hazards Identification

Primary Entry Routes :	Ingestion, inhalation, skin and eyes
Acute Effects :	Inhalation: can cause dizziness, headache and nausea, depresses central nervous system and has an anesthetic effect. Breathing of liquid droplets may lead to chemical pneumonia. Ingestion: can lead to nausea, diarrhea and affect central nervous system.
Skin irritant :	Prolonged contact can result in skin drying and dermatitis.
Eye irritant :	
Carcinogenicity :	Not listed as carcinogenic

3 – First Aid Measures

Eyes :	Flush with water for 15 min. Get medical attention.
Skin :	Wash with warm water & soap.
Inhalation :	Remove to fresh air. Consult a physician if irritation persists.
Ingestion :	Do not induce vomiting. Do not give liquids. Get medical help at once.

4 – Fire Fighting Measures

Flash Point :	> 35 °C and > 66°C for HF HSD
Auto ignition Temperature :	230 °C to 250 °C (highly variable)
LEL :	0.5 %
UEL :	5.0 %
Flammability Classification :	Flammable
Extinguishing Media :	Foam, Dry Chemical Powder, CO2
Unusual Fire or Explosion Hazards :	Heat produces vapours and can cause violent rupture of containers.
Hazardous Combustion Products :	Carbon di oxide, carbon mono oxide, benzene
Fire-Fighting Instructions :	Small fires can be extinguished by hand held extinguishers. Major fires may require withdrawal and allowing the tank to burn. Fire fighters should wear self breathing apparatus while fighting fire

5 – Accidental Release Measures

Small Spills :	Shut off leaks without risk. Absorb on sand or earth.

Containment :	Prevent spillage from entering drains or water sources
Cleanup :	After spills wash area with soap and water preventing runoff from entering drains.

6 – Handling and Storage

Handling Precautions :	Do not use/store near heat/open flame. Use gumboots, gloves while handling the product. Do not inhale. Stay upwind while handling the product. Product should never be used to remove oil or grease from skin. It should not be siphoned by mouth. It should be stored in dry, cool, well ventilated area in closed containers away from heat & source of ignition. Avoid contact with skin and eyes. Wash thoroughly after handling. Keep away from oxidising agents. Storage Requirements : Do not use/store near heat/open flame/water/acids

7 – Exposure Controls / Personal Protection

Engineering Controls :	Provide proper ventilation for environment to be below Time Waited Average (TWA)
Respiratory Protection :	Use respiratory protection if ventilation is improper
Protective Clothing :	Use face shield, PVC gloves, safety boots while handling.
Equipment :	Contaminated clothing to be immediately removed

8 – Protection Physical and Chemical Properties

Physical State :	Liquid @ 15oC & 1 atm
Appearance and Odour :	Straw yellow or dark yellow liquid. Characteristic hydrocarbon like odour
Vapor Pressure :	0.5 mm of Hg at 38 °C (RVP)
Specific Gravity :	0.82 to 0.86 gm / cc
Water Solubility :	Insoluble
Boiling Point :	110 °C to 375 °C
Freezing Point :	0 - 18°C
Vapour Density :	3 to 5 (Air = 1)
Sulphur content :	150 ppm to 2500 ppm and < 0.2% for HF HSD

9– Stability and Reactivity

Stability :	Chemically stable.
Chemical Incompatibilities :	Incompatible with oxidizing agents & chlorine. Reacts vigorously with oxidising materials.
Hazardous Decomposition Products :	Carbon di oxide, carbon mono oxide

MATERIAL SAFETY DATA SHEET

Ethanol

1: IDENTIFICATION OF SUBSTANCE/MIXTURE

Other Names:	Ethyl Alcohol, Absolute alcohol, Industrial Ethanol, Ethanol 96%
Recommended Use:	Fuel blending, General solvent

2: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear colourless liquid.
Odour:	Characteristic alcohol odour detectable at 80 - 100 ppm
Boiling Point:	78°C
Melting Point:	117°C
Vapour pressure:	44 mm Hg @ 20°C
Specific gravity:	0.79-0.81 (Water =1)
Solubility in water:	Complete
Evaporation Rate:	253 (n-Butyl Acetate = 100)
Vapour Density:	1.59
Per cent volatiles:	100%
Molecular weight:	46.08
Flash Point:	13°C
Autoignition Temperature:	392°C
Lower Explosive Limit (LEL):	3.5%
Upper Explosive Limit (UEL):	19%
Hazchem code:	2[Y]E

3: FIRST AID MEASURES

Swallowed:	If a minor amount has been accidentally swallowed, then, if conscious, give large amounts of water. Do not attempt to induce vomiting or give anything by mouth to an unconscious person. Seek medical attention.
Eye:	Flush eye with running water for a minimum of 15 minutes. Seek medical attention promptly if irritation persists or any loss of vision occurs.
Skin:	Immediately remove contaminated clothing. Wash skin with water.
Inhaled:	If there are signs of drunkenness (intoxication or inebriation) or respiratory irritation, dizziness, nausea or headache occurs, seek immediate medical attention. Treat unconsciousness by placing the person in the coma position. Apply artificial respiration if breathing stops.

4: FIRE FIGHTING MEASURES

Specific Hazards:	Highly flammable liquid. May form flammable mixtures with air. Burns with a colourless flame. The vapour is heavier than air and may travel along the ground; distant ignition and flash back are possible. Run off to sewers and drains may cause explosions. All vessels must be earthed to avoid generation of static charges when agitating or transferring solvents. Avoid all ignition sources. Intrinsically safe equipment is necessary in areas where this chemical is being used.
Extinguishing Media:	Use water fog (or if unavailable fine water spray), dry chemical, carbon dioxide or alcohol stable foam.
Fire Fighting Procedures:	Use water to cool exposed containers. Heating can cause expansion or decomposition leading to violent rupture of containers. If safe to do so, remove containers from path of fire. Spills and leaks may be

	washed away with copious volumes of water, fog or spray. For major fires or where the atmosphere is either oxygen deficient or contains unacceptable levels of combustion products, firefighters must wear self-contained breathing apparatus with full face-mask and protective clothing.

5: ACCIDENTAL SPILL AND RELEASE MEASURES

Containment Procedures:	In the event of a spillage eliminate all sources of ignition and take measures to prevent static discharge – no smoking. Stop and contain the spill for salvage or absorb in inert absorbent material (e.g. soil, sand, vermiculite) for disposal by an approved method. Prevent run-off into drains and waterways. Spills can be converted to non-flammable mixtures by dilution with water.
Disposal:	Stop and contain the spill for salvage or absorb in inert absorbent material (e.g. soil, sand, vermiculite) for disposal by an approved method.

6: HANDLING AND STORAGE

Handling:	Use in well ventilated areas away from all ignition sources. Intrinsically safe equipment only must be used in area where this chemical is being used. Containers must be earthed to avoid generation of static charges when agitating or transferring product.
Storage:	Store in tightly closed containers in cool, dry, isolated and well ventilated areas away from heat, sources of ignition and incompatibles. Store away from oxidizing agents.

7: PERSONAL PROTECTION

Personal Hygiene:	Protective clothing (gloves, coveralls, boots, etc.) should be worn to prevent skin contact.
Eye Protection:	Avoid eye contact by wearing chemical goggles with side shields or face shield whenever exposed to vapour or mist or if there is a risk of splashing liquid in the eyes.
Skin Protection:	Avoid skin contact by the use of approved chemical resistant gloves and aprons – PVC or Neoprene.
Respiratory Protection:	None should be needed under normal circumstances. In high vapour concentrations, or in suspected oxygen deficient atmospheres, such as empty vessels or confined spaces, use air supplied hood.

8: STABILITY AND REACTIVITY

Chemical Stability:	Stable
Hazardous Polymerisation:	Will not occur
Incompatible Materials:	Will react with strong oxidizing agents
Conditions to avoid:	Heat, sparks, flame and build-up of static electricity.
Hazardous Decomposition products:	Burning can produce carbon monoxide and/or carbon dioxide

MATERIAL SAFETY DATA SHEET

SUPERIOR KEROSENE OIL

1 – Chemical Identity

Chemical Name :	Superior Kerosene
Chemical Formula :	Complex mixture of hydrocarbons
Synonyms :	Superior Kerosene, Kerosine,
General Use :	Fuel, LAB feed stock, solvent
CAS No.	8008 – 20 – 6
UN No.	1223
Regulated Identification:	Shipping Name: Superior Kerosene Oil, Hazchem Code: 3 Y Kerosene

2 – Hazards Identification

Primary Entry Routes :	Ingestion, inhalation, skin and eyes
Acute Effects :	Inhalation: can cause dizziness, headache and nausea, depresses central nervous system and has an anesthetic effect. Continued inhalation can produce visual and auditory hallucinations.
Ingestion:	Human systemic effects by ingestion, somnolence, hallucinations & distortion perceptions, coughing, nausea or vomiting & fever. Aspiration of vomiting can cause serious pneumonitis particularly in young children.
Skin irritant :	Prolonged contact can result in skin drying and dermatitis.
Eye irritant :	
Carcinogenicity :	Not listed as carcinogenic
Chronic Effects :	No data available

3 – First Aid Measures

Eyes :	Flush with water for 15 min. Get medical attention.
Skin :	Wash with warm water & soap.
Inhalation :	Remove to fresh air. Consult a physician if irritation persists.
Ingestion :	Paraffin olive oil or some other vegetable oil may be given orally to retard absorption of kerosene. Gastric dosage and induction of vomiting not advisable because of the possibility of the development of chemical pneumonia from aspiration of kerosene. Get medical help at once.

4 – Fire Fighting Measures

Flash Point :	> 35 °C
Auto ignition Temperature :	210 °C
LEL :	0.8 %
UEL :	5 %
Flammability Classification :	Flammable
Extinguishing Media :	Foam, Dry Chemical Powder, CO2
Unusual Fire or Explosion Hazards :	Heat produces vapours and can cause violent rupture of containers

Hazardous Combustion Products :	Carbon di oxide, carbon mono oxide
Fire-Fighting Instructions :	Small fires can be extinguished by hand held extinguishers. Major fires may require withdrawal and allowing the tank to burn. Fire fighters should wear self breathing apparatus while fighting fire

5 – Accidental Release Measures

Small Spills :	Shut off leaks without risk. Absorb on sand or earth.
Containment :	Prevent spillage from entering drains or water sources
Cleanup :	After spills wash area with soap and water preventing runoff from entering drains.

6 – Handling and Storage

Handling Precautions :	Do not use/store near heat/open flame. Avoid contact with liquid or vapours. Use gumboots, gloves while handling the product. Do not inhale. Stay upwind while handling the product. Kerosene should never be used to remove oil or grease from skin. It should not be shiphoned by mouth It should be stored in closed containers away from heat & source of ignition. Avoid contact with skin and eyes. Wash thoroughly after handling
Storage Requirements :	Do not use/store near heat/open flame/water/acids

7 – Exposure Controls / Personal Protection

Engineering Controls :	Provide proper ventilation for environment to be below Time Waited Average (TWA)
Respiratory Protection :	Use respiratory protection if ventilation is improper
Protective Clothing :	Use face shield, PVC gloves, safety boots while handling.
Equipment :	Contaminated clothing to be immediately removed

8 – Protection Physical and Chemical Properties

Physical State :	Liquid @ 15oC & 1 atm
Appearance and Odor :	Water white liquid may be dyed blue for detection. Characteristic Hydrocarbon like odour
Vapor Pressure :	< 1 psi at 38 °C
Specific Gravity :	> 0.75
Water Solubility :	Insoluble
Boiling Point :	135 °C to 300 °C
Freezing Point :	< - 30 °C
Vapour Density :	4.5 (Air = 1)

9 – Stability and Reactivity

Stability :	Chemically stable.
Chemical Incompatibilities :	Incompatible with oxidizing agents & chlorine. Reacts vigorously with oxidising materials.
Conditions to Avoid :	Can undergo auto-oxidation in air & generate heat which can build up in a confined space to cause spontaneous combustion
Hazardous Decomposition Products :	Carbon di oxide, carbon mono oxide