PRE-FEASIBILITY REPORT

FOR

PROPOSED AUGMENTATION IN LPG BULK STORAGE CAPACITY AT LPG BOTTLING PLANT AT, UNA, HIMACHAL PRADESH

AT

DIST: UNA, HIMACHAL PRADESH

PREPARED BY

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1. Executive Summary

Indian Oil Corporation Ltd. (IOCL) is a premier public sector company in the Oil & Gas Sector and is engaged in the business of refining and retailing of petroleum products including LPG in the country. It is the leading Indian corporate in the Fortune 'Global 500' listing, ranked at the 161st position in the year 2016. IOCL is having about 91 LPG bottling plants which serve every corner of the country. Indane (the trade name of LPG of IOCL) is supplied to the consumers through a network of about 9144 distributors to 9.88 Crores of Household through 3270. The growth in demand of LPG for domestic purpose is increasing at a rapid pace.

This report is to seek Environmental Clearance for augmentation of 2X600MT mounded storage bullets for storage of LPG to meet the 8/9 days coverage at Una LPG Bottling Plant.

The gas leak detection, fire prevention and control system at Una LPG Bottling Plant are latest and comply with the OISD (Oil Industry Safety Directorate) norms. All LPG storage vessels, cylinder storage/ filling/ repair sheds, LPG Pump House and TLD are fully covered by medium velocity water spray system. This Bottling Plant will also cater to the non-domestic LPG demand, Bulk LPG and Auto LPG demand of Una and surrounding districts. The augmentation at the Bottling Plant is estimated to cost 21.70 Crores.

LPG is a mixture of commercial butane and commercial propane having both saturated and unsaturated hydrocarbons. LPG marketed in India is governed by Indian Standard Code IS-4576. LPG is in vapor form at ambient temperature but is normally maintained in liquid state by application of moderate pressure or reduction in temperature. The power supply to the terminal is from Himachal Pradesh State Electricity Board and during emergency DG sets are being used for emergency purpose only. The water required for the terminal operation such as fire water, domestic water are being sourced from existing tube wells on-site. There is no additional requirement of domestic as well as fire water for the proposed augmentation.

No significant emissions are anticipated from the proposed project activities which are used only during emergencies. Emissions from the DG sets are vented out through exhaust as per statutory norms and are being monitored. Fugitive emissions from project activity are envisaged and adequate control measures are already in place. Solid waste viz. Hazardous solid waste & non hazardous solid waste generated in terminal are being collected, segregated and disposed of through authorized agency as per Hazardous waste rule. The project has adequate safety & fire fighting systems in place to control any toward incidents. These systems are in line with the requirements of OISD.

The project will not require additional manpower during operation phase for the proposed augmentation of the storage capacity. Local manpower will be preferred during construction phase. The proposed project will be completed in approximately 18 months from the date of approval, environmental & other statutory clearances, whichever is later. The total cost of the proposed project is around 21.70 Crores.

2. Introduction

M/s Indian Oil Corporation Ltd has decided to augment storage capacity for existing LPG Bottling Facility (Indane Bottling Plant) at Mehatpur, District: Una, Himachal Pradesh.

LPG is received by Road Tankers from Jalandhar BP and Loni BP stored in mounded bullets of capacity 3 x 300MT (900MT). LPG is pumped from bullets to filling shed where cylinders are filled prior to dispatch through road.

The current proposal to augment the storage capacity with additional 2x600 (1200 MT) is being submitted to Ministry of Environment, Forests & Climate Change for issuance of Environmental Clearance for the bulk LPG storage (2100MT) and the LPG throughput of 60 TMTPA.

There will be no chemical process involved and the operation carried out will be receipt of LPG in Bulk form by road tankers, storage in mounded bullets and filling of LPG into cylinders using carousel and associated systems. The cylinders filled will be checked for quality and then dispatched. In the proposed augmentation, the storage will be pressurized form in mounded storage similar to existing bullets. There are 3x300 MT existing mounded bullets and additional 2x600 are proposed with a total capacity of 2100 MT. The system of mounded storage has been recognized as one of the safest form of storage of LPG.

Nature of Project:

Una LPG Bottling Plant shall operate strictly as a storage & packing facility for LPG. No by-products /additional products are generated / manufactured during the operations. Hence, the present proposal is classified under Schedule 6(b) & Category 'A' according to EIA Notification 2006 & subsequent amendments.

3. Site Information

Below are the Salient Features of the Project Site:

- **Infrastructure**

The following infrastructure already exists at the Una LPG BP such as:

- Rail/ road accessibility;
- Availability of water and proximity to source;
- Availability of land;
- No populated city in vicinity;
- Power evacuation plan; and
- Environmental consideration.

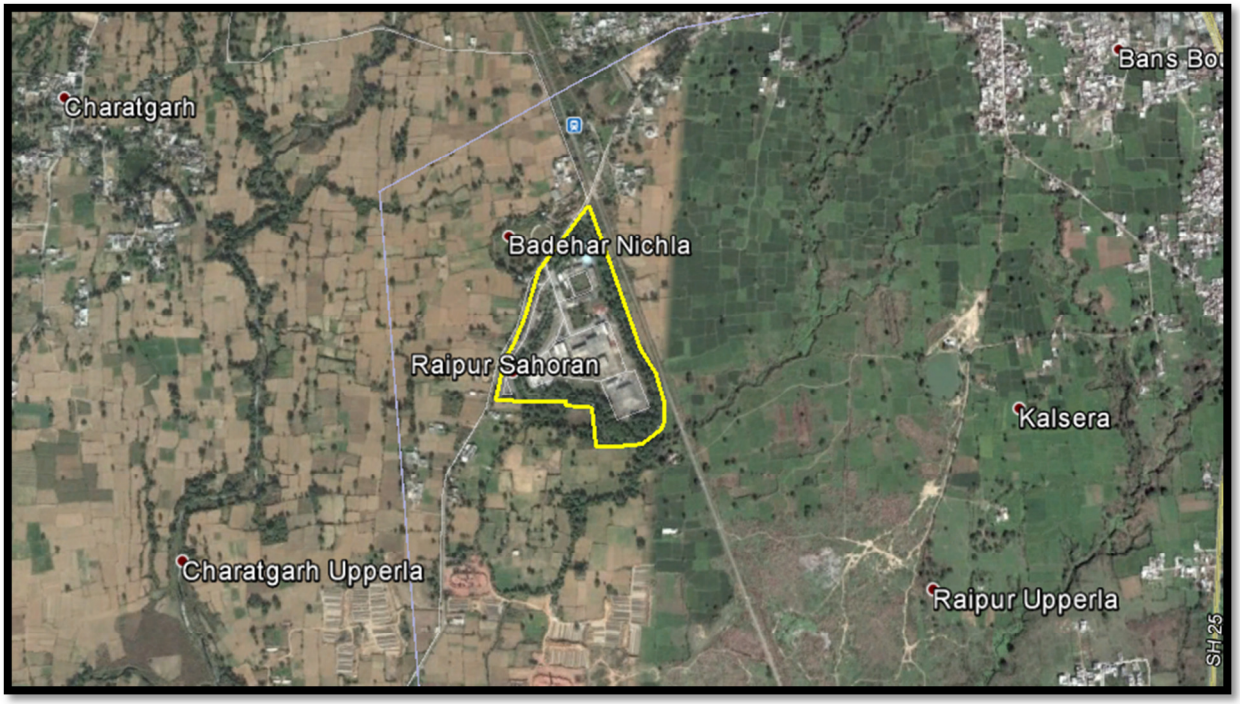

Figure 1: Aerial Image of Project Site

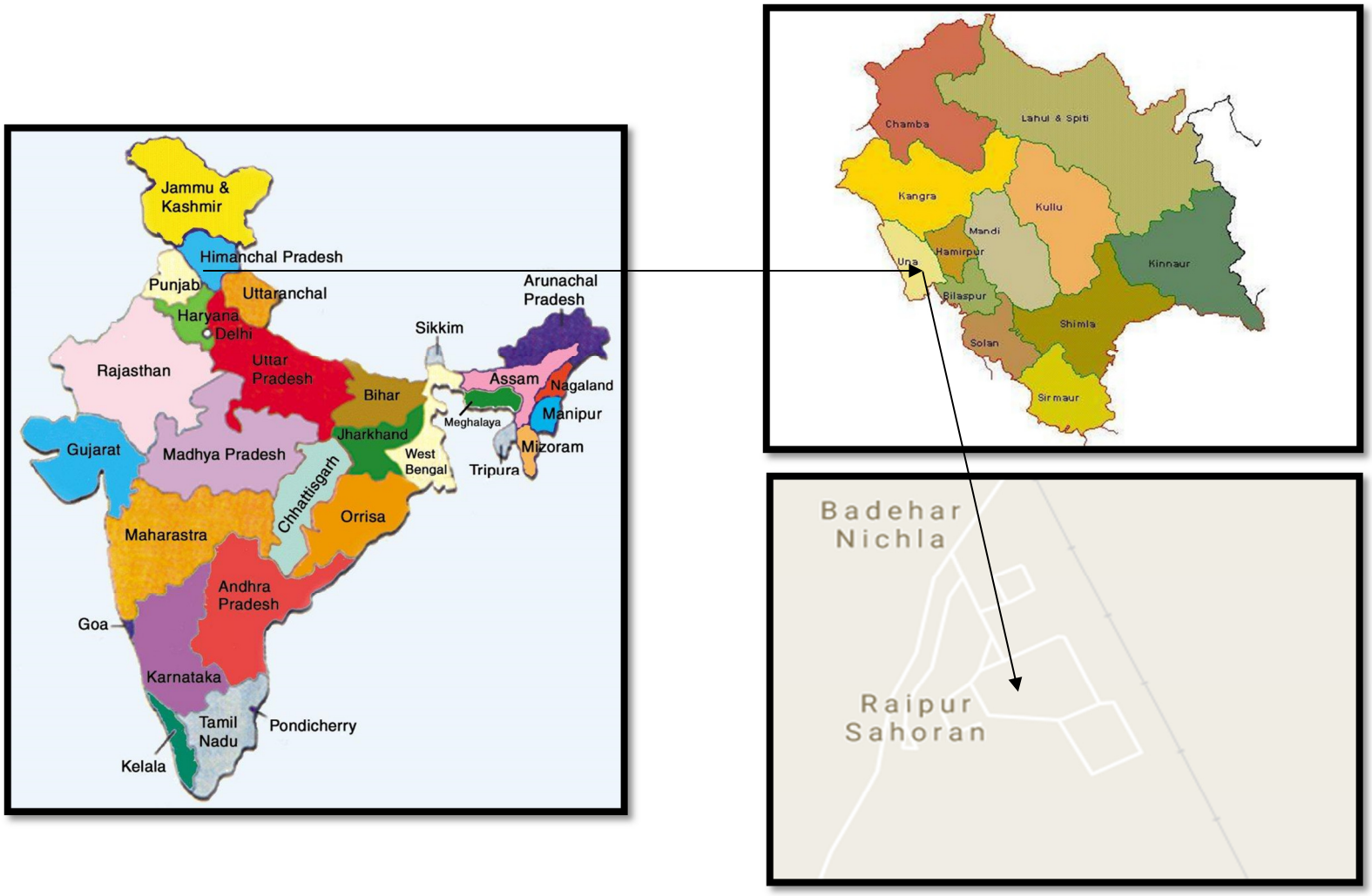

Figure 2: Location Map

- **Connectivity**

The project site is approximately 2.2 km from NH-503 and abutting SH-PWD Pump House Road. The nearest railway station is Raimehatpur Railway station at approximately 0.4 km. The nearest airport is Chandigarh Airport (118 km).

Figure 3: Connectivity Map

- **Environmental Setting**

The Environmental Setting in 10 km radius of project site is presented in **Table 1**.

TABLE 1: ENVIRONMENTAL SETTING

Sr. No.	Particulars	Details
1	Plant location	Indane Bottling Plant Indian Oil Corporation Limited Raipur Sahoran, Mehatpur, Una Himachal Pradesh 174315
2	Site Coordinates	Latitude : 31°23'43.72"N Longitude : 76°19'40.43"E
3	Present land use at the site	Industrial (Bottling Plant)
4	Nearest highway	SH-Pump House Rd : Abutting NH-503 : 2.2 km

Sr. No.	Particulars	Details
5	Nearest railway station	Raimehatpur Railway Station, (0.3 km)
6	Nearest Airport	Chandigarh Airport: 118 km
7	Nearest major water bodies	Satluj Lake – 3.5 km, E
8	Nearest town/City	Nangal : 8 km
9	Nearest village	Badehar Nichla: 0.5 km
10	Archaeologically important places	None in 10 km
11	Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	None in 10 km
12	Reserved / Protected Forests	None in 10 km
13	Defence Installations	None in 10 km
14	Seismicity	The proposed project is located in Seismic Zone IV as per IS: 1893 and all designs will be as per IS Codes

Land Use and Land Ownership

The proposed project will be carried out in the existing premises of Una LPG BP, Dist: Una. Hence, no alternate sites were considered for the project.

4. Project Description

There will be no chemical process involved and the operation carried out will be receipt of LPG in Bulk form in tank trucks from the sources namely IOCL Jalandhar and Loni. The storage shall be in mounded bullets and filling of LPG into cylinders using carousel and associated systems. The cylinders filled will be checked for quality and then dispatched. In the proposed augmentation of storage capacity at LPG bottling plant the storage will be pressurized form in mounded storage. The mounded storage will be in existing 3 bullets of 300 MT each and proposed 2 bullets of 600 MT each with a total capacity of 2100 MT.

The Site Layout is as shown in the **Figure 4** and detailed Site Layout is also provided as **Annexure IV**.

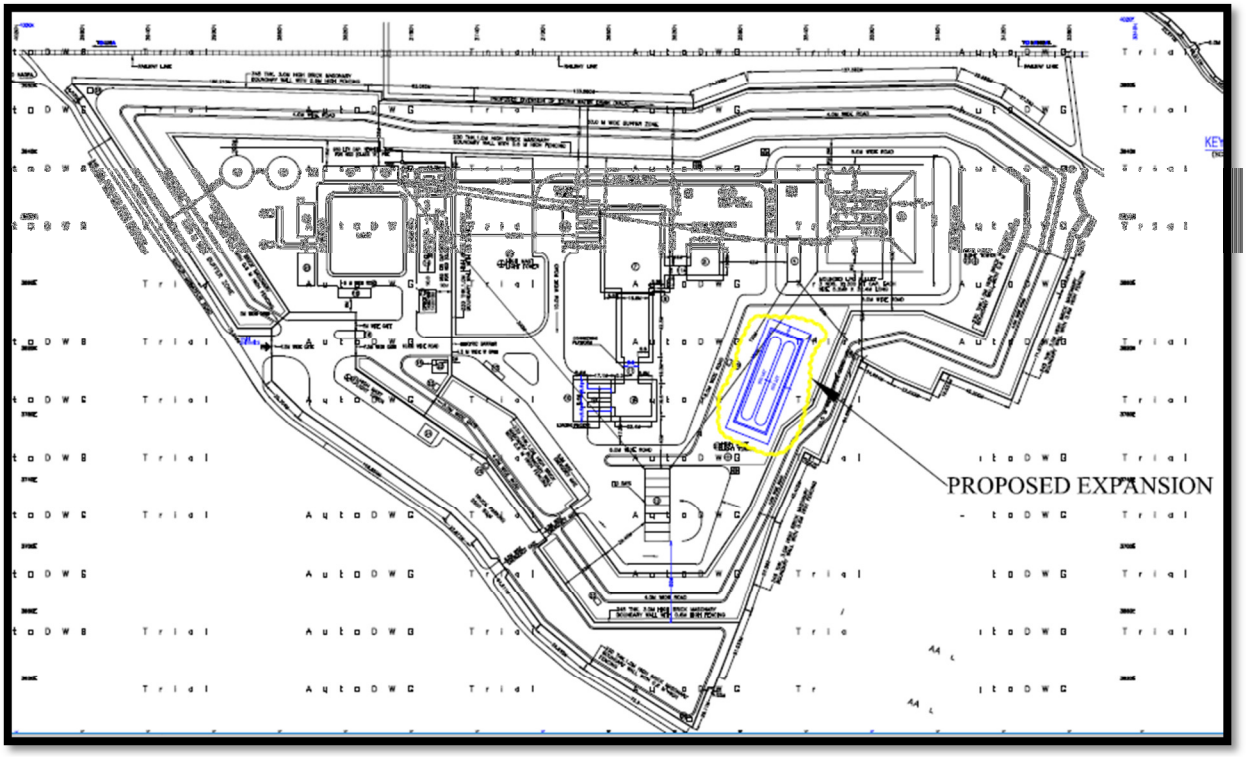

FIGURE 4: PLANT LAYOUT

Process flow diagram is shown in **Figure 5.** The process involved can be divided into 4 Stages:

- Receipt of finished LPG products through bullet trucks.
- Storage of LPG products in storage tanks as per OISD norms.
- Packaging of the LPG into cylinders.
- Dispatch of LPG products through Vehicles (Lorries)

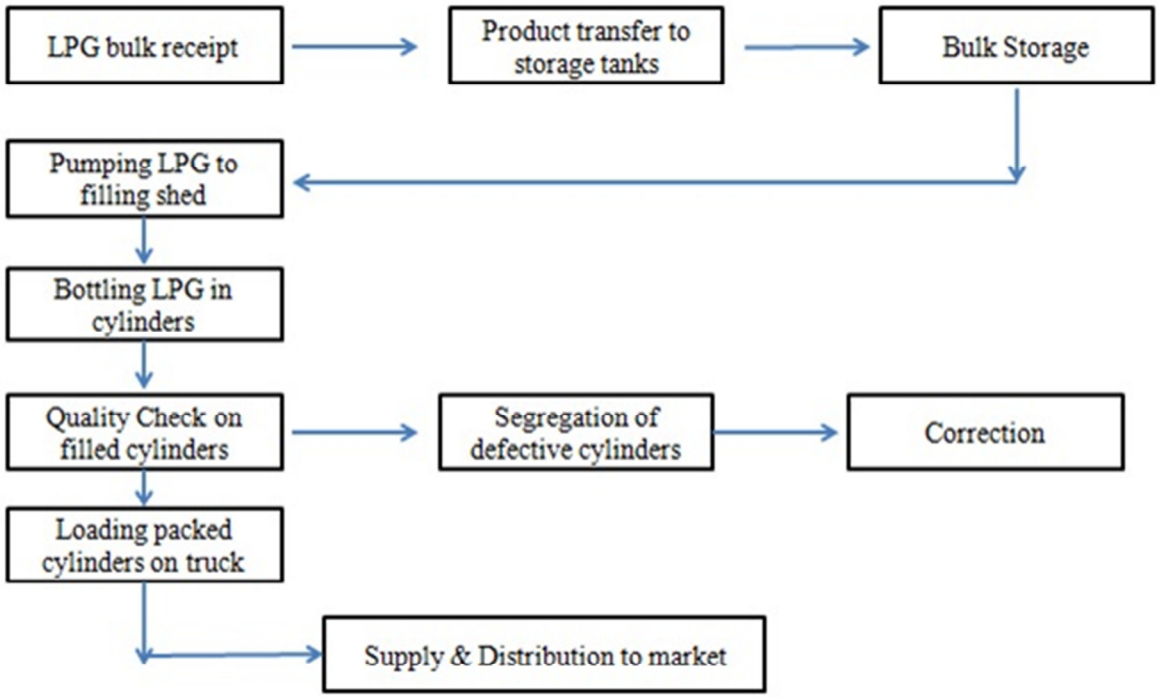

FIGURE 5: PROCESS FLOW CHART

Transport and handling through piping system, handling techniques, specific equipment used and standard operating procedures etc. the details are given below:

Bottling/filling of LPG in packed cylinders
LPG is transferred from storage vessel to carousels, where filling of cylinders takes place with help of LPG pump and also to increase the discharge pressure of LPG pump, pressurization takes place from the other bullet to this delivery bullet with help of LPG compressors.

Dispatching of filled cylinders by stake trucks
The filled cylinders are loaded in stake trucks and are sent to distributors. The movement of cylinders from one place to other place shall be done with help of trolley without rolling.

POWER REQUIREMENT & SOURCE

Power required for the existing operations is 450 KW sourced from Himachal Pradesh State Electricity Board. D.G sets are used of 1x250 kVA, 1x400 kVA and 1x500 kVA. No additional power or DG Set envisaged for the proposed augmentation.

MANPOWER REQUIREMENT

The total manpower requirement will be same as existing for the operation phase.

WATER REQUIREMENT, SOURCE & WASTEWATER GENERATION

Total water requirement including domestic and fire water is being sourced from existing tube wells from site and no additional requirement is envisaged with proposed augmentation of storage capacity.

The existing premises of LPG BP includes and STP of 5 m^3/day capacity along with an ETP.

WASTE GENERATION & DISPOSAL METHODS

No industrial solid waste will be generated during the bottling process. Damaged cylinders will be segregated & stored on site prior to disposal as scrap metal. Hazardous waste generated from D.G set operation will be disposed to HPPCB Authorized Recyclers. The details are provided in **Table 2**.

Table 2: Hazardous Waste Details

S. No.	Type of waste generated	Quantity	Disposal method
1	Solid (damaged cylinders, parts etc.)	---	Sold as scrap metal to dealers
2	Hazardous waste (Used lube oil)	5 LPM	Sold to HPPCB Authorized Recyclers

5. Need for Project Activity

Liquid LPG is a clean fuel and is extensively used as cooking fuel in India. Due to increase in urbanization and improved quality of life the demand for its consumption is increasing. In order to increase its new customer base and to serve the existing customers in a better way M/s Indian Oil Corporation Ltd. are augmenting their existing bottling plants and setting up new plants. With the present LPG Bottling facilities in Himachal Pradesh, IOCL is unable to meet the growing demand of LPG in the State.

As per the installed capacity, plant can bottle around 250 MT per day. Therefore, the existing tankage of 900 MT provides a cover equivalent to bottling of around 4 days. Moreover, with increase in demand in Himachal Pradesh and Punjab, there will be a need to operate the plant in two shifts, which will further reduce the cover to 2 days.

Bulk LPG to the BP is positioned by road tankers which are loaded primarily from Loni BP near Delhi which is at a distance of about 350 kms from Una. In the event of non-availability of product at Loni, either due to high demand at other plants/markets or any technical constraint in JLPL, bulk LPG supplies to Una BP is executed from alternate sources e.g. Jaipur, Dumad, Kandla or Jamngar, which are at a distance higher than Loni. This may result in non-availability of product at Una if sufficient stock at plant is not maintained.

The existing tankage at Una BP is sufficient for bottling of around 4 days. Any disruption in supplies either due to non-availability of product may result in dry out.

In view of the foregoing, IOCL has proposed for provision of augmentation with 2 nos of mounded bullets with 600 MT capacities at Una LPG BP. The augmentation of the storage capacity of Bottling Plant is estimated to cost 21.70 crores.

6. Environment Control Measures

- During construction phase there will be fugitive emissions due to movement of equipment at site, dust emitted during the leveling, grading, earthworks, foundation works and other construction related activities. These impacts will however, be marginal and temporary in nature.
- Periodic LDAR survey shall be carried out to detect & control such measures.
- Existing STP will cater the sewage load. Sewage from the administration building will be routed to the existing STP and the sludge generated from the STP will be dried and used as manure for green belt area. No increment in sewage load and hence the STP Capacity is envisaged with the proposed expansion project.
- The DG sets are acoustically insulated resulting in reduction of noise as per limits prescribed by State Pollution Control Board. The exhaust pipes from DG sets are taken above the building as per State Pollution Control norms.
- No process / manufacturing involved. Hence no solid waste generated.
- All conditions & pre-requisites of water and air consents together with certificate to handle hazardous products issued by State Pollution Control Board shall be strictly adhered to.

7. Fire & Safety Measures

Fire Prevention system-

The gas leak detection, fire prevention and control system at Una LPG Bottling Plant are the latest and comply with the OISD norms. The following systems are provided at Una Bottling Plant:-

GAS MONITORING SYSTEM:

The system consists of gas detecting sensors linked to a computerized processing unit and with alarm panels at control room, filing shed, plant manager's cabin as well as security gate having audio / visual alarms and MIMIC Panel to alert the plant personnel. The sensors are located at sensitive or potential hazard areas in the plant.

AIR/VAPOUR EXTRACTION SYSTEM:

It is a blower with ducts extended to different operating points in filling shed. The blower extracts any leaking LPG vapour from the floor level and cold flares the same to the free atmosphere at the height of 1.5 meter from the highest points of eves of the shed. This system is interlocked with filling system, such that the blower has to be started before the carousel is started for filling operation. A standby blower is also given to meet situations where one of the blowers is out of order. In this way there is no accumulation of LPG at plant floor level and any minor leaks due to operating operation is immediately evacuated and not allowed to reach the lower explosive limit.

REMOTE CONTROL VALVES:

These are pneumatically operated quick shut off valves provided on LPG pipelines with actuating points located both remotely and nearer to operating facilities in plant. When actuated, the valves will close within 25 seconds, stopping the flow of LPG in pipelines. In case of leakage of LPG through flange joint or rupture of pipeline, the remote operated valves are operated restricting the leakage of LPG to the sections between two ROVs only and the LPG in upstream area and the storage bullet area is cut off from the leaking point, thereby preventing major leakage or fire.

HIGH LEVEL ALARM:

This kind of alarm is installed in storage bullets and other vessels. In case of filling of more than 85 % the alarm will be actuated at Pump Housed which is a manned location and REMOTE OPERATED VALVES installed in storage vessel will close the flow of LPG to vessel. The actuation of REMOTE OPERATED valve and alarm is interlocked with the level of LPG liquid in vessel.

EMERGENCY TRIP BUTTONS & MANUAL CALL POINTS:

These emergency push buttons are provided at strategic places in the plant. In case of emergency, when the emergency trip button is actuated action takes place as specified in the clause 11.11 of OISD 144 which involves tripping of electricity to all the operating equipment in the hazardous area of the plant, closure of all remote operated valves on the LPG pipelines and sounding of siren. Operation of manual call point will denote a abnormal situation alerting the plant personnel and will involve the sounding of siren only. These points are provided at strategic locations in the plant.

MEDIUM VELOCITY SPRAY SYSTEM:
This sprinkle system is provided in the operating areas of hazardous areas of plant like al sheds involving filling, storage and operation on cylinders, tank lorry decantation shed, expose flanges of mounded storage, LPG pump house, etc., as per the specifications given in OISD 144.

Adequate storage of fire water in exclusive above ground tanks is maintained as per the fire water calculation. There is a fire water pipeline system which is constantly kept pressurized with a minimum of 7 kg per centimeter square using jockey pumps which start and stop automatically at preset pressures. The fire water pipeline is connected to the MV spray system through deluge walls where an air water balance is maintained. The MV Spray system is equipped with a quartzoid bulb fire detection system. When the temperature reaches 79º C the bulb will be burst releasing the air water balance at the deluge valve and thereby starting the sprinkling of water. This will reduce the pressure in the pipeline which will start the fire water pumps. Thus the entire system of fire protection is automatic. In case of actuation of sprinkler either by bursting of quartzoid bulb, or operating sprinkler manually, all plant machineries will trip electrically, electric siren will be sounded , fire engine will be started ,all remote operated valve in liquid LPG line will be closed and emergency light will be activated (At night). This system is called Interlocked Shut down System.

MUTUAL AID –
IOCL LPG Bottling Plant Una currently has Mutual Aid agreement with neighboring industries.

Fire Fighting Water Calculation

All LPG storage Vessels, Cylinder Storage/ Filling/ Repair Sheds, LPG Pump House, TLD are fully covered by medium velocity water spray system.

The main components of the fire water system are:

- Fire Water Storage
- Fire Water Pumps
- Water Sprinkler/ Deluge system.
- Fire Hydrant/ Monitor distribution piping network.

Flow Rate Design:
MV sprinkler system with automatic heat detection having remote/ local operated deluge valve with spray density of Minimum 10.2 LPM/ Sq.M are provided at all facilities excluding LPG Pump house (i.e., storage Vessels, Cylinder Storage/ Filling/ Repair Sheds, TLD) where as LPG Pump house is provided with 20.4 LPM/ Sq.M.

The fire water system in the plant designed to meet the highest fire water flow requirement of a single largest risk i.e., Filling Shed plus 288 Cu.M/Hr. for operating 2 Nos. Fire water Monitors/ Supplementary Hose requirements.

Fire water Storage
Total two numbers of fire water tanks with capacity of 3700 KL each.

Total fire water storage = 7400 KL.

Fire water pumps capacity

There are five fire water pumps of 410 cum per hour capacity out of which three will be as the main pumps and two fire pumps will be at standby. There are two Jockey pumps (one main and one standby) with a capacity of 10 Cum/Hr which start and stop automatically to maintain the water pressure at minimum 7 kg per sq cm in the fire hydrant line at the farthest end. There are five diesel engine driven water pumps with a capacity of 410 Cum/Hr.

Deluge Valve System

Different Modes of Operating Deluge Valve are

- By Remote operation.
- By Breakage of Quartzoid Bulb.
- By draining water locally.

The actuation of detectors shall initiate the following:

- Opening of deluge valve of the affected zone as well as adjacent zones.
- Audio-visual alarm indicating the affected zone at the fire pump house and manned control panel.
- Fire siren of l km range
- Tripping of main power supply barring the emergency power
- Closure of all Remote Operated Valves in affected facility.
- The water spray from all nozzles within 30 seconds.
- The fire water pump(s) shall start based on their set pressure to supplement/ to maintain the fire water pressure in the ring main.

Fire Alarm System:

- **MAJOR FIRE:** A wailing siren for two minutes. Siren will be sounded 3 times for thirty seconds with an interval of fifteen second in between.
- **DISASTER:** Same type of siren as in case of major fire but the same will be sounded for three times at the interval of 2 minutes.
- **ALL CLEAR (FOR FIRE):** Straight run siren for 2 minutes.

Periodicity of Various Test/Audit:

- Fire Drill Record - Monthly
- Fire Hose testing record –Once in 6 Months
- Pressure gauge Testing Record - Once in 6 Months
- Sprinkler Testing Record – Once in 3 Months
- Explosive meter & meter Pressure Gauge (Dead Weight tester) –Once in a year
- POP Action valve Testing - once in a year
- LPG Hose Testing – Once in 4 Months
- Fire Pump log Book – Daily
- Fire Extinguisher record – Monthly Visual Check
- Fire Extinguisher Servicing Record – Once in 3 Months
- Strainers of Hydrants and LPG Lines- Once in 3 Months

- Hot Work/Cold/Height Work Permits – Immediately
- Daily Safety Audit
- Cap Audit - Monthly
- Safety Committee Meeting - Once in month
- Safety Circle Meeting - Once in month
- SRV Testing – Once in year
- ERD- Once in 6 Months

8. Project Justification, Schedule and Cost

The proposed project shall yield following benefits:

- At present the day's cover of the plant is only 4 days, considering future demand the time of operation may be extended and the day's cover will be reduced to 2 days. If there is any disruption in supply the nominal day's cover should be seven to avoid dry-out situation. Augmentation of storage will increase the day's cover upto 8/9 days.
- Maintain continuity in supply of LPG gas cylinders to the consumers through distributors and quality of services to the consumers.
- Ease in availability of filled LPG cylinders during crisis period.
- Help to overcome the scarcity of bulk LPG due to huge gap between demand and supply.
- Increase safety measures for hazard detection and prevention system.
- Storage of LPG in Mounded Bullet is intrinsically and technologically proven safe device
- Possibility of BLEVE is ruled out in case of storage of LPG in mounded bullets.

The augmentation of the storage capacity at the Bottling Plant is estimated to cost Rs 21.70 crores and the proposed project is estimated to be completed within 18 months after obtaining all the regulatory clearances.