

## EXECUTIVE SUMMARY

### BACKGROUND

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 83<sup>rd</sup> position in the year 2012. IOCL is having about 90 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 5456 distributors (51.8% of the industry). The growth in demand of LPG for domestic purpose is increasing at a rapid pace everywhere in the country including Pune (Maharashtra). To cope-up with the increasing demand, Public Sector Oil Companies are setting up new bottling plants as well as augmenting their existing capacities. Accordingly, IOCL has also initiated the process of setting up new plants as well as augmenting their existing facilities.

IOCL has installed a number of LPG bottling plants in the state of Maharashtra. In Pune, IOCL's LPG Bottling Plant is at Chakan at a distance of about 35 km from Pune. The plant was commissioned in the year 1993 with bottling capacity of 30 TMTPA with an objective to supply LPG in Pune and adjoining districts of Maharashtra. In the year 2012-13, the bottling capacity of the plant increased to 60.87 TMTPA due to installation of a carousel of 24 points filling stations. The main activities of the plant include receipt of bulk LPG, storage, bottling and distribution of the filled cylinders throughout the state of Maharashtra. Presently, an average of about 15 nos. of bulk LPG tankers of 14 MT capacity are unloaded at this plant and about 46 nos. of filled cylinder trucks are dispatched to different part of Maharashtra.

The bulk LPG is received through tank trucks BPCL Uran, ONGC Hazira. The present available storage capacity of 600 MT provides a coverage of about 03 days only which is very low considering the huge and ever growing demand of LPG. Very frequently, the plant becomes dry due to low tankage and other unforeseen circumstances. As a result, the bottling operation becomes standstill.

In order to meet the requirement of LPG as well as to meet the requirement during abnormal situations in the area, IOCL proposes to augment the storage capacity of Chakan bottling plant by installing 02 nos. of Mounded Bullets of 600 MT capacity each. This will enhance the total storage capacity from 600 MT to 1800 MT and the days cover from 03 days to 9 days (on the basis of double shift bottling operation).

As per EIA Notification, published in Gazette of India, Extraordinary Part-II, Section-3, sub-section (ii) of Ministry of Environment & Forest dated 14.09.2006 & subsequent amendments, the proposed project falls in Activity 6(b), Category-B of "List of Projects or Activities Requiring Prior Environmental Clearance". As per the above notification, proposed project will have to obtain environmental clearance from State Environmental Impact Assessment Authority (SEIAA) or State Environmental Appraisal Committee (SEAC).

M/s IOCL has appointed Projects & Development India Limited (PDIL), a Government of India Undertaking, for preparation of EIA/ RA Reports for proposed project in order to seek environmental clearance. PDIL is a QCI-NABET accredited EIA consultancy organisation (Sl. No.: 113, List as per notification dated 05.05.2013 issued by QCI).

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## STRUCTURE OF EIA REPORT

The EIA report has been prepared and reviewed as per “Generic Structure of EIA/EMP/RA Report” required by the MoEF, Govt. of India as per the general condition stipulated in the EIA notification & Terms of Reference (TOR) approved by SEAC, Maharashtra. The salient features of the report have been projected by identifying the environmental and ecological stressors. The impact assessment has been reviewed by making compliance with the threshold limit of the environmental and ecological stressors and other norms available through government or non-government agencies.

## PROJECT PROPOSAL

The project proposal relates to installation of 2 nos. of Mounded Bullets of 600 MT capacity each within the premises of existing bottling plant at Chakan, near Pune.

## PROJECT LOCATION

The LPG bottling plant of IOCL is located at Rase/ Bhoze village, under Khed Tehsil of Pune district in the State of Maharashtra. The bottling plant is spread over an area of 42 acres of land provided by the Government of Maharashtra. Geographically, the plant is located at longitude 73°54'26.36" East and latitude 18°44'32.90" North at an altitude of about 613 m above mean sea level (MSL). The plant is located at a distance of about 40 km from Pune City. Rase & Bhoze villages, the nearest human settlements, are in south direction at a distance of about 1.5 km & 1.3 km from bottling plant. Chakan-Shikrapur Road which links the bottling with Chakan town is located at a distance of about 200m from bottling. Chakan town which is nearest major human settlement is located at a distance of about 5.2 kms in west north-western (WNW) direction. Except Chakan-Shikrapur Road, the bottling plant is surrounded by arable land in all directions. Bhima River, the only major surface water body, is located in southern direction at a distance of about 4.0 km.

## BENEFITS OF PROPOSED PROJECT

The proposed project shall yield following benefits:

- 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.
- Increase the days cover from 03 days to 9 days (as per existing operational practices).
- Help to overcome the scarcity of bulk LPG due to huge gap between demand and supply.
- By adding 2x600 MT Mounded Bullets, risk profile of the existing plant will not be enhanced.
- Increase safety measures for hazard detection and prevention system.
- Discourage deforestation with reduction in use of fire wood and fossil fuels.
- 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.

## OBJECTIVE OF EIA STUDY

The objective of the EIA study is to identify and evaluate the potential impacts (beneficial and adverse), and preparation of impact statement in accordance with existing guidelines of MoEF. The study would provide information on the environmental implications, which could be used for environmental safeguards. The EIA report shall be a document for getting

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environmental clearances from MoEF and other statutory agencies. The EIA report will also present the existing environmental setting vis-à-vis contribution of pollutants and other factors from the proposed facilities.

**SCOPE OF EIA STUDY**

The scope of this EIA study includes detail characterization of pre-project status of environment in an area of 10 Km radius:

- To undertake environmental monitoring so as to establish the baseline environmental status of the environmental components;
- To identify existing pollution loads due to various activities;
- To evaluate and predict the impacts on the various environmental attributes in the study area by using widely accepted environmental impact assessment methodologies.
- To prepare an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality and for environmentally sustainable development.
- To prepare post project monitoring plan to monitor the changes in the environmental quality after the implementation of the project.

**PROJECT DESCRIPTION**

**Existing Storage**

Chakan Bottling Plant has been provided with a total storage capacity of about 600 MT of LPG. The details of facilities are summarized below in Table - E.1.

**Table - E.1**

<b>Facilities</b>	<b>Existing</b>	<b>Proposed</b>
Storage	2 x 150 + 3x100 MT (A/G Bullets)	02 x 600 MT Mounded Bullets
Unloading Bay	4 Nos.	2 Nos.
No. of Carousel	1 x 24 point filling stations	-
LPG Pumps	2 x 36 m <sup>3</sup> /hr	-
LPG Vapour Compressor	3 x 65.77 CFM Type - Reciprocating	1x100 CFM + 1x10 CFM
Air Compressor	3 x 180 CFM	
Air Drying Unit	1 x 550 Nm <sup>3</sup> /hr	
Fire Water Storage	2 x 3768 m <sup>3</sup>	
Jockey Pumps	2 x 20 m <sup>3</sup> /hr	
Fire Water pumps	5 Nos. (4x410 m <sup>3</sup> /hr + 1x613 m <sup>3</sup> /hr)	
Fixed Sprinkler System	At all operating areas	
Hydrants & Monitors	As per OISD-144	
DG Sets	1x 400 +1x 200 KVA	

- Fire protection facilities are designed to cope up with one major fire as per OISD-144.
- Existing water storage capacity and fire pumps are adequate to meet the requirement of the plant post-augmentation.
- Safety distances between facilities are provided as per PESO/ OISD norms. Required number of firewater pumps and jockey pump are provided to take care of the fire hydrants. Four hours pumping capacity are provided as fire water storage in two tanks of 3768 m<sup>3</sup> each.

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- There is a well laid out ring main system around the hazardous area which is provided with fire hydrant points and monitors as per requirements of OISD. In addition, adequate numbers of portable fire extinguishers of dry chemical type are also provided.
- The proposed bullets will also be provided with a fire hydrant system all around and water sprinkler system as required.
- Mock fire drills are conducted at regular intervals and the observations are recorded. Personnel intended to operate the plant are well qualified and well trained. Plant operations are supervised by a responsible Officer. The working personnel are well informed and well trained for fire hazards and fire fighting systems. Bottling Plant security system has been so envisaged to ensure strict compliance of safety requirements and to take up prompt and proper action in case of any emergency.

**PROCESS DESCRIPTION**

LPG is being received from BPCL Uran, ONGC Hazira through 18 MT capacity road tankers and stored in 05 nos. of A/G bullets (2x150 + 3x100MT). The storage vessels are provided with a single liquid inlet/outlet line at bottom, one vapour inlet/outlet line connected with LPG vapour compressor at the top. At present, the no. of days cover for LPG is approximately 03 days only. The capacity augmentation would increase the no. of days cover from 03 to 9 days as per existing operational conditions.

LPG is filled in the cylinders up to 14.2 kg weight with the help of a carousel machine of 12 points filling stations. The Filled cylinders after leak testing, weight testing and fixing safety caps are stacked in the filled cylinder shed near the delivery end as per rules laid down by OISD-144/Gas Cylinder Rules, 1981. Filled cylinders are delivered only to the authorized LPG distributors. Drivers of the trucks carrying LPG are having valid license and are having training in safety & fire fighting procedures.

**DESCRIPTION OF ENVIRONMENT & IDENTIFICATION OF ANTICIPATED IMPACT**

Description of baseline environmental status and the impact on the existing environment after construction and operation of the proposed project have been detailed with respect to the following components of the environment. The existing status of important environmental components and impact of project activities on them is summarized below:

**Land Environment**

The proposed Mounded Bullets shall be installed in an area of 3380 m<sup>2</sup> (52m x 65m) available within the existing licensed premises 42 acres. As the existing plant has been allotted by the Maharashtra Govt. to IOCL for installation of the bottling plant, hence there is no change in existing land use pattern. As per the satellite imagery obtained from Maharashtra Remote Sensing Applications Centre, Nagpur the existing land-use / land cover data of 10 km area around Chakan plant is as under:

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Sl. No.	DESCRIPTION	Area (in Acres)	Percent
1	Agricultural Land-Crop Land-Kharif Crop	2542.71	13.11
2	Agricultural Land-Crop Land-Kharif Crop(Sugarcane)	832.7439	4.29
3	Agricultural Land-Crop Land-More than two crop	79.0736	0.41
4	Agricultural Land-Crop Land-Rabi Crop	2322.787	11.98
5	Agricultural Land-Crop Land-Two crop area	7025.195	36.22
6	Agricultural / Crop Land-Two crop In Notified Forest	138.3788	0.71
7	Agricultural Land-Crop Land-Zaid Crop	39.5368	0.20
8	Built Up-(Rural)	123.5525	0.64
9	Built Up-Mining / Industrial area-	98.842	0.51
10	Forest-Deciduous -Dense/Closed	7.41315	0.04
11	Forest-Deciduous -Open	476.9127	2.46
12	Forest-Scrub Forest	3990.746	20.57
13	Wastelands-Scrub land-Dense scrub	370.6575	1.91
14	Wastelands-Scrub land-Open scrub	956.2964	4.93
15	Waterbodies-River/Stream	363.2444	1.87
16	Waterbodies-Reservoir/Tanks	29.6526	0.15
<b>TOTAL</b>		<b>19397.74</b>	<b>100.00</b>

The land use/ land cover classification as per satellite imagery indicates that the total area covered by agricultural land is about 12980.42 acres which is about 66.9% of total 5-km area, built-up area is about 222.3 acres equivalent to about 1.1% of total area, forest area is about 4475.0 acres equivalent to 23.10% of total area and the area covered by water bodies is about 612.2 acres which is equivalent to about 3.10% of total area.

There is no solid and hazardous waste generation due to the proposed project and consequently any adverse impact on land is not envisaged. Thus, there will be no change in the soil characteristics, land use pattern and landscape due to the construction & operation of the proposed facilities.

- Level of Nitrogen as N ranged between 136.45 and 167.21 Kg/ha.
- Level of Phosphorous as P<sub>2</sub>O<sub>5</sub> ranged between 3.4 & 5.13 Kg/ha.
- Level of Potash as K<sub>2</sub>O ranged between 84.44 & 114.25 Kg/ha.

### Climate & Meteorology

A temporary weather monitoring station was installed for recording hourly wind speed, wind direction, temperature, relative humidity and rainfall measurements on the roof of Administrative Building of the bottling plant. No deviation has been recorded with the secondary data related to meteorology and micro-climatic conditions. Besides this, the proposed project is a non-polluting developmental project and hence, no adverse impact on the existing climate is envisaged.

### Air Environment

#### Existing Ambient Air Quality

The baseline ambient air quality status in the study area is characterized using the following sources of data:

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- Ambient air quality monitoring at four sampling locations within the study area.
- Meteorological data collected during the study period

To evaluate the baseline ambient air quality status, one season data was generated at five locations in and around the bottling plant including residential & rural area for a period of three months from March 2013 to May 2013. During the monitoring period the concentration of air pollutants namely PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, VOCs, Methane & Non-methane Hydrocarbon in ambient were measured.

The highlights of the results are as below:

Pollutants	SA1		SA2		SA3		SA4		SA5	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
PM <sub>10</sub> , µg/m <sup>3</sup>	42	57	27	42	25	37	26	43	32	47
SO <sub>2</sub> , µg/m <sup>3</sup>	11.1	15.4	10.0	13.6	7.2	10.8	10.2	13.9	10.2	14.4
NO <sub>x</sub> , µg/m <sup>3</sup>	14.4	21.6	14.3	19.4	11.2	16.7	14.9	19.9	14.0	18.9
THC, ppm	1.31	1.74	1.33	1.65	1.10	1.36	1.25	1.55	1.31	1.53

From the monitoring results, it may be concluded that the concentration of the air pollutants, as stated above, are well within the limits specified under NAAQS for industrial, rural and residential areas.

**Source of Air Pollution**

Operation of the bottling plant involves only storage and handling of LPG which does not lead to process specific emission of air pollutants into atmosphere. The entire operation of receipt, storage and filling in cylinders is carried out under closed circuit and leak proof system so as to restrict any emission of hydrocarbon vapours into the atmosphere. However, intermittent sources of air pollutants are limited to DG Sets and fire Water pumps which are operated only in case of power failure during working hours and during mock fire drills only (once in a month) respectively. Hence, installation of proposed Mounded Bullets shall not impart any adverse impact on existing air environment.

**NOISE ENVIRONMENT**

Noise monitoring was conducted at 04 locations within the study area, 08 locations inside the bottling plant and 04 locations around boundary walls representing industrial, rural and residential areas. The noise monitoring results reveals that the noise levels vary from 38.7 dB(A) to 54.7 dB(A) during night and day time respectively. The variation in the noise level may be attributed to the movement of vehicles on the SH-55 around the plant. A little increase in the noise level during construction phase has been envisaged. The duration of construction activities shall be 8 to 12 hours with maximum incremental noise level equivalent to 10 dB(A) which will correspond to 3 to 4 dB(A) during day and night. There will be no additional noise generation during operation phase. Hence, impact on the noise quality shall be practically insignificant due to proposed project activities.

**WATER ENVIRONMENT**

To evaluate the existing water quality, 02 nos. of surface water samples and 05 nos. of ground water samples were collected from the sources around the bottling plant and characterized for relevant parameters.

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Summary of the observations are as below:

Parameters	Ground Water (mg/l)		Surface Water (mg/l)	
	Min.	Max.	Min.	Max.
Total Dissolved Solids	210	260	150	180
Alkalinity total as CaCO <sub>3</sub>	78	90	56	64
Hardness total as CaCO <sub>3</sub>	94	138	50	54
Chloride as Cl	22	50	22	34
Iron as Fe	0.1	0.3	0.04	0.06

The characteristics of the samples collected within the study area were found well within the permissible limits of Drinking Water Standards (IS: 10500).

Water Consumption

Existing average water consumption of bottling plant is 7.0 m<sup>3</sup>/day. The project proposal is only for installation of 02 nos. of Mounded Bullets to augment the storage capacity. Hence, the water requirement shall remain same.

Wastewater Generation

The quantity of existing waste water generation under normal operation of the plant is 3.0 m<sup>3</sup>/day. As per existing practice, sanitary waste water (0.5 m<sup>3</sup>) is being disposed off through septic tanks to soak pits and rest of the non-sanitary waste water of 2.5 m<sup>3</sup>/day is discharged into natural drainage system of the area after passing through vapour trap.

**BIOLOGICAL ENVIRONMENT**

The proposed facilities shall be installed in the vacant land available within the existing premises of bottling plant. There is no point and non-point source of emission or discharge of pollutants hence, no adverse impact on the biological environment is envisaged due to the proposed project activities and operation. Moreover, a considerable area of the plant has already been brought under green belt which provides food and habitat for birds and smaller mammalian species. Thus, significant positive impact on fauna is foreseen.

**SOCIO-ECONOMIC ENVIRONMENT**

The development due to proposed project will have temporary impacts on local socio-economic condition of the people residing in the area. The construction of Mounded Bullets would provide temporary employment, which may consist of locals too. This would improve the socio-economic condition of the local population.

The operation of the proposed project would result in positive impacts such as industrial and economic development and generation of indirect employment opportunity.

**ANALAYSIS OF ALTERNATIVE (TECHNOLOGY & SITE)**

IOCL has mastered the art and technology of construction of Mounded Bullets. The Engineering & Project Division of IOCL has well established LPG Bottling Plants. The technology adopted by IOCL for installation of Mounded Bullets for storage of LPG is a fail-safe technology and as such no alternative technology was considered for providing such facilities. Since, the proposed bullets shall be annexed to the existing plant and already vacant space is available hence, alternate site selection is not relevant.

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## ENVIRONMENTAL MONITORING PROGRAMME

A monitoring schedule with respect to Ambient Air Quality, Waste Water Quality, Noise Quality, prepared in consultation with Maharashtra Pollution Control Board, shall be maintained and the monitoring job shall be assigned to a laboratory accredited by MPCB/CPCB.

## ADDITIONAL STUDIES

No additional study is envisaged due to following reasons:

### ***Impact on local infrastructure such as road network etc.***

Presently, about 19 nos. of LPG road tankers of 18 MT capacity are being received in bottling plant daily from different supply sources. Post-augmentation of storage facilities, it is envisaged that the number of bulk LPG tankers may rise upto 25-26. The increase in number of road tankers shall be only for initial few days unless the storage level of LPG of 1800 MT is achieved at Chakan Bottling Plant. Thereafter, there will no increase in traffic load on SH-55. Since, the bottling capacity of the plant shall remain same, there would not be any increase in dispatch of filled cylinders truck from the plant and hence, no impact is envisaged on traffic network.

### ***Compensation package for the people affected by the proposed project.***

The installation of 02 nos. of Mounded Bullets for storage of bulk LPG shall be carried out within the premises of existing Chakan bottling plant. Hence, the proposed project does not involve any issue with respect to displacement & rehabilitation and does not come under purview of RR Policy.

### ***Proposed Plan to handle the socio-economic influence on local community***

For installation of 02 nos. of Mounded Bullets about 40-50 construction workers would be required to carry out construction related jobs. For unskilled jobs, it would be ensured that only local workers are engaged for carrying out construction jobs. This would impart positive impact on the socio-economic condition of the local area. For skilled jobs, only marginal number of workers is likely to be engaged. In view of the size of population residing within 5 km radius, no additional study is required to assess the impact of marginal number of workers coming from outside area.

## ENVIRONMENTAL MANAGEMENT PLAN

### **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 will be temporary in nature and will have no permanent effect on the environment.

Since, the proposed facilities would be installed within IOCL's own land, there will be no change in land-use pattern and soil characteristics of the area.

### **Operation Phase**

As the bullets will be mounded and the operation will be confined in closed, leak proof system, no impact is envisaged on the soil during operation phase.

### **Air Emissions**

There is no continuous source of air pollution from the operation of bottling plant. The sources of air pollution are limited to the DG Sets and the Fire water pumps. These sources of air pollution are intermittent. During operation, when the DG set is operated, emissions of



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SO<sub>2</sub> and NO<sub>x</sub> shall be within the threshold limit. The stack height of the DG set shall be as per prescribed standard.

Waste water Generation

There is no waste water generation from operation of proposed mounded bullets. The existing sources of waste water generation are as follows:

- a) Sanitary waste water from toilets, wash-rooms and canteen.
- b) Non-sanitary waste water from mock drills.

Sanitary waste water from toilets, canteen and wash rooms are treated in septic tanks and disposed off through soak pits. Non-sanitary waste water generated from Mock Fire drill that too once in a month, water bath/washings/service water, etc., shall be passed through vapour trap and discharged into natural drainage system of the area.

**Green-Belt Development**

Trees and plants are well known for trapping particulate matters, attenuation of noise and absorption of gaseous pollutants and also in controlling soil erosion. About 33% of the total area (14 acres) has been brought under green belt development program. Only native species of trees, observed to prosper well in the area, have been planted. However, efforts would be made to develop lawns and gardens in available vacant space within the campus for trapping carbon, sulphur and nitrogen compounds.

**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.

In addition to above management plan, the project will emphasize the following programs to catalyze the green economy of the nation:

**Green Light Program**

It involves installation of energy efficient lighting system which indirectly reduces generation of oxides of Carbon, Nitrogen and Sulphur. However, there shall not be any compromise with respect to required illumination at working places.

**Golden Carrot Program**

This program involves super efficient refrigeration cooling system and installation without the use of CFC. (No CFC)

**Energy Star Program**

Use of energy efficient electrical appliances including computer etc shall be encouraged. IOCL shall pay proper attention to improve the working environment by adopting the principle of Ergonomics in the following line of action:

“In order to maximise the working and skill capability of the workmen, the Environmental Management Plan considers the strategy and goal of Ergonomics. The application of ergonomics will reduce the Muscular Skeletal Disorder (MSD). ***Attempts shall be made to make the Working Environment to fit the Workmen instead of forcing a workman to adopt the Working Environment.***”

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**Compliance of Terms of Reference (TOR)**

The compliance against the points of TOR prescribed by SEAC of Maharashtra State has been complied and presented as Annexure-I

**CONCLUSION**

The overall impact of the proposed project is beneficial as any adverse impacts on air, noise, water, land and ecological environment are insignificant and the socio-economic benefits are predominantly positive. All the relevant safety norms with latest technology have been incorporated in the proposed Mounded Bullets. In view of the above, it may be opined that the proposed project in totality may be considered environmentally safe.