EXECUTIVE SUMMARY

1.0 PROJECT HIGHLIGHTS

- Oil India Ltd. (OIL), a premier National Oil Company, is engaged in the business of exploration, production and transportation of crude oil and natural gas including production of LPG from its fields in Assam and Arunachal Pradesh.
- OIL is proposing to establish Secondary Tank Farm (STF) in 24.447 ha area at Naohalia as a new development project in Tengakhat-Nahorkatiya-Jorajan (TNJ) area in Dibrugarh district in Assam to handle additional crude oil production and to maintain the quality of the same at a total cost of nearly Rs. 120 crores:
- TNJ area lies approximately between $94^0$47' and $95^0$31'East longitude and $27^0$15' and $27^0$29' North latitude.
- Till date TNJ area already has more than 739 wells and many production installations.
- TNJ area belongs to Assam plain, hot sub-humid (moist) to humid eco-region with alluvium derived soils and average annual rainfall of nearly 2300 mm.
- OIL appointed Envirotech Consultants Pvt. Ltd., New Delhi, to carry out an Environmental Impact Assessment (EIA) study in TNJ and adjoining areas so as to prepare an EIA report prior to construction and operation of proposed five new development projects.
- Terms of Reference for EIA study were approved by the Expert Appraisal Committee (EAC) of the Ministry of Environment and Forests (MoEF), Government of India, in its meeting held on 16/7/2008 and communicated by MoEF vide letter No. J-11011/413/2008-IA-II(I) dated 08/08/2008. EAC has exempted the STF development project at Naohalia from public hearing/consultation.
- The STF project was considered by EAC in its meetings on 18/03/2010 and 23/10/2010 for environmental clearance (EC) but considering it as a green field project after a visit to the site by a sub-committee, EAC recommended the holding of PH and submission of final EIA/EMP report after incorporating all issues raised during PH for consideration of EC. Galaxy Envirotech Pvt. Ltd. has been engaged to carry out this work to meet the requirement specified in MoEF letter dated 12/01/2011.
- EIA report is prepared by using primary baseline data collected at the TNJ area during winter season (January 20 to February 22, 2009), secondary data collected from various sources in public domain as well as projected related information provided by OIL.

2.0 PROJECT BENEFITS

- Proposed STF project for storage and handling of increased crude oil production and its transport to downstream users will generate additional revenue for the Assam State in terms of Royalty and Sales Tax as well as for Government of India in terms of Cess. This will also reduce import of oil, save foreign exchange and enhance energy security of the country.

- Handling of increased oil production at STF and its transport to downstream users will assist in the economic and infrastructure development of the area and generate some direct and indirect employment for unskilled and semi-skilled persons.

- CSR schemes initiated by OIL will also result in direct social benefits in the area, such as, improvement in education, medical and community facilities as well as per capita income in the area.

3.0 POLLUTANTS GENERATION, TREATMENT AND DISPOSAL

3.1 Pollution Sources

Pollution potential of STF development project is quite low and will be further minimized by adoption of appropriate control measures by OIL as summarized below:

Air Emissions

- Exhaust gases will be generated from combustion of natural gas from power generators, steam generators, crude oil dispatch pumps, etc.

- Exhaust gases and dust will be generated from movement of vehicles using low sulfur HSD for transport of persons and material.

Liquid Effluents

- Formation water will be produced at Naoholia STF during dehydration of crude oil in electrostatic emulsion treater (EET).

- Domestic waste water will be generated by STF project personnel.

- Waste oil will be generated during oil changes or leakage from equipment, pipeline, storage tanks, etc.

Solid Wastes

- Tank bottom sludge will be generated from crude oil tanks during cleaning once in five years at STF project installation.

Noise

- Noise will be generated from the operation of power generators, pump sets, etc.

3.2 Pollution Control

Air Pollution

- Use of natural gas in engines in most of the applications.
- Use of proper maintenance schedule for ensuring complete combustion of fuel.

Liquid Effluents

- Formation water produced during dehydration in an EET at STF project will be treated in effluent treatment plant to meet limits for re-injection into disposal wells (Oil & Grease = 10 mg/l and TSS = 100 mg/l).
- Domestic waste water will be treated in properly designed septic tank and soak pits.
- Oily water will be treated in oil-water separator to remove oil.

Solid Wastes

- Nearly 225 tonnes of tank bottom sludge generated at STF development project installation after every 5 years during cleaning of crude oil storage tanks will be stored in a secured covered impermeable concrete sludge pit till its proper disposal.
- Other operational and non-operational solid wastes will be segregated.

Noise

- Proper selection of equipment along with good installation procedure and regular maintenance will reduce noise generation.
- Acoustic enclosures and/or barrier walls will be used wherever considered necessary for noise control.
- Plantation of green belt at STF project boundary will ameliorate air and noise pollution.

3.3 Disposal Strategy

Air Emissions

- Stacks of appropriate heights will be used for discharge of exhaust gases from power generators, crude oil dispatch pumps, etc.

Liquid Effluents

- Treated formation water produced during dehydration in an EET at STF project will be re-injected in disposal wells at a depth between 1000 to 1500 m.

- Domestic waste water will be handled in properly designed drainage and sewerage system.
- Used/waste oils will be sold to authorized recycler.

Solid Wastes

- Tank bottom sludge will be sold to authorized recycler.
- Other operational and non-operational waste will be segregated and disposed of as per approved safe procedures.

4.0 BASELINE ENVIRONMENTAL CONDITIONS

Soils

- TNJ area has alluvium derived soils formed by deposition of sedimentary matter.
- Soils are sandy loam, light brown to dark brown in colour with good fertility and suitable for cultivation.

Water Resources and Water Quality

- Rainfall in TNJ area is moderate to heavy spread out over eight months, that is, March to October.
- Sessa river along with its tributaries and small ponds are surface water sources in TNJ area.
- Ground water availability is also good in TNJ area.
- Surface and ground water quality in TNJ area is extremely good and all monitored parameter values are within desirable limits.

Climatology and Meteorology

- Dibrugarh climatological station is the nearest IMD station and is located at a distance of 45 km in western direction from Tinsukia Town close to TNJ area.
- August is the hottest month and January is the coldest month with monthly mean maximum and minimum daily temperatures of nearly 31.4 and 24.6^{0}C, and 22.5 and 8.8^{0}C, respectively.
- Mean relative humidity is highest in July at 8:30 hour and October and November at 17:30 hour. Mean relative humidity is lowest in March.
- Average annual rainfall is 2588.7 mm. July month alone accounts for nearly 19.97% and November to January months together account for only 3.05% of annual rainfall at Dibrugarh.
- The prevailing winds at 8:30 and 17:30 hours generally blow from NE-E sector towards SW-W sector throughout the year.

- Annual average wind speed is 4.1 kmph with March having the highest mean wind speed of 6.2 kmph and November and December having the lowest mean wind speed of 2.3 kmph.

- Meteorological measurements were carried out at Tinsukia during winter season (January 20 to February 22, 2009).

Ambient Air Quality

- Range of 24-hourly monitored values of SPM, RPM, SO_2 and NOx at 8 locations are:

  SPM = 53 to 398 $\mu g/m^3$
  RPM = 10 to 219 $\mu g/m^3$
  SO_2 = 3.9 to 15.5 $\mu g/m^3$
  NOx = 6.7 to 43.4 $\mu g/m^3$

- Range of grab samples of CO, CH_4 and Non-Methane Hydrocarbons including other VOCs at 8 locations are:

  CO = 880 to 1220 $\mu g/m^3$
  CH_4 = 1.8 to 2.9 ppmv
  VOCs including Non-Methane HCs = 0.1 to 0.4 ppmv

- National ambient air quality standards are always met for SO_2 and NOx at all locations and for SPM and RPM only at four locations but not always at other four locations

Ambient Noise Level

- Noise levels at Wilton 22/157 Orr are:

  Lday = 56.0 dB(A) and Lnight 41.0 dB(A)

- Range of 10-hourly day-time (8:00 to 18:00 hour) noise levels at other seven locations is 48.5 to 64.0 dB(A).

Land Use

- TNJ area falls within the area of 220 villages and 9 towns.

- Land use distribution available only for 220 villages with a total of 40,298.74 ha indicates as follows: forest = 0.02% (only in one village), culturable area = 74.88%, culturable waste area = 7.41% and area not available for cultivation = 17.69%.

- Out of total culturable area, irrigated area = 1.94% and unirrigated area = 98.06%

Terrestrial Flora

- TNJ area does not have forest area and area is mostly used for cultivation of paddy and to a limited extent for tea gardens.

- Borajan Wild Life Sanctuary, a small WLS of 421.2 ha area, is located at a distance of 3.8 km from proposed site of STF.

Terrestrial fauna

- Absence of dense vegetation cover over sufficiently large area does not support rich and diverse wild life.

Cropping Pattern

- Winter paddy is the dominant crop in the area. Paddy is also sown to a limited extent in autumn and summer.

Demographic and Socio-Economic

- As per 2001 Census, the TNJ area has a total population of 3,57,506 consisting of a total rural population of 2,13,342 in 220 villages and a total urban population of 1,44,164 in 9 towns.

- Sex ratio is 890, 934 for rural population and 829 for urban population, and literacy rate is 60.24%, 66.86% amongst males and 52.80% amongst females.

- TNJ area has 30.15% main workers, 7.11% marginal workers and 62.74% non-workers.

- Out of main workers 8.22% are cultivators, 1.91% are agricultural labourers, 1.35% are household industrial workers and 88.52% are other workers. Therefore, only 10.13% are engaged in agricultural activities as against 88.52% engaged as other workers mainly in tea gardens and to some extent in E&P activities in TNJ and surrounding area.

- Out of 220 villages, 186 villages have primary schools, 42 villages have some medical facility, all villages have drinking water supply, 42 villages have post office, 82 villages have bus stop, 131 villages can be approached by pucca road and 199 villages have electric supply.

- There is very little industrial or commercial activity in TNJ area except for E&P activities for oil and gas and some tea gardens.

5.0 ENVIRONMENTAL IMPACT ASSESSMENT

Topography and Physiography

- Activities at STF development project will have no impact on topography and physiography of the area.

Soils

- No adverse impact is expected on soils of TNJ area due to construction and operation of STF development project.

Water Resources and Water Quality

- No adverse impact on water resources of the area is expected since water requirement is limited to 20 m^3/d at STF project installation and will be met by installing a tube well at the site.

- No adverse impact on surface or ground water quality is expected since formation water will be produced during dehydration in an EET at STF project will be treated in ETP and treated effluents meeting discharge limits for reinjection will be reinjected in disposal wells at a depth of 1000 to 1500 m in TNJ area. Furthermore, domestic effluents will be handled in well designed drainage and sewerage system at STF project installation.

Climatology and Meteorology

- There will be no impact of construction and operation of STF development project on climatology and meteorology of TNJ area.

Ambient Air Quality

- Use of natural gas operated engines for most of the applications, proper maintenance of engines to ensure complete combustion and use of stacks of adequate heights for discharge of gaseous emissions to atmosphere from emission sources will ensure that there is no perceptible adverse impact on ambient air quality at Naoholia in TNJ area from the operation of STF development project.

- Dust generated due to small number of vehicular movement at STF will settle quickly to cause any dust problem in the area.

Land Use

- Total land requirement of 24.447 ha for STF development project within or close to existing E&P facilities will not result in any adverse impact on land use of the area.

Terrestrial Flora and Fauna

- There is negligible forest land area and construction and operation of STF development project will have no adverse impact on terrestrial flora and fauna.

- Borajan WLS, a very small WLS occupying only 421.2 ha area, is at a distance of nearly 3.8 km from the proposed STF project at Naohalia. OIL will; therefore, take all necessary measures including maintenance of safe distance to ensure that construction and operation of STF do not cause any adverse impact on flora and fauna of the Borajan WLS.

Demographic and Socio-Economic

- The demography of the TNJ area will not be affected due to presence of nearly 30 persons at STF project installation during operation phase.

- Slight beneficial impact on job opportunity in TNJ area may be expected because some local persons may find direct employment as unskilled or semi-skilled workers in new development project installation as well as many more may find indirect employment for providing supporting services.

- Increase in crude oil production will generate additional revenue for the Assam State and Union governments in terms of royalty, taxation and profit petroleum.

6.0 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

- Adequate fire fighting facilities including fire hydrant, water spray, foam pourer, automatic fire detection and alarm systems will be installed as well as adequate personal protective equipments will be available at STF project installation.

- First aid as well as a 24 hour standby vehicle (ambulance) will be available at STF project installation to meet any emergency.

- Safe distances for stationary persons not to cause any discomfort for exposure time upto 60 seconds will be 77.5 m from the boundary of pool fire in tank farm area of STF installation.

- On-site disaster management plan is prepared for quick and efficient emergency handling.

7.0 ENVIRONMENTAL MANAGEMENT PLAN

- Since pollution potential from construction and operation of STF project is fairly small and OIL will take suitable abatement and control measures, elaborate environmental control measures are not required.

- EMP outlines various general mitigation measures for minimizing adverse environmental impacts in the area, if any.

- Specific measures to be adopted by OIL during construction and operation of new development projects are detailed in **Sections 8.2.2** as well as in **Table 8.1 in Chapter 8**.

- Environmental monitoring and occupational health surveillance programme are also summarized in EMP.

- A properly designed green belt will be developed at STF project site for improving the aesthetic environment and ameliorating air and noise pollution.