
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 has committed to supply 6.0 MMSCMD of natural gas to Brahmaputra Cracker and Polymer Limited (BCPL) from its Oil Fields in Assam. Out of this 6.0 MMSCMD of gas, 1.5 MMSCMD of gas will be produced from Baghjan Fields in Tinsukia District. To meet this requirement, number of wells is under drilling in Baghjan Area to produce both non-associated and associated gas. Hence, OIL is proposing to establish following three new development projects in Tinsukia-Dhola (TD) area in Tinsukia and Dibrugarh districts of Assam for transportation of natural gas and to handle additional crude oil production from Baghjan Area at a total cost of Rs. 133.91 crores:
 - 37 km long 400 mm diameter gas transmission pipeline from Baghjan to CGGS & OTP near W/50.
 - 45 km long 200 mm diameter Baghjan-STF crude oil pipeline.
 - 23 km long 100 mm diameter crude oil pipeline from Baghjan to Makum OCS.
- TD area lies approximately between 94⁰50' and 95⁰50' East longitude and 27⁰22' and 27⁰45' North latitude.
- Till date TD area already has 50 drilled oil wells and many production installations.
- TD 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 TD and adjoining areas so as to prepare an EIA report prior to construction and operation of proposed three 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-11011/463/2008-IA-II(I) dated 8/8/2008. EAC has exempted the proposed new development projects from public hearing/consultation.
- These development projects were considered by EAC in its meetings on 18/03/2010 and 23/10/2010 for environmental clearance (EC) but considering

them as green field projects after a visit to the site by a sub-committee, EAC recommended the holding of public hearing (PH) and submission of final EIA/EMP report after incorporating all issues raised during PH for further consideration for EC. Galaxy Envirotech Pvt. Ltd. has been engaged to carry out the work stipulated in MoEF letter dated 12/01/2011.

- EIA report is prepared by using primary baseline data collected at the TD area during winter season (January 20 to February 22, 2009), secondary data collected from various sources in public domain as well as project related information provided by OIL.

2.0 PROJECT BENEFITS

- Eco-friendly pipeline transport of increased crude oil and natural gas production to downstream users will reduce pollution in the area as well as assist in the economic development of this less developed area of Assam due to increase in crude oil and natural gas revenue as well as generating some direct and indirect employment for unskilled and semi-skilled persons. These projects will play a very important role in the commissioning of Brahmaputra Cracker and Polymer Limited (BCPL) being set up at Lapetkata near Dibrugarh town because a portion of the required feedstock in the form of supply of 1.5 MMSCMD of natural gas will be transported through the proposed 400mm NB pipeline. This industrial development in turn will result in improving the quality of roads, and growth of telecommunication and hospitality sectors in the area apart from generating employment opportunities.
- Increased production of crude oil and natural gas for downstream users on commissioning of the proposed three pipeline projects will generate additional revenue both for the Assam State and Central exchequer in terms of Royalty, Cess, Sales Tax etc.. This will also reduce import of oil and gas, save foreign exchange and enhance energy security of the country.
- 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 increase in income of the area.

3.0 POLLUTANTS GENERATION, TREATMENT AND DISPOSAL

3.1 Pollution Sources

Pollution potential of new development projects 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/ low sulfur HSD powered crude oil dispatch pumps, natural gas compressors/boosters.
- There will not be any air emission from pipelines buried underground.

Liquid Effluents

- No liquid effluents are likely to be generated from pipelines buried underground.

Solid Wastes

- Very small quantity of sludge will be recovered from the crude oil lines at the Pig receiving points only during pigging operation.

Noise

- Noise will be generated from the operation of power generators, pump sets, compressors/boosters.

3.2 Pollution Control

Air Pollution

- Use of natural gas for operating crude oil despatch pumps and natural gas compressors/boosters.
- Use of proper maintenance schedule for ensuring complete combustion of fuel.

Liquid Effluents

- Small amount of used/wasted oils will be periodically generated from crude oil despatch pumps and natural gas compressors/boosters.

Solid Wastes

- 50 to 200 tonnes of sludge generated at pig receiving station during each pigging operation, will be stored in a secured covered impermeable concrete sludge pit till its proper disposal.

Noise

- Proper selection of equipment along with good installation procedure and regular maintenance will reduce noise generation from crude oil despatch pumps and natural gas compressor/boosters.
- Acoustic enclosures and/or barrier walls will be used wherever considered necessary for noise control.

3.3 Disposal Strategy

Air Emissions

- Stacks of appropriate heights will be used for discharge of exhaust gases generated from operation of crude oil dispatch pumps and natural gas compressors/boosters.

Liquid Effluents

- Used/waste oils will be sold to approved recycler.

Solid Wastes

- Crude sludge recovered during pigging operation will be sold to approved recycler.

4.0 BASELINE ENVIRONMENTAL CONDITIONS

Soils

- TD 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 TD area is moderate to heavy spread out over eight months, that is, from March to October.
- Dibru and Dongari river along with their tributaries and small ponds are surface water sources in TD area.
- Ground water availability is also good in TD area.
- Surface and ground water quality in TD 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 TD 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 24.6⁰C, and 22.5 and 8.8⁰C, 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, SO₂ and NO_x at 8 locations are:

SPM	=	53 to 398 $\mu\text{g}/\text{m}^3$
RPM	=	41 to 219 $\mu\text{g}/\text{m}^3$
SO ₂	=	4.2 to 15.5 $\mu\text{g}/\text{m}^3$
NO _x	=	7.4 to 43.4 $\mu\text{g}/\text{m}^3$
- Range of grab samples of CO, CH₄ and Non-Methane Hydrocarbons including other VOCs at 8 locations are:

CO	=	710 to 1220 $\mu\text{g}/\text{m}^3$
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 SO₂ and NO_x at all locations and for SPM and RPM respectively at two and one location but not always at other locations

Ambient Noise Level

- Noise levels are:

Baghjan Gaon: L_{day} = 61.0 dB(A) and L_{night} 52.0 dB(A)
Jaygukhowa Gaon: L_{day} = 59.0 dB(A) and L_{night} 48.0 dB(A)
- Range of 8 to 10-hourly day-time noise levels at other six locations is 52.3 to 59.6 dB(A).

Land Use

- TD area falls within the area of 157 villages and 6 towns.

- Land use distribution available only for 156 villages with a total of 26,541.27 ha indicates as follows: forest = Nil, culturable area = 84.07%, culturable waste area = 4.85% and area not available for cultivation = 11.08%.
- Out of total culturable area, irrigated area = 1.75% and unirrigated area = 98.75%

Terrestrial Flora

- TD area does not have forest area and area is mostly used for tea gardens and to a limited extent for cultivation of paddy.
- Bherjan Wild Life Sanctuary, a small WLS of 104.8 ha area only, falls in the 5 km radius study area of Barekuri OCS and part of the Dibru-Saikhowa National park falls in 5 km radius study area of Baghjan OCS.

Terrestrial fauna

- Absence of dense vegetation cover over sufficiently large area does not support rich and diverse wild life.
- Only Bherjan WLS of small size and Dibru-Saikhowa National Park are observed to have some 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 TD area has a total population of 2,48,486 consisting of a total rural population of 1,36,296 in 157 villages and a total urban population of 1,12,190 in 6 towns.
- Sex ratio is 876, 928 for rural population and 817 for urban population, and literacy rate is 57.14%, 64.38% amongst males and 48.88% amongst females.
- TD area has 31.31% main workers, 5.65% marginal workers and 63.04% non-workers.
- Out of total main workers 6.15% are cultivators, 2.17% are agricultural labourers, 1.67% are household industrial workers and 98.01% are other workers. Therefore, only 8.32% are engaged in agricultural activities as against 90.01% engaged as other workers mainly in tea gardens and to some extent in E&P activities in TD and surrounding area.
- Out of 150 inhabited villages, 113 villages have primary schools, 34 villages have some medical facility, all villages have drinking water supply, 19 villages have post office, 64 villages have bus stop, 109 villages can be approached by pucca road and 140 villages have electric supply.
- There is very little industrial or commercial activity in TD area except for E&P activities for oil and gas and some tea gardens.

5.0 ENVIRONMENTAL IMPACT ASSESSMENT

Topography and Physiography

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

Soils

- No adverse impact will be expected on soils of TD area due to construction and operation of new development projects.

Water Resources and Water Quality

- No adverse impact on water resources of the area is expected since there is practically no water requirement.
- No adverse impact on surface or ground water quality is expected since there is no generation of liquid effluents.

Climatology and Meteorology

- There will be no impact of construction and operation of new development projects on climatology and meteorology of TD area.

Ambient Air Quality

- Use of natural gas operated crude oil despatch pumps and natural gas compressors/boosters and their proper maintenance to ensure complete combustion, as well as 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 in TD area from the operation of new development projects.

Land Use

- Total land requirement of 69.61(right of way only) ha for all three new development projects 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 no forest land area and construction and operation of new development projects will have no adverse impact on terrestrial flora and fauna of the area.
- Divisional Forest Officer, Tinsukia Wildlife Division, estimated following distances (if located within 10km from proposed projects) from the analysis of

satellite imagery using the coordinates taken in the field as well as those provided by OIL:

Proposed Project	Aerial Distance from Dibru-Saikhowa National Park	Aerial Distance from Borajan, Bherjan and Padumoni WLSs
Baghjan OCS (Starting point of 3 pipelines)	2.5 km	6.4 km from Bherjan WLS and 9.8 km from Padumoni WLS
STF (End point of 200 mm crude oil pipeline)	_____	3.8 km from Borajan WLS
Makum OCS (End point of 100 mm crude oil pipeline)	_____	7.5 km from Bherjan WLS and 6.6 km from Borajan WLS
W/50 (End point of 400 mm natural gas pipeline pipeline)	_____	2.6 km from Borajan WLS and 9 km from Bherjan WLS

- OIL will, therefore, take all necessary measures including maintenance of safe distances to ensure that construction and operation of the projects do not cause any adverse impact on flora and fauna of the Borajan WLS, Bherjan WLS, Padumoni WLS and Dibru-Saikhowa National Park.
- Probability of crude oil leakage in river Dibru from underground Baghjan-STF crude oil pipeline crossing river Dibru is estimated as only once in 5714 years, but if crude oil leakage does occur from the pipeline, then some localized adverse impact upto a down stream distance of 15 km on aquatic ecology may be felt temporarily from few days to few months.

Demographic and Socio-Economic

- Slight beneficial impact on job opportunity in TD area may be expected because some local persons may find direct employment as unskilled or semi-skilled workers in new development project installations as well as many more may find indirect employment for providing supporting services.
- Increase in crude oil & natural gas 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 each new development project installation.

- First aid as well as a 24 hour standby vehicle (ambulance) will be available at each new development 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.
- On-site disaster management plan is specified for quick and efficient emergency handling.

7.0 ENVIRONMENTAL MANAGEMENT PLAN

- Since pollution potential from construction and operation of new development projects 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 and 8.2.3** as well as in **Table 8.1 in Chapter 8**.
- Environmental monitoring and occupational health surveillance programme are also summarized in EMP.