
Executive Summary

1.0 Introduction

Oil and Natural Gas Corporation Limited (ONGC) is a public sector petroleum company in India. It is a company contributing 77% of India's crude oil and 81 % natural gas production. It is the highest profit-making corporation in India. In order to meet the increasing demand of petroleum product, ONGC has proposed to carry out exploratory drilling in the awarded block CY-ONN-2004/1 in Cauvery Onshore area along the coast in the state of Tamil Nadu to test the occurrence of hydrocarbons in the identified formation.

Oil and Natural Gas Corporation limited (ONGC) being an operator in this block requires to carryout the Environmental Impact Assessment (EIA) study. The purpose of such study is to assess the environmental impacts arising due to the exploratory drilling proposed in the block. To conduct this study, ONGC retained National Environmental Engineering Research Institute (NEERI), Nagpur to carry out EIA study for various environmental components including air, noise, water, land, biological and socio-economic which may be affected and to prepare Environmental Management Plan (EMP) for mitigating the adverse impacts.

2.0 Project Description

Exploratory drilling is undertaken to establish the presence of hydrocarbons indicated by seismic survey and interpretation of data. Exploratory drilling is temporary and short duration activity and includes site preparation, well foundation, rig building, drilling and restoration of the well site. This activity takes approximately 3-4 months under normal conditions. Drilling rig is used for drilling the well and involves rotation of drill bit, attached to a long string of a drill pipe down the well. Drilling mud is pumped through the drill string, through the drill bit, which returns up the annulus between the drill string and bore. Drill mud is used to cool the drill bit while drilling, remove cuttings from the well, control formation pressures, suspend and release cuttings, seal permeable formations, maintain well-bore stability, minimize reservoir damage, cool and lubricate the bit etc. The drill cuttings are separated from the drilling mud in shale shaker and the fluid is re-circulated. If the presence of hydrocarbons is detected during drilling, production testing is normally conducted. The production testing is carried out to ascertain the reserves and economic viability.

3.0 Environment in the Block

The environmental baseline data was collected during the post-monsoon season 2007-2008 and primary data was collected along with the secondary data from various sources in public domain made available from published literature including discussion with various government departments and the project information is provided by ONGC.

The baseline status of ambient air quality was carried out in the block. While selecting ambient air quality monitoring stations due consideration was given to topography, terrain, human settlements, sensitive locations, general meteorological conditions, existing emission sources, industries, regional background and possible impact zones based on available information within the block area. The arithmetic mean and 98th percentile values of 24 hourly average samples for SPM varied between 80-128 $\mu\text{g}/\text{m}^3$ & 95-145 $\mu\text{g}/\text{m}^3$, RSPM in the range of 27-43 $\mu\text{g}/\text{m}^3$ & 31-48 $\mu\text{g}/\text{m}^3$, SO_2 in the range of 3-5 $\mu\text{g}/\text{m}^3$ & 3-6 $\mu\text{g}/\text{m}^3$ and NO_x varied between 5-10 & 5-13 $\mu\text{g}/\text{m}^3$ respectively. Non-methane and methane hydrocarbons were monitored within the block area and varied between 0.3-0.5 ppm and 0.6-1.1 ppm respectively.

The background noise levels observed during daytime for residential and commercial areas were in the range of 46-54 dBA and 62-70 dBA and during night time, in the range of 39-44 dBA and 51-54 dBA respectively. In the sensitive areas the noise levels were observed to be 44-51 and 36-39 during day and night time respectively.

The baseline data for surface and groundwater was collected based on its use especially for drinking purpose by the villagers. There are, tube-wells and hand-pumps in villages. The monitored surface waters showed pH values 8.0 indicating water is in alkaline nature, TDS : 389-11048 mg/l, turbidity : 1-5 NTU and hardness : 172-1887 mg/l. Minerals content was observed in the samples collected from river. Nutrient values in the form of nitrate and phosphate was found to be less with organic load BOD : <3 mg/l and COD in the range of 9-73 mg/l respectively. Similarly groundwater of the study area showed high mineral content. The variations in the levels of various parameters are: total dissolved solids : 692-9560 mg/l, hardness : 220-2545 mg/l, whereas chlorides, sulphates in the range of 71-3510 and 33-374 mg/l respectively. Both surface and groundwater showed faecal contamination and need chlorination before used for drinking purpose.

The soil samples were collected for various types of land uses. The texture of the soil is clay, sandy clay and loamy sand and clay loam. The soils in the region are low

to moderate and high adsorption capacity. The soils are normal with respect to exchangeable sodium percentage.

The study area is dominated by natural vegetation and mangrove plantation. The terrestrial plants adjoining the Pitchavaram forest have been listed which include 86 species, in which there are 24 trees, 21 shrubs, 28 herbs, 7 climbers, 3 creepers and 3 parasites. The drilling site is surrounded by the agricultural field. In Cuddalore district extensive mangrove wet land is located in Pitchavaram representing a heterogenous mixture of mangrove ecosystem. The faunal diversity is very good in the study area. Mammals like Monkeys, Squirrels, Mongoose are common in the study area. Dominant birds observed in the study area are House Sparrow, House Crow, Myna, Parakeet and Dove. Common fishes found in the study area are Mulletts, Chanos chanos, Etroplus suratensis, Elops machnates, Maglops cyprinoids and lates calcarifer. In this area, agriculture and cattle rearing is the occupation. The agriculture is the main activity in the study area. The main crops grown are paddy, millets, groundnut, sugarcane and cotton.

Demographic profile of this area consists of 68954 inhabitants in the area. Sex ratio in the region is 989 male/1000 female. Literacy rate is 66.49 %. Total main workers are 31.83 %. Primary middle and higher secondary schools and Primary Health Sub Centres are available in this area. Education facilities, medical and transportation and sanitary facilities are available in the area. Drinking water source is through handpumps, borewells and other allied sources.

4.0 Anticipated Environmental Impacts

The land requirement per well is about 150 m x 150 m and the environmental impacts during the construction stage to drilling phase is short term, temporary in nature and does not entail any displacement of people. The well head facilities will be located in such a manner avoiding settlements. The potential environmental impacts due to the proposed exploratory drilling activities can be exhaust gases from DG sets used for drilling; flaring of associated gas during production testing and the duration is for 3-4 days, disposal of drill cuttings and drilling mud, noise from the drilling operations and power generation units. The electricity requirement for proposed activities will be generated using DG sets. No existing resources/water sources (surface/groundwater) which are currently being used by the villagers for the purpose of obtaining drinking water, water for irrigation or other purposes will be tapped. Water will be supplied through tankers to the site.

5.0 Environmental Management Plan and Mitigation Measures

The land requirements for exploratory drilling is approximately 150 mx150 m and the land use pattern will not be affected as this is a short duration activity and of temporary nature. The land will be acquired from private/government lands. Crop and land compensation will be paid as determined by the revenue officials. The total water requirement will be met from tapping groundwater aquifer by drilling bore wells near the well site. If the local water quality does not meet the minimum quality requirement for use as make up water for drilling fluid/potable use, suitable arrangement for transportation of water will be made. Approximately 150 m³ of spent drilling mud would be generated at each well site. Drilling mud is re-used as much as possible. At the end of drilling operations, the residual unusable mud is collected in lined pits and solar evaporated. The pit will be covered with soil for restoration. The domestic sewage will be treated in septic tanks followed by soak pit system. The solid waste generation is limited to spent drill bits, packaging wastes and used containers, drill cuttings, waste oil and any contaminated soil during the drill rig movements and operations. The only hazardous waste generated in exploratory drilling operations is spent lube oil. The spent oil will be collected, stored and disposed as per the MoEF guidelines and in compliance to the Hazardous Waste (Handling & Management) Rules. All DG sets and flaring will be installed with adequate stack heights to ensure wider dispersion. The mud chemical storage area will be paved. Emission standards stipulated by CPCB and SPCB would be complied with. The noise level will not exceed 85 dB (A) beyond the boundary of the drill site. Personal protective equipment will be provided and their proper usage will be ensured for eardrum protection of the workers. The ecological studies are carried out during the study period, rich and diverse vegetation in the study will be taken care and maintained. Special care will be taken to project endangered and localized animals. Wherever necessary, wildlife habitat will be re-established or restored.

6.0 Project Benefits

Though the exploratory drilling activity is temporary and of short duration it has beneficial impacts.

- The commissioning of project would lead to improvement in transport facilities as loose or soft surface rural roads will be upgraded to facilitate movement of the drilling rig and supply vehicles.
- In case hydrocarbon reserves are found it will lead to all round prosperity of the region & nation