

DIROK RICH GAS FIELD DEVELOPMENT

Introduction:

Dirok gas field is located in Block AAP-ON-94/1 in Assam-Arakan Basin. The block is currently being operated by Hindustan Oil Exploration Company (HOEC), along with JV partners Oil India Limited (OIL) and Indian Oil Corporation Limited (IOCL) under a Production Sharing Contract signed with the Government of India in 1998. Exploration in the block established a potential for more than 250 Billion Cubic Feet of gas that could be developed to add significantly to the domestic production of natural gas, and further establish the North-East region as a significant petroleum province in India.

The remote location of the field near the forest and wildlife sanctuary, as well as a limited time window to carry out surface activities due to weather conditions in Assam, posed significant challenges for fast-track development. The Dirok JV, working under the able support and guidance of the Central and State Governments and an enabling policy framework, was able to execute the project and deliver first gas from the field in a record time of 27 months from the approval of the Field Development Plan.

The delivery of the Hollong Modular Gas Processing Plant (HMGPP) as part of the Dirok field development represents a significant milestone in gas infrastructure development in the North-East. The plant is currently delivering about 35 Million Standard Cubic Feet of gas per day, which represents more than 15% of Assam's natural gas production, as well as about 800 barrels of condensate to Asia's oldest refinery in Digboi operated by IOCL.

Field Development Plan:

Recognising the significant resource potential in the Dirok field and the challenges associated with its development, the Dirok JV decided to adopt a phased approach to develop the field. In line with this strategy, a Field Development Plan (FDP) was prepared and submitted to the Directorate General of Hydrocarbons (DGH) for approval. The FDP was approved in May 2015.

The FDP targeted development of about 130 bcf of gas and involved the following scope:

- Drilling and completion of 6 development wells – 3 re-entry and 3 new wells
- Setting up a Gas Gathering Station
- Setting up a Gas Processing Plant of sufficient capacity
- Laying of pipelines to tie into existing infrastructure to export gas and condensate

Project Execution:

To address the challenges and achieve accelerated cost-effective project delivery, the Dirok JV decided to use a fast-track delivery strategy that included:

- A modular and standardised design, and an innovative build, maintain and operate contracting model for the Gas Processing Plant

- Focus on sustainable design, including key changes that enabled the securing of the clearances required to operate in an environmentally sensitive area
- An early production scheme to take advantage of existing facilities and achieve first gas in record time
- Maintaining local license to operate by ensuring significant local content in project delivery

Working under an enabling policy regime, and constant support from Central and State Governments ensured that fast-track delivery of the project was achieved. The key aspects of the project delivery included:

- Drilling and completion – Re-entry and completion of 3 smart wells, and drilling of 3 new development wells with unitized compact X-mas trees. A total of approx. 7500 m was drilled in 222 days.
- Setting up a Gas Gathering Station – This Gas Gathering Station (GGS) is zero-emission (no flare). Remote power generation and underground power transmission to this GGS is executed to minimize noise and air pollution.
- Laying pipelines to evacuate gas and condensate – A total of approximately 60 km of pipelines, including infield ones were laid for this project.
- Setting up Hollong Modular Gas Processing Plant (HMGPP) – A Modular Gas Processing Plant with a capacity of 36 mmscfd is setup in Margherita, Assam under a Building, Maintenance and Operations (BMO) contract awarded to Expro, UK. The HMGPP was commissioned in March 2018.

In the delivery of the Dirok Project and HMGPP, the Dirok JV focused on ensuring significant local content, as well as on sustainability. Significant achievements in the project delivery include:

- First gas delivered in 27 months from approval of FDP, which is a record for greenfield development in the North-East
- Leveraging expertise and capacity available with contractors, including both global and local contractors
- L&T HIPPS – India’s first indigenously developed High Integrity Pressure Protection System (HIPPS) for Dirok Gas Field development. HIPPS detects and isolates the source of high pressure within seconds, and hence avoids excess fluid discharge
- Zero-Emission GGS – This Gas Gathering Station is zero-emission (no flare). Remote power generation and underground power transmission to this GGS is executed to minimize noise and air pollution
- HMGPP built using an innovative contracting model – Adoption of a modular-based approach on OPEX model resulted in (i) Zero CAPEX on equipment (ii) Reduction in project construction period and (iii) Utilisation of state-of-the-art technology

The tables below list the major global and local contractors used in the delivery of the project.

Global Contractors:

S.No	Supply/Service Description	Contractor
1	Drilling Rig	Essar Oil field
2	Drilling Services	Schlumberger
3	Completion Services	Halliburton
4	Directional Drilling	Baker Hughes
5	Casing & Tubing Running Services	Weatherford
6	Wellhead accessories	Delta Corp
7	Drilling & Completion Fluid and Solid Control Services	MI Overseas
8	Tubings	PT Citra
9	Supply of Casings	Marubni, Hunting Energy
10	Mud Logging	OFI
11	Wellhead	FMC
12	X-Mas tree	KOP
13	Modular GPP	Expro

Top 5 Local Contractors:

S.No	Supply/Service Description	Contractor
1	Pipeline laying	M/s Tiratna Enterprises, Tinsukia
2	Gas Gathering Station	M/s Santosh Sahewalla
3	Kusijan FGS	M/s Woodland works, Digboi
4	Drill Sites	M/s Civil SG Construction, Duliajan
5	Local Logistics	M/s Builders and Carriers, Guwahati

The schematic below shows the infrastructure developed as part of the Dirok rich gas field development, as well as the connectivity to the key consumers in the region.



Conclusion:

The enabling policy structure implemented by the Government has succeeded in attracting deep interest in the petroleum sector in the North-East region. The Dirok field development serves as a successful case study for fast-track development of the significant oil and gas resources in the North-East region using Private – PSU partnership.