

Alternate Route Analysis through Forest Land

Laying of underground Oil & Gas Pipelines along Upper Dehing Reserve Forest portion of Duliajan-Digboi Road, Assam

Project Background

Pipeline-1: 8-Inch diameter Duliajan-Digboi Crude Oil Pipeline:

35 km long, 8-Inch diameter Crude Oil Pipeline with capacity of 0.65 MMTPA from Pump Station-1 Duliajan to Digboi refinery terminal is delivering required crude oil as feedstock for Digboi Refinery since 1954. After more than six decades of operation, the aging pipeline needs immediate replacement for safe and reliable operation as well as to comply with present industrial and statutory norms of Petroleum Pipeline operation.

The existing route of the pipeline is along Duliajan-Digboi road on the left side (viewing from Duliajan end) with portion of it through Upper Dehing Reserve Forest from Kathalguri to Kenduguri Road (approx. 16.4 km). The Pipeline was laid prior to enactment of Forest (Conservation) Act, 1980.

For the pipeline replacement project, the source and designation points of the pipeline remains Pump station-1 Duliajan and Digboi Refinery terminal respectively. Minimal detours have been taken at Duliajan, Bhadoi Panchali and Digboi end to avoid populated areas. In the forest portion of the route from Kathalguri to Balijan, pipeline is intended to be laid on the right side of the road (viewed from Duliajan end) on the same pipe track of proposed 18-Inch Natural Gas Pipeline.

Cable route for Current Cathodic Protection system:

To comply with statutory norms, the buried pipeline will be cathodically protected to protect from corrosion using Impressed Current Cathodic Protection system. Anode bed required for the system is intended to be installed centrally at Jorajan Location inside Upper Dehing Reserve Forest, at approximately 414-meter perpendicular distance from the pipeline. Anode bed will be connected to the pipes through cables to be laid underground through a narrow cable route.

Pipeline 2: 18 inch diameter Kushijan-Duliajan Natural Gas Pipeline:

The state of Assam is in huge demand of rich natural gas for utilizing in various downstream industries. Shortfall of pipeline network and the availability of minimum facility to distribute the indigenously produced gas are major bottleneck for its end utilization. By laying the proposed 18-inch pipeline will carry the natural gas produced in the Dirok fields in Margherita Sub-Division, Tinsukia which will be primarily supplied to Brahmaputra Cracker and Polymer Limited (BCPL) through Central Gas Gathering Station (CGGS) at Duliajan and it will facilitate enhancement of gas production as well.

The pipeline will be routed from Kushijan Gas Gathering Station (GGS) to CGGS Duliajan mostly along Duliajan-Digboi Road. Kushijan to Kathalguri portion of the pipeline will be passing through Upper Dehing Reserve Forest.

Alternative Analysis

The feasible routes for the pipelines were scouted through desktop and reconnaissance surveys along three different routes from source to destination station. The comparative route alignment has been discussed as follows.

ROW Alternative 1

A pipeline ROW (Segment 1) was considered, which will pass from Kathalguri to Kenduguri along the ROW of Duliajan -Digboi and Segment 2 Kusijan GGS to Balijan along the edge of Upper Dehing Reserve Forest. The Segment 3- Cable route required for the pipeline cathodic protection system is intended to be installed centrally at Jorajan Location inside Upper Dehing Reserve Forest, at approximately 400-meter perpendicular distance from the pipeline. Total length of this pipelines in Forest portion would have been close to 18 km. About 16.5 km of the pipeline will pass through ROW of the existing road and rest 1.636 km will pass through the edge of the forest. The ROW of Alternative 1 does not pass through settlement and infrastructure like schools, hospital, shops, etc.

ROW Alternative 2

The ROW Alternative 2 was considered from Kathalguri to Keduguri on the northern side of Duliajan –Digboi road through Lakhipathar area, mostly along the edge of the forest. The ROW of the pipeline will pass through agriculture land and tea garden and virgin forest. The total length of this alternative route of pipelines for the forest portion is approximately 35.83 km; of which approximately 13.4 km will pass through the Upper Dehing R.F (West Block) would result in fragmentation of forest that may lead to some adverse effects like:

- Pipeline through virgin natural forest will lead to felling of old mature trees.
- Fragmentation of top canopy may lead to isolation of arboreal species population like Western Hoolock Gibbon (*Hoolock Hoolock*).
- Pipeline through the middle of the forest may open up access routes deep inside the forest that may lead to encroachment inside the forest, illegal felling of trees and poaching.
- Resettlement and rehabilitation as the pipeline route is ass through the village.

Also, for 8-Inch Duliajan-Digboi Crude Oil pipeline, extended route will not permit feasibility of pipeline hydraulics as a replacement project.

ROW Alternative 3

Another alternate pipeline was considered towards the southern side of the Duliajan-Digboi road mostly besides the Buri Dehing River. The total length of the alternative route of pipelines for the forest portion in this case is around 43.78 km. Approximately, 27. 58 km will pass through the Upper Dehing R.F (West Block) and Dehing Patkai National Park would result in fragmentation of forest that may lead to some adverse effects like:

- Pipeline through virgin natural forest will lead to felling of old mature trees.
- Fragmentation of top canopy may lead to isolation of arboreal species population like Western Hoolock Gibbon.
- Pipeline through the middle of the forest may open up access routes deep inside the forest that may lead to encroachment inside the forest, illegal felling of trees and poaching.

For this alternative also, for 8-Inch Duliajan-Digboi Crude Oil pipeline, extended route will not permit feasibility of pipeline hydraulics as a replacement project.

Selection of the Alignment

Alternate 2 would have shortest alignment passing through the forest land; however, it is passing through the dense forest area and settlement area. This would require tree felling and

fragmentation of virgin forest. Keeping under consideration safety of people living in the villages and fragmentation of virgin forest land this pipeline was not considered.

Alternate 3 would have avoided human settlement by passing through dense forest area. But by fragmenting virgin forest this pipeline route may compromise the long ecological stability of the forest and may possess threat to wildlife. As a result, this pipeline route was considered not suitable from an ecological perspective.

Alternative 1: A longer portion of Alternate 1 (18.181km) is passing through forest areas when compared to Alternate 2 (13.369 km), but as the pipeline is passing through the ROW of the existing Duliajan-Digboi road, it is not passing through any virgin forest areas and will not lead to habitat fragmentation in Upper Dehing Reserve Forest. Also this pipeline will reduce impact in pristine dense forest areas by passing through the existing Duliajan- Digboi Road. As this pipeline will be passing through the existing ROW of the Duliajan- Digboi Road tree felling would be minimal among the three alternatives. Moreover, laying this pipeline through the ROW of the will avoid densely populated human settlement of Barjan and Balijan villages.

For 8-Inch Duliajan-Digboi Crude Oil Pipeline, this route is the hydraulically feasible option for pipeline operation as a Replacement project.

Considering technical requirement of pipeline hydraulics, minimal ecological impacts and safety of people living in Barjan and Balijan villages, Alternate 1 was selected over ROW Alternate 2 and ROW Alternate 3.

Planned Measures to Reduce Impact of Pipeline

- ROW of pipeline within reserve forest will be reduced from 18 m to 7.5 m taking advantage of road side nature of pipeline track as it will facilitate space for construction material and equipment mobilization.
- Pipeline ROW in reserve forest is aligned in a way to reduce tree cutting.

Figure 1: Alternative Pipeline Alignments for Laying of underground Oil & Gas Pipelines along Upper Dehing Reserve Forest portion of Duliajan- Digboi Road, Assam

MAP SHOWING THE 3 (THREE) NOS. OF ALTERNATE ROUTE ALIGNMENT AGAONST PROPOSED 13.43 HECTARE AREA OF FOREST LAND FOR LAYING OF UNDERGROUND OIL & GAS PIPELINE ALONG DULIAJAN- DIGBOI ROAD AT UPPER DIHING (WEST BLOCK) RESERVE FOREST UNDER DIGBOI FOREST DIVISION



Legend	
—	PROPOSED PIPELINE ROUTE (NON-FOREST AREA)
—	PROPOSED FINAL PIPELINE & CABLE ROUTE ROUTE (FOREST AREA)
—	PROPOSED ALTERNATE ROUTE NO. 2
—	PROPOSED ALTERNATE ROUTE NO. 3

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Place: Duliajan

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