

Gas Authority of India Limited

The Gas Authority of India Ltd. (GAIL), one of India's leading Public Sector Enterprises, is the largest gas transmission and marketing company in the Country. The Company, possessing a well developed and efficient infrastructure, was established as a wholly owned Company of the Government of India in August, 1984, with 100% equity held by the Government of India and, within a short time, it has grown into one of the '*Navratna*' enterprises and is ranked among the top ten companies in India.

Today GAIL owns and operates over 4000 km of pipeline and has about 95% market share in the Natural Gas business in India. GAIL has an ISO-9002 and ISO-14001 (for adherence to environmental standards) certification for its pipeline and LPG plants.

GAIL was established by the Government in August 1984 to lay an onshore pipeline from Hazira on the west coast to supply natural gas to these facilities in the states of Gujarat, Rajasthan, Madhya Pradesh and Uttar Pradesh. Construction of the HBJ Pipeline was begun towards the end of 1986 by a consortium led by Spie-Capag of France, Nippon K.K. and Toyo Engineering of Japan.

As a result of GAIL's emphasis on operations and maintenance, which utilizes the Company's advanced supervisory control and data acquisition ("**SCADA**") computer monitoring system, the HBJ Pipeline has been available for the transmission of gas to customers virtually without interruption since its completion. The Company believes its operational focus on predictive and preventive maintenance and timely servicing has also resulted in a machine availability ratio of over 96 per cent at the Company's other operations.

HBJ Pipeline

The main trunk of the HBJ Pipeline consists of carbon steel pipe ranging in size from 18 to 36 in diameter running from Hazira on the west coast of India to Delhi in the north and has been constructed in conformity with API (American Petroleum Institute) engineering standards. Although originally 1,700 km of pipeline was laid, subsequent extensions and spur lines have been added and the HBJ Pipeline is currently over 2,300 km in length. The HBJ Pipeline system also consists of receiving terminals, dispatch terminals for the supply of metered gas system, six compressor stations for boosting the pressure of the gas as it is transmitted, the SCADA system to provide central monitoring and control and a dedicated telecommunications system to provide reliable voice and data communication. The HBJ system had initial capacity of 18.2 MMSCMD of natural gas. Due to increased Gas availability and consumption, the system's gas handling capacity has been upgraded to 33.4 MMSCMD.

PURPOSE AND OBJECTIVES

The O&M arm of GAIL is constantly making efforts to improve upon its performance in its operations. In order to provide a highly efficient information storage and retrieval system, GAIL has embarked upon a project to prepare Functional Design Specifications (FDS), carry out a Survey and prepare as-built computerized route maps/ drawings, prepare database, test and commission the system for GAIL's Natural Gas pipelines in and around Delhi and integrating the same with a Geographical Information System (GIS).

Mascon MSC Pvt. Ltd., Vadodara was entrusted this project under the Project Leadership of Mr Mandar Mehta.

Objectives:

- *Effective Operation and Maintenance(O&M)*
- *Aid in emergencies like pipeline leak or burst.*
- *Disaster Management.*
- *Apart from GAIL the information from this system will be of use to other departments like Telecommunications, DDA, GDA (for laying water, sewage-lines), Delhi Electricity Supply Undertaking.*

Scope of work

The scope of the work covered digitization of city maps of Delhi, Gurgaon, Noida, Ghaziabad and Shahibabad to the scale 1:20,000.

For a corridor of 6 km on either side of the pipelines, the map included:

- Police Stations(with phone nos.)
- Fire Stations(with phone nos.)
- Hospitals(with phone nos.)
- Roads
- Railway Lines/Stations
- Agricultural Land/Green areas
- Water Bodies
- Important Landmarks
- Census Data-Population Density
- Elevation-Contours

SURVEY

A 50 m wide corridor survey was conducted for land and other structures along the the entire pipeline route covering 160 kms. The scaling of corridor is 1:500. All structures like Walls, Fences, Sheds, Parks, Drains, Water Bodies, Soil Type, Buildings, Power Transmission Towers, Radio Towers, Trees / Dense Vegetation, Sectionalizing Valves, Terminals, Radio Repeater Stations of GAIL, Tap-off Points (TPs), Pressure Measurement Locations, Roads and Railway Lines/ Stations, Overhead Bridges, Canal and River crossings, depth of Pipelines (wherever GAIL provided information), Substation Transformers (with grid voltage), Direction marks and Warning Sign Boards of GAIL & Km Markings of GAIL etc. have been shown in the 50 m wide corridor in suitable color code and proper dimension. The pipeline and other structures are identified in Latitude and Longitude and in meters also in x, y plot in the map. The pipeline position is indicated in the maps from the nearest roads, structures, landmarks etc.

Mascon developed a **P**ipeline **R**egulation, **O**peration, **M**aintenance and **I**nformation **S**ystem (**PROMIS**) in accordance with the specifications of GAIL. A desktop model involves users who are individuals or teams working in their application areas. The desktop GIS users need not be GIS specialists and shall use GIS to enhance their productivity and save precious time.

With **PROMIS**, map maintenance and reproduction shall become more elegant and shall also provide the underlying information instantly.

Where necessary the users can take color printout of maps and data according to their requirements within the scope of the system.

PROMIS can be upgraded to include more information, data update, Database changes, analysis, generation of new reports, etc. with easy to use tools. The supplied system shall probably be integrated with GAIL's SCADA system in future by GAIL.