



A Rockwell Automation Company

Interprovincial Pipe Line Inc. Capacity Expansion Program 1994

The Client:

Interprovincial Pipe Line Inc. (IPL) owns and operates a pipeline network spanning from Norman Wells in the Northwest Territories, to Montreal, Quebec. They own the longest petroleum transmission pipeline utility company in the world. IPL's entire system consists of 7213 miles of pipeline linking western Canada to refining centers and markets in eastern

Canada and the midwestern United States. IPL transports NGL, refined products, gasoline, diesel, light, heavy and synthetic crude oil.

The entire system is controlled from IPL's control center headquarters in Edmonton, Alberta.

The Requirement:

In late 1993 IPL received approval from the National Energy board to expand pipeline capacity by 170,000 barrels / day. This was in response to demands to increased western crude oil production from central and eastern markets. The expansion project created a new line for delivery of light crude from Hardisty, Alberta, to Clearbrook, Minnesota. Construction included a new 20 inch diameter, 305 mile pipeline between Hardisty and Regina, Saskatchewan. The new line tied into an existing inactive pipeline between Regina and Cromer, Manitoba. Additionally an existing pipeline between Cromer and Gretna, Manitoba, was converted to crude service.

An existing pipeline between Gretna and Clearbrook, Minnesota, was also converted to crude service upon the completion of a new pipeline to Clearbrook. The new Line 13

resulted from joining these three sections of pipeline. This line carries predominantly light sweet crude oil. Pipeline in-service target date was January 1, 1995.

Line 13 required eight (8) new pump stations utilizing Variable Frequency Drive technology. The pipeline is operated without pressure control valves. Pressure control is achieved by regulating the speed of the VFD driven pump-motors. These stations were the first within IPL to feature VFDs. Hinz joined IPL and SNC-Lavalin to form a multi-discipline project team. Hinz was responsible for the Instrumentation and Control (I & C) engineering for these eight new stations.

The Design Solution:

Hinz was contracted by IPL to provide the Instrumentation and Control engineering for Line 13. The I & C team was responsible for the following: preliminary engineering and estimation, project coordination, detailed design support by providing technical assistance to IPL for the generation of a "Line 13 Control Philosophy"; full instrumentation design including density, pressure, temperature and flow measurements; station fire and gas protection and implementation of elaborate motor control required by VFDs. Hinz also provide drafting services, material specifications, control equipment procurement, testing, field support, and commissioning.

Station design was provided on a local level by utilizing OS/2 Factory Link Human Machine Interface (HMI), a Nematron backup HMI, and a backup control panel. Remote control was provided through a Remote Telemetry Unit (RTU) interface to the IPL tower control centre in Edmonton with some sites having additional station control through the tank farm control room. Each station utilized a Modicon 984-785 programmable controller to provide all the operational controls and safety.

The I & C team was established with an IPL team leader (corporate sponsor), an instrumentation project leader, and a

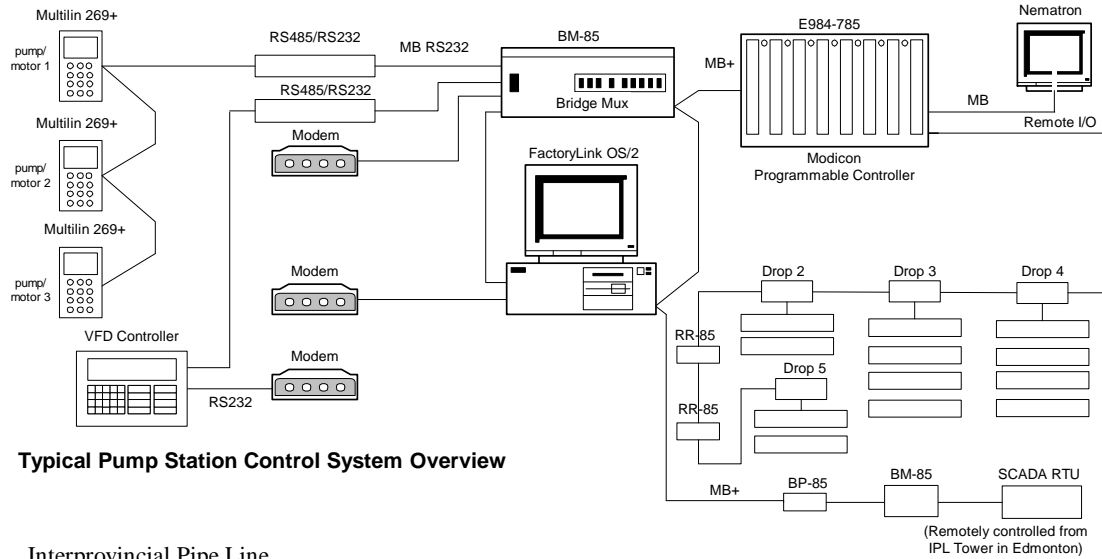
control project leader. The Hinz I & C team relocated to the SNC-Lavalin office building in downtown Edmonton to join the IPL/SNC/Hinz project team. Hinz expended over 14000 man-hours and generated nearly 300 CAD drawings using a Hinz proprietary Project Management.

Database System (PMDS) which generates native AutoCAD drawings from the project instrumentation database. The I & C team returned to the Hinz office for Modicon programming and HMI development after site construction commenced. Two IPL project engineers also moved to the Edmonton office. During the month of September 1994, the I & C team mobilized eight team members to Line 13 pump stations to begin commissioning. In October, IPL reconsidered their apportionment constraints and chose to advance the start-up date of the pipeline from January 1, 1995 to December 1, 1994. At 2:00 PM, November 27, 1994 the pipeline was started up with full production achieved two weeks later, two weeks ahead of schedule. Hinz has subsequently provided site support and control upgrades for Line 13 and other IPL facilities.



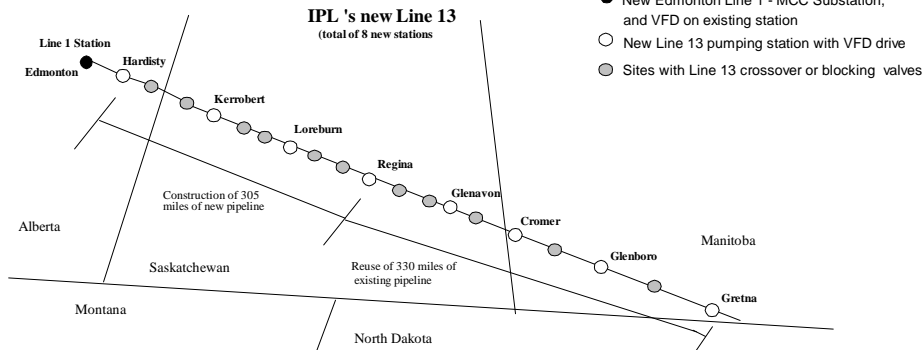
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Typical Pump Station Control System Overview

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System Specifications:

- Modicon 984-785 PLC 's, BM-85, and RR-85's
- Multilin 269 Plus Motor Protection Relays
- IRD Vibration Equipment
- Robicon Variable Frequency Drives
- U.S Data FactoryLink /OS2
- Power Measurement ACM 3720's
- Milltronic Level Inducators
- Quick Panel HMIs
- ITT Barton Transmitters
- Solartron Density Meters

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com