



A Rockwell Automation Company

BP Pipelines (North America) Bravo CO2 Pipeline System Lost Draw Station PLC Replacement

The Client:

BP Pipelines (North America) combines three proud traditions: Amoco, Arco, and BP.

BP Pipelines (North America) is the second largest liquids pipeline company in the US transporting over 450 million barrel-miles of oil, refined products, natural gas liquids, carbon dioxide, and chemicals daily, about 9 percent of the

U.S. Liquids pipeline market. Beyond their core operations, with a control center in Tulsa, OK, they participate in various joint venture pipelines and operate several pipelines.

The Lost Draw Station is one of many servicing the Texas Panhandle and surrounding regions via the CO2 Bravo Liquids Pipeline System.

The Requirement:

The Lost Draw Station was initially brought on-line in 1996. At the time, the station was controlled by a GE Fanuc Series 6 PLC, two Moore PID Controllers, a Daniels Flow Computer, and a Ross Hill VFD and Seal Oil System, in addition to the traditional complement of pumping station equipment.

After six years of operation, the BP Pipelines corporate decision was made to upgrade the PLC control systems to the latest version of GE hardware and software (Machine Edition—ME) since the GE Series 6 PLC line had become obsolete.

The existing PLC code would need to be thoroughly evaluated and cleaned-up to delete old or retired code. The PLC code would then have to be converted to Machine Edition and re-structured to meet the new BP Pipeline requirements. The two Moore PID controllers would need to be incorporated into the new PLC code.

In addition, a local HMI (GE Machine Edition Viewer) would need to be completely developed that would allow the capability to control the station while handling the new ME software and future expansions.

The existing station equipment also included a Ross Hill VFD and Seal Oil system that were shared between the two units. The new control system would need to seamlessly integrate with all existing site equipment. Thus, a very accurate and detailed electrical design package was required.

The control system at Lost Draw would need to incorporate the current VSAT communications protocol changes required to communicate with the Tulsa SCADA host computer. This would include a change from Amocams to Modbus protocol.

In addition to construction management of BP Field personnel and station commissioning requirements, Hinz would be required to system test everything from field device to control center.

The Design Solution:

Hinz was contracted to prepare a detailed budgetary estimate for control system upgrade at Lost Draw. Working together with BP Pipeline personnel, a detailed proposal and estimate were prepared which defined the project scope, budget, and implementation plan.

The scope of work included replacing the station PLC system, the existing PID controllers, and the control network. Hinz would also provide new PLC/HMI configurations and the SCADA Host computer interface, along with a complete electrical drawing design package.

Since control cabinet space was in short supply, the existing auto-station transfer switchgear cabinet was re-used for the new station PLC equipment.

The detailed project scope included:

- Prepare a detailed Functional Requirements Document (FRD).
- Modifying the existing station P&IDs to accommodate the incorporation of two Moore PID controllers into the

new GE 90-30 PLC.

- Analysis of I/O requirements.
- Complete PLC Control System Configuration.
- Preparation of Bill of Materials for a new back-plate, control hardware, and cabling.
- Modifications to the existing BP Pipeline electrical drawings to interface to Ross Hill VFD, Seal Oil System, and new Station PLC.
- Generation of software standard guidelines for the PLC control software and HMI package.
- Creation of an operation/maintenance manual.
- Programming, testing, and commissioning of the new control hardware and software.
- System tuning of the new PID functionality.
- Construction supervision and commissioning.

Hinz provided BP Pipelines with a new control system and met required budgets and in-service dates.

