



A Rockwell Automation Company

El Paso Corporation - Colorado Interstate Gas Boehm Blow-Down Project - System Architecture

The Client:

El Paso's interstate transmission system spans the nation, border to border and coast to coast. The nationwide pipeline system is consolidated into three regional operations.

The Western Pipeline group consists of El Paso Natural Gas Company and Colorado Interstate Gas Company and is headquartered in Colorado Springs, Colorado.

Colorado Interstate Gas (CIG) is a major transporter of natural gas in the Rocky Mountain region. The Colorado Interstate Gas system is connected to nearly every major supply basin in the Rocky Mountains as well as production areas in the Texas Panhandle, western Oklahoma, western Kansas, and Wyoming.

The Requirement:

The Boehm Natural Gas Storage Field located in south western Kansas on El Paso Corporation's pipeline system had two working formations, the Keyes and the G-Sand Formations. The Keyes Formation had become increasingly sour and was unusable as a storage formation. El Paso desired to blow-down the Keyes Formation, remove the hydrogen sulfide from the gas stream, and sell the gas into

the market. Eventually, the Keyes formation would be depleted and abandoned as a storage facility. The G-Sand Formation would continue in service. Equipment necessary to blow-down the Keyes Formation in the Boehm Storage Field needed to be installed, and consisted of a compressor, dehydration unit, and hydrogen sulfide removal skid.

The Design Solution:

Hinz was asked to provide a new Allen-Bradley ControlLogix PLC program configuration and new Intellution Fix32 HMI computer SCADA node for the Boehm Storage Facility. Hinz selected the new Allen-Bradley ControlLogix PLC control system based upon El Paso Corporation's engineering design requirements. Existing Fix32 HMI computer nodes nearby at Morton Station included previous HMI screens which were to be modified for the Boehm Storage Facility. The new PLC replaced the control functions currently configured in the Uticor 4001 PLC system, including Regulator Control, Reboiler Temperature Control, and Station Monitoring. The Uticor PLC was obsolete and was to be replaced as part of the overall project. The new FIX32 HMI SCADA computer and PLC were configured to monitor and alarm the new station equipment, including the H₂S removal unit, the compressor, and station gas measurement.

A new PLC control panel containing the Allen Bradley ControlLogix PLC and I/O modules to accommodate the station and analyzer signals was fabricated and shipped to the site. The FIX32 HMI computer included the Windows 2000 operating system, FIX32 SCADA software with Allen-Bradley RSLinx, ABR, and ROC I/O drivers, a UPS, and an 18" flat panel mount display. The control panel was installed in a new control building.

A Fischer ROC was installed to perform total station flow

and fuel gas usage metering and gas flow calculations. An analog output module installed in the ROC was configured to provide AGA total gas flow rate to the PLC as an analog input. Flow rate accumulations (current day and previous day) were performed in the ROC and were polled by the FIX32 HMI SCADA node. Flow accumulations were accessible for viewing on the HMI screen and were communicated to El Paso Gas Control.

New analyzers for H₂S and moisture were added at the outlet of the Keyes Formation Plant and their I/O was connected to the new PLC. Logic was written such that if high H₂S is detected, a valve is closed to prevent sour gas from entering the mainline pipeline. Installation of an Ethernet network at this facility enabled El Paso Operations to monitor the status and control the process remotely. A wide-area LAN network connection was provided from Boehm to the Morton County Station over a TCP/IP Spread Spectrum Radio. For local operations, the new FIX32 HMI node provided the operator interface to the process. The HMI node communicates to the PLC through an Ethernet link. The HMI node also communicates with the ROC using a serial connection. The HMI graphic display screens consist of a station site screen showing station operating status, process flows, popup displays, PID loops, alarm and metering screens.

