



A Rockwell Automation Company

Colorado Interstate Gas, El Paso Corporation Natural Buttes Dew Point Plant Expansion

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:

Hinz was asked to engineer Dew Point Plant and Compressor PLC/HMI Control Systems for El Paso's Natural Buttes natural gas compressor station located in western Utah.

Plant processing removes liquid hydrocarbons and water from the natural gas entering the plant, thereby producing dry gas for pipeline transport. The plant was previously controlled by a Fisher MicroProvox DCS system that was obsolete. The project involved moving control of the Dew

Point Plant to a new Allen-Bradley ControlLogix PLC and Wonderware HMI terminal. A new FlexLogix PLC was also provided for the installation of new Compressor CG-3.

Hinz would provide PLC and Wonderware HMI programming along with control panel design and electrical and control systems drawings.

The Design Solution:

Hinz was contracted to engineer electrical and PLC/HMI control systems for the Dew Point Plant Expansion at the Natural Buttes Compressor Station. The project included the following:

The Dew Point Plant was previously controlled by a Fisher MicroProvox DCS system. Engineering was performed to remove the obsolete MicroProvox DCS control panel and associated HMI monitor and install a new Allen Bradley ControlLogix 5000 PLC system control in its place. In the control room, the existing control enclosure was retained and a new back-panel containing the ControlLogix PLC and racks of Flex I/O modules was fabricated to fit inside the cabinet. As much as practical, existing cables were re-used and reconnected to the new control panel. Miscellaneous new instruments and devices were specified which dictated the need to install new cables. Miscellaneous I/O signals to and from the existing Station Uticor PLC were included in the functionality of the new PLC and accounted for in the design process.

A Functional Requirements Document (FRD) was developed for new and existing equipment systems. PLC and HMI application programs were developed and based upon existing P&ID drawings, the FRD, and the previous MicroProvox DCS documentation. During the upgrade project, the existing Intellution Fix32 HMI computer system was converted to a new Wonderware HMI system and the HMI database and screens were updated.

PLC and HMI system design included PID loop programming for 21 control valves, 11 pressure transmitters, 10 temperature transmitters, 2 flow transmitters, 9 level transmitters, and other miscellaneous instrumentation devices. The HMI/PLC programming also included functional controls for the 3 compressors CG-1, 2, and 3, that were separated into different stages of system compression. PLC/HMI programming for a new Allen-Bradley FlexLogix PLC was provided for the Compressor CG-3 installation, along with a PanelView 600 MMI terminal configured for ControlNet communications.

The Main Gas Dew Point control system design included instrumentation and controls for the following equipment: Gas Chillers E-8370 and E-8320; Gas/Liquid Separators V-8170 and V-8200; Gas/Gas Exchangers E-8310A and E-8310B; Low Temp HC/Glycol Separator V-8110; Refrigerant Subcoolers E-8340 and E-1; Vapor Heater E-8315; Deethanizer C-8710; Reboiler E-8350; LPG Cooler, LPG Product Storage, and LPG Loading Pumps. The Propane Refrigeration System design included instrumentation and controls for the following equipment: 1st, 2nd, and 3rd Stage Refrigerant Compressors CG-1, 2, and 3; Gas Chillers E-8320/E-8370; 1st and 2nd Stage Suction Scrubbers V-8120/V-8220; High Pressure Refrigerant Economizers V-8140/V-8190; Refrigerant Condensers AC-8910/AC-8930; Refrigerant Accumulator V-8150; Discharge Oil Coalescer F-8210.

