HINZ
A Rockwell Automation Company

El Paso Corporation / Colorado Interstate Gas Co.
Campo Blending Automation Upgrade

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 provide new Wonderware HMI and ControlLogix PLC control systems for the Campo Regulator Station and natural gas pipeline blending facility located in Southeastern Colorado. The Campo Regulator Station is a pipeline junction point used to blend high and low BTU gas as required to meet tariff specifications. The project scope included replacement of the obsolete Uticor 6001 Station PLC with a new Allen-Bradley ControlLogix PLC, revision of the blending algorithms, replacement of the Gas Chromatographs (GC) and RTUs, and conversion of the HMI computer from Intellution Fix32 to Wonderware. Design and installation of a new control building to house the PLC, HMI, gas chromatographs and gas analyzers was also included in the project scope.

The Design Solution:

Hinz was asked to engineer electrical and control systems for the Campo Blending Automation Upgrade Project, including new Allen-Bradley ControlLogix PLC and Wonderware HMI computer programming, along with facility improvements.

Campo Regulator Station is a junction point of eight natural gas pipelines. Several of the pipelines support bi-directional flow and crossovers. Gas can be diverted to and from nearby storage depending on the season. Instrumentation at Campo Regulator Station is currently used for blending control, metering, and gas quality monitoring.

In the Campo Blending Automation Upgrade Project, the Hinz design replaced the obsolete Uticor 6001 Station PLC with a new Allen-Bradley ControlLogix PLC. PLC and HMI system design included programming for 8 control valves and 23 yard block valves for blending control and flow or pressure regulation. The PLC was also used to interface output signals from the 2 Gas Chromatographs and 3 gas quality analyzers. The gas analyzers were used for monitoring the H_2S, H_2O & O_2 content of the 8 pipelines at various sampling points. The two existing Applied Control GCs were replaced with Danalyzer GCs. The two Teledyne RTUs were replaced with two Fisher ROC 364 flow computers. Hinz designed a new control building to house the PLC, HMI, GCs, and gas analyzers.

Hinz revised and replaced the Intellution Fix32 HMI computer and converted the programming to Wonderware InTouch. The HMI computer polls data from the Station PLC, GCs and RTUs. Gas analyzer and GC data is time and date stamped in the PLC/HMI.

The Hinz design revised the blending algorithm from BTU control to Wobbe control with BTU override. In general, PLC blending control for the Keyes flow is regulated based upon an operator entered HMI set point. The blend ratio is controlled by adjusting the Morton flow set HMI point to achieve the desired Wobbe number and BTU of the blend gas.

The PID feedback controllers used were direct acting and were always active. The calculated flow set points from the Wobbe and BTU controllers were passed through a high select to provide Wobbe control with low BTU override. The final set point was limited by a maximum blend ratio set point.

Blend ratio control can be set to automatic or manual though the HMI and PLC. Bumpless transfer is provided when switching to manual. Eight control valves are regulated with PID controllers implemented in the new Station PLC and HMI. Two of the control valves are used for pipeline pressure regulation.

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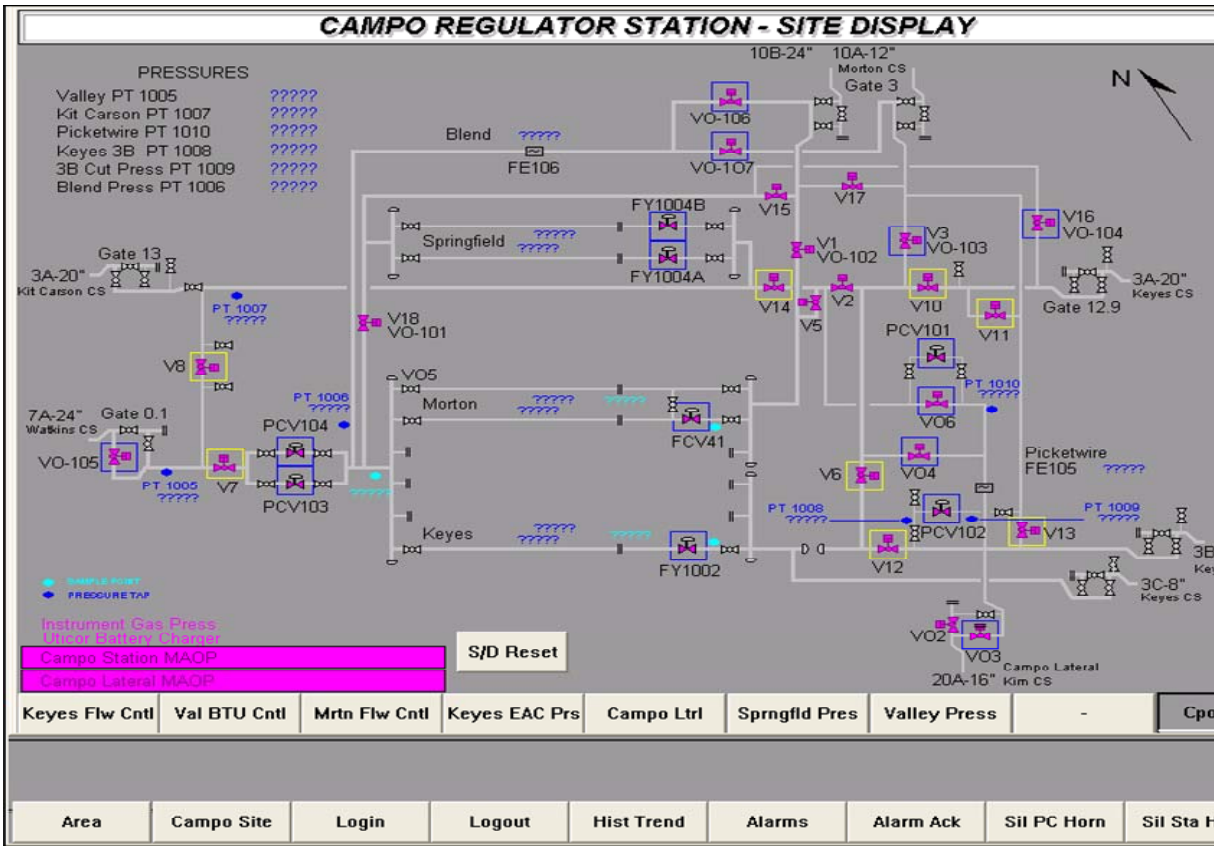

System Specifications:

- (2) Fisher ROC 364 Flow Computers
- (2) Danalyzer Gas Chromatographs
- (1) Station HMI Computer, Wonderware InTouch
- (1) ControlLogix 1756-L55 PLC with Chassis
- (1) ControlLogix 1756-ENB Ethernet Module
- (1) ControlLogix 1756-CNBR ControlNet Module
- (6) 1794-IF4I Flex I/O 4-ch Analog Input Modules
- (2) 1794-OF4I Flex I/O 4-ch Analog Output Modules
- (5) 1794-IB16 Flex I/O 16-pt Discrete Input Modules
- (2) 1794-OB8EP Flex I/O Discrete Output Modules
- (4) 1794-ACNR Flex I/O Communication Modules
- (3) PLC Control Panels for Station I/O and Remote I/O

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

www.hinz.com