



A Rockwell Automation Company

Alberta Energy Company / EnCana / Terasen Platte Pipeline Casper Station Power Upgrades

The Client:

The Platte Pipe Line Company was assembled by Marathon Ashland Pipe Line LLC and other small investors and began operation in 1952. In 1996, Alberta Energy Company (AEC) purchased the Platte Pipe Line Company on the premise that Marathon Ashland would revitalize and operate the pipeline for AEC. In 2002, Alberta Energy Company and PanCanadian merged to form EnCana, creating one of North America's leading independent oil and gas companies with an enterprise value of approximately US \$35 billion. In

January, 2003, Terasen Pipelines was formed as it took over operation of both the Platte Pipe Line system and Express Pipe Line system from EnCana.

Terasen Pipelines is the current operator of the Express and Platte Pipeline system. Covering a total length of 932 miles, the Platte Pipeline transports crude oil through 19 pump stations on its 20" diameter line between Casper, WY, and Wood River, IL.

The Requirement:

For the transportation of crude oil, the Platte Pipe Line was originally designed and constructed with a rated capacity of approximately 150,000 US barrels per day. In the early 1980's when the slumping oil production in Wyoming and Montana hit the oil industry hard, the Platte Pipe Line Company was forced to reduce delivery through the pipeline to a fraction of the capacity.

As demand for crude oil increased again in 1996, Alberta Energy Company purchased the Platte Pipe Line Company

and began revitalizing the pipeline. Inoperative pumping stations were restored and existing operational stations were upgraded to achieve a projected throughput of approximately 180,000 US barrels per day.

Hinz was contracted to provide Electrical Engineering services and support for the revitalization effort, including new control system and electrical power system upgrades.

The Design Solution:

In December 1996, Hinz engineers had an informal meeting with the Senior Project Engineer for Platte Pipe Line Company. The meeting focused on the existing power equipment at all the stations. From previous investigation, Hinz had discovered that most of the equipment at the stations had out lived its initial design life. The air circuit breakers were of the 1950/1960 vintage and rated for approximately 5,000 operations. From an operational standpoint, most of these breakers were not reliable because of excessive wear to key operating parts, due to the registered 20,000 to 25,000 operations. Thus, this equipment had not only performed as per specifications, but it had actually performed longer than the manufacturer had intended it to. Hinz advised Platte Pipe Line Company that the equipment should be replaced because of reliability issues.

Platte Pipe Line engineers agreed with the Hinz conclusions. As a result, Hinz prepared estimates and began design efforts to update the electrical distribution system and equipment for the Casper Station. The original distribution system at Casper and other pumping stations was a 2400 Volt, 3-phase, 3-wire, ungrounded, delta-system. On such a system, a single line to ground fault permits continued operation, but the fault results in over-stressing the remaining phase conductors of the

system. Hinz proceeded with design work to install a new 69kV Substation and to convert the existing distribution system at Casper to a 4160 Volt, 3-phase, 3-wire, resistively grounded Y-system.

The Platte Pipe Line mechanical design team concurrently came up with significantly larger pumping unit requirements for Casper and other stations. Casper originally had four 1500 HP or smaller Direct-On-Line (DOL) pumping units. A new unit rated at 4000 HP was required to add pumping capacity to the station. Starting such large units without reduced voltage starters would result in excessive voltage dips on starting. Starting large units directly online would contribute to perceivable flickers for other customers connected to the utility system. New electrical design criteria was therefore developed and adopted by the project team that included the use of electronic Soft-Starting technology for units rated between 1500 and 2000 HP, and Variable Frequency Drives (VFD) for all pumping units larger than 2000 HP.

Thus, for the installation of Casper's new Unit 5, a VFD was included in the Hinz power system design as the unit was rated at 3500/4250 HP. Casper Units 1 through 4 and the yard booster pump were updated with the installation of new DOL motor starters.



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Casper Station Yard Valves

System Specifications:

Casper Station, Electrical Engineering Design by Hinz Included:

- New 69KV/4160V-480V Substation, Rated for Future Upgrade to 115KV Class.
- Station Power Distribution Upgraded to 4160V System.
- Units 1 through 4, and Booster Pump, 1500 HP, 4160V, Motors using Direct On-Line Starters.
- Unit 5, 3500/4250 HP, 4160V, Motor using a Variable Frequency Drive (VFD).
- Tank Farm Booster Pump Power Distribution, Lighting, Instrumentation, and Gauging.
- Uninterruptible Power Supply Design.
- Harmonic Filter Bank.
- 480V Motor Control Center.

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

www.hinz.com