



A Rockwell Automation Company

## Alberta Energy Company / EnCana / Terasen Platte Pipeline Various Power System 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 informal meetings with Platte Pipe Line Company project engineers. The meetings focused on the existing power equipment at all stations. From previous investigation, Hinz had discovered that most of the equipment at the stations had out-lived its initial design life. 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 Douglas, Yoder, Harrisburg, and Casper Stations. At these facilities, the power original distribution system installed 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 efforts to convert the existing distribution systems at these stations 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 the stations, possibly requiring units rated at 4000 HP. Starting such large units without reduced voltage starters

would result in excessive voltage dips on the 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.

At Douglas Station, Hinz provided the electrical design for a new 57kV Substation, station power distribution upgrades, and for two new pumping units. Unit 1 was rated at 1750 HP, 4160V, and required a Soft-Starter, while Unit 2 was rated at 3500 HP, 4160V and required a VFD.

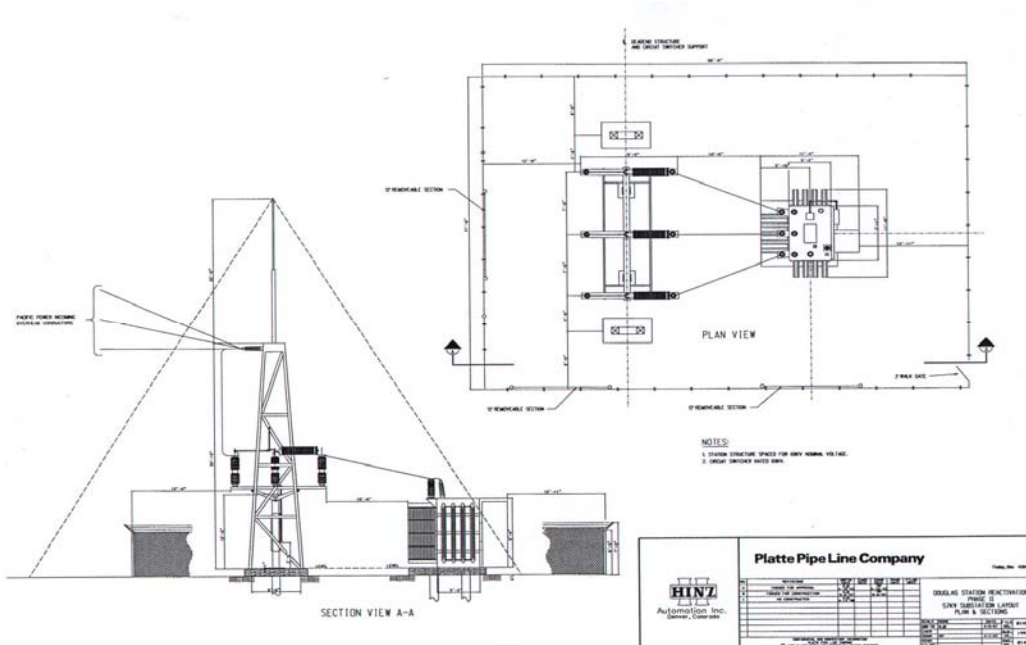
At Yoder Station, Soft-Starters were used for the 1500 HP, 4160V unit motors. The existing motors were rewound in order to handle the new 4160V distribution voltage. The entire station was rebuilt, complete with a new 34.5KV Substation, station power distribution upgrades, and a new control system.

At Harrisburg Station, the entire site was demolished and a new pumping station was designed and built. The new pumping station included a new 34.5KV Substation, station power distribution upgrades, a single 3500 HP, 4160V pumping unit controlled by a VFD, and new control system equipment.



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## System Specifications:

Douglas Station, Electrical Engineering Design by Hinz  
Included:

- New 57KV/4160V-480V Substation; Station Power Distribution Upgraded to 4160V System.
- Unit 1, 1750 HP, 4160V, 1800 RPM, Motor using a Soft-Starter.
- Unit 2, 3500 HP, 4160V, 3600 RPM, Motor using a Variable Frequency Drive (VFD).

Yoder Station, Electrical Engineering Design by Hinz  
Included:

- New 34.5KV/4160V-480V Substation; Station Power Distribution Upgraded to 4160V system.

- Units 1 and 2, 1500 HP, 4160V, 1800 RPM, Motors using Soft-Starters.
- Power Factor Correction Capacitor Bank.

Harrisburg Station, Electrical Engineering Design by Hinz  
Included:

- New 34.5KV/4160V-480V Substation; Station Power Distribution Upgraded to 4160V system.
- Single unit 3500 HP, 4160V, 3600 RPM, Motor using a Variable Frequency Drive (VFD).
- All new pumping station; Electrical Engineering and design provided by Hinz.

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

[www.hinz.com](http://www.hinz.com)