



A Rockwell Automation Company

Alyeska Pipeline Services Company Crude Oil Pipeline Process Risk Reduction

The Client:

Alyeska Pipeline Services Company (APSC) owns and operates the Trans Alaska Pipeline, a 48-inch sweet crude line that stretches from Prudhoe bay to the Valdez terminal, over 800 miles in all. The Trans Alaska Pipeline transports 25% of the continental USA's transportation energy.

The Alyeska Pipeline Services Company (APSC) is in the process of redesigning the Trans Alaska Pipeline to handle reduced flow rates more efficiently. This has been dubbed the "Strategic Reconfiguration Project."

The Requirement:

APSC needed a process automation company that could help them ensure the new pipeline design would be safer based on their Process Hazards Analysis report (PHA) study results. Hinz was selected for this task.

The risks normally associated with operating a crude pipeline are somewhat amplified on the Trans Alaska Pipeline. The line passes over arctic tundra, mountains, and rivers that are very sensitive to environmental changes. All engineered changes are overseen by a regulatory body called the Joint Pipeline Office (JPO). The JPO need verifiable proof that the pipeline will be made safer with each engineered change to the process. This includes all aspects of safety: people, environment, and asset protection.

Delivery outages will affect the profitability of the pipeline. Extended delivery outages can be risky for the entire US economy. There is little tolerance for spurious trips on this pipeline.

The Strategic Reconfiguration Project was necessarily limited in scope. Large mainline valves and relief system valves had to remain as is. Between pump stations there are gate valves, over sixty in all. These are needed to limit the loss of inventory in the event of a major earthquake. Remote gate valves employ older Triconex remote terminals that could not be upgraded at the same time as the pump stations. Retention of these existing components made risk reduction assessment very difficult.

The Design Solution:

Hinz provided an integrated Risk Reduction service. As part of this overall service, Hinz evaluated the achieved risk reduction for every new or rebuilt component. Hinz's Layers Of Protection Analysis (LOPA) methods made sure all the pipeline safety functions would meet or exceed the requirements stated in the client's PHA.

Wherever new equipment was to be applied in a critical application or risk reduction application, Hinz implemented a policy to purchase only those components that were tested and certified to meet the international safety standards IEC 61508 and IEC 61511. Meeting this standard also meant meeting Alyeska's seismic requirements. To prove compliance, Hinz asked all vendors to provide copies of their TÜV certificates and certification reports. Each report was carefully examined by Hinz.

Existing process valves were to remain in place and be used by the Safety Integrity Pressure Protection System (SIPPS) for critical shutdown functions. None of these

valves were SIL certified. To determine whether they met risk reduction requirements, Hinz analyzed ten years of maintenance work order history for each valve type and calculated their respective failure rates and modes.

Many of the SIPPS nodes are remotely located in areas that are very difficult to access during the winter months. To compensate, the calculation of risk reduction was based on an average repair time of 24 hours. (The industry standard is eight hours).

Hinz used a modified version of the LOPA method described in IEC 61511 to calculate the effect of each applied risk reduction layer. The method was audited by an independent third party (ModuSpec) and found to be accurate.

In situations where net risk reduction was found to be insufficient Hinz made recommendations for improvements or additional layers of protection.

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Hinz's final risk reduction engineering and automation engineering was independently verified against the Safety Requirements Specification document to make sure each safety function that was called for was actually designed into the process. The final LOPA analysis was audited to check that the method was applied consistently and correctly. Finally, Hinz's Engineered Risk Reduction Report was audited to make sure the claims made and conclusions drawn

were supported by evidence.

The redesigned pipeline will be safer and more reliable. Alyeska's quantified risk reduction translates directly into a cost savings forecast. This, and improved process availability, are forecasted to pay for the SIPPS system within the first two years of operation.

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

www.hinz.com