



Control Systems International®



In less than two years, more than 70,000 workers completed the Trans-Alaskan pipeline in May of 1977. At a cost of 8 billion dollars it was the largest privately funded construction project in American history.

The Trans-Alaskan Pipeline traverses three mountain ranges in some of the harshest conditions on Earth.

*Since it first went on line, 12 pump stations have pushed more than 14 billion barrels of crude through 800 miles of 48 inch pipe. In May of 2005, **Alyeska Pipeline Services Company (APSC)** replaced the aging legacy SCADA system on that pipeline with a new state-of-the-art **UCOS SCADA** system, developed by **Control Systems International, Inc. (CSI)**, of Lenexa, Kansas.*

Alyeska needed a robust SCADA system that could manage both the pipeline and the marine loading facility. It needed a reliable system that could be installed and maintained with little or no down time. It needed a system that could be used with the hardware and protocols already in place.

After a careful search, Alyeska chose the pipeline SCADA system that already had a proven track record: UCOS.

Project Profile: Alyeska Pipeline Company

UCOS Monitors and Controls 2 Million Barrels of Oil a Day



UCOS (User Configurable Open System) executes on standard, off-the-shelf hardware, and can be integrated with existing field equipment that often requires no rewiring, which was the case with Alyeska.

From the south shores of Prudhoe Bay, the Trans-Alaskan Pipeline delivers 17% of our nation's domestic crude oil to Port Valdez, the northern-most non-freezing port in America. To manage this precarious journey, Alyeska maintains a UCOS SCADA master station in Port Valdez which monitors and controls every inch of the pipeline and marine terminal, 24/7.

CSI engineers started design specifications in 2003. Working closely with Alyeska engineers, CSI built a control scheme using the patented UCOS device templates which are pre-tested and pre-configured. Once one device is configured and tested, all like devices can be added to the control scheme with a few clicks of a mouse. What takes days to configure in some SCADA systems can be performed in seconds with UCOS.

This visually oriented design technology also allows engineers to see the logic, operator interface, tag definitions, and faceplates of any device or sequence of devices with the click of a mouse. Being able to see the control scheme in a dynamic graphic run-time environment greatly reduces training and maintenance time, as well.

UCOS monitors and controls 3,047 input points and 352 control points on the pipeline and 1,074 input points and 461 control points at the marine terminal. It scans 14 data acquisition units on the pipeline (each pump station, the North Pole metering facility, and the Petro Star refinery), 24 units at the marine terminal, and 14 metering units. UCOS manages all data acquisition and control; alarm and data processing; display; and interfaces to historical archiving and reporting. UCOS also interfaces with APSC's hydraulic modeling, leak detection, and seismic evaluation systems.

Alyeska chose CSI's UCOS SCADA system over Telvent's or Honeywell's system because UCOS is an open system, does not require proprietary hardware to operate, and will configure to existing equipment without rewiring.

UCOS can monitor, control, and interface to unlimited input and control points and can scan several brands of I/O on the same system.

By design, UCOS SCADA master stations can be distributed anywhere along the network. For example: If there is a problem in the Valdez master station, Alyeska has Alternative Operations Control Centers (AOCC) at Anchorage, pump station one, and pump station nine. This gives Alyeska the option of operating the entire pipeline from any of those locations.

Over the years, Alyeska installed several sub-systems to monitor and control various functions throughout the pipeline. Instead of tearing all of those systems out and replacing them with newer, more expensive equipment, CSI engineers configured UCOS to communicate with these legacy subsystems.

CSI and Alyeska engineers also installed UCOS parallel to the legacy system, so there was no down time at cut over. This saved Alyeska time and money because the crude oil kept flowing while engineers switched systems.



18 holding tanks contain 9.18 million barrels

UCOS also monitors and controls the pumps and valves at the tank farm. There are 18 tanks, each with a capacity of 510,000 barrels of crude oil.

UCOS controls the oil flow into the tankers when loading an ultra large crude carrier (ULCC) which can hold up to 300,000 dead weight tons (dwt) of crude, or a very large crude carrier, (VLCC) which can hold between 150,000 and 300,000 dwts. Alyeska has loaded more than 18,800 tankers since the first batch of crude came through the pipeline in June of 1977.



VLCCs can carry up to 300,000 dwts

UCOS also interfaces with leak detection, and seismic evaluation systems. If a leak occurred in the pipeline, the UCOS SCADA system would be notified by the leak detection system and UCOS would generate an alarm to the operator workstations. This all happens instantaneously which allows Alyeska personnel to act quickly. The same holds true for earthquakes. Any seismic activity evaluated by the APSC system will notify UCOS which would in turn generate an alarm at the operator workstations.

By using the UCOS Pipeline SCADA system Alyeska will be able to add new hardware or change the old hardware without having to re-engineer the entire system. As new technology emerges UCOS can be configured to newer hardware, usually without any down time. This will enable Alyeska to keep up-to-date and keep the Trans-Alaskan Pipeline up and running smoothly to provide us with our growing energy needs.



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