

New Dimension Solutions Formulates Maintenance Policies For One of World's Largest Pipelines

The Client:

Alyeska Pipeline Service Company

APSC operates and maintains one of the largest pipelines in the world. The 800 mile trans-Alaskan pipeline moves crude oil approaching 88,000 barrels an hour through a 48 inch pipeline from the production oil fields of the North Slope at Prudhoe Bay to the Port of Valdez in Prince William Sound. It takes 5.6 days at 6 mph for a barrel of oil to reach the Valdez Marine Terminal. Once the oil reaches the port, it is normally stored in storage tanks and then loaded into



tankers at an average rate of 58 tankers per month. Outbound laden tankers are assisted by the Ship Escort Response Vessel System (SERVS) from the Port of Valdez to the Hinchinbrook entrance at the Gulf of Alaska. Navigational safety affects the escort rules such as the presence of icebergs, high winds or sea conditions.

There are seven active stations along the pipeline. Six of these are pump stations (1,2,4,7,9,12) each have variable speed gas or liquid turbine driven pumps. Pump Station 5 is actually a relief station with a large crude breakout tank and small re-injection pumps. There is a pressure relief system and a breakout tank at each of the pump stations designed to protect the pipeline from over-pressure due to surges or static head. Although the pipeline's maximum capacity was 2.136 million bbls/day, the expectation is to pump between 1.1 and 1.3 million bbls/day at a maximum pressure of 1180 psi for the foreseeable future. Oil will remain pump-able in the pipeline for up to 14 days in the winter in the event of a complete line stoppage. Crude volume in the pipeline when it is full is 9,065,065 bbls., approximately equal to the total storage capacity of the Valdez Marine Terminal tanks.

Benefits

- Substantial improvements in overall reliability
- Significant reductions in PM man-hours
- Lower overall maintenance costs

Alyeska's 1300 employees are divided into three divisions, Corporate, Fairbanks Business Unit (FBU) and Valdez Business Unit (VBU). Alyeska's operating budget in 1998 was approximately \$530 million.

Phase 1

RCM Projects Completed By New Dimension Solutions

NDS was retained by APSC VMT Business Unit to analyze a number of strategic and sensitive systems using Reliability Centered Maintenance throughout 1999 and during March 2000. The systems analyzed by NDS and APSC personnel were as follows:

- Berth 5 Tanker Vapor Collection System
 - Fenwal Safety System
 - Oxygen Analyzers
 - Berth 5 Vapor Collection System
 - Bailey Distributed Control System
- Waste Gas Incinerators
- Nitrogen Supply System
- Nitrogen Supply Air Compressors
- Berth 4 Fire Systems

Phase 2

Bureau of Land Management – Joint Pipeline Office

The Joint Pipeline Office (JPO) based in Anchorage, Alaska is made up of several US Government and State of Alaska agencies that oversee the operations and maintenance of the Trans Alaska Pipeline System (TAPS). The Right of Way (ROW) agreement between Alyeska Pipeline Service Company (the operator and maintainer of TAPS) and the US Government is coming up for renewal. To enable the US Government to grant a renewal of ROW agreement they wanted to evaluate the maintenance strategies of the TAPS' critical systems and chose RCM2 as the process to evaluate these critical systems. NDS won a Request For Proposal to conduct these RCM evaluations. After conducting several 3-day courses, NDS facilitated 26 analyses in 2001 on critical systems at the Valdez Marine Terminal and on the Pipeline. NDS will continue facilitate the remainder of these critical systems during 2002. The ultimate objective of the JPO is for APSC to take ownership of the RCM2 program.

Benefits

The analysis of these systems have resulted in substantial improvements in overall reliability, reductions in PM man-hours and maintenance costs. Several 3-day training courses and one 10-day facilitator course have been conducted.