



Survival of the Trans-Alaska Oil Pipeline

Full Mitigation Best Practice Story

State-wide, Alaska

The State of Alaska - Each day, the Trans-Alaska oil pipeline carries one million barrels of oil, about 17% of the domestic oil supply for the United States, valued at about \$25 million. If the pipeline had ruptured during the recent Denali earthquake, the lost revenue and cost of repair and environmental cleanup would have been incalculable.



When the pipeline was proposed in 1968 to transport oil from producing fields near Prudhoe Bay on the Arctic Ocean to the ice-free port of Valdez, USGS geologists realized that earthquakes on faults along the pipeline route presented a potential threat. In the 1970's, seismologists and geologists commissioned by the Alyeska Pipeline Service Company, in concert with the USGS, studied the likely effects of a magnitude 8.0 earthquake, judged to be the maximum credible earthquake for the Denali fault. The resulting technical requirements for the pipeline stipulated it must be designed to withstand intense shaking levels and up to twenty feet of offset, which proved to be right on target for the magnitude 7.9 earthquake that occurred on November 3, 2002.

Shaking during the magnitude November 3 earthquake was violent and damaged a few of the elevated supports south of the fault zone. However, the pipeline design successfully accommodated the damage and remained adequately suspended between undamaged uprights without rupturing. The Alaska oil pipeline had survived intact, with only nominal damage. "Although considered to be excessively conservative at the time, the USGS design guidance proved to be on target, and the resilience of the pipeline to Sunday's fault rupture is a testament to the importance of science in hazard mitigation and decision-making" says USGS Director, Charles Groat.

Activity/Project Location

Geographical Area: **State-wide**

FEMA Region: **Region X**

State: **Alaska**

Key Activity/Project Information

Sector: **Public**

Hazard Type: **Earthquake**

Activity/Project Type: **Utility Protective Measures**

Activity/Project Start Date: **11/2002**

Activity/Project End Date: **Ongoing**

Funding Source: **Private funds**

Activity/Project Economic Analysis

Cost: **Amount Not Available**

Non FEMA Cost: **0**

Activity/Project Disaster Information

Mitigation Resulted From Federal
Disaster? **Unknown**

Value Tested By Disaster? **Unknown**

Repetitive Loss Property? **Unknown**

Reference URLs

Reference URL 1: http://www.fema.gov/plan/prevent/earthquake/sty_oil.shtm

Reference URL 2: http://www.fema.gov/plan/prevent/bestpractices/NEHRP_BP_page.shtm

Main Points

- In the 1970's, seismologists and geologists commissioned by the Alyeska Pipeline Service Company, in concert with the USGS, studied the likely effects of a magnitude 8.0 earthquake, judged to be the maximum credible earthquake for the Denali fault.
- The resulting technical requirements for the pipeline stipulated it must be designed to withstand intense shaking levels and up to twenty feet of offset, which proved to be right on target for the magnitude 7.9 earthquake that occurred on November 3, 2002.
- Shaking during the magnitude November 3 earthquake was violent and damaged a few of the elevated supports south of the fault zone.
- However, the pipeline design successfully accommodated the damage and remained adequately suspended between undamaged uprights without rupturing.
- The USGS design guidance proved to be on target, and the resilience of the pipeline to the fault rupture is a testament to the importance of science in hazard mitigation and decision-making