Alaska Dept of Labor & Workforce Development

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JOINT AFTER-ACTION REPORT FOR THE TAPS BULLET HOLE RESPONSE

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FOREWORD

Following any significant response to an oil or hazardous substance release incident, the key response agencies normally prepare an after-action report to document the significant lessons learned in order to improve future responses of this nature. Staff from Alyeska Pipeline Service Company (APSC), the State of Alaska Departments of Environmental Conservation (ADEC), Fish and Game (ADF&G), Labor and Workforce Development (ADOL), Natural Resources (ADNR), and Public Safety (ADPS), the U.S. Environmental Protection Agency (EPA), the Joint Pipeline Office (JPO), U.S. Department of Transportation-Office of Pipeline Safety (DOT-OPS), U.S. Department of the Interior-Bureau of Land Management (DOI-BLM), and other entities have collaborated in producing this joint after-action report.

While this report highlights areas requiring improvement, there were many positive aspects of the response as well. These include the rapid and coordinated response by APSC, State, and Federal response teams, the effective containment and control of the spilled product using established as well as innovative tactics, and the recovery of a large amount of the crude oil. Details of the significant, positive lessons learned are included within each section.

APSC as well as the Federal and State agencies are committed to improve their collective spill response capabilities through applying the lessons learned contained in this report. These lessons learned may also be periodically reviewed during future drills and spill incidents to ensure similar problems do not occur, and to further refine and improve the spill response process. Corrective actions may be immediate in some cases, while long term for other, more complex issues.

This report identifies only those issues directly related to the TAPS Milepost 400 event, and provides consensus-based observations and recommendations developed by the work group. Individual agencies may also have developed internal lessons-learned reports, specific to improving the agency's ability to respond to an oil or hazardous substance release.

An electronic file of this report is available at: http://www.state.ak.us/dec/dspar/perp/home.htm

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INTRODUCTION

During the afternoon of October 4, 2001, an oil spill occurred when the Trans-Alaska Pipeline System (TAPS) was shot with a high power rifle. The incident occurred approximately 80 miles north of Fairbanks near the community of Livengood. Alyeska Pipeline Service Co. (APSC) discovered the leak by aerial security surveillance, and also spotted the alleged shooter. Alaska State Troopers and pipeline security staff apprehended the alleged shooter within hours. State and federal agencies along with APSC and its contractors quickly responded to the release. The APSC Fairbanks Emergency Operations Center (FEOC) was activated, and the Unified Command was formed to direct incident management operations.

The impacted section of the pipeline was quickly isolated by control valves; however, the residual oil in the pipeline was still under pressure, and crude oil sprayed from the bullet hole for an extended period of time. Steps were immediately taken to reduce the pressure within the section of the line. Oil remaining in the section of pipeline was pumped around Remote Gate Valve 65 into the segment north of the isolation valve as a method to reduce segment pressure.

The high pressure also created a serious hazard for responders: a fine mist of oil created a potentially explosive atmosphere. Fire crews were staged near the spill with foam suppressants as heavy equipment was brought in to stop the leak.

A hydraulic clamp, designed, built and tested for such a leak, was lifted by crane into place within 36 hours after the release. By the next morning, the bullet hole had been permanently plugged, North Slope oil production resumed at the normal pace, and the flow through the pipeline was restored.

Trenches, berms and containment pits were dug and proved effective in containing the oil to within a quarter of a mile of the leak. In fact, even before the bullet hole was plugged, crews were recovering more oil than the actual release rate. Recovered oil was re-injected into the line at Pump Station 7. To date, approximately 175,793 gallons (of the estimated 285,600 gallons of spilled product) has been recovered, and removal of the contaminated soils and vegetation is presently underway.

Detailed information regarding this incident (i.e., Situation Reports, photos, other documents) may be obtained by visiting the Unified Command website at:

http://www.state.ak.us/dec/dspar/perp/011004301/index.htm

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EXECUTIVE SUMMARY

In the course of discussing and developing the lessons learned from this event, the after-action report work group members expressed a common concern; the need to stress the hazards associated with this response in order to view the overall operation in the proper perspective. Too often, an oil spill is viewed as a puddle of product on land, or a viscous layer or sheen on water. In this event, the release of crude oil from the bullet hole initially began as an aerosol spray, which created explosive vapor levels much higher than a flowing release of product.

Another public concern that needs to be addressed is the length of time taken from the initial bullet hole release to the installation of the clamp and the subsequent permanent repair. The issues discussed below (and in the subsequent sections of this report) will hopefully provide a general overview of the problems faced by the response crews. The overall driving factor was the need to have everything in place and all of the safety issues addressed prior to installing the hydraulic clamp.

While the purpose of this report is to identify elements of the response that may be subject to improvement, it must be remembered that the overall response is considered to have gone well. Due to the efforts of the responders, spilled oil was contained in a limited area, thus limiting environmental damage. Pipeline throughput, important to the economy of the State and the nation, was restored with minimal disruption to the public. Despite the hazardous nature of the event, no one was injured, and TAPS, an asset to National Security, was restored to service promptly.

Source Control: Source control for a leaking barrel may be to simply drive in a wooden peg. It is not so simple for a large diameter oil pipeline. After the area has been characterized for hazards to response personnel and the appropriate safety plan has been established, the leak source must be, at least cursorily, examined. The insulation remaining around the pipeline must be removed. The nature of the damage must be generally known to determine what methods can be used to stop the leak, and what may be needed for the permanent repair.

Concerns for working near a high-pressure leak (See also the section on Safety): High-pressure spray atomizes volatile elements very quickly, potentially producing significantly higher vapor concentrations, an explosive atmosphere, and an extreme fire hazard, without large amounts of liquid oil pooled nearby. The high-pressure jet also spreads the oil over a larger area, with the wind having a greater affect on the spread of the oil aerially.

Health and safety: There are significant health and safety threats while working around an oil spill. There are exposures to air contaminated from benzene, dermatitis from skin contact with crude oil, reduced visibility, and slips, trips and falls from walking in oiled surfaces. Workers were protected from these hazards by wearing respirators, gloves, boots, hardhats, safety glasses, and fire resistant clothing, as appropriate. Decontamination stations were set up for workers leaving the hot zone. Because of the fire hazard during the repair, emergency crews were suited up in bunker gear to rescue oil spill workers if needed.

Fire/explosion: With the presence of flammable vapors, any ignition source, including a spark of static electricity, could have started a fire. If the vapor concentrations were high enough, an explosion could occur. The mechanized construction equipment needed to lift or apply heavy clamps against the pipeline's internal pressure is almost always a potential source of ignition. The general public may view crude oil as less of an explosive hazard than gasoline. This is not the case as vapors from a crude oil spill can ignite in much the same manner as vapors from a gasoline release.

Significant Lessons Learned

- **Incident Command System:** While there was excellent sharing of information and duties within the staff assigned to the spill, communications between the Unified Command and the Joint Pipeline Office senior management could be enhanced by exploring new methods for direct meetings and information flow.

- **Unified Command Website:** The Joint Information Center (JIC) and associated web site provided an excellent source of public information.

- **Communications:** Communications between the field and the Incident Management Team (IMT) at the Emergency Operations Center (EOC) could be improved, especially early on during the response when developing and disseminating Incident Action Plans (IAPs).

- **Firefighting Support:** Mutual aid received from the Steese Volunteer Fire Department together with the expertise brought in from Williams Fire and Hazard Control provided a critical element of the overall site safety.

- **Leak Detection:** The spill was visually detected shortly after the pipeline was shot, and before any leak detection systems alarmed. Although the on line leak detection systems were functioning as designed, there are limitations to these systems. There is ongoing work to improve the capabilities of existing leak detection systems, which are believed to be best available technology (BAT). The current leak detection sensitivities are well within the sensitivity requirements of 1% of throughput and are consistent with BAT, per State regulatory requirements. Nevertheless, APSC is targeting improvements to its overall leak detection abilities to compensate for changing pipeline operations and routine operational activities.

- **Source Control:** The Plidco Smith+ Clamp, despite its common name of "bullet clamp," was deemed inappropriate to seal this bullet hole because installation against the jet stream pressure and the hazardous environment was considered unsafe for the workers who would have to manually install the clamp. The Pipeline Hydraulic Clamp was chosen because it could be applied remotely under the site line pressure and jet stream force. There were no issues related to that decision that require immediate actions. However, several ideas to increase the ability to reduce pressure and/or stop the leak at a site merit investigation for effectiveness and practicality. (See details in Section IV, Source Control). While making preparations to reduce the pressure of the oil at the spill site, there was pipe movement at Check Valve 50 that resulted in tripped anchors. Changes to procedures are suggested for maintenance of the relief valves and for operations while check valves are locked open.

- **Safety:** The safety controls implemented to reduce exposures to hazards prevented a serious injury, fire, or similar disaster from occurring. However, there are areas that could be improved.

  Future exercises and preparedness training should include appropriate participation by community fire departments together with APSC fire and safety personnel in order to establish or enhance mutual aid and working relationships. There should be an effort to identify in-state and out-of-state resources that could enhance fire prevention and fire suppression capabilities.

- **Containment and Cleanup:** In the initial stages, the decision to concentrate available resources on containment rather than source control was made in the field. Because of the complexity of the source control issue, it was best managed by technical staff at the EOC. This decision was strategic in limiting the area of contamination and allowed time to safely address source control.

- **Return to Service:** Prior to the decision to install a Threaded O-Ring (TOR), there were discussions of different options for repair. There are additional agencies involved with TAPS repair and startup that are not closely involved with the oil spill response. Close coordination with Joint Pipeline Office agency personnel not at the Fairbanks Emergency Operations Center was required to ensure that pipeline restart and future operational issues were adequately addressed.

- **Contingency Plan Implementation:** In general, the provisions of the Cplan were implemented during this response. However, certain sections of the plan will require revision to more completely describe the existing systems such as leak detection and source control, while other portions of the plan should be revised to include the effects of hazardous conditions on response actions. The Cplan could be enhanced to include the containment tactics used in this response as well as more information on permits needed for portions of the response.

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