Construction-related Oil Spills
Along Trans-Alaska Pipeline

BY:
Nancy Kavanagh
and
Alan Townsend
1977
Special Report No. 15
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JOINT STATE/FEDERAL FISH AND WILDLIFE ADVISORY TEAM
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Abstract

Oil spills, both major and minor were common occurrences during construction of the Trans-Alaska Pipeline. Alyeska Pipeline Service Company prepared a contingency plan outlining procedures for handling construction-related oil spills. Despite the philosophy advanced in their contingency plan, i.e. that prevention of oil spills by good maintenance and housekeeping is the best policy, the effort expended by Alyeska and its contractors was not adequate. Numerous small spills and several serious spills occurred. Reporting of spills was inconsistent and response to spills was, in many cases, quite poor. On future construction projects, education and training of employees, good maintenance, and strict enforcement of oil spill regulations and policies should be employed.
Introduction

The possibility of an oil spill occurring as a result of a pipeline leak or rupture has long been considered part of the gamble inherent in operating the Trans-Alaska Pipeline. Alyeska Pipeline Service Company (APSC) was bound by the stipulations imposed on it by the state and federal governments to produce a comprehensive oil spill contingency plan in case an accident involving the pipeline should take place during its operation.

The risk of an oil spill, however, was not confined to the operations phase. It was recognized by APSC that oil spills were likely also during construction of the pipeline. With this in mind, APSC formulated their "Contingency Plan - Oil Spills - Construction." This handbook was updated annually during the construction phase.

The objectives of this paper are to:

1. Discuss APSC's construction oil spill plan.
2. Discuss representative oil spills which occurred during construction.
3. Evaluate APSC's response to oil spills and the adequacy of the construction Oil Spill contingency plan.

Construction Phase Oil Spill Contingency Plan

APSC's construction contingency plan was divided into seven sections, the first being an introduction which described the plan's scope, purpose and APSC policies. The plan was to apply to "all Alyeska Pipeline Service Company facilities, including communications facilities, roads and camps, stations and terminal, and any construction activities." In addition, the manual stated that it "will be the responsibility of Alyeska Pipeline Service Company, the Construction Management Contractors and all other Contractors to participate in the implementation of this plan."

APSC considered it to be their policy to "comply with all air and water pollution laws and regulations" and "to adopt every reasonable measure for the protection and conservation of air and water resources." They emphasized that "the prevention of oil spills is the best procedure. Good operational procedures, good housekeeping and adequate equipment maintenance are the best insurance against oil spills." How this policy actually operated will be explored later.

Section 200, Prevention, mentioned that orientation sessions would be conducted for all construction supervisory operating personnel. There also would be periodic inspections of construction equipment and facilities, including special contingency equipment.

Other contingency plans, such as the National Oil and Hazardous Substances Pollution Contingency Plan are described in Section 300. Section 400 covers the APSC contingency organization. Action, alert and after spill procedures are described in Sections 500, 600 and 700.
The annexes to the manual contain the lists of contingency equipment and briefly explain the types of actions necessary to report and clean-up a spill. The above information is packed into a booklet 7 X 4 inches and 1/8 inch thick.

Construction-related oil spills

The APSC booklet was intended for use if and when an oil spill did occur. Theoretically, APSC's good housekeeping procedures would keep oil spills to a minimum. This was not the case. As part of the government monitoring force, members of the Joint State/Federal Fish and Wildlife Advisory Team (JFWAT), had ample opportunity to observe and become involved in many of the oil spill incidents which occurred during the construction of the Trans-Alaska Pipeline. (See JFWAT report no. 12 for a complete description of the composition and activities of the fish and wildlife team).

Sources of information on oil spills include the U.S. Environmental Protection Agency oil spill reports, APSC contractor oil spill reports, JFWAT files, and Alaska Pipeline Office (APO) reports. The discussion has focussed on the year 1975 since this was the peak construction year.

Oil spills can be divided into two categories: small spills, or those less than 50 gallons and large spills which are over 50 gallons. The definition of an oil spill is taken from APSC's contingency plan: any accidental spill of unrefined crude and all refined crude products (Ref. 1 and 2).

Small oil spills

Trying to obtain an accurate count of small spills proved to be frustrating if not impossible task. Examination of the reports to the different agencies revealed the following discrepancies:

1. missing weekly reports
2. partial reports
3. different reported spill dates
4. spills reported to one agency and not to another
5. different causes reported to agencies
6. different quantities reported
7. different clean-up methods reported

Consequently, in the tabulation, some spills may be reported more than once whereas others may not be reported at all. The reasons for the discrepancies and omissions are not readily apparent. Perhaps there were so many spills that keeping reports accurate and timely was an insurmountable task. There was some unsubstantiated evidence that the contractors in some areas coerced employees into not reporting small spills or falsifying reports of the total amounts spilled. It was understood that employees...
not abiding by this unwritten policy would be fired or transferred to less desirable jobs.

Table 1 is a summary of spills reported by APSC Quality Control (QC) personnel and those reported by a contractor Price-Potashnik-Codell-Oman (PPCO), during the time from January 1, 1975 to December 7, 1975. The area covered was construction section 3 of the pipeline which extended from the Yukon River to the Salcha River south of Fairbanks. It can be seen from the table that most oil spills occurred as a result of equipment repair, refueling or vehicular accidents. This is corroborated by the JFWAT surveillance reports.

Table 2 gives a summary of oil spills for 1974, 1975 and 1976. It is notable that more oil was spilled, according to APSC reports, in 1976 than in 1975, even though 1975 was the peak construction year. Perhaps a greater percentage of spills were reported in 1976 or maybe the contractors grew more careless.

JFWAT biologist Steve Person wrote in a report dated March 3-12, 1975:

"Minor oil spills ... are becoming more and more frequent along the workpad. Virtually every place a piece of equipment is repaired, either oil, coolant or hydraulic fluid is spilled, and often left on the pad. Most of these are minor but their impact could be reduced simply by requiring use of oil absorbent material...." (Ref. 14).

During the same period, Ed Bellringer wrote:

"At intersection of [access road] 67 APL-5 and [pipeline workpad] observed workman burning off an area on the workpad where oil had been spilled during repair of dump vehicles. Diesel oil was being poured on oil saturated ground from time to time and burned with a propane weed-burner type torch." (Ref. 3).

Another prime cause of oil spills was the practice of storing petroleum products, especially waste oil, in barrels and leaving them in vulnerable locations rather than placing them in properly lined and diked areas. An excerpt from Person's surveillance report of February 16-26, 1975 reads:

"Two potential oil spills were discovered. A 55 gallon barrel full of DN600 was found punctured and propped against a hydroax on [access road] 66 APL-2. ... Two half barrels containing a total of 30 to 40 gallons of what appears to be crank case oil, antifreeze and solvent were found sitting (uncovered) on the edge of the workpad at the top of the hill south of the Tatalina [River] (A.S. 67)." (Ref. 13).

The following appeared in Person's May 27-June 5, 1975 report:

"I found a 55 gallon drum nearly full of waste crank case oil in a pond created by the culvert at Station 1795 (A.S. 66)." (Ref. 15).
Table 1. Quality Control (QC) and Price-Potashnick-Codell-Oman (PPCO) oil spill logs for January 1, 1975 through December 7, 1975 in section 3 of the Trans-Alaska Pipeline.

<table>
<thead>
<tr>
<th>Cause of Spill</th>
<th>Number Reported</th>
<th>Estimated Gallons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Q.C.</td>
<td>PPCO</td>
</tr>
<tr>
<td></td>
<td>Q.C.</td>
<td>PPCO</td>
</tr>
<tr>
<td>1. Leaky equipment</td>
<td>125</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>573.5</td>
<td>186</td>
</tr>
<tr>
<td>2. Repair of equipment</td>
<td>62</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>365</td>
<td>89</td>
</tr>
<tr>
<td>3. Broken hydraulic line</td>
<td>41</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>323</td>
<td>236.5</td>
</tr>
<tr>
<td>4. Refueling</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>50.5</td>
<td>193.5</td>
</tr>
<tr>
<td>5. Overturned Equipment</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>169</td>
<td>191.5</td>
</tr>
<tr>
<td>6. Damaged drums</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>87</td>
</tr>
<tr>
<td>7. Other Equipment</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Breakage</td>
<td>43.5</td>
<td>101</td>
</tr>
<tr>
<td>8. Unidentified</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>18</td>
</tr>
<tr>
<td>TOTALS</td>
<td>279</td>
<td>155</td>
</tr>
<tr>
<td></td>
<td>1612.5</td>
<td>1104.5</td>
</tr>
</tbody>
</table>

Average amount of oil per spill

Q.C. - 5.8 gallons per spill

PPCO - 7.1 gallons per spill
Table 2. SUMMARY OF ALYESKA MINOR SPILL REPORT DATA*

<table>
<thead>
<tr>
<th></th>
<th># Spills Reported</th>
<th># Gallons Spilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>29</td>
<td>272</td>
</tr>
<tr>
<td>1975</td>
<td>3,319</td>
<td>20,222</td>
</tr>
<tr>
<td>1976</td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>129</td>
<td>863</td>
</tr>
<tr>
<td>February</td>
<td>353</td>
<td>1,784</td>
</tr>
<tr>
<td>March</td>
<td>787</td>
<td>4,813</td>
</tr>
<tr>
<td>April</td>
<td>1,231</td>
<td>7,684</td>
</tr>
<tr>
<td>May</td>
<td>1,144</td>
<td>8,142</td>
</tr>
<tr>
<td>June</td>
<td>1,336</td>
<td>8,567</td>
</tr>
<tr>
<td>July</td>
<td>1,043</td>
<td>6,125</td>
</tr>
<tr>
<td>August</td>
<td>664</td>
<td>4,560</td>
</tr>
<tr>
<td>September</td>
<td>528</td>
<td>3,702</td>
</tr>
<tr>
<td>October</td>
<td>347</td>
<td>3,121</td>
</tr>
<tr>
<td>November</td>
<td>300</td>
<td>1,894</td>
</tr>
<tr>
<td>December</td>
<td>85</td>
<td>777</td>
</tr>
<tr>
<td></td>
<td>7,947</td>
<td>52,032</td>
</tr>
<tr>
<td>GRAND TOTAL</td>
<td>11,295</td>
<td>75,526</td>
</tr>
<tr>
<td>Reported as Majors</td>
<td>40</td>
<td>697</td>
</tr>
</tbody>
</table>

* Includes Prince William Sound Regional Office and Northern Regional Office
The documentation reveals that APSC's attitude and that of their contractors was generally unconcern over these small spills. Apparently, good housekeeping as a measure of prevention was not employed. Small spills occurred constantly and were not reported or cleaned up. JFWAT biologist Charles Kay wrote in 1976:

"As a specific example of a chronic condition, civil equipment was repaired on the workpad near [access road] 73 APL-1 and the 50-75 minor oil spills that resulted from this maintenance activity have not been cleaned up. [Government engineer] Brendle has told APSC to clean-up their entire act." (Ref. 6).

Plates 1 through 4 and Plate 10 illustrate the sloppy procedures which resulted in the numerous small oil spills.

It can be assumed that the unconcern stems from economic considerations and ignorance of the cumulative effect of countless small oil spills. A contractor can save more money by adding five gallons of hydraulic fluid per day to a $100,000 piece of equipment with leaky hoses than if the equipment was standing idle for days waiting to be repaired. The result is a series of 5 gallon hydraulic fluid spills over the entire time the equipment is in use.

The problem of the management and workers' attitude was discussed in a memo from M.J. Nelson (APSC) to State Field Surveillance Officer B.E. Wondzell dated December 8, 1975.

"Your Field Memos .... have been discussed by our personnel and with the PPCO POL Representative in an effort to create an attitude of concern about the numerous small oil spills that occur. We are well aware that the intent of your memos goes far beyond cleaning up those few spills you mentioned that should be cleaned up. The intent is to change a prevailing attitude, and in all candor, this is not easy. Personnel with whom we are dealing have used procedures for years which now are not allowed (i.e. draining a gear box onto the ground). To change this attitude is not only difficult, but costly. The older experienced hands, who follow the old ways are also the producers; the younger "environmentally concerned" hands are still learning.

The result is that we are caught in a cross-fire between trying to keep production as high as we can and trying to place responsibility on someone to see that the spills are cleaned up."

When worker's carelessness produces countless small oil spills, it can consume all of a quality control person's time simply in submitting reports and documentation. Consequently, many spills were never reported. Foremen are reluctant to detail their men to oil spill cleanup when it involved minor spills because it involved taking the men away from their regular duties and could slow down work. Furthermore, the foreman may question the necessity for mopping up "just a little bit of oil."
Experience indicates that the good housekeeping procedures mentioned by APSC's oil spill contingency plan were not generally implemented either from economic reasons or apathy. Oil spills were often not reported or were reported inaccurately. Clean-up was often not prompt presumably for the same reasons mentioned above.

**Large oil spills**

Spills greater than 50 gallons in volume occurred as a result of either vehicular accidents (Plate 5) or faulty fuel facilities in camps. Of the two, vehicular accidents were the most common. For example, JFWAT biologist W.L. Pamplin chronicles the events that occurred after a tanker truck left the road in the Chandalar Shelf area on the south side of the Brooks Range. Approximately 8500 gallons of diesel fuel had been spilled and was entering a side channel of the Dietrich River. (Memo from W.L. Pamplin, Jr. November 11, 1974). In May 1977, 1200 gallons of diesel were spilled into the same tributary after another tanker left the road in the same place. (Ref. 4). Steve Person describes a spill of 2000 gallons of diesel oil near a tributary to Globe Creek after another tanker ran off the Elliot Highway (Ref. 12). A surveillance report by Alan Townsend includes the account of a tanker accident on the TAPS highway which dumped 4000 gallons of diesel oil next to Lost Creek (Ref. 16) (Plate 6).

How did Alyeska respond to these spills? The reports appear to indicate that, whereas the reporting of the spills seemed to be generally timely and correct, the containment and cleanup was often disorganized and ineffective. Pamplin reports that, after receiving the report of the tanker accident at 7:30 am, an inspection of the scene at 3:00 pm revealed that no cleanup actions were on-going. Eventually, laborers and equipment arrived and cleanup commenced but the effort was still disjointed enough that a pump to remove diesel from the stricken tanker did not appear until the next day - more than 24 hours after the initial incident.

Person indicates that following the tanker spill on the Elliot, immediate response in the form of heavy equipment to remove contaminated snow, was timely but that follow-up work was not forthcoming. In Townsend's report of the Lost Creek spill, he reports that he did not observe the site until the day after the spill. APSC's containment and cleanup was inadequate and circumstances forced him to take charge of the operation in accordance with the National Oil and Hazardous Substances Pollution Contingency plan.

Spills involving camp fuel facilities were probably the most serious that occurred during the construction of the pipeline. Almost every camp experienced oil spills resulting either from fuel storage or pipe ruptures. Usually detection of these spills was not immediate since the cause was often a break in a buried fuel line. Thus the diesel fuel could leak out for days, if not weeks and months before it surfaced, usually in a nearby lake or water course. The mishap at Galbraith Lake Camp is a case in point. Gary Milke wrote in June 1975:
"The line carrying heating fuel to Galbraith Lake Camp ruptured last February. Leaked fuel was not visible, but the camp's consumption of fuel nearly doubled. This situation may have existed for a month and the quantity of fuel spilled was between 60,000 and 500,000 gallons. This week fuel became visible in a stream that flows past the camp and into Galbraith Lake." (Ref. 8)

Alyeska dug a trench in which to contain the diesel before it reached the stream but this measure proved to be unsuccessful and "a great amount [of oil] was found by-passing and entering the stream (Ref. 7). It became apparent that more extensive measures would have to be undertaken. The solution attempted was to dam the stream which fed the lake. This helped retain some diesel but it also blocked fish passage to and from Galbraith Lake. On July 20, 1975 diesel fuel was still flowing from the ground and into the lake. A report dated April 15, 1976 by Milke states: "APSC is presently constructing a large fuel spill interceptor ditch around the east and south borders of Galbraith Camp." Obviously, spills which occur in camp pads require intensive long term measures to clean up. APSC was reluctant in many cases to devote the large amounts of men, equipment and time, which ultimately meant dollars, necessary to continue a thorough long term cleanup of this type of oil spill.

Another example is the incident which occurred at Prospect Camp (Plates 7-9). As a result primarily of the discovery of the Galbraith Lake Camp spill six months previous, APSC was in the process of installing meters on all camp fuel lines so that discrepancies in consumption could more readily be detected. Why these meters were not part of the original installation is a matter of speculation but, as can be seen, their omission was certainly a false economy.

While in the process of installing such meters at Prospect Camp, workers noticed that with all lines shut down one of the meters began registering flow immediately. An excavation was undertaken and a break in a fuel line was discovered approximately 25 feet from the meter. A few days later, on January 30, 1976, diesel was discovered in a slough of the Jim River near the camp. Calculations from the monthly fuel consumption records showed the spill to be roughly 40,000 gallons. APSC was directed by JFWAT personnel to undertake immediate containment actions.

In the case of the Prospect Camp oil spill, APSC responded very well under the direction of government personnel. However, as in the case of the Galbraith Camp spill, it was evident that clean up would be a tedious and long term operation. Here again, APSC failed to continue their efforts without constant prodding from the government agencies. JFWAT biologists during their field tours, continued inspecting the spill sites and sampling throughout construction and into the operations phase of the pipeline.

Evaluation of APSC's Construction Oil Spill Plan

It is possible that Alyeska went beyond what a company usually does in generating an oil spill contingency plan for use during construction. One can find little fault with what is down on paper, except perhaps that it is heavy on reporting and light on methodology. The difficulty arose in implementation of the plan.
First of all, Alyeska and its contractors did not follow their own advice and employ "Good operational procedures, good housekeeping, and adequate equipment maintenance" in order to prevent oil spills. The result was a constant stream of small spills during construction that could amount to 75,000 gallons or 750,000 gallons. No one can give a really accurate estimate.

Secondly, the attitude of the average worker was such that spills, other than major ones, were often not reported or cleaned up. A feeling of unconcern prevailed at all ranks.

When major spills occurred, government personnel found that often APSC personnel were not well trained enough to handle the situation effectively. Apparently, the orientation promised by the manual was either inadequate to prepare APSC people for spills or it was non-existent. As in the case with the Lost Creek tanker spill and the Prospect Camp spill, government personnel were often obliged to direct containment and cleanup.

The next deficiency which occurred was in the matter of oil spill contingency equipment and supplies. The manual contained a list of equipment which was supposed to be found at each camp. Not infrequently, when a spill occurred, the equipment was inoperable, inaccessible or unavailable.

From the evidence presented here, it can be seen that Alyeska's construction contingency plan fell short of its goals.

The recommendations that can be inferred from the APSC experience are straightforward:

1. Prior to the start of a project, an oil spill contingency plan must be formulated, reviewed and agreed upon by all participating parties. The plan should contain, at a minimum, a) procedures for reporting spills, including definitions of what constitutes a spill b) suggested methods of containing an oil spill, recovering spilled oil and cleaning up c) a list of all contingency equipment and its location d) list of all agencies and management personnel to be contacted.

2. All personnel should be thoroughly briefed on reporting procedures and what will be expected from them in the event of a spill, both major and minor.

3. The contractor should employ good, i.e. environmentally sound, techniques at all times to minimize the possibilities of oil spills. This would include proper refueling and repair methods and the correct storage and disposal of all petroleum products.

4. Oil spill equipment should be readily available and should be sufficient to handle at least a 5000 gallon spill, as would be the case if a tanker truck was to overturn. Equipment should be inspected frequently to assure that it is in good working order.
5. The contractor should employ a functional quality control organization to insure that the above criteria are met.

6. The contractor should accept the fact that if, due to carelessness or accident, a spill occurs, cleanup will likely be costly, and could possibly extend over many months, if not years.

Education seems to be the key; education which can change the attitude of workers and management and imbue them with an awareness that their actions have very real environmental consequences.

Plate 2. 041-5A (JFWAT) - Dewatering operation at Material Site MS 57-2. Frequency of oil spills is indicated by sorbents floating on the water. Discharge is directly into Moose Creek. May 16, 1975. Photography: E. Bellringer


Photographer: A. Carson

Photographer: A.H. Townsend
References


