



U.S. Department  
of Transportation

**Pipeline and  
Hazardous Materials Safety  
Administration**

12300 W. Dakota Ave., Suite 110  
Lakewood, CO 80228

**NOTICE OF PROBABLE VIOLATION  
PROPOSED COMPLIANCE ORDER  
and  
PROPOSED CIVIL PENALTY**

**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

August 1, 2013

Mr. Tom Barrett  
President  
Alyeska Pipeline Service Company  
3700 Centerpoint Drive  
P.O. Box 196660  
Anchorage, AK 99503

**CPF 5-2013-5008**

Dear Mr. Barrett:

On January 8, 2011, a representative of the Pipeline and Hazardous Materials Safety Administration (PHMSA), pursuant to Chapter 601 of 49 United States Code, responded to and began an investigation of a crude oil release at Pump Station 1 (PS-01) of the Trans-Alaska Pipeline System (TAPS) operated by Alyeska Pipeline Service Company (Alyeska).

**Background**

TAPS is an 800 mile, 48-inch diameter pipeline. Alyeska has operated TAPS since 1977, transporting crude oil from Prudhoe Bay to the Valdez Marine Terminal in Alaska. The unique environment and circumstances under which TAPS operates pose many challenges for the pipeline. The challenges Alyeska faces include seismic instability, permafrost, cold temperatures, the vast distance of land the pipeline travels, mountainous and rugged terrain, remote locations along the pipeline, and internal and external corrosion.

In 1988, Alyeska discovered internal corrosion in sections of pipe known as deadlegs which experienced only occasional or low flow movement of oil. Alyeska reported that the cause of this internal corrosion was water that was deposited by the crude oil and settled in the bottom of the pipe.<sup>1</sup>

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<sup>1</sup> GAO Report to the Chairman, Subcommittee on Water, Power, and Offshore Energy Resources, Committee on Interior and Insular Affairs, House of Representatives, RCED91-89, *Trans-Alaska Pipeline*, July 1991, page 24.

In 2007, Alyeska discovered internal corrosion in the heat-affected zone of girth welds in sections of pipe that were being removed from PS-01. An Alyeska summary of the corrosion noted that this section of the piping system at PS-01 has low oil flow compared to the mainline pipe, that low flow rates can increase the potential for water and sediment to settle at the bottom of the pipe and provide a corrosive environment, and that the facility piping systems are not piggable by either cleaning pigs or in-line inspection pigs.<sup>2</sup>

On April 1, 2008, PHMSA issued a Notice of Probable Violation alleging that Alyeska had failed to provide any records to demonstrate that it had investigated the corrosive effects of the hazardous liquids transported and that it had not taken adequate steps to mitigate internal corrosion in the TAPS mainline.<sup>3</sup> In Alyeska's written response, the company stated "Alyeska has not analyzed the crude oil transported in TAPS."<sup>4</sup> Alyeska asserted that it mitigated internal corrosion through the use of an aggressive maintenance pigging program, chemical inhibitors, and corrosion coupons. Nonetheless, Alyeska agreed in a Compromise Agreement dated November 16, 2011, that the company had committed these violations. The Compromise Agreement also stated that the company had developed and implemented an internal corrosion mitigation program.

In September 2008, Alyeska discovered internal corrosion adjacent to girth welds in tank lines at PS-01 and filed a Safety-Related Condition Report with the Office of Pipeline Safety. The flow rate in these tank lines is significantly less than the flow rate on the mainline pipe. Alyeska installed five sleeves over areas with significant pipe wall loss, including two areas with over 80% wall loss.<sup>5</sup> In February 2010, PHMSA inspectors noted in the Safety-Related Condition Report that "Alyeska has completed a conceptual engineering study of the active below ground DOT covered piping. This study identified piping that was... difficult to inspect due to structural interference. Alyeska is currently conducting a preliminary engineering study to determine project details for the subset of this work at PS01."

Alyeska's 2008 Annual Report for Pipeline and Valdez Marine Terminal Facilities Corrosion Monitoring was sent to the Joint Pipeline Office (JPO) on April 17, 2009. This report shows that the company questioned the effectiveness of a corrosion inhibitor that it was using on TAPS: "The use of RU248, which is formulated for corrosion caused by dissolved acid gases, may no longer be effective in APSC system due to changing crude oil characteristic. This is because corrosion induced bacteria has been identified in several locations at the facilities.... IME [Alyeska's Integrity Management Engineering department] recommends and will be conducting an evaluation of current corrosion inhibitor effectiveness by conducting a study on all segments of the facilities; a recommendation and implementation of the most effective chemical that inhibits corrosion will be completed."<sup>6</sup>

In 2009, the JPO requested information on the internal corrosion at PS-01. Alyeska responded

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<sup>2</sup> GL 17088, Exhibit 5, page 1.

<sup>3</sup> Notice of Probable Violation, CPF No. 5-2008-5008.

<sup>4</sup> See GL 16053, May 22, 2008, Finding 5, pages 2-3.

<sup>5</sup> PHMSA OPS Safety Related Condition Report 20080077.

<sup>6</sup> Trans Alaska Pipeline System 2008 Annual Report for Pipeline and Valdez Marine Terminal Facilities Corrosion Monitoring, page 20, Appendix A, Table 5.

that they had performed a risk assessment on October 6, 2008, and decided not to excavate the concrete boxes at PS-01 to inspect for corrosion on the below ground piping.<sup>7</sup> In addition, Baker Petrolite, a contractor Alyeska selected to evaluate the corrosivity of TAPS crude oil, reported “significant levels of bacteria in the Alyeska system which have the potential to cause corrosion.”<sup>8</sup> Specifically, Baker Petrolite noted that “[b]ased on the current test results, it appears that facility piping which is not in turbulent flow and able to be pigged has the potential for bacteria corrosion problems.”<sup>9</sup>

In December of 2009, Baker Petrolite reported to Alyeska the results of a bacteria enumeration survey that it conducted in fall of 2009 on the pipeline deadlegs. The report stated: “The basic conclusion from this survey is that Pipeline and the Valdez Marine Terminal have bacteria in numbers that can and will degrade the integrity of the measured systems.”<sup>10</sup>

On June 24, 2010, Alyeska met with PHMSA and made a presentation regarding its internal corrosion program. The materials Alyeska provided during that presentation indicated that it had been analyzing the corrosivity of the crude oil and water in TAPS since 2007, that the internal corrosion inhibitor that it had been using was ineffective for the type of bacteria found in TAPS, and that the company planned to begin using a new corrosion inhibitor treatment program by September 15, 2010.<sup>11</sup> The company also planned to treat all deadlegs in the system according to the new inhibitor program in September and October of 2010.<sup>12</sup>

On January 8, 2011, crude oil was discovered flowing into the PS-01 booster pump basement under the insulation at the 4<sup>th</sup> Unit Booster Pump discharge line basement wall penetration. Alyeska contracted with Det Norske Veritas (DNV) to perform the metallurgical analysis of the removed pipe segment. DNV produced a report, “PS01 Booster Pump Manifold Failure Investigation: Laboratory Analysis September 12, 2011,” which concluded: “High levels of bacteria were found in solids and swabs taken from the area of pitting associated with the leak location.... The presence of microorganisms on the pipe surfaces combined with the undercutting pit morphology observed in the metallographic cross-sections indicates that microbiologically influenced corrosion (MIC) is likely the primary corrosion mechanism.”<sup>13</sup>

In 2011, Alyeska contracted with DNV to perform a Root Cause Analysis of the PS-01 crude oil release. The final Root Cause Analysis report, dated December 7, 2011, concludes that the direct cause of the oil leak was Microbiologically Influenced Corrosion (MIC), and that five causal factors were: “a. PS01 Booster #4 not added, b. No bio testing/ biocide injection, c. Non-biocide inhibitor began in mid-90s, d. Risk mitigation less than adequate on urgency to replace piping, and e. Lack of accessibility to inspect below ground deadleg/low flow pipe segments.” The report states, “Some of the causal factors have a very long historical influence on the potential

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<sup>7</sup> GL 18303, Exhibit 7, Removing Concrete from PS01 Buried Piping for Internal Corrosion Investigation, page 16.

<sup>8</sup> GL 18303, Exhibit 5, Baker Petrolite letter to Alyeska dated February 9, 2009, page 1.

<sup>9</sup> GL 18303, Exhibit 5, Baker Petrolite letter to Alyeska dated February 9, 2009, page 5

<sup>10</sup> Baker Petrolite Letter to Alyeska dated December 10, 2009, pages 1-2.

<sup>11</sup> Alyeska Internal Corrosion Program, Integrity Management Engineering, presentation dated June 24, 2010, slide 14.

<sup>12</sup> *Id.* at slide 23

<sup>13</sup> DNV, *PS01 Booster Pump Manifold Failure Investigation: Laboratory Analysis*, September 12, 2011, page 19.

for MIC to develop (e.g., a. and b. above).”<sup>14</sup>

DNV’s Root Cause Analysis noted six generic causes of the accident, including “Less than adequate process for corrosion inhibitor selection.”<sup>15</sup>

In response to the January 2011 release at PS-01, PHMSA issued a Notice of Proposed Safety Order (CPF 5-2011-5001S) on February 1, 2011, which proposed requiring Alyeska to implement certain safety actions to address factors involved in the release of crude oil and difficulties associated with safely restarting the pipeline. That proposed safety order resulted in a Consent Order on August 17, 2011. Once PHMSA believed the primary causal factors of the January 2011 release had been addressed, PHMSA began to focus on whether any regulatory violations had contributed to the release by reviewing the DNV metallurgical analysis and root cause analysis and the PHMSA Accident Investigation Report.

In 2013, Alyeska installed a sleeve over a pipe with approximately 40% wall loss caused by internal corrosion in the 36” high-pressure (discharge) relief header at PS-9.<sup>16</sup> This pipe has a low flow rate compared to the mainline pipe, similar to the low flow conditions in the PS-01 deadleg prior to the January 2011 release.

It appears that you have committed a probable violation of the Pipeline Safety Regulations, Title 49, Code of Federal Regulations. The probable violation is:

**1. §195.579 What must I do to mitigate internal corrosion?**

- (a) General. If you transport any hazardous liquid or carbon dioxide that would corrode the pipeline, you must investigate the corrosive effect of the hazardous liquid or carbon dioxide on the pipeline and take adequate steps to mitigate internal corrosion.**

Alyeska did not take adequate steps to mitigate internal corrosion in deadlegs and areas of low flow in TAPS. Alyeska was aware of this problem by 2008, but failed to adequately mitigate internal corrosion. PHMSA, the Joint Pipeline Office, and Alyeska’s contractors voiced numerous concerns regarding Alyeska’s internal corrosion mitigation efforts, including those being taken at PS-01, between 2008 and 2010.

The leak that began at PS-01 on January 8, 2011, was caused by internal corrosion; DNV’s final Root Cause Analysis report concluded that the direct cause of the oil leak was Microbiologically Influenced Corrosion (MIC), and noted six generic causes of the accident, including “Less than adequate process for corrosion inhibitor selection.” In 2013, Alyeska installed a sleeve at PS-9 to remediate internal corrosion that was causing significant pipe wall loss, which shows that the internal corrosion program continued to be inadequate.

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<sup>14</sup> DNV, *Alyeska Root Cause Analysis – PS01 Booster Pump*, December 7, 2011, pages 24-25.

<sup>15</sup> *Id.* at 25.

<sup>16</sup> Email from Joseph P. Robertson, Alyeska, to Bill Flanders, PHMSA (May 30, 2013, 2:49pm) (on file with PHMSA).

Proposed Civil Penalty

Under 49 United States Code, § 60122, you are subject to a civil penalty not to exceed \$100,000 for each violation for each day the violation persists up to a maximum of \$1,000,000 for any related series of violations. The Compliance Officer has reviewed the circumstances and supporting documentation involved in the above probable violation and has recommended that you be preliminarily assessed a civil penalty of \$145,000 as follows:

<u>Item number</u>	<u>PENALTY</u>
1	\$145,000

Proposed Compliance Order

With respect to item 1 pursuant to 49 United States Code § 60118, the Pipeline and Hazardous Materials Safety Administration proposes to issue a Compliance Order to Alyeska. Please refer to the Proposed Compliance Order, which is enclosed and made a part of this Notice.

Response to this Notice

Enclosed as part of this Notice is a document entitled *Response Options for Pipeline Operators in Compliance Proceedings*. Please refer to this document and note the response options. Be advised that all material you submit in response to this enforcement action is subject to being made publicly available. If you believe that any portion of your responsive material qualifies for confidential treatment under 5 U.S.C. 552(b), along with the complete original document you must provide a second copy of the document with the portions you believe qualify for confidential treatment redacted and an explanation of why you believe the redacted information qualifies for confidential treatment under 5 U.S.C. 552(b). If you do not respond within 30 days of receipt of this Notice, this constitutes a waiver of your right to contest the allegations in this Notice and authorizes the Associate Administrator for Pipeline Safety to find facts as alleged in this Notice without further notice to you and to issue a Final Order.

In your correspondence on this matter, please refer to **CPF 5-2013-5008** and for each document you submit, please provide a copy in electronic format whenever possible.

Sincerely,



Chris Hoidal  
Director, Western Region  
Pipeline and Hazardous Materials Safety Administration

Enclosure: *Response Options for Pipeline Operators in Compliance Proceedings*

cc: PHP-60 Compliance Registry  
PHP-Alaska (#132739)

## **PROPOSED COMPLIANCE ORDER**

Pursuant to 49 United States Code § 60118, the Pipeline and Hazardous Materials Safety Administration (PHMSA) proposes to issue to Alyeska Pipeline Service Company a Compliance Order incorporating the following remedial requirements to ensure the compliance of Alyeska Pipeline Services Company with the pipeline safety regulations:

- 1) With regard to Item Number 1 of the Notice of Probable Violation, pertaining to 49 CFR § 195.579, Alyeska must contract with a third party approved by PHMSA to complete the following:
  - a) Optimize procedures for microbiological monitoring, especially effectiveness in deadlegs and low flow areas, as well as biocide dosing protocols to mitigate MIC for current and anticipated future flow rates no later than 180 days following receipt of the Final Order;
  - b) Assess chloride sources and their potential impact on corrosion acceleration no later than 180 days following receipt of the Final Order;
  - c) Determine and use the appropriate biocide and corrosion inhibitors in TAPS to mitigate the corrosive effects of the hazardous liquids on the pipeline no later than 180 days following receipt of the Final Order;
  - d) Assess the effectiveness of item (c) no later than 270 days following receipt of the Final Order.
  - e) Submit to PHMSA a copy of all procedures, analyses, reports, evaluations, etc., related to items (a), (b), (c), and (d) within 300 days following receipt of the Final Order.
  
- 2) PHMSA requests that Alyeska maintain documentation of the safety improvement costs associated with fulfilling this Compliance Order and submit the total to Chris Hoidal Director, Western Region, Pipeline and Hazardous Materials Safety Administration. Costs should be reported in two categories: 1) total cost associated with preparation/revision of plans, procedures, studies and analyses, and 2) total cost associated with replacements, additions and other changes to pipeline infrastructure.