DEPARTMENT OF TRANSPORTATION

Office of Pipeline Safety Operations

[Docket No. 76–10W]

TRANS-ALASKA CRUDE OIL PIPELINE

Grant of Waiver

By letter dated March 19, 1976, the Alyeska Pipeline Service Company (Alyeska) requested a waiver from compliance with the welding requirement of 49 CFR 195.218 with respect to girth weld No. 49344T at the completed Jim River Crossing No. 2 on the Trans-Alaska crude oil pipeline. This girth weld serves to tie-in two sections of 48-inch concrete coated pipe in the 620-foot crossing. Section 195.218 requires that longitudinal weld seams on adjacent length of pipe must be offset. However, at weld No. 49344T, the seams on adjacent pipe lengths are abutting, not "offset" as required.

In requesting the waiver, Alyeska asserted that "there are no metallurgical or safety reasons for offsetting longitudinal seams on liquid pipelines." As further support for the waiver, Alyeska submitted that at the factory in Japan each seam had been ultrasonically inspected over its entire length and radiographed for a distance of eight inches from each end. Also, Alyeska said the girth weld was radiographically tested in the field and found acceptable under the standards of API Standard 1104 (1973 ed.), which are incorporated by reference in 49 CFR 195.228. Alyeska further stated that the entire crossing was hydrostatically tested to at least 1152 psi, or 92 percent of specified minimum yield strength (SMYS), and that the operating pressure at the weld is not to exceed 750 psi, or 60 percent of SMYS. (To meet the requirements of 49 CFR 195.302, the crossing must be tested again for 24 hours before being placed in operation.)

After reviewing the information and arguments presented by Alyeska, the Office of Pipeline Safety Operations (OPSO) denied the waiver request by letter dated August 6, 1976. The request was denied because Alyeska did not convincingly demonstrate that offseting [sic] of seams is not necessary for safety at weld No. 49344T. OPSO stated that even though the pressure and weld test data indicate an absence of unacceptable defects, "the data do not demonstrate that the concentration of stresses at the intersection of welds would not eventually be detrimental to the (girth) weld strength, which is what Section 195.218 is intended to prevent." Nevertheless, Alyeska was afforded an opportunity to submit a petition for reconsideration based on additional information about the safety of the girth weld and reasons why compliance with Section 195.218 would not be in the public interest.

On August 12, 1976, Alyeska submitted a petition for reconsideration. In its petition, Alyeska argues that because of the excellent notch toughness properties of the pipe and girth weld materials at weld No. 49344T, even the presence of surface flaws would not be a problem at the intersection of welds and thus a fracture would not result from the cyclic loading to which the pipe and girth weld materials will be subject. Alyeska further argues that the very small difference between material properties of the girth weld metal and pipe metal minimizes the opportunity for stress concentrations in the weld or heat affected zone, and that any strain in these areas would be accommodated by the ductility of the surrounding material.

In addition, Alyeska alleges that compliance with Section 195.218 would not be in the public interest because of the environmental disturbances that would occur if the weld must be replaced. Alyeska states that replacement would entail excavation to at least 30 feet below the water table with consequent silting and adverse effects on stream flow. According to Alyeska, the results would be harmful to the eggs and fry of the large fish population of the Jim River and to the river's use as a fishery.

On August 13, 1976, OPSO asked Alyeska to supplement its petition with data on the mechanical properties of the girth weld and pipe materials. The requested data indicates that the mechanical properties of elongation, hardness, and fracture roughness (as evidenced by high Charpy V-Notch energy levels at low temperatures) greatly exceed the pipeline's specifications for sound ductile welds. The data further indicates that the pipe and girth weld materials have similar tensile and notch toughness properties.

Additionally, OPSO discussed the welding problem with welding engineering experts outside the Government. In the opinion of these experts, the strength of the weld would not be reduced by the abutting longitudinal seams. The experts also agreed that replacement of the weld at its underwater location could reduce the pipeline's integrity, particularly in view of the apparently high quality of the existing weld. The latter opinion is premised by the many difficulties associated with properly replacing an existing girth weld under adverse working conditions.

Finally, OPSO asked the Department's welding/radiographic experts in Alaska to examine the radiograph of weld No. 49344T to determine the condition of the weld. The experts reported that the weld is of very high quality and exceeds the standards of acceptability under Sec. 6 of API Standard 1104 as incorporated by reference in 49 CFR 195.228.

The materials Transportation Bureau (MTB) has reviewed the additional information and arguments submitted by Alyeska in connection with its petition for reconsideration. Based on that review and other relevant considerations, MTB finds that the requested waiver is not inconsistent with pipeline safety and is in the public interest. The reasons for this decision are:

1. The girth weld exceeds the standards of acceptability in Sec. 6 of API Standard 1104 and does not contain any weld defect which might grow to an unacceptable level under cyclic loadings.

2. The ductility of the pipe and girth weld metals would provide for localized yielding where high residual stresses may exist and thereby prevent fracture initiation and failure of the weld. (Section 195.218 was adopted when pipe and weld materials in general use were less ductile than the materials at weld No. 49344T.)

3. The similarity of mechanical properties between the girth weld and pipe metals minimizes the likelihood of any concentration of residual stresses existing at the intersection of welds and surrounding heat-affected zone.

4. The fact that the longitudinal seams are ground flush with the inside pipe circumference at the joint mitigates the likelihood of any concentration of residual stresses caused by excess metal at the intersection of welds. (The longitudinal seams were ground flush with the inside circumference at pipe ends when the pipe was manufactured to accommodate an internal line-up clamp during welding.)

5. Replacing weld No. 49344T to comply with Section 195.218 could re-

duce the pipeline's integrity because of the difficulties in cutting out a segment of the concrete coated crossing and rotating and realigning it, especially in view of the adversities of working in a 30-foot excavation in a river crossing.

Accordingly, effective immediately, Alyeska is hereby granted a waiver from compliance with 49 CFR 195.218 with respect to weld No. 49344T at the Jim River Crossing No. 2 on the Trans-Alaska crude oil pipeline.

(Sec. 6, Pub. L. 89–670, 80 Stat. 937 (49 USC 1655); (18 USC 831–835); 40 FR 43901, 49 CFR 1.53.)

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Director,
Materials Transportation Bureau.

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