



RCA Name Pipeline weld non-conformance
 Report Number 2012-001
 Report Date 7/27/2012

Root Cause Analysis Report

Problem Statement

Focal Point Near miss-Almost had to replace 5 miles of 6" underground oil pipe

When

Start Date 7/8/2012
 Unique Timing After discovering QC was not performed on installation

Where

Component Oil Pipelines
 Location Porter Creek interstate network

Actual Impact

		Cost
Cost	Excavation & inspection of 5 weld joints	\$95,000.00
Cost	Radiography	\$25,000.00
Cost	Risk Assesment	\$21,000.00
Customer Service	Damaged reputation with client	\$0.00
Actual Impact Total:		\$141,000.00

Frequency 1 times overall

Frequency Notes Have missed other inspection points but this is the first time an entirely new installation had all inspections points missed.

Potential Impact

Cost	excavate and replace pipeline	\$9,000,000.00
Environmental	New environmental impact study	\$130,000.00
Revenue	potential loss of customer	\$15,000,000.00
Potential Impact Total:		\$24,130,000.00

Report Summaries

Executive Summary

In July of 2012, it was discovered that 5 miles of underground pipe that had been installed did not meet specifications due to out of spec welds and improper radiographic inspection. The client agreed to not replacing the entire pipeline if we repaired the out of spec welds, and if we completed an engineering assesment that included random inspection of 10 other welds, which was successfully completed to their satisfaction.

The welds were out of spec because the wrong weld rod was used and the welds were not inspected. The wrong weld rod was used because the welder was not clear on the specs and he thought the rod used would meet the specs because he used that same rod on a previous job. The welds were not inspected because the weld inspectors were not notified to be there because the project manager didn't think it was necessary.

The improper radiographic inspection was caused by using the wrong film and overexposed x-rays. The wrong film was used because the technician had multiple films available for use and he was unclear on which to use. The x-rays were over exposed because the wrong developing procedure was used.

Solutions include but are not limited to: 1) Pre-scheduling of weld inspections at the beginning of jobs, 2) Have weld inspectors sign off on the weld rod container prior to first use, 3) Conduct pre-job review between welders and inspectors prior to the start of work, 4) Require certified x-ray technicians and verify certification prior to commencing work.

Cause and Effect Summary

In July of 2012, we had a near miss where we almost had to replace 5 miles of pipe after it was discovered that the underground pipe did not meet specifications due to out of spec welds and improper radiographic inspection. The client agreed to not replacing the entire pipeline if we repaired the out of spec welds, and if we completed an engineering assesment that included random inspection of 10 other welds, which was successfully completed to their satisfaction

The welds were out of spec because the wrong weld rod was used and the welds were not inspected. The wrong weld rod was used because the welder was not clear on the specs and he thought the rod used would meet the specs because he used that same rod on a previous job. The welds were not inspected because the weld inspectors were not notified to be there because the project manager didn't think it was necessary and he was trying to complete the job quickly. He was trying to complete the job quickly because they were nearing the end of the project and if they got done ahead of schedule, the team would receive a bonus.

The improper radiographic inspection was caused by using the wrong film and overexposed x-rays. The wrong film was used because the technician had multiple films available for use and he was unclear on which to use. The technician was unclear on which film to use because he was new to the job and had not received much training. The lack of training was caused by technicians employer thinking he was qualified and because they didn't have the staff available to train or mentor him. The x-rays were over exposed because the wrong developing procedure was used because the technician was inexperienced in this area.

Solutions

ID	Label	Description		
1	Solution	Pre-schedule weld inspections at the beginning of pipe installation		
	Cause	Inspectors not told to be at inspection		
	Note			
	Assigned	Brandon Prudent	Criteria	Pass
	Due	8/8/2012	Status	Selected
	Term	Long	Cost	\$0.00
3	Solution	Conduct pre-job review between welders and inspectors prior to the start of work. Assure welders have specs in the field and have reviewed them prior to starting.		
	Cause	Did not have weld spec available in field		
	Note			
	Assigned	Cory Boisoineau	Criteria	Pass
	Due	8/8/2012	Status	Selected
	Term	Short	Cost	\$150.00
4	Solution	Require certified X-ray technicians in the bid specs and followup to verify certification before technicians commence work		
	Cause	radiographer was inexperienced		
	Note			
	Assigned	Cory Boisoineau	Criteria	Pass
	Due	8/8/2012	Status	Selected
	Term	Medium	Cost	\$0.00
6	Solution	When specific exposure, film and testing procedures exist, clearly include in bid specs.		
	Cause	was unsure of what film to use		
	Note			
	Assigned	Chris Eckert	Criteria	Pass
	Due	8/8/2012	Status	Selected
	Term	Medium	Cost	\$0.00

