



A Tethered Challenge: 540° of Bends in 2.01 Miles

PROJECT OVERVIEW

INDUSTRY: Oil & Gas
PROJECT: Tethered Inline Inspection

PROJECT CRITERIA

The client approached Canline Pipeline Solutions (CPS) to complete a sub-surface natural gas pipeline inspection project in Great Falls, Montana. The project involved inspecting three sections of pipeline for corrosion, each with varying lengths, diameters, pipe wall thicknesses, and numerous bends. The project was required as the pipeline must comply with API pipeline inspection requirements.

PROJECT CHALLENGES

The inspection project encountered several challenges, requiring the experience of the CPS crew in collaboration with the inspection services provider to devise several innovative modifications in each of the separate sections of pipe.

Section 2 required 3 tool runs (Gauge Pig, Caliper Pig and Smart Tool). There were challenges blowing the 2-disc bidirectional Caliper Pig down to the receiver end of the line as the discs on the pig distorted while moving through the 90° fittings on the risers. This allowed the compressed air to bypass the discs, immobilizing the Tow Pig. A 2-Conical Cup Tow Pig was constructed onsite using inspection tool parts typically carried on Canline's 40,000lb Pulling Technology Unit, affectionately called "The Wicked Winch", that was paired to complete the project. The inspection on Section 2 was changed to a unidirectional run, using a centering ball to aid in the positioning of the pig through the 4, 90° fittings to the end riser.

PROJECT SNAPSHOT

One of Canline's more complex Inline Inspection projects.

Timeline of Project:

One month from estimate to completion

Pipeline Project Details:

SECTION 1

Project Type: Bidirectional Inspections, adapted to a Unidirectional Inspection
Pigs: Gauge, Geometry & MFL
Centering Balls: Yes
Number of Passes: 3
Line Length: 2.01 miles / 10,588.30'
Line Diameter: 12"
12" Pipe Wall Thickness: 0.250" - 0.375"
Number of Bends: 5 - (2) 1.5D 45°, (3) 3D 90° bends
360° total

SECTION 2

Project Type: Bidirectional Inspections, adapted to a Unidirectional Inspection
Pigs: Gauge, Geometry & MFL
Centering Balls: Yes
Number of Passes: 3
Line Length: 1.6 miles / 7830'
Line Diameter: 12"
12" Pipe Wall Thickness: 0.250" - 0.375"
Number of Bends: 8 - (4) 1.5D 45°, and (4) 3D 90° bends
540° total

SECTION 3

Project Type: Bidirectional Inspections
Inspection Pigs: Gauge, Geometry & MFL
Centering Balls: Yes
Number of Passes: 3
Line Length: 0.91 miles / 4784'
Line Diameter: 12"
Number of Bends: 4 - (2) 1.5D 45°, and (2) 3D 90° bends
270° total

CASE STUDY

PROJECT CHALLENGES (cont.)

In Section 1, the CPS crew loaded and launched the newly created Tow Pig from the previous run. The Tow Pig ran flawlessly for the entire 2 miles, but it stopped 50 feet from the end due to an undetected tee in the line that created an air bypass issue. The CPS crew modified the Tow Pig, extending the length by approximately 6", adding an additional 2 cups to allow the additional length to span the void space created by the tee. The CPS crew was then able to complete all 3 runs in this section.

After successfully completing Section 2 and 1, CPS crew attempted to blow the CPS Tow Pig down to the launch end of Section 3. The pig navigated 4, 90° elbows and 2, 45° elbows, totaling 270° of bends. However, after inspecting the Gauge Pig, it was discovered that two of the underground 90's were possibly short radius, preventing the Smart Inspection Tools from passing through. Consequently, the run was completed as a bidirectional tethered run. Although there was air bypassing the discs on the bidirectional pigs, the Gauge and Caliper runs were successfully executed. During the last Magnetic Flux Leakage (MFL) run, the tool stopped 100 feet short of the target on a weld. It was critical the client survey the complete length of pipe as it is classified as a "high consequence area" due to the close proximity of housing. The solution involved the client opening another bleed-off valve at the far-end riser to reduce the high back pressure caused by air bypass around the pig. The pig moved another 44 feet and stopped again on the next weld. The CPS crew assessed the situation and decided to close the two bleed-off valves, one 2" and one 4". They built up the air pressure in the entire pipeline to 50 psi, then reopened both blow-down valves simultaneously, enabling the Smart Pig to finish its data collection without further issue.

HOW THE CRITERIA WAS MET

Canline Pipeline Solutions' expertise was relied upon to overcome the many challenges presented during the inspection of the 3 pipeline sections. The team was well prepared for the project due to the completion of their comprehensive pre-job coordination process. This included conducting several meetings with stakeholders involved in the project, executing site inspections, and obtaining the appropriate information required to plan and coordinate the project. Canline's thorough checklists were instituted to ensure no details were missed.

Canline deployed one of its fully prepared tethering units to the site. All pulling units are equipped with Real Time Data Acquisition Equipment that monitors and records speed, weight, and distance in a Data Logging Record (DLR). The tethering units direct drive hydraulic capstan system, allows for smooth, consistent pulling power, making it far superior to conventional "wireline" trucks. This unit also features specialized, lightweight, high performance, synthetic rope. The specialized rope is extremely strong, flexible, and safer than steel cable, as cable has an incredible amount of stored energy when under tension. The use of synthetic, lightweight rope allows for longer pulls and eliminates the potential for internal damage to the pipeline, especially where there are bends.

Throughout the project there was adherence to Canline's high safety standards. This included conducting ongoing Job Safety Analysis (JSA) and Job Hazard Analysis (JHA). At the completion of the project, the client received Canline's Quality Control Package, inclusive of the real time data collected during the project. This detailed package included job location, date, time, pipeline size, and the electronic run data logs.

The combination of Canline's trusted and proven team of experts, reliable processes and systems, and technology innovations, ensured the client's complex pipeline inspection could be successfully completed on time and on budget, despite the many challenges presented.

