



CASE STUDY

Executed a 176.23-mile high-flow natural gas run using speed-controlled cleaning and debris mapping tools, delivering pre-ILI data within a 12-hour reporting window.



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EXECUTIVE SUMMARY

Inline Services was engaged to support the pre-ILI preparation of a 176.23-mile high-flow natural gas pipeline stretching from Washington to Oregon. The client required a safe and effective cleaning strategy capable of operating under high-velocity conditions (700 MMCF/D) while also capturing detailed debris data—critical for ensuring in-line inspection (ILI) readiness in accordance with PHMSA regulations. Additionally, the client set a strict requirement for post-run reporting to be completed within 12 hours of tool receipt.

To address these challenges, Inline deployed its Speed Control Pig (SCP) system, linked to the Winterhawk Debris Measurement and Mapping tool. The SCP allowed precise velocity control between 6.50–8.50 mph—critical for operating safely in flow conditions exceeding 12 mph—while also performing effective mechanical cleaning. The pig link connection ensured that the Winterhawk tool could collect accurate debris data despite high product flow.



Thanks to a four-week planning period, detailed pipeline data provided by the client, and close cross-functional coordination, Inline completed the run safely in 21 hours and 10 minutes. The tool traveled at an average speed of 7.86 mph, and minimal debris was observed due to the client's ongoing maintenance program. Inline's analysis team processed the data and delivered a complete report within the required 12-hour window.

This project set a new distance record for Inline Services and demonstrated the scalability, precision, and responsiveness of its speed control and debris mapping technologies. It reinforces the value of proactive client collaboration and advanced planning in achieving ILI readiness under challenging conditions.

BACKGROUND



Inline Services is a pressurized pipeline solutions provider specializing in data-driven cleaning and maintenance strategies. As part of the Critical Infrastructure family of brands, Inline offers a comprehensive range of mechanical cleaning pigs and services tailored to pipeline integrity. Their service capabilities are anchored by two specialized teams: the Speed Control Pig (SCP) team, which focuses on high-flow natural gas cleaning, and the Winterhawk team, which delivers a range of pre-in-line inspection (pre-ILI) solutions, including advanced debris measurement, mapping tools, and pipeline condition assessments designed to support ILI readiness and enhance system insight.

CRITICAL INFRASTRUCTURE FAMILY

Critical Infrastructure Holdings is a privately held group of companies focused on supporting the integrity, performance, and reliability of pressurized pipeline systems. Through its portfolio – including Inline Services, Winterhawk Pipeline Services, SUN Pipeline Solutions, and others – the company delivers specialized tools, technologies, and field services to address pipeline cleaning, inspection readiness, and temporary gas operations. Each brand operates with a shared commitment to safety, responsiveness, and technical excellence, enabling Critical Infrastructure to provide comprehensive solutions across the full pipeline lifecycle.



THE CHALLENGE

Preparing a 176.23-mile high-velocity natural gas pipeline for an in-line inspection required overcoming limitations in tool speed, safety, and debris detection under strict time constraints.



The client needed to identify and remove debris from a high-flow natural gas pipeline in preparation for an upcoming in-line inspection (ILI) required by PHMSA regulations. Excess debris could compromise the ILI tool's performance, potentially leading to a failed run, costly rework, or regulatory penalties. The pipeline's high flow rate made traditional mechanical cleaning methods both ineffective and unsafe, as standard pigs are not designed to operate reliably at speeds exceeding 10 mph—posing risks to equipment integrity and operator safety. Adding to the complexity, the pipeline segment requiring preparation stretched 176.23 miles, increasing the challenge of maintaining consistent cleaning performance over a long distance. In addition to regulatory requirements, the client was under a tight schedule and required a detailed analysis of pipeline conditions within 12 hours of receiving a pre-ILI tool. A cleaning solution was needed that could safely operate in high-flow conditions, cover the extended run length, and deliver fast, reliable results to keep the inspection timeline on track.

THE SOLUTION

Inline implemented an integrated solution using the Speed Control Pig and Winterhawk Debris Mapping tool to ensure accurate, safe pre-ILI preparation across 176.23 miles of high-velocity pipeline.

To address the high-flow conditions of the pipeline, Inline Services deployed its Speed Control Pig (SCP) in tandem with the Winterhawk Debris Measurement and Mapping tool. The SCP is designed to run at operator-defined speeds, allowing Inline technicians to monitor and control tool speed throughout the run with little to no reduction in product flow. The SCP, equipped with sealing cups, scraper discs, brushes, and magnets, provided effective cleaning while maintaining stability in the high-flow gas environment.

A pig link was used to connect the SCP to the Winterhawk tool, enabling the Winterhawk system to travel at a reduced, controlled speed for accurate debris data collection. Software support and IT resources were on standby throughout the operation to ensure seamless data transfer and processing. Inline's analysts were prepared in advance and delivered the report within 12 hours of tool retrieval. This controlled, data-driven approach ensured the pipeline was safely and thoroughly cleaned, while also providing the detailed insight necessary to support a successful ILI run under strict time constraints.



RESULTS

Despite high-flow conditions and extended line length, Inline completed the longest SCP-assisted run in company history with precise tool control and expedited reporting.

Inline Services successfully completed a 176.23-mile run from Washington to Oregon—setting a new distance record for the company. The Speed Control Pig (SCP) maintained an average velocity of 8.3 mph with a measured tool speed of 7.86 mph, running within the operator-defined range of 6.50 to 8.50 mph. Despite a calculated product flow rate of 12.53 mph (700 MMCF/D), the SCP performed as designed, ensuring safe and controlled passage through the line. Total run time was recorded at 21 hours and 10 minutes.

MOBILIZATION OF SOLUTION

Three technicians were deployed for the run, including personnel from Inline's Speed Control and Debris Mapping divisions. The tool was configured with cleaning elements—sealing cups, scraper discs, brushes, and magnets—to support light cleaning while enabling controlled movement. The SCP was attached to the Winterhawk Debris Measurement and Mapping tool using a pig link, allowing for accurate debris data collection under high-flow conditions.



ANALYSIS



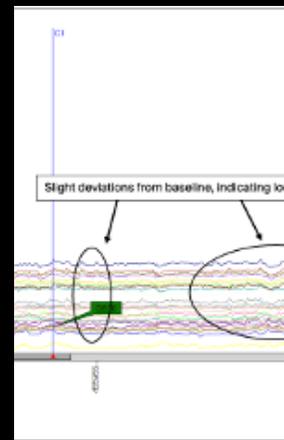
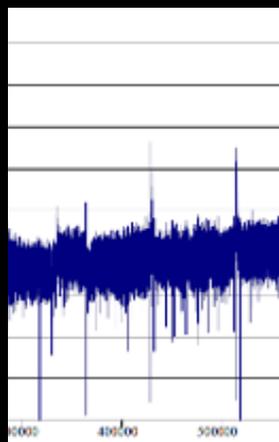
Debris accumulation was minimal, consistent with the client's frequent cleaning schedule. This allowed for an expedited analysis process. Inline's analysis team, fully briefed in advance and supported by IT and software teams on standby, segmented the dataset by pipeline sections to allow for parallel processing. Once analysis was complete, the data was recombined and validated. The report was delivered within 12 hours of tool receipt.

LOOKING BACK

Contributing factors to the project's success included a four-week preparation period, early receipt of detailed pipeline data, pre-run coordination calls, and cross-departmental collaboration. These measures ensured tool configuration matched known line conditions and that reporting would be both accurate and timely. The operation was completed safely, within scope, and on schedule.



KEY TAKEAWAYS



THOROUGH PRE-RUN PLANNING IS CRITICAL

Early coordination with the client and detailed pipeline data collection allowed for proper tool configuration and ensured all analysis documentation was prepared in advance. This eliminated avoidable delays and improved reporting accuracy.

DATA SEGMENTATION ENABLES EFFICIENT ANALYSIS FOR LONG RUNS

The 176.23-mile run required the dataset to be divided and analyzed in parallel by multiple team members. Having a structured segmentation and recombination process in place proved essential for delivering results within the 12-hour reporting window.

CLIENT'S ONGOING MAINTENANCE PROGRAM PAYS OFF

The client's established cleaning schedule resulted in minimal debris, reducing mechanical stress on tools and allowing for a faster analysis turnaround. This highlights the value of proactive pipeline hygiene in optimizing ILI readiness.

CONTROLLED VELOCITY TOOLS ARE EFFECTIVE IN HIGH-FLOW ENVIRONMENTS

The Speed Control Pig (SCP) demonstrated the ability to maintain safe, consistent speed even under high-flow conditions (700 MMCF/D). This control was essential to ensuring effective debris collection and tool integrity.

INTERDEPARTMENTAL SUPPORT IMPROVES OPERATIONAL RESILIENCE

Collaboration between field technicians, project managers, IT, and analysis teams allowed for smooth data handling, tool readiness, and post-run reporting. Real-time availability of software and technical support mitigated risks during data offloading and review.

GRAPHS & VISUALS

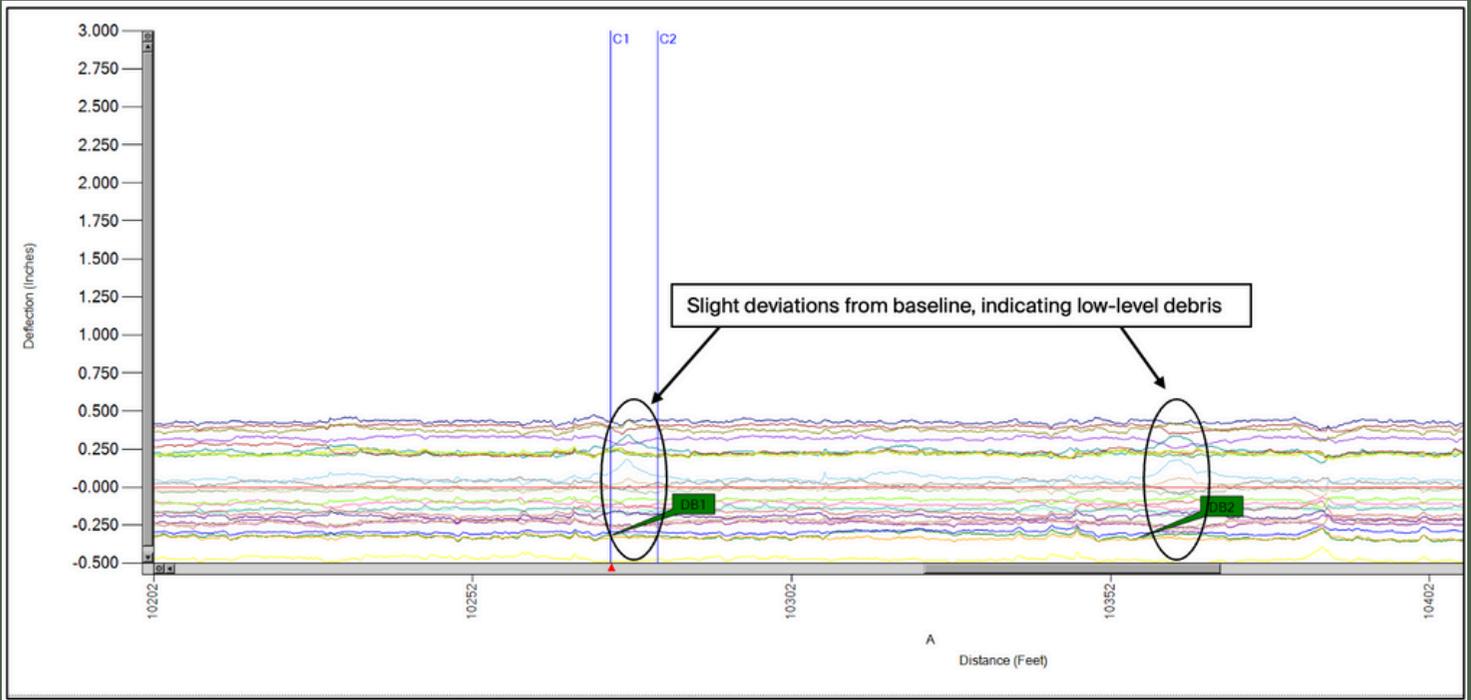


FIGURE 1 - DEBRIS MAPPING DATA

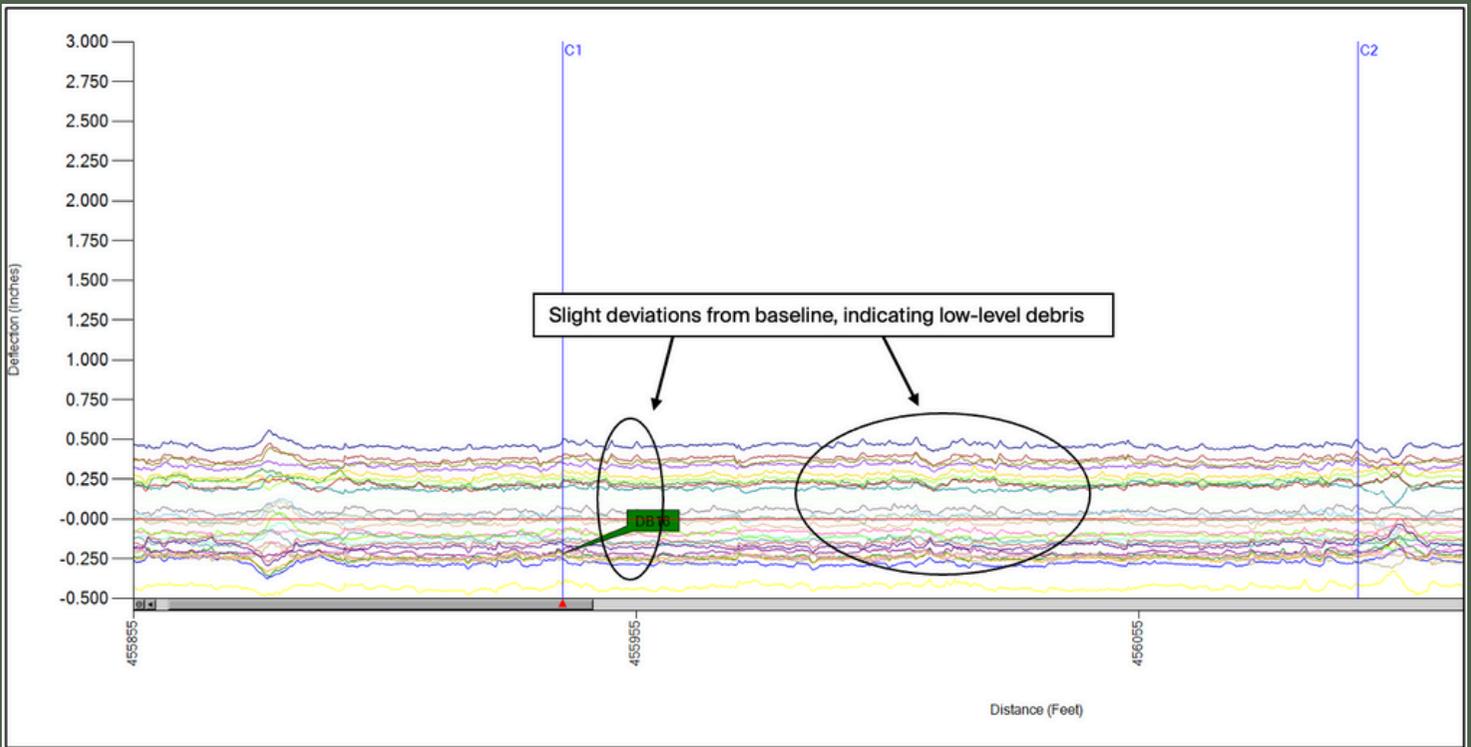


FIGURE 2 - DEBRIS MAPPING DATA

GRAPHS & VISUALS

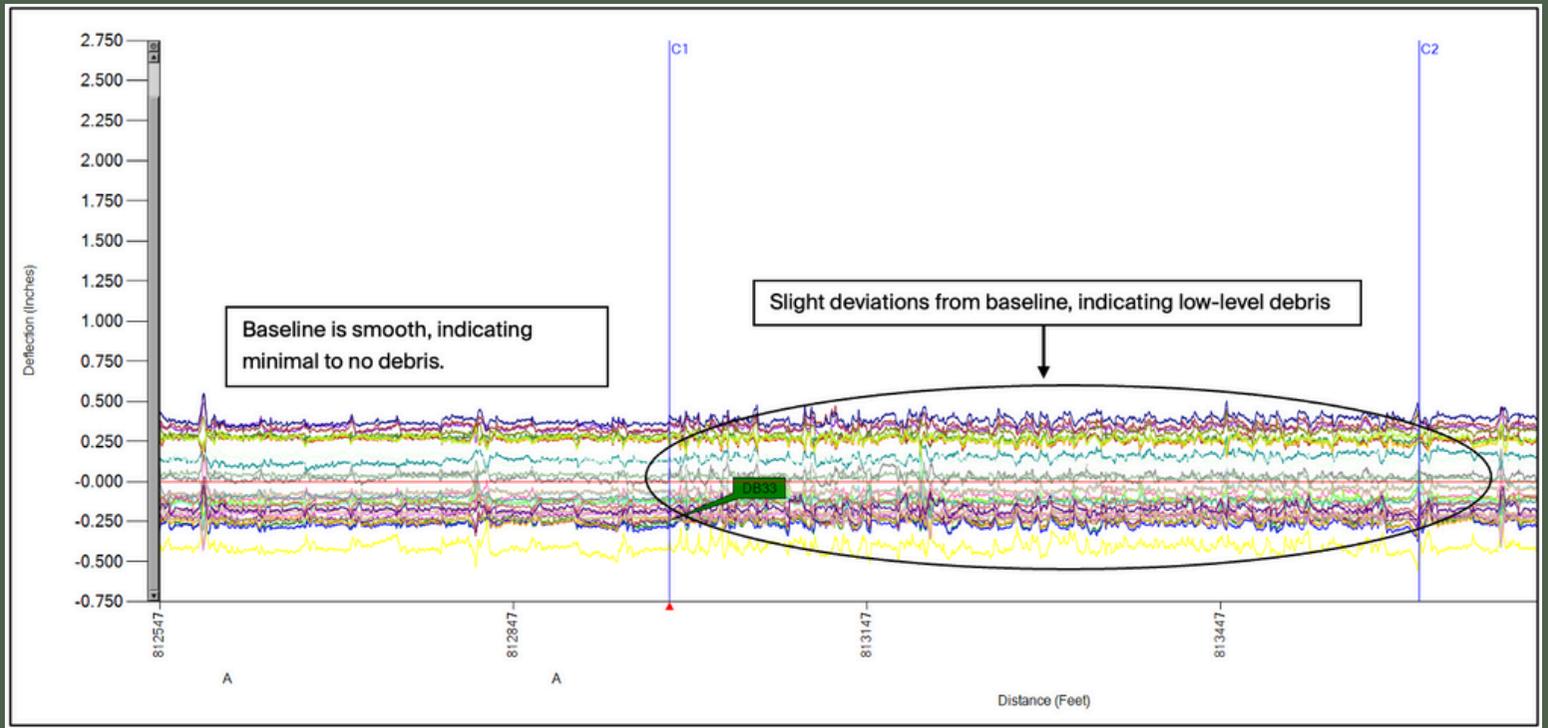


FIGURE 3 - DEBRIS MAPPING DATA

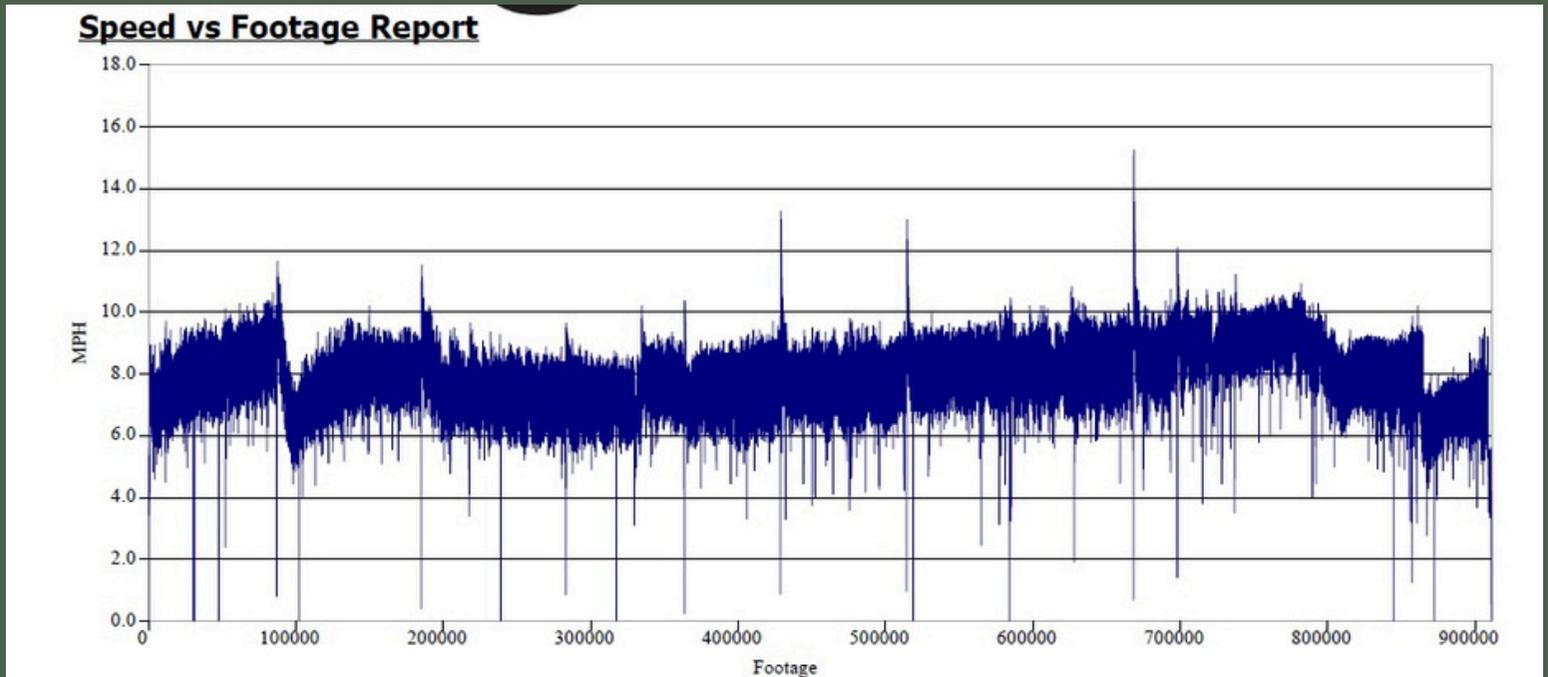


FIGURE 4 - SPEED CONTROL PIG SPEED VS FOOTAGE DATA

GRAPHS & VISUALS



IMAGE 1 - SCP AND DEBRIS MAPPING TOOLS POST RUN



IMAGE 2 - SPEED CONTROL PIG AND PIG LINK



IMAGE 3 - DEBRIS MAPPING TOOL

THANK YOU!

If you're facing challenges with high-flow pipeline cleaning or need support preparing for ILL, reach out to learn how our Speed Control team can help ensure a safe and successful run.



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