

# Pigging Industry News

*the newsletter of the Pigging Products & Services Association*

## THE PRESIDENT'S LETTER

*By Odd Reidar Boye, IKM Testing, Norway*

**Godt nytt år og takk for det gamle, alle sammen!**, meaning "Happy New Year and thanks for the old one, everyone!", directly translated from how we Norwegians wishes all welcome to and into a new year.

And a very good 2024 it surely has been for PPSA we think! It is now 2 months since many of us met up at the annual PPSA Seminar in Aberdeen on Operational Pigging. The 2024 gathering was one of the most attended seminars in PPSA's history – with a record-breaking amount of exhibitors that, with their range of displayed products and technology, strongly contributed to interesting and advanced discussions one would hear and observe during the intermissions of the conference presentations.

We are also proud of last year's "innovation" the day before the conference; the PPSA PEP talks. Young Pigging Emerging Professionals (PEPs) were given coaching sponsored by PPSA for presenting a free chosen technical topic from their work location or situation. Based on feedback from the participants, this initiative will surely be continued also for 2025 and we strongly encourage other up-and-coming pipeliners to participate!

As a wrap-up of the summary of the 2024 PPSA seminar, we cannot avoid mentioning that the Scottish Ceilidh dinner also set a new record of attendees, both at the tables AND on the dance floor! Intentions are also to continue this arrangement in 2025, making it 3 times in 3 consecutive years – thereby having become a tradition.

For those of you that unfortunately could not attend last year's seminar, a virtual summary can be seen at [PPSA 2024 Seminar Summary Video](#)

Earlier in the autumn PPSA were present at the IPCE in Calgary in September and sponsored 2-off YPP events in October; The YPPE Mini Conference Best Paper Awards in Amsterdam and the YPP Malaysia Conference in Borneo.

Looking onwards into 2025, there are a lot of exciting activities and events that await. First of all, we are excited to meet up again in connection with the PPIM conference and exhibition in Houston in week 5, where PPSA has the following venues:

- Monday January 27<sup>th</sup> – The PPSA Golf Tournament, raising money for the Young Pipeline Professionals (YPP) projects and events. Registration is open and details can be found at: [PPSA Golf Tournament](#)
- Tuesday January 28<sup>th</sup> at 3pm – The



*Vice President (Neil McKnight) and the Author at PPSA Seminar 2024*

## NEW Members

**Full**

**Pipeworktech F.Z.E, UAE**

**Individual**

**Dickson Chinedu Unogu,  
Nigeria**

PPSA Annual General Meeting at the George R Brown, 3rd floor room 370F. Everyone is welcome to attend.

Following the PPIM conference the following days, the next major event for PPSA will be the 20<sup>th</sup> Pipeline Technology Conference (PTC) in Berlin in week 19. By then the undersigned will have resigned as President of PPSA, leaving the wheel to the always positive and encouraging Neil McKnight who surely will continue to lift and promote PPSA and the services of our members in an excellent way throughout the industry. I look back at an interesting, instructive but most of all very motivating year as PPSA President! Thanks and see you all soon!



*PPSA Seminar in Aberdeen November 2024 - Sarah Early of The Safer Plug Company presenting Donald Ballantyne of Tracerco with the prize for correctly estimating the weight of one of the packers on the world's first 6 inch autonomous isolation plug - 558 grammes*

## Successful inline inspection of gas storage pipeline in northern Germany

**3P Services** recently completed a turnkey inline inspection (ILI) project for a 10" field pipeline connecting an operational site to a cavern at a gas storage facility in northern Germany. This comprehensive project showcased the company's expertise in pipeline integrity management and marked a critical milestone for the client.

### Project Overview

The pipeline, which had never been inspected before, had to be inspected using free swimming ILI tools to ensure its integrity and operational safety. To achieve this, the pipeline was temporarily decommissioned and taken out of service, allowing 3P Services and its contractor to take over operational control and commence the inspection activities.

### Key Phases of the Project

#### 1. Preparation and Cleaning

Temporary traps were installed at both ends of the pipeline to facilitate the inspection process. The line was filled with water, and a series of specialized cleaning tools were deployed to ensure the internal surface was free from debris or obstructions. This

rigorous cleaning phase prepared the pipeline for the intelligent ILI tool run.

#### 2. Selection of Inspection Technology

Given the pipeline's heavy wall thickness, ultrasonic wall thickness measurement (UT-WT) was determined to be the most effective inspection method. 3P Services utilized one of its high-resolution UT inspection tools, capable of delivering precise metal loss measurements. This baseline inspection was particularly significant as the pipeline had never undergone assessment prior to this project.

#### 3. Advanced UT Fleet Capabilities

3P Services' current ultrasonic inspection tool fleet, available off the shelf, covers pipeline diameters ranging from 3" to 12". This flexibility allows the company to address a wide range of pipeline configurations and operational requirements, ensuring comprehensive inspection coverage for various client needs.

#### 4. Execution and Data Acquisition

The high-precision UT tool traversed the pipeline, collecting detailed measurements and identifying any potential metal loss. Additionally, the onboard XYZ unit, equipped with an inertial measurement unit (IMU), recorded the tool's exact movements. This enabled the precise geographic mapping of welds and



3p-services.com

# INNOVATIVE ILI

## SOLUTIONS WORLDWIDE

MFL, UT, GEO, GEO+, XYZ, DMR, SRD, NEO



3P Company Video



### PROTECT PEOPLE AND PLANET



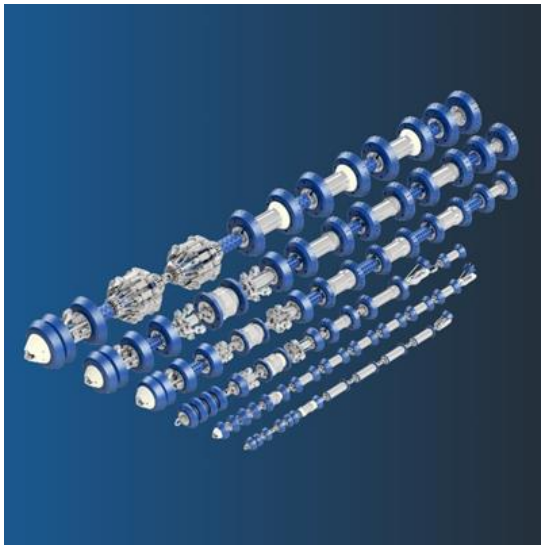


Fig. 1: 3P Services 3"-12" ultrasonic (UT-WM) inspection tool fleet

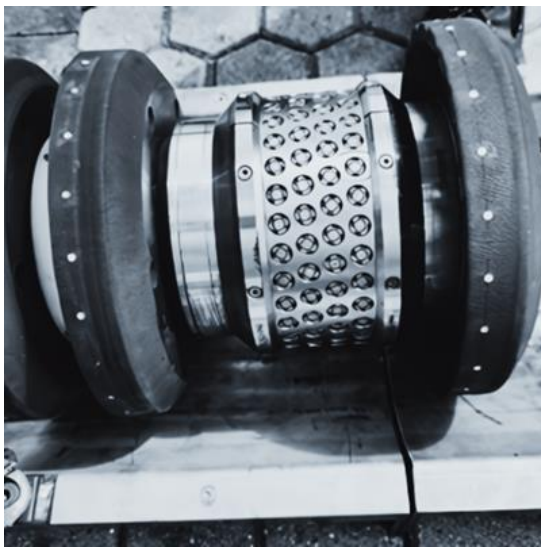


Fig. 2: 3P UT module

detected anomalies, ensuring that any areas of concern could be accurately located for future reference.

#### 5. Completion and Recommissioning

Following the successful ILI run, the pipeline was drained, dried, and prepared for recommissioning. The entire field execution phase, from initial pipeline takeover to the final handover, was completed within one working week - a demonstration of the efficiency and expertise of the 3P Services team.

#### Delivering Value Through Expertise

This project highlights 3P Services' ability to manage complex ILI operations under tight schedules while employing cutting-edge inspection technologies. By providing accurate baseline data, the client now has a comprehensive understanding of the pipeline's condition, ensuring safer and more reliable operations moving forward. ●

## Naftoserwis pipeline inspections utilizing smart ultrasonic tools

Pipeline inspections utilizing smart ultrasonic tools are a key service offered by **Naftoserwis**. These technologically advanced inspection tools are developed and manufactured by our in-house team of engineers. Our continuously evolving technologies ensure the safe and efficient diagnostics of linear infrastructure while enabling uninterrupted transport of various energy utilities.

We have gained the trust of leading operators within the fuel industry. Furthermore, we bring extensive experience in managing and executing international projects across multiple continents, including Africa, Asia, Europe, and South America. Our inspection services have allowed us to collaborate with trustful companies, such as **TDW**, and conduct inspections in regions such as Côte d'Ivoire. Additionally, we have carried out inspections of critical infrastructure in Italy, further showcasing our global capabilities and expertise.

In 2024, we successfully developed a project that encompassed the design, creation, and testing of an advanced bidirectional combo-ultrasonic tool, specifically engineered for 3-inch pipelines. This innovative tool is capable of conducting both geometry inspections and wall thickness measurements, providing a reliable assessment of the condition of pipelines used for the transportation of field gas. As a result, we have expanded our services to include the testing of gas pipelines to determine their suitability for the injection of hydrogen and hydrogen mixtures. Additionally, the actions outlined above have enabled us to extend our inspection capabilities to the chemical industry, covering products such as methanol, ethylene, and ammonia.

The projects described are just a part of our activities. Naftoserwis, constantly seeking new areas for research and development and recognizing the growing demand for innovative services, has decided to leverage its extensive inspection experience. Our team is eager to take on new challenges, and we can assure you that pipeline systems continue to serve as the world's vital energy lifelines, operating safely, efficiently, and reliably. ●



Naftoserwis smart ultrasonic tools ●

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With over 40 years of experience, **iNPIPE PRODUCTS™** is a leader in pipeline pigging solutions. Our engineering expertise and in-house manufacturing allow us to deliver high-performance, custom-engineered solutions for cleaning and maintaining pipelines across all sectors.

- Pipeline cleaning for pipes up to 3200mm in diameter.
- Comprehensive debris mapping.
- Visual and internal measurement inspection to validate cleaning efficiency.
- Continuous condition monitoring for long-term pipeline integrity.

Our advanced solutions validate cleaning processes, ensuring both new and existing pipelines achieve peak operating conditions.



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## NDT Global Advancing pipeline integrity: Enhancing detection of complex cracking in LF-ERW Pipelines

By Christopher Newton, Jordi Aymerich, Sayan Pipatpan, Tannia Haro, Santiago Urrea, and Alex Hensley

Pipeline integrity remains a cornerstone of the energy industry's commitment to safety and reliability. With aging infrastructure and evolving operational demands, operators constantly seek innovative methods to enhance detection and assessment of potential pipeline threats. A recent collaboration has advanced the detection and characterization of complex cracking in low-frequency electric resistance welded (LF-ERW) pipelines.

### The Challenge: Detecting Complex Cracks

Cracks in LF-ERW pipelines, particularly those with complex geometries such as "hook cracks" or surface laps, pose significant challenges. These defects often originate from manufacturing anomalies and can compromise pipeline integrity. Traditional inline inspection (ILI) tools and non-destructive examination (NDE) methods sometimes struggle to accurately detect and size these anomalies due to their orientation or embedded nature.

### The Two-Phase Approach

To tackle these challenges, a systematic, two-phase approach was used:

- **Phase 1:** This phase focused on analyzing ILI data to identify patterns indicative of complex cracking. Advanced signal analysis and pattern recognition techniques were applied, incorporating insights from NDE results to differentiate potential "hook cracks" from other anomalies.
- **Phase 2:** The findings from Phase 1 were validated through destructive testing of pipeline samples. This metallurgical evaluation provided ground-truth data to assess the accuracy of both ILI and NDE results.

### Key Insights from Destructive Testing

The laboratory testing involved seven pipeline coupons containing nine linear anomalies. The results were illuminating:

- Anomalies confirmed as lack-of-fusion (LOF) defects at the weld bond line, resulting from manufacturing issues such as improper strip edge preparation.
- Anomalies identified as surface laps, caused by folding of the pipe's external or internal surfaces during welding.

These findings not only validated the initial ILI data patterns but also underscored the importance of destructive testing in accurately characterizing complex anomalies.

### Practical Applications

Using the destructive testing results, the pattern

recognition methodology was refined and applied across a broader dataset of over 3,000 anomalies. The analysis reduced the list of potential "hook cracks" and surface laps to fewer than 20, enabling a more targeted and risk-based approach to remediation. This refined approach ensures a more effective allocation of resources and reduces unnecessary digs.

### Industry Implications

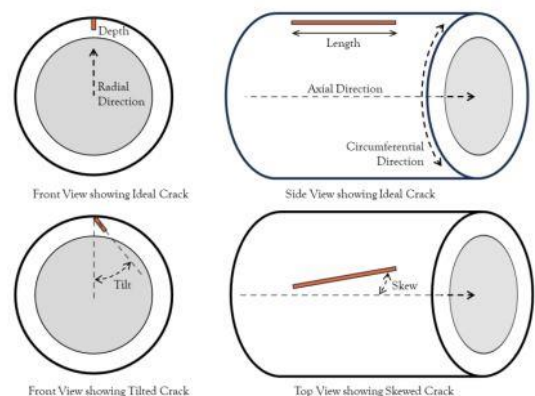
This case study highlights several key takeaways for pipeline operators:

1. **The Value of Ground-Truth Data:** Destructive testing remains a gold standard for validating ILI and NDE results, enabling operators to refine detection methods and enhance confidence in their data.
2. **Collaboration is Key:** Partnerships between operators and technology providers can drive innovation, combining field expertise with advanced analytical tools to address complex integrity challenges.
3. **Avoiding Over-Reliance on NDE:** While NDE is a critical component of pipeline integrity programs, its limitations must be acknowledged. Adjustments to ILI sizing curves should be based on verified ground-truth data, not solely on NDE results.
4. **A Systematic Approach:** Employing a structured methodology, as outlined in industry standards like API 1163, ensures consistency and minimizes errors in pipeline integrity assessments.

### Looking Ahead

This collaboration sets a benchmark for advancing pipeline safety. By leveraging destructive testing and sophisticated data analysis, this initiative demonstrates how operators can overcome the challenges of detecting and managing complex cracking in aging infrastructure.

As the industry continues to prioritize integrity and innovation, these lessons will undoubtedly shape the future of pipeline inspection and maintenance strategies.



Crack definitions and terms. Schematic of tilted and skewed ideal cracks. ●

## Non-intrusive pipeline assessment for unpiggables, combining conventional approaches with data analytics

**Author: Lews Barton, Service Manager – Non-Intrusive Pipeline Assessment, ROSEN Group**

Corrosion and other time-dependent anomalies are some of the major threats operators face, costing millions annually in identification, mitigation, and repair. The situation is often even more complicated for “unpiggable” pipelines, which pose their own unique challenges.

**ROSEN** is known for its industry-leading inspection capabilities. Where In-Line Inspection (ILI) is not possible or impractical, ROSEN has developed the Non-Intrusive Pipeline Assessment (NIPA). The NIPA approach is built on industry-recognized Direct Assessment (DA) methodologies, enhanced by the addition of Advanced Data analytics and Large Standoff Magnetometry (LSM).

Developed and implemented by ROSEN since 2019, NIPA has been constantly evolving and improving to meet the challenges posed by pipelines operating in differing environments around the world. Now, it is further evolving to be deployed by Unmanned Aerial Vehicles (UAV) for inspection in the most challenging terrains and distances.

The NIPA methodology integrates and overlays multiple pipeline datasets, such as construction and operational records, in conjunction with data obtained from multiple above-ground surveys to gain a holistic picture of the pipeline integrity condition. This process involves an assessment of pipeline condition along with a review of data collected to support the critical elements of an integrity management plan. The information can be cathodic protection performance, corrosion control measures, and the potential for pipe deformation due to ground movement or external interference, amongst others. The data overlay follows the classic “Reason’s Swiss Cheese model,” which reduces risk and uncertainty, limiting missed defects by overlaying many different data sources. Crucially, this allows operators to screen for and monitor critical integrity threats and prioritize locations to centimeter-scale GPS accuracy for field verification or remediation and repair, all without upsetting pipeline operation.

The combination of multiple datasets and ROSEN’s proprietary alignment and prioritization algorithms have been proven by direct field experience and verification. When combined with ROSEN’s comprehensive warehouse of pipeline inspection data, the Integrity Data Warehouse (IDW), this significantly improves confidence in anomaly identification and monitoring of problem areas. ROSEN is well-positioned to perform insightful data exploration and develop powerful predictive models

## Unlock the Power of Data

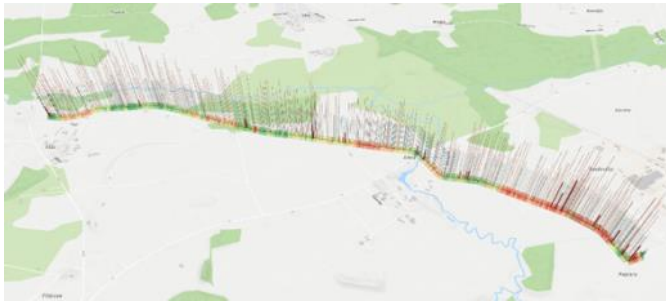
Elevate your asset integrity with unmatched data accuracy and unparalleled expertise

Our unique synergy of advanced inspection systems, cutting-edge analytics and human expertise allows us to transform data into knowledge. Knowledge enables smarter decision-making and delivers a comprehensive understanding of asset safety, lifetime, and performance.



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relating to pipeline integrity. This is made possible due to ROSEN's comprehensive IDW of pipeline inspection data. The IDW contains over 26,000 historical inspections across pipelines located globally and contains detailed pipeline information, including routes, product, manufacturer details, and pipeline defect features obtained through in-line inspection (ILI). The IDW has also been enriched with additional geospatial features that enhance the data by introducing contextual information that can be integrated into predictive models. Understanding the relationship between geo-enrichment variables and known sections of a pipeline that do or do not contain defects can further enhance our understanding of defect risk factors. We have introduced the following datasets into the IDW to create a data-driven external corrosion risk model:

- Geology: Geological period and mineral composition
- Soil: Type, material content, moisture and pH
- Groundwater: Depth and distance to the nearest water table
- Precipitation: Hourly precipitation data
- Elevation: Digital elevation maps (DEM) constructed from RADAR and LIDAR point cloud data
- Terrain Classification: Clustering of terrain into discrete definitions
- Historical Landslide Data: Distance and duration since nearby landslides
- Land Use Classification: Clustering of land use into discrete definitions
- Open Street Maps: Intersections with roads, railways, or waterways offer a truly unique proposition in the industry.

These variables expand the data horizon by considering not only the local survey results of the pipeline in question but also how every other pipeline identified in the IDW has behaved – which provides valuable insights for condition prediction. In summary, integrating a data-driven external corrosion risk model and NIPA into a DA process provides data to back up the expertise and opinions of pipeline integrity/corrosion subject matter experts. This strengthens the experts' position and provides them with additional input that can be used when historical inspection or survey data is sparse or questioned. This is especially true in the case of pipelines where minimal anomalies may be present, as proving the absence of defects can often be more challenging than proving their existence! ●

## Subsea composite repair solution for pipe reinforcement in the Middle East

### Overview

The objective of the repair, carried out in May 2024 by 3X ENGINEERING (3X) and its local distributor was to reinforce a 24" gas pipeline suffering from 8 external impact defects. Four dents are situated on the topside and 4 other dents on the bottom side of the pipe. To restore pipe integrity, it was decided to repair the defected areas using 3X composite repair solution specifically dedicated for subsea environment REINFORCEKiT® 4D SUBSEA.

### Scope of Work

All dents were modeled at the same time to consider the interaction between them. The geometry was previously reconstructed using FEA study. According to ISO 24.817 standard and 3X calculations, it was decided to apply REINFORCEKiT® 4D SUBSEA using R3X65S resin. Fifty-six layers of composite were determined to reinforce the complete defected area. Working at 19-meters depth is a shallow water job. At this depth, divers can dive for about 70mn. Divers are equipped with umbilical sets allowing them to breathe and communicate with the control room. These divers are previously trained by 3X supervisor to complete all the steps of the repair.

Surface preparation was completed using gritblasting to get an optimal surface roughness and ensure a good bonding between the pipe and the composite repair. To blast the full area to be repaired, it took 4 dives. The composite repair was then completed following 5 main stages, as below

- 1/ Marking and measurement of the defects + P3X30 primer application on the defects to ensure a good bonding with composite plates.
- 2/ Composite plates covered with high-performance subsea F3XSB filler were positioned centrally on the defected locations and fasten with ratchet belts until the filler was cured (3 hours).
- 3/ Another layer of P3X30 primer was applied on the whole surface before composite wrapping.
- 4/ Composite wrapping was completed using Kevlar® tape impregnated with R3X65S resin. The tape impregnation was quickly performed using BOBIPREG device inside the container before immersion device. The subsea wrapping was performed by 2 divers to control the wrapping quality. It was necessary to apply 56 layers of composite material ==> total of 52 Kevlar® tapes installed in less than 20 hours for a total repair length of 2500mm.
- 5/ Protective cover against rocks and serial number plate were installed on the composite wrapping to finalize and validate the repair.

### Results

Samples of resin were taken during each tape impregnation for quality control. Hardness measurements were performed 3 days after job completion and concluded the success of this subsea repair. ●



## Using chemical solutions to recover loose material in subsea tie-back pipeline

By Erika Johana Tovar, Halliburton

This article contains highlights of paper SPE-222871, “Recovering Loose Material During Decommissioning of Subsea Tie-Back Pipeline Using Chemical Solutions in the Norwegian Sea: A Case Study”, by J. Skorpen, Equinor; E.J. Tovar, E. Byremo, O. Aamodt, A. Groven, R. Eliassen, Halliburton, prepared for the ADIPEC conference and exhibition held in Abu Dhabi, UAE, Nov 4-7, 2024. For more details, find paper in OnePetro.org

Engineered and customized chemical solutions have demonstrated to be effective with debris and solid material transportation, even in pipelines. This case study shows the successful implementation during decommissioning operations in the Norwegian Sea of a superior gel system designed and adapted for low temperatures to recover several cap-screws lost in subsea flowlines after pigging operations were performed, avoiding any potential consequences of the loose material to the assets.

### Challenge

During the pigging operations, it was discovered that rear module had disconnected from the joint assembly of four dual module pigs and in one more, the front module had disconnected as well from the joint assembly. In total, 28 cap-screws were missing, left in the subsea flowlines.

### Customized Solution

The main concern was to ensure that no damage would be caused in the future by the loose material in the flowlines, generating additional operational costs and affecting the integrity of the full system. Recovering loose material with magnets was considered and a trial was done to determine whether



*Disconnected cap screws with wear damage on the threads*

magnets would pick up any loose material. However, the magnetic attraction was very low and would not allow safe pick-up of the cap screws.

Inspection with camera and ultrasonic tool were performed and confirmed that no immediate damage was caused by the cap-screws, but there would be potential risk if they were left permanently in the system. Removal was necessary.

Therefore, a MegaGel fluid system was used as a viscous medium to suspend the cap-screws and recover them to surface. The fluid system features high static gel strength, high debris suspension capacity and it was designed to work in the low temperatures of the Norwegian Sea, reducing the risk of hydrates formation in the subsea flowlines.

As a result, 19 cap-screws were recovered successfully. Only 9 cap-screws remain unaccounted for, which could have been ejected to the open-sea pig cage, recovered to surface but not noticed, discharged to closed drain and/or remain in the flowline system without serious impact.

The collaboration and engineered solutions enabled the safe execution of contingency actions within the time frame available, using custom pipeline chemical solutions to enhance the decommissioning operations success.



*Dual Module pigs with disconnected articulated joint assembly*



## IP Pipeline Technology successfully completes inaugural pipeline inspection phase in Mexico

IP Pipeline Technology has marked a major milestone by completing the first phase of a comprehensive pipeline inspection project in Mexico, reinforcing its strategic expansion into the Americas. The project encompassed a 65.05 km pipeline with a diameter of 1219 mm and was carried out from December 9 to December 20, 2024, ahead of schedule.



Leveraging advanced diagnostic technologies, including Caliper tools, Magnetic Flux Leakage (MFL), and Transverse Field Inspection (TFI), the inspection provided a detailed assessment of the pipeline's structural integrity and safety. These cutting-edge solutions proved invaluable in navigating the complexities of Mexico's dynamic oil and gas sector.



Despite logistical challenges, meticulous planning and execution ensured smooth project progression. The successful completion reflects IP Pipeline Technology's commitment to delivering precision, efficiency, and professionalism in high-stakes international operations.

This project represents the company's inaugural inline inspection effort in the Americas. As IP Pipeline Technology continues its growth trajectory, it remains dedicated to providing innovative and reliable solutions tailored to the region's pipeline industry needs.

Looking ahead, the company is eager to embrace new challenges, further solidifying its reputation as a trusted partner in the global pipeline inspection and integrity management market. ●

## PPSA golf tournament - Monday January 27, 2025, Wildcat Golf Club in Houston

Thanks to our sponsors for helping us raise money for Young Pipeline Professional's (YPP) events and training



LUNCH sponsor



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## Advancing the hot tap and line stopping landscape with SmartStop®

**TEAM Inc.** has long been a global leader in providing innovative solutions to the midstream, petrochemical, and refining industries. With decades of experience in hot tapping and line stopping technologies, TEAM continues to push the boundaries of safety, reliability, and efficiency. Its latest innovation, **SmartStop®**, exemplifies this commitment, delivering a groundbreaking evolution in line isolation technology.

### Revolutionary Features for Enhanced Safety and Performance

SmartStop® is designed to streamline and simplify traditional double block and bleed (DBB) isolation processes. Unlike conventional systems requiring multiple fittings and extensive equipment, SmartStop® deploys through a single hot tap/line stop fitting. Its integrated bleed port ensures a zero-energy interspace between primary and secondary seals, eliminating additional hot taps for seal validation. This innovation significantly reduces risk and enhances personnel safety by maintaining zero energy throughout the isolation process.

Capable of handling a wide range of liquid and gas products, SmartStop® boasts ANSI 900# self-energized seals that support pressures up to 2,220 PSIG without requiring external activation mechanisms. Its simplicity and effectiveness redefine the standards for positive isolation in challenging operational environments.

### Simplified Deployment and Compatibility

One of SmartStop®'s standout features is its compatibility with any standard line stop fitting, regardless of manufacturer. This universal adaptability not only minimizes the need for costly modifications but also allows seamless reentry into existing line stop fittings. The system's rigid rail design ensures smooth, reliable insertion and retraction, even under significant flow conditions. By eliminating pivot points and relying solely on linear motion, SmartStop® can perform effectively in high-flow environments where traditional tools often fail.

### Operational Benefits and Client-Centric Solutions

SmartStop® reduces the required fittings for DBB isolations from three to one, offering a leaner, more efficient solution. Its ability to tolerate flow during the setting process ensures uninterrupted operations, saving both time and costs. TEAM's global manufacturing capabilities, backed by ISO 9001-certified facilities, enable rapid delivery and deployment tailored to specific client needs.

TEAM's highly trained technicians and application engineering teams leverage advanced software tools to deliver precise, reliable results. Whether it's

engineering assessments, custom fabrication, or on-site implementation, SmartStop® is supported by TEAM's robust infrastructure and commitment to 24/7 service.

### A Proven Legacy of Innovation

With over 100 years of experience in the industry, TEAM's legacy of innovation continues with SmartStop®. By addressing the limitations of conventional line isolation tools, SmartStop® ensures safe, efficient, and dependable solutions for a wide range of applications. From enhancing flow capabilities to reducing risks, SmartStop® reinforces TEAM's position as a trusted partner in the industry. For more information, visit [www.teaminc.co.uk/](http://www.teaminc.co.uk/)

## Pigtek Ltd celebrates 25 years in business

UK based international pipeline pigging specialists, **Pigtek Ltd** are celebrating 25 years in business. Incorporated in November 1999, the business was founded by Ralph Hyslop who had previously worked for several pipeline / pigging providers including Sir Alfred McAlpine Services and Pipelines, British Gas and Pipeline Integrity International.

Pigtek Ltd was formed to fill a void in the market which was to provide non-standard equipment and services internationally and to date, Pigtek Ltd have provided equipment and services to well over 200 different customers. This includes supplying equipment and services to all seven continents in the world – including a pigging system that was designed and supplied to the British Antarctic Survey.

Other notable achievements include:

- Design and supply of specialist mandrel pigs for use in extremely large diameter pipelines. This includes several pigs up to 2.6m in diameter, which are believed to be the largest diameter cleaning tools currently in use worldwide.



- Design, trial and supply a specialist cleaning tool for use in a 16" x 24" x 34" multi diameter pipeline. This was an extremely challenging project as the flow velocities in the pipeline were very low and forecast to diminish considerably over the life of the pipeline, meaning there was little motive



force in the pipeline product to aid pig motion. Pigtek overcame the problem by using state of the art materials for the pig construction and conducting multiple detailed verification trials in a full-scale test loop at the Pigtek trials facility.



In early 2024, the business came under new ownership with Vince Garton taking over from Ralph Hyslop. Vince brings a wealth of international pipeline experience with him and the business continues to evolve and develop new products and services.

The business also moved to new premises in May 2024. Still based in Chesterfield, Derbyshire, UK, the new premises has over 4500m<sup>2</sup> of office, workshop and yard space, which will allow the business to expand its ability to offer full scale pig trials to our customers. The business is now very well established and well placed to adapt to the ever-changing nature of the international pipeline industry and can look forward to the next 25 years of success for Pigtek Ltd.

## Apache Pipeline Products precision in dual diameter Pigging – Latest projects

**Apache Pipeline Products** recently demonstrated its capabilities in executing complex dual diameter pigging operations, a win that reinforced its position as a leader in pipeline solutions. Operating from an expanded 55,000 sq ft manufacturing facility in Edmonton, Alberta, Canada, they conducted extensive dual diameter pull tests with support from Canline Pipeline to evaluate performance across varying pipe sizes.

Apache's in-house approach ensures that every stage of the process – from design and engineering to fabrication and assembly – is tightly controlled,



promoting efficiency and maintaining the highest quality standards. This seamless integration of capabilities reflects their commitment to solving some of the most challenging pigging conditions faced by pipeline operators.

## Rigorous Dual and Multi Diameter Testing Yields Key Insights

### 36" x 30" Reducer Pull Test

A critical test assessed the performance of a dual diameter pig in transitioning from a 36" to a 30" pipeline. The pig was placed into a fixture with a 36" x 30" reducer welded to a short section of 30" STD pipe. Using a winch truck, a controlled force was applied to pull the pig through a dry fixture, recording a peak load of 9500 lbs. The detailed analysis of this test provided valuable data that enabled Apache to refine the pig's design, ensuring improved efficiency and reduced operational risks during deployment. Such refinements are part of their ongoing effort to enhance product reliability in real-world applications.

### 42" x 36" x 48" Fixture Pull Test

A second, more complex test evaluated the pig's navigation through multiple diameter transitions. The fixture simulated a 42" launcher reducing to 36" and expanding to 48". Pulled through lubricated pipe sections, the pig required 4200 lbs, 7200 lbs, and 3600 lbs of force. for the 42", 36", and 48" sections, respectively. This multi-diameter test exemplified the adaptability of Apache's designs, affirming their reliability in complex operational environments. The results contribute to their continuous product development pipeline, offering insights that drive further advancements in pigging technology.

## Delivering Solutions for Complex Pipeline Challenges

Apache's in-house engineering, fabrication, and testing highlight their ability to address unique pipeline conditions with precision. These tests demonstrate the operational readiness and durability of their dual diameter pigs, ensuring reliable performance under demanding conditions. By focusing on innovation and rigorous testing, they've positioned themselves as a trusted partner capable of handling pipeline configurations that vary in diameter and present operational complexities. Apache continues to innovate, providing end-to-end solutions that enhance efficiency and extend the service life of pipelines.



## State of Integrity at PPIM 2025 – A preview

### What is the State of Integrity?

The State of Integrity is a data analysis project which started in earnest in 2023. With over 11,000 assessments on 410k miles of pipeline from 17 pipeline operators and 34 inline inspection (ILI) companies, **OneBridge Solutions (now Irth Solutions)** is believed to have amassed the largest and most diversified set of ILI data in the industry. Comparing this to US pipeline mileage, that's 32% of the assessable pipeline mileage reported to PHMSA in 2023, i.e., natural gas transmission and hazardous liquid gathering and transmission. Additionally, CIM contains ILI reports from 230 different ILI technologies for a total of 225 million features and 165 anomalies. That's a lot of data!

### The Data

Since its inception in 2017, pipeline operators have uploaded inline inspection (ILI) reports into the Cognitive Integrity Management or CIM platform. In addition to inline inspection data, other attributes that characterize a pipeline are housed in CIM via integration with an operator's GIS, e.g., the pipeline vintage, coating, locations of consequence, etc. User input and actions undertaken within the platform are also stored, e.g., what conditions are used to analyze an inline inspection, what anomalies are identified for action, what anomalies are repaired, etc. Additionally, repair information of anomalies identified for evaluation can also be uploaded to the platform. This last piece of the puzzle allows for the characterization of ILI performance.

### The Problem Statement

The State of Integrity project includes any insights gleaned from the analysis of said data. Everything from pipeline properties to trends in ILI technology, trends in ILI vendor usage amongst the industry and operators of different sizes, the most utilized anomaly conditions, and how anomaly types have changed over time are just a few of the studies conducted as part of this project. However, ILI performance has generated the most interest from our clients (to no one's surprise.) For PPIM 2025, it was decided that answering the question of "Who has the best ILI performance?" wasn't much of an interesting question. Besides, this question would only benefit a few stakeholders. Instead, "What factors contribute to a high ILI performance?" was found to be a better, more interesting question. And one that would benefit all stakeholders.

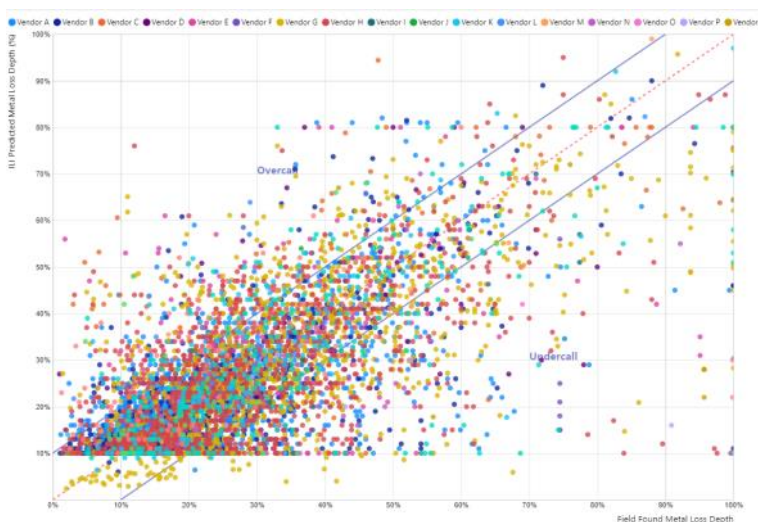


Figure 1: A unity plot for all anomalies utilized in this study, categorized by ILI company (vendor.)

### What is meant by a high-performing inline inspection?

For a multitude of reasons, performance was analyzed for metal loss inspection systems only, i.e., MFL and UT, by comparing the ILI predicted depth with the field-found depth of metal loss anomalies.

Performance is, therefore, quantified using certainty and tolerance, as described in API 1163. Tolerance is the range by which the field-found depth is within the ILI-predicted depth and certainty is the percentage (or probability) that this occurs. For example, if an ILI vendor is within +/- 10% of the field-found depth, 90% of the time, 90% is the certainty, and 10% is the tolerance. In Figure 2 below, you can see that the certainties ranged from 54.5% to 96.1%, meaning that the ILI company with the best performance, Vendor Q, was within +/-20% of the field-found depth, over 96% of the time, while Vendor T was within +/- 20% only 54.5% of the time.

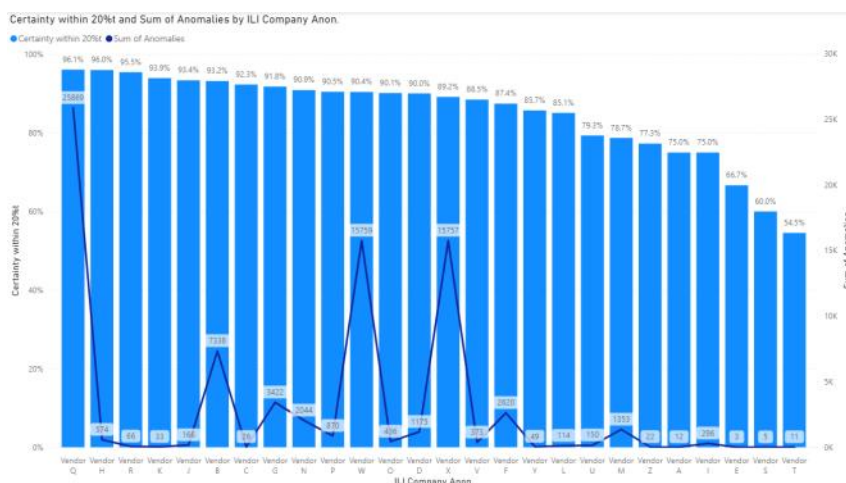
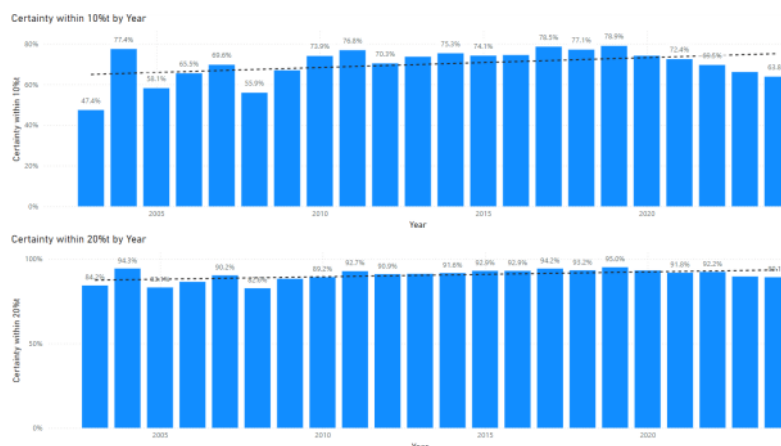


Figure 2: The certainty within a 20% tolerance by anonymized ILI company. The number of anomalies to calculate certainty is plotted as a line on the secondary axis. (Those companies with less than 23 data points were excluded from the analysis but are included in this figure.)



Certainties were calculated using the comparison of ILI-predicted depths versus field-found depths. After some extensive data cleanup, the data that was analyzed consisted of:

- 81,497 anomalies that had both an ILI-predicted depth and a field-found depth
- Mostly external corrosion or external metal loss (81%)
- Mostly general corrosion or pitting per the Pipeline Operators Forum classification (74%)
- Mostly from standard resolution MFL-A (77%)
- 54% from liquid pipeline operators and 46% from gas pipeline operators



**Figure 3:** Certainty with a 10% and 20% tolerance by assessment year, 2003 to 2024

### What factors were analyzed?

Various factors were analyzed to determine their effect on performance, and for some factors, the highest performer was identified. The following were analyzed:

- ILI company
- ILI technology, i.e., MFL-A, high-resolution MFL, MFL-C, combination MFL, and UT
- Pipeline operator
- Depth of metal loss
- Number of assessments (experience) for both ILI company and pipeline operator
- Assessment year/time

### What drives performance?

The results of this study are provided in the paper presented at PPIM 2025. However, we will leave you with the results of our last analysis, which posed a lingering question. Not only was performance assessed for multiple variables, but performance over time was also analyzed. As you can see from Figure 3 below, although performance has improved overall, recently, performance has decreased from 2020 until 2024. What's the reasoning? What has changed in recent years to cause a decrease in performance?

One hypothesis is that ILI systems have plateaued in their progress, as significant technological gains did not occur as they did between 2003 and 2019. However, a plateau of technological advancement would not cause a decline in performance.

Another cause might be the change in NDE technology utilized to determine the depth of anomalies "in the field." As manually operated pit gauges are being replaced by automated laser scans of corrosion fields, the field-produced depths are becoming more accurate. Is the advancement of NDE technology increasing the discrepancies between the ILI-predicted depths and the "truth data?"

Another possible explanation is that the anomalies are changing (or at least the anomalies pipeline operators

choose to evaluate are changing). Could the anomalies in recent years be of a morphology that's more difficult to size for our current ILI systems?

What's your hypothesis? We'd love to hear your thoughts. ●

## Celebrating 25 years of Pipeline Research Limited

**Pipeline Research Limited** was set up 25 years ago (January 2000) with a view to providing specialist pigging consultancy. Since then, work has involved over 450 projects (some short studies, some lasting several years such as Barossa, Crux, B11 bypass, Heimdal Brae recovery and others), with over 100 different clients and in 47 different regions ranging from Alaska to Aberdeen to Australia. Clients include the major operators, contractors and pigging and inspection vendors. Focusing on pipeline pigging, projects have included: -

- Gas dynamics (using the inhouse PIGLAB model);
- Pipeline pre-commissioning;
- Dewaxing and pipeline cleaning;
- Dual and Multi-diameter pig design;
- Wear and lubrication considerations;
- Two phase, gas / liquid flow and liquid receipt;
- Pigging in hydrogen and carbon dioxide;
- Pig assurances, expert witnessing and avoiding issues such as stuck, stalled and damaged pigs.

Pipeline Research has been involved, directly or indirectly, in over 100 different test programs and using this and other experiences to improve design and to allow better behaviour in pipelines. We have also had the pleasure of working with many good people along the way and look forward to more of the same for the foreseeable future. ●

## Optimizing pipeline reinspection intervals with Dynamic Risk's IRAS solution

Effective pipeline integrity management is critical to ensuring the safe, compliant, and efficient operation of extensive infrastructure networks. Maintaining reliability while meeting regulatory standards and managing costs is challenging for pipeline operators responsible for large and geographically diverse systems. **Dynamic Risk's** Integrity Risk Analysis System (IRAS) platform helps pipeline operators address these challenges by providing insight for optimal reinspection intervals using data-driven analysis, empowering operators to achieve maximum safety and operational efficiency.

This article explores how Dynamic Risk's IRAS solution enables pipeline operators to transition from fixed reinspection schedules to a risk-based, cost-effective approach. By examining a recent case study involving a Canadian operator managing over fifty pipelines, we'll delve into how IRAS helps balance cost savings with rigorous safety standards and regulatory compliance.

### Pipeline Integrity and the Reinspection Challenge

Pipeline operators face the complex responsibility of safeguarding their systems against integrity threats like corrosion and cracking. Inline inspection (ILI) technologies such as magnetic flux leakage (MFL) and crack detection are instrumental in identifying these threats, providing vital data on pipeline conditions for determining safe reinspection intervals. Differences in jurisdictional regulations impact reinspection intervals and flexibility. In the U.S., regulations like the Code of Federal Regulations (CFR) Sections 49 CFR §192 (gas transmission) and §195 (hazardous liquids) enforce mandatory maximum reinspection intervals, limiting operator flexibility to reduce intervals but prohibiting extensions beyond maximum limits. In Canada, the Canadian Standards Association (CSA) offers a more flexible, risk-based approach. Here, operators are encouraged to prioritize data-driven risk assessments over fixed timelines. This difference in regulatory frameworks makes Dynamic Risk's IRAS solution particularly valuable, as it allows operators to optimize intervals based on specific integrity threat data, maximizing efficiency without compromising on safety or compliance.

### Case Study: Reinspection Interval Optimization for a Canadian Operator

In early 2024, a Canadian hazardous liquids pipeline operator enlisted Dynamic Risk's expertise to optimize reinspection frequencies over fifty pipelines. This project illustrates how Dynamic Risk's IRAS platform supports risk-based reinspection planning for large pipeline networks.

### The client's project objectives included:

- Projecting the growth of metal loss and crack anomalies over ten years, to anticipate when each feature might require intervention.
- Evaluating the remaining life of metal loss and crack anomalies until they met specific intervention criteria, such as 70% wall loss or reduced burst pressure thresholds.
- Assessing the fatigue life of crack-like flaws on selected pipelines, where crack ILI data was available.
- Comparing the projected costs of digs and repairs with reinspection costs to inform reinspection interval decisions.
- Developing visual aids and scenario planning tools to evaluate reinspection options across multiple pipelines.

By defining these goals, Dynamic Risk created a tailored analysis plan, enabling the client to make data-driven decisions about inspection schedules, maintenance prioritization, and resource allocation.

### The IRAS Solution: Enhancing Pipeline Integrity with a Systematic Approach

Dynamic Risk's IRAS platform offers an integrated suite of tools that empowers operators to adopt a risk-based model, allowing them to prioritize inspections based on actual threat profiles. For this project, IRAS served as the central platform for data integration analysis, allowing the client to make informed integrity decisions across their network. In the initial phase, Dynamic Risk and the client established parameters for consistency, ensuring the results were reliable, repeatable, and defensible for compliance purposes. Key elements of the approach included:

- **Anomaly Criteria:** Consensus was achieved on the types of anomalies included in the analysis, based on feature type, inspection date, interaction with other features, and repair history. This standardized the data analysis, ensuring a robust foundation for decision-making.
- **Fitness-for-Service Evaluation:** Utilizing the client's criteria, Dynamic Risk applied methods such as Modified B31G and Effective Area for metal loss evaluation, while PRCI MAT-8 and API 579 standards were employed for crack-like flaws. This dual-method approach gave the client options for projections, as different models will often give slightly different results.
- **Growth Rate Selection and Prioritization:** Dynamic Risk developed a prioritization chart with the client, ensuring that signal-to-signal run comparisons were prioritized, where available, and alternative rates used were representative of real pipe conditions. This prioritization helped refine growth projections, enhancing the reliability of future maintenance planning.
- **Remaining Life for Crack-Like Anomalies:** With limited data for certain cracks, fatigue life analysis was prioritized over environmental growth rates, ensuring the analysis reflected real-world conditions and data limitations.



By implementing these core methodologies within the IRAS RiskAnalyst tool, Dynamic Risk was able to handle extensive data and perform a system-wide assessment, rather than focusing solely on individual pipelines. Compatibility with the client's existing IRAS database also streamlined data integration and analysis, supporting a holistic view of integrity risks across the asset base.

### **Predictive Modeling for Anomaly Growth and Maintenance**

The IRAS suite's predictive modeling capabilities allowed Dynamic Risk to conduct ten-year projections on anomaly growth. This generated annualized insights on each anomaly's expected growth, specifically targeting factors like wall loss depth and burst pressure for metal loss anomalies, as well as crack depth and fatigue life for crack-like flaws. By examining projected growth over time, Dynamic Risk helped the client refine inspection schedules based on actual threat levels, rather than predetermined timelines. This approach yielded several benefits:

- **Optimized Resource Allocation:** By identifying the highest-risk features, operators can concentrate maintenance resources where needed most, ensuring efficient use of personnel and materials.
- **Cost-Effective Maintenance Planning:** Financial data can be easily integrated with integrity data, enabling operators to balance reinspection and remediation costs, making it easier to weigh the cost of deferred inspections against immediate repairs.
- **Data-Driven Risk Management:** IRAS supports a risk-based model that allows operators to dynamically set reinspection intervals, prioritizing pipelines with the greatest threat levels.

### **Deliverables and Data Visualization Tools**

The primary deliverable from Dynamic Risk's analysis was a comprehensive dataset of fitness-for-service, anomaly growth, and remaining life projections, covering about 450,000 anomalies. The deliverables also included dig/remediation tables, dashboards, and a detailed report of reinspection interval recommendations.

Dynamic Risk provided several user-friendly visualization tools, distilling extensive data into actionable insights for strategic planning. The tools included:

- **Dig/Remediation Outlook Dashboard:** This dashboard visualized intervention criteria for metal loss and crack-like anomalies, presenting the cost inputs specified by the client.
- **Scenario Planning Reports:** Summary reports outlining various reinspection scenarios, enabling the client to review multiple options side by side, allowing them to make informed, cost-effective decisions.

Additionally, IRAS preserved unique identifiers for each anomaly, enabling the client to reintegrate analysis results into their pipeline GIS database,

providing seamless data compatibility and future reproducibility.

### **Long-Term Benefits and Flexibility for Future Planning**

Dynamic Risk's IRAS-based approach brought several long-term benefits to the client, including:

- **Comprehensive Data Integration:** IRAS created a system-wide database covering all ILI metal loss anomalies and crack-like anomalies, ensuring that each was documented with defensible fitness-for-service data, supporting compliance with regulatory requirements.
- **Financial Analysis and Scenario Flexibility:** By integrating financial analysis into remaining life results, the client could compare multiple reinspection interval scenarios. IRAS's flexibility also allows Dynamic Risk to refresh or update all deliverables when new inspection data or repairs are available, providing the client with an adaptable tool for future planning.
- **Enhanced Decision-Making Tools:** User-friendly dashboards and visuals distilled large datasets into actionable insights, empowering decision-makers to plan maintenance strategies confidently and cost-effectively.

### **Proactive Pipeline Management: A Shift Towards Data-Driven Decisions**

Dynamic Risk's IRAS solution transforms pipeline integrity management by facilitating a proactive approach. With IRAS, operators can prioritize inspections and maintenance based on real-time data, rather than adhering strictly to fixed reinspection schedules. This risk-based strategy enhances safety and helps prevent incidents, while reducing costs by focusing resources on the highest-risk areas. As the pipeline industry aims for zero-incident operations, IRAS aligns with this goal by equipping operators with the tools needed for informed decision-making. This proactive model not only supports regulatory compliance but also promotes the longevity and reliability of pipeline assets, reinforcing the industry's commitments to safety and environmental responsibility.

### **A New Era in Pipeline Integrity Management**

Dynamic Risk's IRAS solution represents a pivotal advancement in reinspection interval optimization. By leveraging risk-based assessments and comprehensive data analysis, IRAS enables pipeline operators to achieve an optimal balance between safety, compliance, and cost efficiency. The Canadian operator's experience underscores how IRAS facilitates data-informed decisions, guiding pipeline integrity management toward a future of proactive, intelligent asset management. As the industry continues to evolve, IRAS and similar technologies will be vital in shaping the future of pipeline management. By equipping operators with predictive analytics and scenario planning tools, these solutions are setting new standards for operational excellence and regulatory compliance, contributing to a safer and more efficient energy infrastructure. ●

## STATS Group expands operations in the Kingdom of Saudi Arabia

**STATS Group** announced a significant expansion of its operations in the Kingdom of Saudi Arabia, marking a strategic milestone in the company's global growth.

The company has opened a new 2,500 sq m base in Dammam in the country's Eastern province, and the newly created Saudi operating company STATS Limited Co. for Oil Services has been awarded Approved Vendor status by one of the Kingdom's leading energy Operators.

With more than \$4 million in assets and equipment assigned to Dammam, STATS is now the first Saudi-dedicated hot tap and double-block and bleed isolation specialist and, holds the most extensive inventory of large-diameter pipeline isolation equipment in-country.

A significant investment in the new service hub included provision for offices, crane facilities, testing bays and equipment storage to the global STATS ISO standard – and hosts STATS' patented Tecno Plug® and BISEP® double block isolation tools in sizes up to 56", alongside Hot Tapping Machines of various sizes up to 60" and Inline Weld Testing equipment. ●

## 20th Pipeline Technology Conference unveils expanded technical program and new highlights

The **Pipeline Technology Conference (ptc)** is set to mark its 20th anniversary with a milestone edition that promises an enlarged technical program and dynamic new features. Taking place from 5-8 May 2025 at the Estrel Congress Center in Berlin, ptc 2025 will present 150+ technical presentations arranged into 48 dedicated sessions, positioning itself as global pipeline event where pipeline operators and experts from around the world convene to exchange ideas, solutions, and visions for the future.

A broader range of topics will ensure that delegates gain deeper insights into cutting-edge developments. From hydrogen integration, inline inspection, offshore infrastructure, CO<sub>2</sub> transportation, leak detection, and control room management to climate adaptation and methane reduction strategies, ptc 2025 covers the entire spectrum of challenges and opportunities shaping the global pipeline landscape. With digitalization and artificial intelligence taking center stage, participants can expect forward-looking discussions on how advanced technologies are redefining safety standards, enhancing operational efficiency, and ensuring regulatory compliance. ●

**20<sup>TH</sup> ANNIVERSARY** **ptc** **20TH PIPELINE TECHNOLOGY CONFERENCE**  
5-8 MAY 2025, BERLIN

**Get your ticket now!**

**#ptcBerlin**