

PIPELINE INTEGRITY FUNDAMENTALS

MAXIMIZE THE RETURN ON INVESTMENT FROM YOUR INTEGRITY ASSESSMENTS

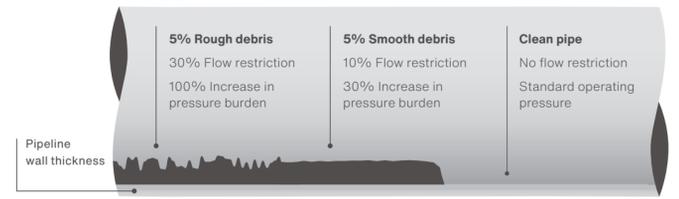
CLEAN

PRE-INSPECTION CLEANING

How clean is your pipeline? Don't let debris impede your inspection results. Tough pipeline conditions – scale, black powder, paraffin, condensates, ferrous oxides and general debris – can restrict internal diameter, result in in-line inspection (ILI) tool damage, potentially cause a stuck tool, and/or degrade data quality. Pre-inspection cleaning reduces or eliminates debris and pipe wall deposits, improving inspection sensor contact for more accurate data and higher ILI first-run success rate.

PROGRESSIVE PIGGING

In addition to preparing your line for inspection, progressive pigging can dramatically improve operational efficiency and pipeline performance by using low-to-high aggression pigs to effectively remove debris from a pipeline segment.



INSPECT

STABLE THREATS

Coating and Lamination Anomalies



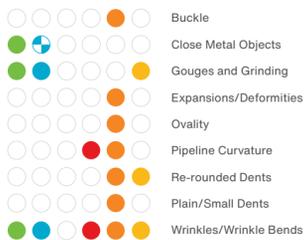
Mill Anomalies



Construction-weld Anomalies



Construction Anomalies



TIME INDEPENDENT THREATS

Geological-force Anomalies



*As defined by B31.8S/INGAA
Though not essential to detect this anomaly, the inclusion of this technology enhances identification and characterization.

INTERACTIVE PIPELINE THREATS

Interactive threats are the coincidence of two or more threats in a pipe segment, the result of which is more damaging than either of the individual threats themselves.¹



MATERIAL VERIFICATION



TIME DEPENDENT THREATS

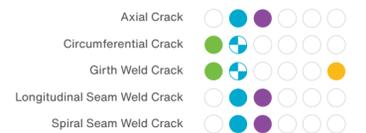
Metal Loss Anomalies



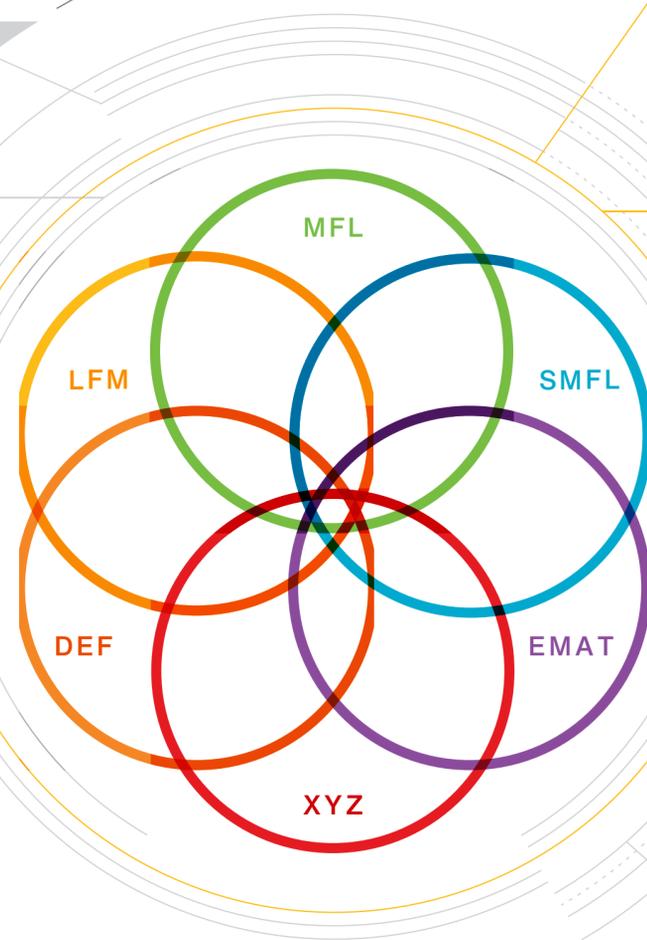
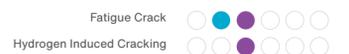
Environmentally-assisted Corrosion Anomalies



Crack Anomalies



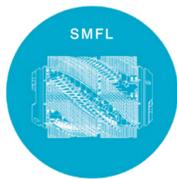
Environmentally-assisted Crack Anomalies



AXIAL MAGNETIC FLUX LEAKAGE

MFL

Detects, identifies and sizes metal loss and circumferential planar anomalies.



SPIRAL MAGNETIC FLUX LEAKAGE

SpirALL® MFL

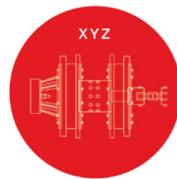
Detects, identifies and sizes axially oriented metal loss and planar anomalies. SpirALL® MFL is proprietary to TDW



ELECTROMAGNETIC ACOUSTIC TRANSDUCER

SpirALL® EMAT

Detects, identifies and sizes crack anomalies and coating disbondment.



INERTIAL MAPPING

XYZ MAPPING

Measures pipe centerline, provides highly accurate coordinates for all reported features, and enables bending strain analysis.



GEOMETRY DEFORMATION

Detects, identifies and sizes bore changes such as dents, ovalities, expansions and wrinkles.



LOW FIELD MAGNETIC FLUX LEAKAGE

LFM

Identifies material property changes resulting from manufacture, milling or mechanical working.

VALIDATE

NON-DESTRUCTIVE EVALUATION (NDE)

NDE should be performed to verify the accuracy of ILI so you can prioritize repairs and maintain operational integrity. It can be performed in-situ to quantify the severity of anomalies while your pipelines remain in service.

Positive Material Identification (PMI) is an industry-leading process applied to generate reliable, traceable and verifiable pipe records for material verification. It is a patented proprietary TDW process.



ASSESS & ACT

PIPELINE INTEGRITY ENGINEERING

Data-driven guidance, better integrity decisions

- Immediate Integrity Assessment
- Future Integrity (including Corrosion Growth Assessment)
- Crack Assessment
- Advanced Defect Assessment
- Curvature, Bending Strain and Line Movement
- Dent Prioritization and Assessment
- Interactive Threat Assessment



- Risk and Reliability Studies
- Pipeline Integrity Management Support
- Pipeline Integrity Data Acquisition and Integration
- Training