

# Pipeline Integrity

PIPELINE & FACILITY INTEGRITY SERVICES

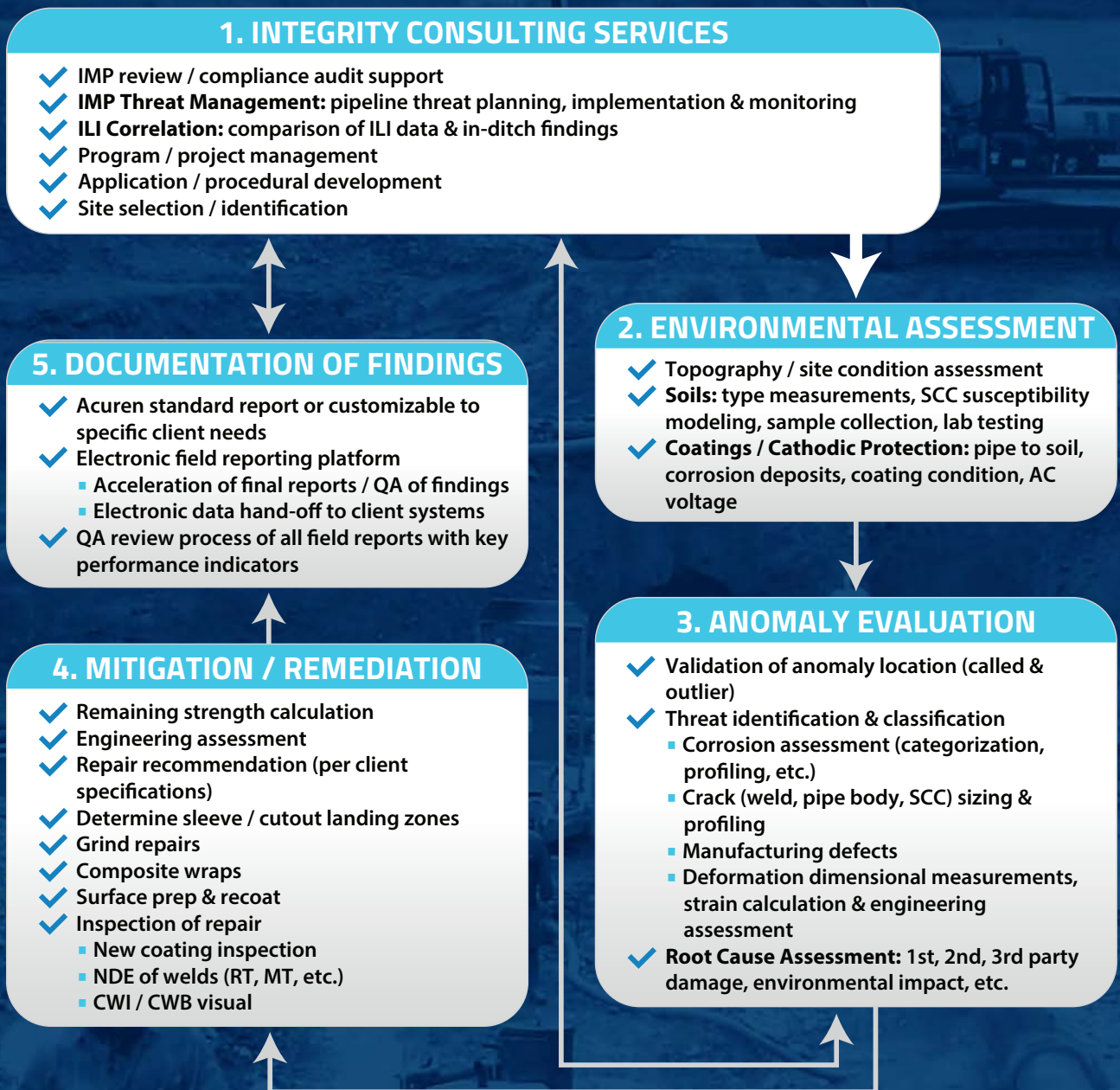


A HIGHER LEVEL  
OF RELIABILITY®



**ACUREN**

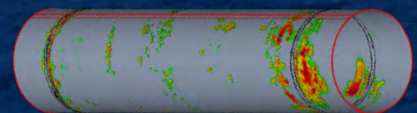
# Comprehensive Services



## FAILURE ANALYSIS & MATERIAL EVALUATION OF PIPELINES

Owners manage the integrity of above-ground and buried pipelines with numerous systems and processes. However, there can be unforeseeable circumstances or system breakdowns which precipitate failures of piping and auxiliary equipment. Acuren's highly experienced engineers can perform failure analysis, evaluate material properties, suggest alternatives to materials, testing/monitoring procedures to help Owners prevent future occurrences. As part of the failure investigation / product evaluation, engineers assess the components in the field and/or laboratory which may include:

- Detailed analysis of pipeline fracture surface to determine failure mode/mechanism
- Determine if pipe meets the specified mechanical and chemical properties with laboratory testing
- Optical microscopy and scanning electron microscopy to evaluate material microstructure, flaws and fracture surfaces
- Determine presence of bacteria involved in microbiologically influenced corrosion (MIC)
- Identify type of corrosion scales and foreign debris using x-ray diffraction (XRD) or energy dispersive x-ray (EDX) spectroscopy
- Perform burst testing of pipe to predict failure pressures, strain and fracture mode
- Crack Tip Opening Displacement (CTOD) testing to determine critical allowable flaw sizes in pipe welds
- Provide independent failure analysis and reports for regulatory bodies





# The Acuren Advantage

## COMMITTED TO EXCELLENCE

Committed to delivering a higher level of reliability, Acuren provides an unrivaled spectrum of services to support the safe operation of industrial assets. Acuren's commitment to safety, quality and professionalism spans four decades. We have programs to manage risk in all environments as well as robust programs to manage resources, equipment, personnel, environmental practice, audit, reporting, safety and customer stewardship expectations. Our expertise in weld inspection, crack sizing, corrosion mechanisms, and deformation has made us the first call for natural gas and liquid pipeline operators across all climates.

Our goal is to provide pipeline integrity programs, services and threat management programs to meet the increasing demands of our pipeline customers. Acuren has dedicated years of training and resources to ensuring the value we deliver through our pipeline integrity programs far exceeds that of our competition.

**Execution Excellence:** dedicated pipeline integrity operation ensuring safety, quality and scope execution excellence

**Specialization:** technicians specifically trained and dedicated to supporting pipeline integrity programs rather than general NDE technicians

**Damage Mechanism Capabilities:** technicians have specific and intimate damage mechanism identification capabilities

**Scalability:** we have a pipeline integrity technician pool that spans North America

**Multiple Disciplines:** our pipeline integrity technicians have experience in multiple disciplines: coatings, cathodic protection, soils geology, inline inspection and NDE

**Program Management:** verification of log data, interpretation of inspection results and threat management

## DEDICATED PERSONNEL

- We employ technicians that are trained, capable, and certified in:
  - ◊ NACE
  - ◊ CWI/CWB
  - ◊ PAUT
  - ◊ Corrosion Mapping
  - ◊ Guided Wave
  - ◊ TOFD
  - ◊ OES
  - ◊ PEC
  - ◊ MT
  - ◊ PT
- Better understanding of pipeline defect mechanisms resulting in more accurate anomaly evaluations
- Better productivity / efficiency in ditch reducing overall cost per dig
- More consistent and higher quality reports
- Inhouse Operator Qualification management (EWN, ISN/ NCCER, Veriforce) allows Acuren to ensure inspectors are certified and qualified for tasks performed

## CENTRALIZED MANAGEMENT

- Single point of contact
- Consistent invoicing
- Ease of scheduling
- Complimentary services

## SCC THREAT MANAGEMENT

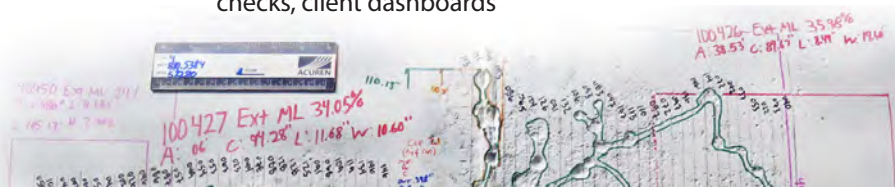
- Multiple inspection methods
- 15+ years performing assessments
- Soils modeling / survey integration

## FULL RANGE OF SOLUTIONS

- NDE on Pipeline Approach
  - ◊ Conventional NDE inspection techniques (e.g. MT, UT Straight Beam, Pit Gauging) on pipeline defects
  - ◊ Provide results to 3rd party / company personnel for assessment
- Hybrid Approach
  - ◊ Broader, more complex inspection methods with more encompassing report to include additional components (such as soils, coatings, cathodic protection system readings, etc.)
- Root Cause Assessment
  - ◊ Analytical process / procedure to assess defect and attempt to identify root cause (isolated or more systemic damage mechanism)
  - ◊ Up to 3rd party engineering / assessment

## INVESTMENT IN ACCURACY, REPEATABILITY, & EFFICIENCY

- Pipeline specific training program (nomenclature, damage mechanisms, manufacturing methods, etc.)
- Reporting platforms (efficiencies, quality, timeliness of reports)
  - ◊ Client specific customization, reduction of transposition errors, reduced report generation time, systematic QA checks, client dashboards



# Specific Services

## RT

- Iridium Sources
- X-Ray Tube
- Cobalt Sources
- Real Time X-Ray (parts/in-house)
- Real Time Radiography (CUI)

## MAGNETIC PARTICLE SERVICES

- Portable MT - Yokes/Coils
- Wet Horizontal Machines

## DYE PENETRANT SERVICES

- Portable PT
- Dye Penetrant Lines

## ULTRASONIC SERVICES

- Thickness Gauging
- Shear Wave/Angle Beam
- Boiler Tube Loggers
- B-Scan Examination
- Hardness Measurements

## EDDY CURRENT SERVICES

- Eddy Current Tube Inspection
- RFT Surface Exams

## FLUX LEAKAGE

- Steel Test Examination
- Magnetic Liftoff
- Tank Floor Examination

## THERMAL INSPECTION

- Infrared Inspection

## AUTOMATED ULTRASONIC

- Automated UT (AUT) Scanning
- Automated Pipeline Inspection
- TOFD (Time of Flight Diffraction)
- Phased Array Ultrasonic
- Automated Tank Crawler
- Guided Wave Inspection (GUL)

## ADVANCED ULTRASONIC

- Flaw Analysis and Sizing
- EMAT Boiler Inspection
- High Temperature
- NOTIS - Oxide Thickness
- HTHA (High Temp Hydrogen Attack)

## SPECIALIZED TECHNIQUES

- ACFM Examination
- Boiler Tube Floor Scanner

## ADVANCED RADIOGRAPHIC

- Computed/Digital Radiography (CR/DR)
- Digitization Services

## SPECIALIZED TUBING INSPECTIONS

- Near Drum Examination
- Hone and Glow
- IRIS Examination
- DS2 Paper Machine Scanning
- Remote Field Testing (RFT) Tube Exams
- Near Field Testing (NFT)

## BOILER LIFE ASSESSMENT/ MATERIALS ENGINEERING

## PIPELINE SERVICES

- Pipeline Bridge Span Examination
- Wire Rope Examination
- Coating Removal and Repair

## VALVE LEAK DETECTION

## FUGITIVE EMISSIONS

## GROUND PENETRATING RADAR

## MATERIALS ENGINEERING SERVICES

- Failure Analysis
- Engineering Services
- Expert Witness

## MATERIALS LABORATORY SERVICES

## ROPE ACCESS INSPECTION

## CALIBRATION SERVICES

## WELDER TESTING

## PIPELINE INTEGRITY SERVICES

- Direct Examination

## MOISTURE DETECTION

## TRAINING SCHOOLS

## VISUAL INSPECTION

- Certified Welding Inspectors
- API 510 / 570 / 653 Inspectors
- NACE Inspectors
- Drone Visual Examination

## SOFTWARE DEVELOPMENT

- DMAPS Software
- Heat Exchanger Tube Inspection Module
- BEAM Boiler Exam and Analysis Software

## AUTOCAD/FIELD SKETCHING

## PROCEDURE DEVELOPMENT



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**BEYOND INSPECTION**