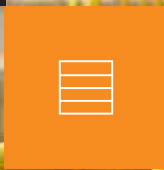




Supporting the **Integrity** of your assets

OIL & GAS



Our people find solutions

At Stantec, integrity begins with people. Our team of specialists have the technical and field experience to provide practical and creative solutions to ensure integrity of your assets. Our goal is to deliver safe, reliable, and regulatory compliant solutions to the oil and gas industry.

Our experts include In-Line Inspection (ILI) specialists and NACE-accredited corrosion, cathodic protection, and coating professionals. We work collaboratively to provide comprehensive integrity strategies for our clients.

Integrity isn't just a job for us, it's a part of who we are.





Safe, reliable, compliant

In the late 1990's, few people were talking about the importance or implications of asset integrity. At the time, we were providing owners with the resources and information needed to keep their operations—and their product—moving safely.

With public scrutiny more intense than ever, Stantec continues to lead the way, helping our clients anticipate, prevent, manage, and mitigate potentially dangerous and costly conditions associated with their pipelines and facilities. Over the last 15 years, our integrity specialists have become highly engaged in the design process, in addition to maintenance programs. We can help mitigate threats before a project even breaks ground, and consider the entire asset lifecycle.





Fitness for Service

Inline Inspection Analysis

Pipeline Integrity

Facilities Integrity

Corrosion Assessments

Materials Welding & Inspection

Cathodic Protection

Safety Loss Management Systems

AC/DC Interference Studies

Risk Management Programs





Pipeline and Facilities Integrity

Leading pipeline
and facilities integrity
management services for
the oil and gas industry

Stantec's Integrity team is client-focused and has an excellent reputation for providing practical, value-added solutions. Our team includes In-Line Inspection specialists and NACE accredited corrosion, and cathodic protection professionals.

We use our integrated engineering design and integrity maintenance services to search for and provide benefits for our clients.

Our team has the necessary expertise to support the integrity management process and the engineering services to ensure the continued, safe, reliable, and regulations-compliant performance of our clients' operating systems.

300

turnkey integrity
assessments each year

Facilities Integrity

SERVICES

- Certified inspection for piping, vessels, and tanks
- Owner/user management systems
- Risk Based Inspection (RBI) and inspection plans
- Baseline assessments for tanks and underground piping
- Facilities Integrity Management Programs

PROJECTS

- Trans-Northern Pipelines Inc. – Development of Asset Integrity Management Program (AIMP)
- Imperial Oil Ltd. – Risk Based Inspections (RBI)
- Ultramar – Development of FIMP for regulatory application
- IOL Scona Refinery 2018 T/A Planning
- Enbridge – Facility Integrity

Pipeline Integrity

SERVICES

- Pipeline Integrity Management programs
- Pipeline Operating and Maintenance Manuals (POMM)
- Pipeline Risk Assessments
- Project management
- General integrity support and engineering services
- Customized integrity programs to suit client needs
- Integrity standards, processes, and procedures

PROJECTS

- Access Pipelines – Development of IMP manual and corporate standards
- North West Redwater Partnership – Development of IMP prior to construction and operation
- Imperial Oil Program Support
- Enbridge Program Support

External Corrosion

SERVICES

- Cathodic Protection (CP) design, installation, and survey for pipelines, casings, and tanks
- Coating selection and coating evaluation
- ECDA program development, survey, and assessment
- FEED studies, capital cost estimating, and construction management
- Cathodic Protection system performance review incorporating corrosion inspection results

PROJECTS

- TransCanada PipeLines Ltd. – Keystone XL CP Designs
- Enbridge Norealis – Coating selection
- CNRL – Horizon CP Surveys and Support
- Enbridge and IOL – CP Program Review
- City of Calgary Greenline LRT – CP Designs
- CEPA – Coating Studies





Internal Corrosion

SERVICES

- Internal corrosion assessments based on corrosion and flow analysis models
- Review of chemical inhibition and production treatment programs
- Field evaluation and corrosion defect assessments
- Design of corrosion control and monitoring programs

PROJECTS

- TAQA – Chemical inhibition review
- Enbridge – Pressure restriction removal
- Bears paw – Corrosion assessments
- Tourmaline – Pipeline Program Review
- Husky – Corrosion Program Review

Materials and Welding

SERVICES

- Material selection and specification
- Sweet to sour conversions
- Failure analysis
- NDE report QA/QC
- Material testing
- Welding Procedures and Specifications

PROJECTS

- Canadian Natural Resources Limited – Firetube material selection
- Imperial Oil Ltd. – Pipeline reliability and failure probability studies
- Pacific Trails Pipeline – Material selection
- IOL and Enbridge In-Service Welding Procedures
- Tundra - Pipeline Crack Management
- Suncor - Advanced Material Selection

In-Line Inspection Analysis

SERVICES

- Qualification and interpretation of inspection results
- In-Line inspection tool selection
- Growth rate analysis
- Failure pressure analysis
- Dig program planning
- Field evaluations
- Raw data analysis (W/M and CD)

PROJECTS

- Imperial Oil Ltd. – Detailed ILI data analysis
- Suncor – Growth modeling methodology development
- IPL - ILI Secondment and EA Support
- TNPI - QA/QC of ILI Data
- Enbridge – Corrosion and Cracking Trending
- Pembina – ILI Support for Geohazard Risk

Engineering Assessments

SERVICES

- As per CSA regulatory requirements (AER, OGC, and NEB approved)
- Asset life-cycle analysis
- Repair and maintenance schedules
- Inspection intervals and monitoring methods
- Long and short-term integrity plans
- Due diligence assessments

PROJECTS

- Inter Pipeline
 - Engineering assessments
- Pembina – Engineering assessments
- Canadian Natural Resources Limited – Midstream engineering review
- TAQA North
 - Engineering assessments
- Husky Energy
 - Engineering assessments

Risk Management Programs

SERVICES

- Asset risk ranking
- Development of client-specific risk matrices
- Asset Integrity Management (AIM) database development

PROJECTS

- Imperial Oil Ltd./ Trans-Northern Pipelines Inc.
 - APPL risk assessments
- TAQA – Upstream risk assessments
- Trans-Northern Pipelines Inc.
 - Asset Integrity Management database development

Third Party Audits

SERVICES

- Facility and pipeline audits
- Corporate due diligence
- Regulatory compliance

PROJECTS

- Corporate Manuals and Procedures
- Confidential client
 - NEB compliance review
- Confidential client
 - OGC Compliance Audit
- Confidential client – AER mandated Third Party Audit
- Confidential client – OPS (US DOT) Pipeline Audit

AC and DC Interference Mitigation

SERVICES

- AC Interference modeling on pipelines and stations using PRCI or Safe Engineering CDEGS Software.
- Design of pipeline AC mitigation and station grounding systems
- AC interference field surveys, system commissioning and performance assessments
- DC interference testing and design of mitigation systems related to foreign CP systems, light rail systems (DC traction), and telluric currents
- Field testing including track-to-earth resistance testing and stray-current surveys

PROJECTS

- TransCanada Pipelines Ltd.
 - Design of AC mitigation and cathodic protection system for four projects: the Northern Courier, Eastern Mainline, Merrick and Parkway West pipelines.
- Union Gas Ltd – AC fault study and design of the grounding system for the Payne Transmission Station.
- Enbridge Pipelines
 - AC fault study for the Line 9 Don River Valve stations
- ATCO Pipelines
 - AC interference studies on four pipeline projects – NE Calgary Connector, SW Edmonton Connector, North Branch and Salt Cavern.
- PGE – AC Risk Ranking and Localized Interference Studies



PRA Benefits (cont.)

- Individual Line Segment Risk Summary
 - ✓ PL-100
 - ✓ PVR
 - ✓ Internal Corrosion
 - ✓ 5x5 Risk Matrix
 - Unmitigated Risk
 - Current Mitigated Risk
 - Recommended Mitigation Risk
 - ✓ Pipeline Segment Elevation Plot



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a job for us, it's a
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IRA Benefits (cont.)

- Individual Line Segment Risk Summary
- ✓ F-11
- ✓ F-14
- ✓ F-15
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COMPLEMENTARY SERVICES



DATA MANAGEMENT

Sound data management is at the core of our activities. Oil and gas projects and studies require many different data inputs from project information, field work and engineering efforts, and data providers such as regulators and industry associations. Stantec has developed web-based applications for a variety of oil and gas clients. Our easy to access portals integrate a client's data and our license free web mapping tools assist in the integrity decision making process.



REGULATORY SUPPORT

We provide our clients with regulatory support for all main and incidental activities of an IMS which include applying for and managing compliance of approvals. We have worked with companies to write and review Emergency/Facility Response Plans, confirm compliance, and provide technical support.

Our team has vast experience in all aspects of environmental assessments and permitting, as well as a comprehensive understanding of all legislative and regulatory requirements.



HIGH CONSEQUENCE AREA (HCA) ANALYSIS

We've completed HCA mapping and spill flow path modelling for over 12,000 km of pipelines (and counting) in the United States and Canada.

High-resolution threat and HCA maps and databases are produced to understand pipe interactions and facilitate pipeline design optimization. Post-construction conditions are updated and reassessed as part of the operational integrity/management plans. In addition to pipeline right-of-ways, we evaluate any impact zone for the pipeline and associated pipeline facilities.



GEOMATICS AND GIS

Our positioning specialists analyze and govern the flow of coordinate data throughout the in-line-inspection (ILI) project life. This minimizes the introduction of positioning errors and omissions. Dig success is enhanced. Ground disturbance and excavation time is reduced.

We are taking pipeline integrity surveys to a new level. By embedding our expertise along the ILI project timeline, we solidify girth weld target coordinates needed for repair. This means a significant savings in your construction budget.



GEOHAZARDS

Rivers, creeks, and other waterways threaten to expose pipeline and impact integrity.

Stantec's geohazards team helps reduce pipeline vulnerability and risk of exposure. Our team combines field surveys, geohazard assessments, hydrotechnical analytics, and pipeline design to identify pipeline hazards and develop a management plan.

Using a risk-based approach, we help you manage your assets, reduce your liability, and gain budget confidence.



SAFETY LOSS MANAGEMENT SYSTEMS (SLMS)

Because of recent requirements by both federal and local regulators in North America, pipeline owners and operators are incorporating elements of their existing Integrity Management Programs (IMP) into a more holistic corporate approach – SLMS. Stantec has recently led several major pipeline companies in developing, implementing and auditing SLMS at a corporate and/or regional level. We have the experience and subject matter experts in all elements of the SLMS, to do a thorough review and gap assessment of each, and create a comprehensive summary.

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise; to appreciate nuances and envision what's never been considered; to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers innovating together at the intersection of community, creativity, and collaboration. Balancing these priorities results in projects that advance the quality of life in communities across the globe. Stantec trades on the TSX and the NYSE under the symbol STN. Visit us at stantec.com or find us on social media.



Design with community in mind