PIPELINE SERVICES

MINIMISING RISK FOR PIPELINE CONSTRUCTION AND OPERATIONS

WWW.SGS.COM/INDUSTRIAL

AS A COMPETENT PARTNER FOR A SAFE PIPELINE

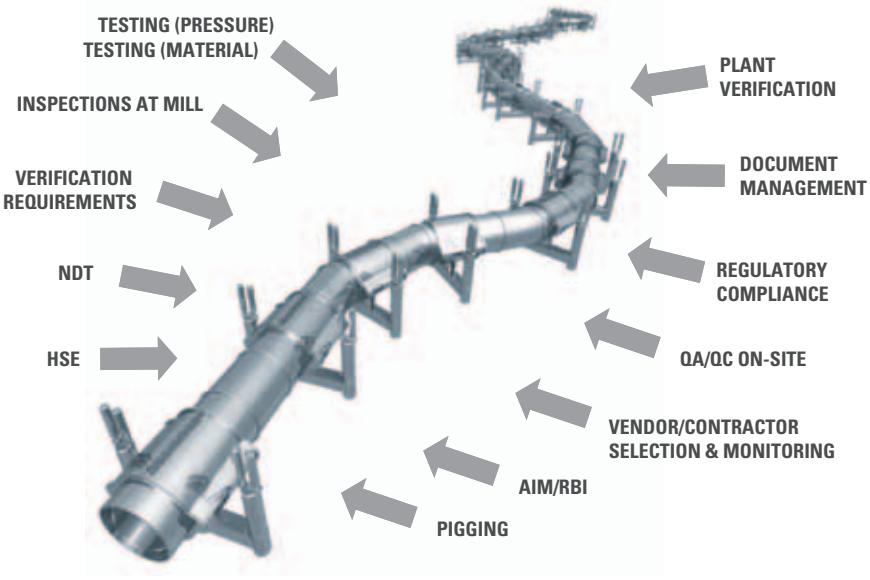
Pipelines represent considerable financial investment and are critical business assets. Rising energy costs, shortage of resources together with increasing demand and relocation of consumers have resulted in sustained growth of oil and gas pipeline construction during recent years. However, safety and reliability remain the critical elements to ensure financial success for a pipeline project.

Ensuring pipeline integrity promotes cost effectiveness in organisations and companies that depend on transmission pipeline networks. To maintain pipeline assets in a safe and reliable condition is one of the major tasks for pipeline operators. Assuring integrity and reliability demands the highest standards of quality inspection during pipeline manufacture and installation.

Involved in more than 500 pipeline projects all over the world, SGS is a reliable and attractive partner for pipeline integrity.

MANAGING THE COMPLEXITY IS A CHALLENGE

A safe pipeline is a combination of factors. Proper design, correct performance of pipe mills and vendors as well as good workmanship of contractors and proper operation and maintenance has to be managed and monitored.



SGS distinguishes itself through efficiency, innovation, flexibility and highly qualified personnel. SGS' global experience in pipeline inspection includes successful testing of thousands of miles of oil, gas and product pipelines.

For almost 50 years, SGS has been testing pipelines all over the world and understands all types of mill and site inspections on pipeline projects wherever located.

Partnering with SGS guarantees access to an unparalleled global network of technical know-how and capabilities. We eliminate uncertainty, enhance mutual confidence, and offer you the freedom to concentrate on the things that really matter: the growth of your core operations and the profitability of your enterprise.

WE REDUCE COMPLEXITY AND ADD VALUE

SGS SERVES ALL PHASES OF A PIPELINE LIFE CYCLE…

A broad range of expertise is required to ensure that each pipeline system is designed, fabricated, installed and operated in a safe, reliable and cost effective way.

With a highly experienced and well trained global network of personnel, SGS is well equipped to meet all the requirements of the pipeline market worldwide – safely, reliably and cost efficiently. SGS can offer tailored solutions based on clients needs and throughout the complete pipeline life cycle.

DESIGN & ENGINEERING

- Review/Verification of Feasibility Studies, FEED, basic and detailed Designs
- Drafting/Revising of Pipeline Coating Specifications
- Tender Support
- Technical Expertise
- Technical Staffing
- Specification of Metering and Hydrocarbon Allocation Systems

PROCUREMENT & FABRICATION

- Quality Assurance/ Quality Control
- Line Pipe Inspection
- Equipment Inspection
- Vendor Audits
- Audits of Pipeline Coating Shops
- Expediting
- Loading Supervision
- Non-Destructive Testing
- Laboratory Services: Material Testing, Environmental Tests (soil, water etc.)
- Health, Safety and Environmental Coordination
- Document Control
- Verification of Metering System Compliance

CONSTRUCTION

- Site Supervision, Third Party Inspection
- Non-Destructive Testing
- Qualification/Certification of Welding and NDT Procedures, Welder Qualification
- Inspection of Pipeline Coating Production
- Warranty Surveys during Line Pipe Transport and Offshore Pipelay
- Health, Safety and Environmental Coordination
- Technical Staffing
- Factory Acceptance Testing of Measurement and Allocation Systems

OPERATION & MAINTENANCE

- Pipeline Integrity Management (ASME 31.8 S)
- Pipeline Risk Assessment
- Pipeline Risk Based Inspection (RBI)
- Maintenance Engineering
- Fitness-For-Purpose Assessment
- Damage/Accident Investigation
- Intelligent Pigging
- Leak Detection
- Special NDT (Guided Wave, TOFD)
- Technical Staffing
- Services for Metering
  - Re-Certification of secondary instruments
  - Flow Computer Checks
  - Sampling System and Analyser Maintenance
  - Design Review
  - On-Site Calibration of Meters and Provers
  - Off-Site Meter Calibration

VALUE-ADDED SOLUTIONS WHICH REDUCE RISK,

MINIMISING RISK THROUGHOUT PIPELINE LIFE CYCLE

The demand for new pipelines shows an upwards trend and the resources the pipeline industry spends on maintaining the assets increase. A failure for whatever reason will result in loss of production for an extended period. Also, the potential for damage to the environment, to health and the operator's reputation can prove equally costly.

SGS can overcome many of these issues by providing a total package of Pipeline Integrity Management and Verification Services either to support larger projects or as stand alone consultancy. SGS advises owners and/or operators in all technical as well as statutory matters and assures the conformity to project specifications and pipeline codes to reduce the operational risks.

Headquartered in Geneva, Switzerland, the SGS Group is the global leader and innovator in inspection, verification, testing and certification services. Founded in 1878, SGS is recognised as the global benchmark in quality and integrity. With 50,000 employees, SGS operates a network of more than 1,000 offices and laboratories around the world.

The core values of complete independence, transparency and integrity guide us in our mission to deliver first-class services on a constant high quality level to customers around the world.

SGS offers Quality Assurance and Control as well as worldwide Pipe Mill Inspections and Vendor Audits during fabrication of components such as line pipes, bends, tubes, pipe traps, coating, etc.

We perform Site Inspections like Third Party Inspection or Health, Safety and Environmental Coordination. SGS executes Non-Destructive Testing of girth welds during construction of pipelines and provides full quality control in the field, either directly on behalf of the pipeline owner or as a sub-supplier to the pipeline contractor. Thereby the SGS Project Manager acts as a single point of contact throughout the whole project.

As our client you will benefit from SGS' extensive know-how which has been gained during numerous pipeline projects. SGS has years of experience in all aspects of On-site and Laboratory Inspection and assessment of pipelines.

Our international teams include registered professional engineers and certified inspectors from a variety of technical disciplines, including petroleum engineering, corrosion, mechanical engineering, coating inspection, chemistry, metallurgy and materials science. We also have a comprehensive array of laboratory and field testing equipment, all calibrated on a routine basis in accordance with both national and international standards.

To engage a qualified partner like SGS will significantly reduce the risk of overseeing critical mistakes during fabrication and in the construction phase.

ENHANCE VALUE AND MAXIMISE RETURNS

OUR CAPABILITIES IN NON-DESTRUCTIVE TESTING

Whether it is in fabrication, pipe manufacturing, pipeline or plant construction - our Non-Destructive and Mechanical Examinations provide Quality Assurance and process safety. SGS' R&D, special examination and consulting teams are at your disposal for complex test requirements. Our variety of equipment and personnel offers technically and financially suitable methods, be it traditional or more specialised examination techniques.

Our certified NDT experts provide the necessary certainty and guide you in choosing the most appropriate and efficient NDT method or combination of methods, either for single components or large projects.

Besides the standard testing techniques, SGS offers a complete range of specialised Non-Destructive Testing methods and inspection services including

- Manual Ultrasonic Testing (UT) (Pulse-echo Method)
- Surface Examination using Magnetic or Penetrant Testing
- Radiographic Examination (RT), X-Ray or Gammagraphic Testing
  - X-Ray crawlers for diameters DN200 to DN350 and DN400 to DN1600
  - Directional X-Ray tube
  - Gamma crawlers for diameters DN150 to DN500 and > DN 500
  - Gamma container Teletron SU100, TIF and Se75
- Special Examinations
  - Eddy Current Testing
  - Guided Wave Examination
  - Positive Material Identification (PMI), Alloy Analysis
  - Time of Flight Diffraction Examination (ToFD)
  - Infrared Thermography (tracing of heat loss)
  - Endoscopy, Videoscopy
  - On-site Hardness Measurements
  - Hydrogen Induced Cracking Examination (HIC)
  - Hot Hydrogen Attack Examination
  - Digital Radiography as on stream technique to determine remaining wall thickness
  - Automatic Ultrasonic Testing (AUT) of Pipeline Girth Welds
  - Computer aided recording and handling of NDT inspection data with PipeCad software

ADVANCED INSPECTION TECHNIQUES

The Guided Wave technology screens pipework for metal loss features such as corrosion and erosion. Originally developed for the inspection of corrosion under insulation; the technology is suited for application to pipelines and process pipework, including road crossings, bridge piers and poorly accessible pipework generally.

Time of Flight Diffraction (TOFD) as a unique ultrasonic technique has big advantages in speed, detection of defects and is the most accurate defect sizing technique in general use. One of the important advantages of using TOFD for weld inspections is the absence of radiation. TOFD combines a high detection rate with a very high reliability in pre-service and in-service inspections.

RELY ON OUR KNOW-HOW AND EXPERIENCE TO

PIPELINE INTEGRITY MANAGEMENT

Mechanical loads, rate of corrosion, and the remaining wall thickness have to be analysed and calculated to evaluate the risk of pipeline leaks. The pipe is vulnerable to attacks by internal and external corrosion, cracking, third party damage and manufacturing flaws. Corrosion on pipelines is directly related to the internal and external conditions present for the unique location of a given pipeline, as well as to the materials of manufacturing and the quality of these materials.

SGS holds worldwide multi-discipline competences to assist in the development of an integrity management system as well as ongoing integrity assessment of pipeline systems. We provide a variety of services addressing issues related to pipelines in operation. These services focus on reducing pipeline operation cost, while still maintaining an acceptable reliability and safety level.

Risk acceptance criteria are used to help determine the most appropriate type of inspection and the optimum timing for inspections of relevant parts of the pipeline system. Inspection and maintenance tasks (costs) are balanced out with equipment units of varying levels of risks (personnel safety, production loss, life cycle costs, operational costs).

Our Pipeline Integrity Management System (PIMS) uses a scheme of examination for each segment and a risk ranking of the segments, which will enable the client to manage the interventions in the pipeline, required for safety reasons, in a cost effective way.

The system also gives information about the techniques of detection most applicable to each segment, as a result of hazards acting at that particular length of pipeline, and the most applicable mitigation actions for those hazards which produce damages that can not be detected in advance.

The systematic mitigation of risks is fundamental for achieving cost reductions, as well as extension of the pipelines remaining lifetime.

Implementing PIMS ensures that

- Mechanical Pipeline Integrity is always known
- Potential Pipeline failures can always be predicted and so these failures can be avoided
- The risk of Pipeline burst, leakage and a possible catastrophic scenario will be reduced
- Due to more targeted inspection intervals and inspection points costs on inspection activities can be saved

SGS experts work together with the pipeline operators to establish the most cost efficient solutions for each pipeline system.

ASSURE PIPELINE INTEGRITY AND RELIABILITY

SERVICES FOR PIPELINE METERING SYSTEMS

Pipeline transportation of hydrocarbons requires quality and quantity measurement in accordance with specified standards at all points of entry to and exit from the pipeline. Failure to comply with required quality and quantity standards will result in potential non-compliance with

- Fiscal measurement requirements
- Allocation agreements defining methods for allocating revenues generated from shared transportation system
- Pipeline corrosion management and/or quality bank agreements

Under measurement exposes suppliers to direct loss and over measurement exposes suppliers to future claims to recover over-assessed revenues.

Measurement defines a combination of primary measurement devices, secondary instruments, installation pipework, flow computers, sampling equipment, and analytical laboratories. Errors in any one of these elements will result in mis-measurement.

SGS can provide services to ensure that the equipment is designed to meet measurement requirements and is consistently operated as specified.

To identify and correct errors due to instrument malfunction or drift and to comply with regulatory requirements for measurement of hydrocarbons won and saved, pipeline operators should re-certify their Metering Systems.

This will also protect their financial interests from under and over measurement and assist reservoir engineers in optimising field performance.

Re-Certification of Metering Systems involves

- Calibration
  - Primary Devices (Orifice Meters, Turbine Meters, Ultrasonic Meters)
  - Secondary Devices (Pressure, Temperature, Differential, Density, Sampling Systems)
  - Gas Composition (Verification of Chromatograph Results)
- Verification
  - Flow Computers Performance (Analogue to Digital Conversion, Frequency Conversion, Flow Rate Computation and Totalisation Functions, Data Integrity and Security)
  - System Integrity (Valve Checks, Seal Register Maintenance)

Since SGS is independent of metering system and equipment manufacturers, we are often asked to advise operators, regulators, engineering contractors and others on the most appropriate systems to use for a particular metering application. In this role we

- Ensure compliance with applicable standards
- Advise on the most cost effective system design to meet the specified uncertainty
- Determine the uncertainty by considering all potential sources of error through the traceability chain
- Consider how the system can be calibrated in operation or its performance verified
- Make proposals to Regulators and Partners

CONTACT US WWW.SGS.COM/INDUSTRIAL OR INDUSTRIAL.GLOBAL@SGS.COM

WWW.SGS.COM

WHEN YOU NEED TO BE SURE

SGS