

APTECH Engineering Services, Inc. Petrochemical Group

Pipeline Integrity Assessment Courses

These courses provide an opportunity to gain the knowledge and necessary skills as required to develop and manage a pipeline integrity assessment and rehabilitation program. The following personnel will benefit from this course: Engineers, Pipeline Integrity Managers, Engineering Consultants, Facility Operators, Maintenance Personnel/Supervisors, Inspectors, In-line Inspection Technicians/Analysts, and Pipeline Regulators.

Benefits to Participants

Students will study and gain a greater understanding of critical aspects of pipeline assessment techniques and rehabilitation approaches as relates to the following:

- ◆ Regulatory requirements relating to in-line inspection and rehabilitation applications, industry failure modes, and statistics.
- ◆ Pipeline assessment and mitigation techniques.
- ◆ Technical aspects of in-line inspection tool application, including review of the benefits and limitations relating to each in-line inspection technology.
- ◆ In-line inspection contractual considerations, including the option for auditing of in-line inspection results, assurance of inspection tool accuracies, continued technical support and structure of final reporting.
- ◆ Project risk assessment – Case Study 1 – A four-phase approach to pipeline assessment and rehabilitation that provides for a logical and systematic approach to large program budgeting.
- ◆ Application of in-line inspection results within a repair program, including requirement for correlation excavations, excavation prioritization approaches, pipeline design applications, and development of criteria for excavation.
- ◆ Development of field repair program, including development of criteria for field repair, methods of field repair, and review of key field procedures.
- ◆ Field service procedure development, including site survey, excavation, pipe surface preparation, nondestructive examination (NDE), and pipe repair methodologies.
- ◆ Database applications-control of all program data, including in-line inspection (ILI) results, NDE results, sectioning results, regulatory documentation, and ILI accuracy monitoring applications.
- ◆ Field program quality control applications and techniques to ensure excavations are performed at the correct location and NDE results correlate to predicted ILI findings.
- ◆ Project risk assessment – Case Study 2 – Project risk assessment – A detailed nine-step approach to a typical pipeline assessment and repair program.
- ◆ New and emerging pipeline integrity assessment and rehabilitation technologies.

Course 1 – Basic Pipeline Integrity Assessment

Day 1

- ◆ North American Pipeline Network Overview.
 - Pipeline failure statistics.
 - Pipeline integrity regulations and standards.
 - Integrity management plan development.
 - Excavation and repair criteria development.

- ◆ Pipeline Problems and Defects. Statistical Breakdown of Events.
 - Material related.
 - Construction related.
 - Third-party contact related.
 - Corrosion – External and internal related.
 - Cracking (pipe body) related.

- ◆ Mitigation Methods.
 - Cathodic protection.
 - Inhibitor injection.
 - Arial patrols.

- ◆ Overview – Pipeline Integrity Assessment Methods and Approaches.
 - Depth of cover surveys.
 - Pipe coating integrity surveys.
 - Pipeline leak surveys.
 - In-line inspection surveys.
 - Direct assessment approaches.

- ◆ The History of Pipeline Pigs.
- ◆ Overview – Types of Pipeline Pigs/Utilization of Pipeline Pigs.
- ◆ Pipeline ILI Tools.
 - Gauging.
 - Geometric.
 - Magnetic flux leakage (MFL)
 - Ultrasonic.
 - Eddy Current.
 - Geodetic.

- ◆ Selection/Limitations of ILI Tools.
 - Defect modes.
 - ILI vendor qualification process.
 - Contractual considerations.
 - Specifications – Accuracy Tolerances.
 - Pipeline design/product flow considerations.



Day 2

- ◆ Running an ILI Tool – The Process.
 - Pipeline preparation.
 - Scheduling requirements.
 - Operational parameters.
 - Diameter confirmation, running a geometry tool.
 - Tracking requirements.
 - Above ground marker (AGM) approaches.
 - Contingency plans (stuck pig, etc.).
- ◆ In-line Inspection Tool Data Assessment.
 - Analysis techniques.
 - Data storage and processing.
 - ILI data analysis.
 - Grading techniques and principles.
 - Data accuracy and tolerances.
 - Repeatability and reliability.
 - Third-party analysis (quality assurance).
Validation of results (correlation).
 - Prioritizing the excavation program. Repair criteria.
 - Managing ILI data.
 - Analog versus digital data.
 - Standardization of data.
 - Database models – distance versus joint tally.
 - Correlation of multiple types. Years of survey data.
 - Risk assessment applications.
 - Geographic Information System (GIS) and Geographical Positioning System (GPS) Applications.



Day 3

- ◆ Case Study (Group Response). Practical Program Applications. Project Risk Assessment Development.*
 - Phase 1 – Pipeline system integrity and repair historical review. Integrity Management Plan development. Code compliance evaluation. Repair criteria development. Validation of inspection tool performance.
 - Phase 2 – Specific project development and strategy.
 - Phase 3 – Pipeline rehabilitation and repair.
 - Phase 4 – Final reporting. Database input.
- ◆ Review and Open Discussion.
- ◆ Emerging Pipeline Integrity Approaches and Technologies.

**Note: Participants will meet in small groups to discuss and suggest the best possible solution to a case study problem with emphasis on the various project “what if” risks involved. A representative from each group will present the solutions to all participants. An open discussion will follow.*

Course 2 – Advanced Pipeline Integrity Assessment & Rehabilitation

Day 1

- ◆ Basic Pipeline Integrity. A Review of ILI Tools, Pipeline Integrity Concepts, and Applications.
- ◆ In-line Inspection Data Verification.
 - Correlation results.
 - Accuracy tolerance applications.
 - Independent data auditing.
- ◆ Codes and Regulations.
 - API 1163 – In-line Inspection Systems Qualification Standard.
 - NACE Standard RP0102 – Standard Recommended Practice, In-line Inspection of Pipelines.
 - NACE TR 35100 – In-Line NDE Inspection of Pipelines.
 - API Standard 5T1 – Standard on Imperfection Technology.
 - API Specification 5L – Specification for Line Pipe.
 - ASME B31.4 – Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids.
 - Pipeline Integrity Management Federal Register/Volume 65, No. 232- 195.452-Pipeline Integrity – Management in High Consequence Areas. Section 5 – Special Requirements for Scheduling Repairs.
- ◆ Geographic Information System (GIS) and Geographical Positioning System (GPS) Applications

Day 2

- ◆ Procedure Development and Field Service Applications.
 - Field survey. Site Confirmation.
 - ◆ Site location assurance.
 - Excavation.
 - ◆ Safety and personnel considerations.
 - ◆ Technical considerations.
 - Pipe Preparation.
 - ◆ Pipe surface cleaning requirements.
 - ◆ Pipe surface cleaning techniques.
 - ◆ Pipe surface cleaning medium.
 - ◆ Pipe surface profile considerations.
 - NDE and pipeline evaluations.
 - ◆ Quality of personnel.
 - ◆ Data to be collected.
 - ◆ Documentation approaches.
 - ◆ Photograph requirements.
 - ◆ ILI data correlation.
 - ◆ Data management and storage.
 - ◆ Issues of nomenclature. How to we define an anomaly?
 - ◆ Reporting considerations. Legal exposure considerations.



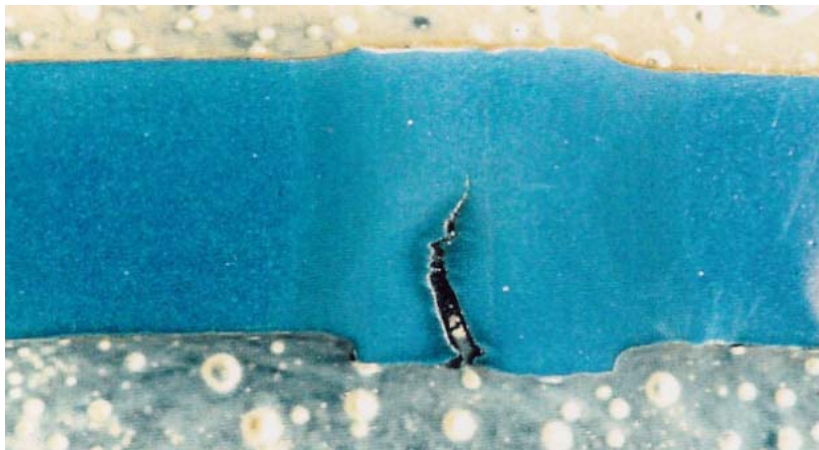
Day 2 – Continued

- Repair criteria. Approaches to repair.
 - ◆ Composite (ClockSpring, armour plate, others)
 - ◆ Steel Sleeves (A & B).
 - ◆ PetroSleeve.
 - ◆ Bolt on sleeves.
 - ◆ Overlay.
 - ◆ Cut out. Section replacement.
 - ◆ Buffing.
 - ◆ Documentation requirements.
 - ◆ Cost considerations.
- Pipeline recoat approaches.

Day 3

- ◆ Case Study (Group Response).Nine-Step Rehabilitation Program Approach. Project Risk Assessment Development *
 - Step 1 – Pipeline assessment. Determining the problem.
 - Step 2 – Bid document release. Vendor selection. Contract negotiations.
 - Step 3 – Pipeline preparation. Cleaning. Launcher and receiver installation. Geometry inspection. Establish AGM locations. Project risk assessment.
 - Step 4 – Inspection tool launching and receiving. Inspection tool tracking.
 - Step 5 – ILI data acceptance. Preliminary data review.
 - Step 6 – Correlation excavations. NDE approaches. Metallurgical assessment. Development of Criteria for Excavation.
 - Step 7 – ILI final report. Software release.
 - Step 8 – Pipeline rehabilitation program planning. Project budgeting. Cost controls.
 - Step 9 – Pipeline rehabilitation program implementation.

** Note: Participants will meet in small groups to discuss and suggest the best possible solution to a case study problem with emphasis on the various project “what if” risks involved. A representative from each group will present the solutions to all participants. An open discussion will follow.*



Instructors



Mr. Phillip Nidd

Mr. Nidd is a Canadian citizen who resides in Houston, Texas. He has in excess of 27 years of experience in the pipeline integrity business, having served both as an operating pipeline company Pipeline Integrity Manager and as an independent Pipeline Integrity Consultant during this time period. In his present position as Pipeline Integrity Specialist for APTECH, Mr. Nidd is responsible for providing project management expertise on large-scale pipeline integrity assessment and rehabilitation projects.

Mr. Nidd is a recognized expert in the field of pipeline integrity and has authored or co-authored a number of papers. These include the following:

- ◆ *“On Line Inspection Evaluation, Maintaining Integrity on High Pressure Gas Lines”*
- ◆ *“Nova On-Line Pull Test Evaluation, Hard Spots in Pipeline Steel”*
- ◆ *“An Approach to Pipeline Integrity Assessment”*
- ◆ *“Clock Spring Repair Sleeves and Pipeline Rehabilitation”*
- ◆ *“Evaluation of Pipeline Integrity Using Instrumented Pigging Tools”*

Mr. Nidd acted as the primary ILI consultant on the Platte Pipeline TFI Rehabilitation Program and was also a co-author along with the Platte Pipeline Company of “Platte TFI Program - Innovative Solution to Hydrostatic Testing,” as presented at the 2000 International Pipeline Conference in Calgary, AB.

Most recently Mr. Nidd is acting as a Senior Pipeline Integrity Consultant (on going) to the Oleoducto De Crudos Pesados (OCP Ecuador) ILI team and assisting in the areas of contract development, contract award, writing of critical procedures, development of excavation and repair criteria, development of integrity management plans, and general technical support.



Mr. W. C. (Bill) Witte

Mr. Witte resides in Houston, Texas and is a graduate of Northwestern University with a BS in Business Administration. He has 29 years experience in the pipeline industry and has served as President of a coating contractor, Worldwide Product Manager for several coating manufacturers, private consultant to several international engineering companies, and principal investigator on three coating failure and rehabilitation projects. In his present position with APTECH Engineering Services, Inc. he is responsible for Pipeline Integrity/Coating Specialist Programs.

Mr. Witte is a recognized expert in the field of external corrosion coatings, which can be applied in a plant or field operation. He has authored numerous papers and made presentations on the selection of coatings for in plant application, field application (rehabilitation projects), and field joint coatings. The most recent paper was titled, “New Developments in the Evaluation and the Use of Tar Urethane Coatings for Pipeline Rehabilitation and Girth Welds.”

Some of the most recent projects Mr. Witte has completed include the following:

- ◆ Coating of 90,000 field joints on the Esso/Chad Pipeline in Africa
- ◆ Completion of the Black Dust Study on a 42-inch OD pipeline in the Middle East
- ◆ A condition assessment and evaluation of a liquid line in Texas
- ◆ A sour gas line evaluation in the Middle East.

APTECH's Asset Management Services

Pipeline Rehabilitation & Integrity Management Engineering

Aptech Engineering Services, Inc. (APTECH) offers the **Pipeline Rehabilitation & Integrity Management Engineering (PRIME)** support package; the cornerstone of the APTECH pipeline integrity assessment and rehabilitation service. APTECH **PRIME** support delivers a cost-effective, integrated, engineering and field services solution to the high cost of pipeline integrity assessment and rehabilitation programs.

APTECH **PRIME** Support:

- ◆ Applies a systematic, engineering focused approach to pipeline integrity assessment and integrity management plan development
- ◆ Applies proven contract procedures and quality control approaches to In-line Inspection or Direct Assessment programs
- ◆ Allows the pipeline operator to reduce pipeline rehabilitation costs by providing key field support services under one umbrella company, utilizing single point management along with project wide safety and technical procedures
- ◆ Provides a pipeline integrity and rehabilitation focused data management solution

Pipeline Rehabilitation Support

- ◆ Contract, Request for Quotation (RFQ) Development, Procedure Management
- ◆ Engineering Criteria, Department of Transportation (D.O.T.) Reporting
- ◆ Field Activity Support, Single-Point Project Management
- ◆ Joint Venture Development for Lump Sum Project Bidding
- ◆ Data Management, Cost Controls, and Reporting Support

Integrity Management Support

- ◆ Pipeline Integrity assessment/ Pipeline Integrity Management Plan Development
- ◆ Pipeline Operating Integrity Due Diligence Assessment
- ◆ Direct Assessment Method Applications
- ◆ In-line Inspection Program:
 - Contract Development, Procedure Management
 - Data Quality Controls, Engineering Criteria
 - Field Activity Support, Data Acceptance Criteria, Data Auditing
- ◆ Pipeline Integrity Long-Term Management Programs

Engineering Support

- ◆ Risk Based Inspection (RBI) Program Development
- ◆ Detailed Pipeline Integrity & Rehabilitation Course Training
- ◆ Failure Analysis
- ◆ Metallurgical Services, Engineered Solutions
- ◆ Litigation Support

APTECH's Petrochemical Group

Aptech is an internationally known consulting engineering services firm. We have provided services for over 25 years to businesses throughout the world. Our corporate offices are located in Sunnyvale, California. The APTECH Petrochemical Group is a division of Aptech Engineering Services, Inc. and is located in Houston, Texas. The Petrochemical group provides asset management services and solutions to the process industries worldwide.

APTECH provides specialists in the fields of corrosion/metallurgy, thermal-hydraulic analysis, stress analysis, fracture mechanics, vibration analysis, statistical analysis, and process plant management systems. Our specialists provide technical solutions to meet our clients' needs.

APTECH provides a full range of consulting services for Managing Risk to create, execute, and evaluate Risk Based Inspection (RBI) programs. APTECH personnel are familiar and experienced with several RBI approaches, methodologies, and software tools and can assist with the implementation of a client's program of choice:

- ◆ Development of RBI objectives and goals
- ◆ RBI Planning and Implementation (from pilot studies to full plant implementation)
- ◆ RBI Audits and Reviews
- ◆ RBI Software and Integration with existing inspection planning tools
- ◆ Training

APTECH provides RBI software, training, and support for clients wishing to implement an in-house RBI program, or we can provide all labor necessary to complete a RBI analysis program turnkey.

For More Information, Contact APTECH's Houston Office.

Aptech Engineering Services, Inc.

16100 Cairway Drive, Ste 310, Houston, Texas 77084

Phone: 832.593.0550, Fax: 832.593.0551

E-Mail: aptechtexas@aptecheng.com

Website: www.aptechtexas.com



Aptech Engineering Services, Inc.

139, 11215 Jasper Avenue, Edmonton, Alberta, CANADA, T5L 0L5

Phone: 780.669.2869, Fax: 780.669.2509

E-Mail: aptechalberta@aptechtexas.com

Website: www.aptechtexas.com

Corporate Headquarters

601 West California Avenue, Sunnyvale, CA 94086-4831

Phone: 408.745.7000; Fax: 408.734.0445