Materials & Corrosion Engineering

Pipelines: Long Term Integrity

Presented by Ammonite Corrosion Engineering Inc.

Pipelines are Canada's and North America's best choice for moving oil, gas and bitumen from the producer to the processing plant or to the customer.

Proactive management is the key to ensuring long term integrity of pipeline assets. Enhanced long term integrity, means that operators must ensure that corrosion protection is a proactive task, not a reactive one.

Ammonite Corrosion Engineering provides Clients with the right services and products for selecting and maintaining the correct pipeline materials, ensuring long term integrity of their assets.

Our services include materials selection for all types of pipelines: sweet and sour gas, complex multi-phase, sour water, disposal fluids, etc. We provide specifications for steel, non-metallic (composite and fiberglass), stainless steel, high alloy, high alloy internally clad, non-metallic liners, alloy mechanical liners and internal weld overlay lining. Our sources include overseas manufacturers with "best in class" quality and production.

EFFECTIVE AND INFORMED MANAGEMENT FOR THE LONG-TERM INTEGRITY OF AGING PIPELINE ASSETS.

Ammonite Corrosion Engineering Inc.

We can also source "best in class" fittings, bends and valves matching the pipe quality. In order to combat corrosion, our Clients rely on us for effective chemical inhibitor programs, external coating selection and specifications for mainline and girth welds.

Corrosion Engineering includes cathodic protection systems design, for the procurement and installation of any pipeline system. We have specialists that provide annual, quarterly and monthly surveys for our Clients.

Upstream, downstream, onshore and offshore, Ammonite has the experience and focus to ensure that our clients' pipeline integrity programs are completed on time and on budget and are designed as per the most recent regulatory codes and standards.

FAST FACTS

67% **Percentage of pipeline leaks & ruptures caused by corrosion from 1990-2012 in Alberta. (AER Report 2013-B)**

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Preventing corrosion is vital in every step in the production of Oil & Gas. Ammonite Corrosion Engineers identify corrosive conditions and set operating limits for monitoring process conditions.

Our firm conducts Internal Corrosion Direct Assessment (ICDA) services for major pipeline operators by creating and reviewing pipeline operation and maintenance programs and manuals, and assisting in scheduling maintenance activities on pipeline systems.

Internal Corrosion

- Evaluation of internal corrosion potential of pipeline fluids.
- Methods of monitoring internal corrosion.
- Methods of corrosion inhibition and mitigation of internal corrosion.
- Evaluation of chemical corrosion inhibitors for effectiveness.
- Methods/procedures to mitigate/rehabilitate internally corroded pipelines.

Materials Selection and Specification

- Materials selection and specification of new pipelines for all fluids.
- Selection and specification of non-metallic pipelines, alloy pipelines, internally clad pipelines and non-metallic liners for corrosive fluids.

External Coatings

- Methods of monitoring the condition of external coatings of pipelines.
- Evaluation of external coatings of pipelines.
- Selection and specification of external coatings for all pipeline materials including mainline, girth weld and repair/rehabilitation.

Cathodic Protection

- Design, specification, purchase and installation of cathodic protection for pipelines including sacrificial anode and impressed current systems.
- On-going evaluation of cathodic protection systems (e.g. annual potential surveys) including estimates of remaining life of anodes/ground bed.

In-Line Inspection

- Selection of in-line inspection tools (“smart pigs”) for pipeline corrosion/condition evaluations.
- Interpretation of smart pig inspections and recommendations for further evaluations: excavations, repairs, re-hydrotesting, etc.

CSA Z662 Integrity Management and Risk Assessment Support

- Prepare Pipeline Integrity Management Program as per Z662 Annex N.
- Can assist in preparing/supporting the Risk Assessment Program as per Z662 Annex B.
- AER Directive 77, Section 5, CSA Z662 Annex N, Integrity Management Program is mandatory for all Pipelines in Alberta. We can prepare such programs for our Clients.

Pipeline Flow Analysis

- Through our parent company, OEL Projects Ltd., we can analyze pipeline flow regimes (steady state and transient) to determine flow types including liquid hold-ups (stagnant regions), slugging, dispersed flow and others. Knowledge of flow types assists in selecting corrosion inhibitors and determining pigging schedules.