Identifying and Managing Seam Weld Anomalies

Hazardous Liquids Pipeline Industry Perspective on Identifying and Managing Seam Weld Anomalies

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Identifying and Managing Seam Anomalies

- Risk based process;
  - Gather relevant data
  - Assess the data
  - Develop management plan
  - Execute on the plan
  - Start over and continue process

Identifying Seam Weld Threats

- Conduct integrated risk assessment to determine susceptibility to longitudinal seam failures
- Data included in the risk assessment process may include but, not limited to;
  - Pipe Specifications
    - Diameter
    - Wall thickness
    - Grade
    - Age
    - Manufacturer
    - Seam type

Identifying Seam Weld Threats

- Data included in the risk assessment may include but, not limited to;
  - Service failure history
  - Hydrostatic test history
  - Operating pressure cycles
  - Maximum operating pressure
  - In line inspection findings
  - Maintenance excavation findings

Identifying Seam Weld Threats

- Utilizing data gathered conduct seam failure susceptibility assessment
- Various industry documents i.e. OPS TTO5 are available for reference
- Operators Integrity Management Plan establishes data to be used and process for conducting the assessment

Managing Seam Weld Anomalies

- If the results of the assessment indicate that a pipeline segment is susceptible to seam failures then a seam integrity assessment is conducted
- Operators generally choose in-line-inspection or hydrostatic testing to validate the integrity of the longitudinal seam.

Mitigation of Seam Threats

- Hydrostatic testing includes a short duration spike test
- Maximizing the difference between the test pressure and the operating pressure allows for a longer period between test intervals as smaller defects are left in the line.
- Reliable in-line-inspection can identify and characterize seam anomalies.
- Accuracy of the in-line-inspection tool is validated through excavations
- Identified injurious seam anomalies are repaired via pipe replacement or full encirclement welded sleeves.

Mitigation of Seam Threats

- After a seam integrity assessment (either ILI or H2O test) an analysis is conducted to determine a re-inspection interval.
- The re-inspection interval determination process is a function of the size of the remaining seam defects after the assessment and repairs and theoretically growing those anomalies over time based upon the way the pipeline operates.

Managing Seam Threats

- Crack growth analysis which is utilized in the re-inspection interval determination process determines a defect time to failure in which half of that time is utilized for a safety factor.
- Seam integrity is a continuous process as operating conditions and integrity discoveries can change on a pipeline.