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MANAGING RISK

ICDA for Dry Gas

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DG-ICDA in Codes & Standards

- NACE Standard Practice SP0206
  - ICDA Methodology for Pipelines Carrying Normally Dry Natural Gas (DG-ICDA)
- 49CFR §192
- ICDA Development
  - GRI 02-0057, "Internal Corrosion Direct Assessment of Gas Transmission Pipelines – Methodology
  - NACE CORROSION/02 Paper Number 87

Direct Assessment (ECDA, ICDA, SCCDA)

1. Pre-assessment – determine mechanism for susceptibility
2. Indirect Examination – prioritize susceptibility based on measurements or predictions
3. Direct/Detailed Examinations – characterize local damage
4. Post-assessment – Verify process/mechanism and calculate reassessment interval

ICDA Step 2 – Where is the Water?

- Upstream highest priority
- Locations of water accumulation
  - NACE CORROSION/06 Paper Number 183

$$\theta = \arcsin\left[\left(0.675\frac{\rho_G}{\rho_L - \rho_G} * \frac{V_g^2}{g * ID}\right)^{1.091}\right]$$

Experience and Challenges

1. Threat Assessment
2. Length of pipe to inspect
3. Inspection methods and procedures
4. Inclination Profiles
5. Character of liquid inputs
6. Reassessment intervals
7. Integrating DA methods

1. Threat Assessment

- Normally dry gas
  - Not intended for characterizing widespread damage
- Process prioritizes based on any significant damage
  - Damage distribution not presently considered
- Opportunity for DG-ICDA evolution
  - Threat assessment broader than ICDA

2. Length of Pipe to Inspect

- Validation project
  - Compared ILI and virtual ICDA
- Long Inclines
  - Short vs. long inclinations
  - Increasing inclination
- Upstream elevation profile

3. Inspection Methods & Procedures

- Detection of IC flaws
  - Flaw size
  - Leak vs. rupture
- Radiography
- UT Scans
- Point UT
  - Grid spacing

4. Inclination Profiles

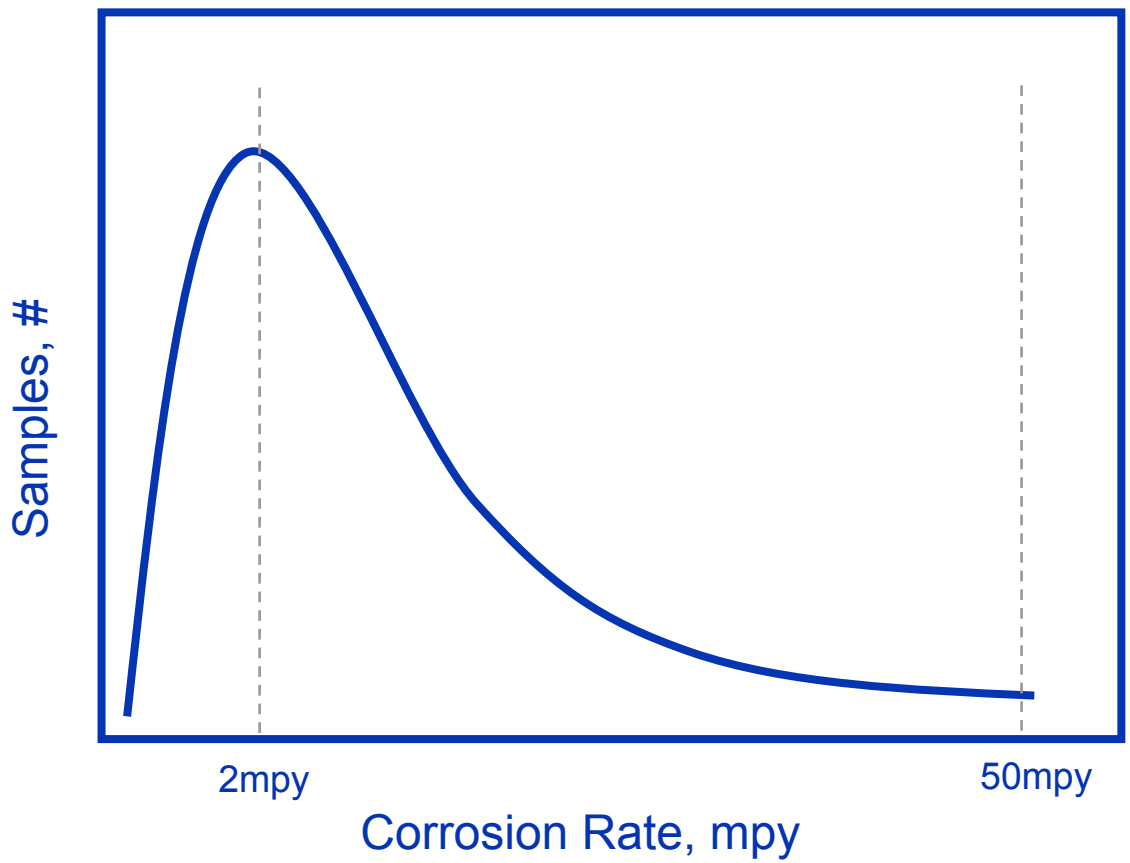
- Guidelines/Procedures
- Impact of uncertainties

5. Character of Liquid Inputs

- Modeling for small water volumes
- Consider
  - Glycol Carryover
  - Solids
- Monitor/sample gas quality

6. Re-Assessment Interval

- On average, corrosion rates are less than 2mpy, but what is likelihood of 50mpy extreme value?



7. Integrating DA Methods

- DA methods typically performed stand-alone
- Can gain efficiencies by combining surveys and excavations
- Optimize risk

Summary

- ICDA Method
  - Consensus
  - Simple and intuitive
  - Appropriate for a significant portion of pipelines
- ICDA Implementation
  - Inconsistencies between IMP procedures, code, standards
  - Gaps in knowledge, much to be filled by experience or data not previously collected
- Consider corrosion rate distribution for reassessment intervals
- Integrate DA methods