Transmission Integrity Management Programs (TIMP)

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MPSC

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TIMP Inspections

- Intrastate
  - Comprehensive every 4 years (plan & records)
    - 2018-2019
    - ~ 2022-2023
    - ~ Will eventually become risk based frequency
  - Field inspections annually (based on activity)
- Interstate
  - As part of integrated inspection cycle (typically every 4 years)
  - Risk based as determined by PHMSA

Hot Topics

- Incidents
- New Threats
- SCC / EMAT
- Manufacturing Seam Threat
- Risk Model Upgrades
- Inspection Findings

Incidents => Threats

- 2016
- Second-party damage during integrity dig.
  - Operator identified that many of these “stubs” in the distribution system are not mapped.

Incidents => Threats

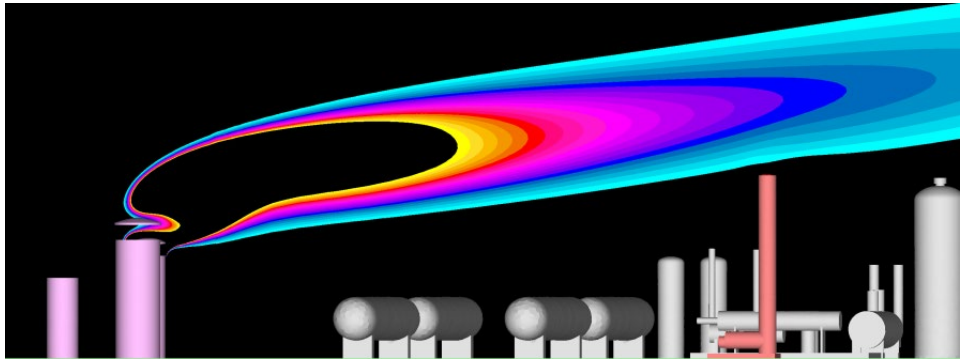
- 2017
- Compressor station blowdown fire.
  - Operator identified blowdown silencer not designed to prevent rainwater and debris from entering the top and collecting in the bottom.

Incidents => Threats

- 2017
- Pipeline rupture and ignition.
  - Operator identified a history of buoyancy and induced stresses, as well as weld defects from a 2009 weld.

Incidents => Threats

- 2019
- Compressor station blowdown fire.
  - Operator identified low velocity of gas discharge from blowdown silencer in conjunction with a close proximity to the thermal oxidizer allowed for ignition.



New Threats to Consider

- Never be 100% confident in your threat identification and risk analysis.
  - This process is meant to be ever evolving and improving.

New Threats to Consider

- Lack of data
  - Unmapped pipelines / stubs contributes to a higher probability of mechanical damage.
  - Consider data sources and where there may be gaps.

New Threats to Consider

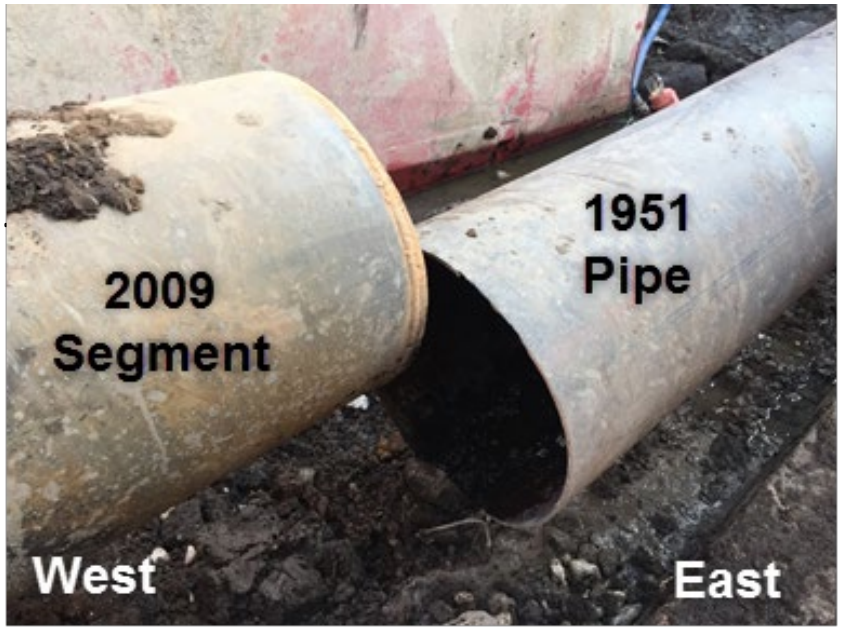
- Blowdown silencer design
  - Water or debris collecting allows for a higher probability of ignition in the event of a blowdown.
  - Slower velocity and turbulence allows for a higher probability of ignition due to mixing with air.
  - Higher frequency of blowdown actuation also contributes to a higher probability of ignition.

New Threats to Consider

- Stresses identified during O&M activities or incidents.
  - Stresses can contribute to a higher probability of failure:
    - Buoyancy (pipe rising out of ground)
    - Sag lowering
    - Pipe “ripping” while cutting
    - Filling over pipeline identified during patrolling

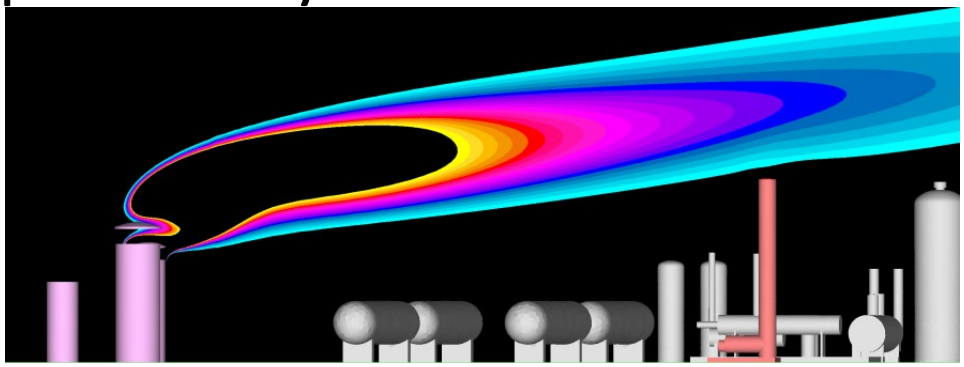
New Threats to Consider

- Weld defects.
  - Weld defects can contribute to a higher probability of failure:
    - IF, IFD, Porosity, ID Offset, No taper, possible hingetack
    - Within spec or out of spec
    - Workmanship of 2009 construction crew comes in question.



New Threats to Consider

- Blowdown silencer design
  - Slower velocity and turbulence allows for a higher probability of ignition due to mixing with air.
  - Higher frequency of blowdown actuation also contributes to a higher probability of ignition.
- Ignition sources
  - Proximity to ignition sources can contribute to a higher probability of failure



New Threats to Consider

- How can these new threats be addressed in your risk assessment?
  - Think outside the box and use all information you have access to even if it doesn't fit well into your existing risk model.
  - Use "lessons learned" from other operators

SCC and EMAT

- When do you have to assess for the threat of SCC?
  - 192.917 (Threat Identification / Data Gathering)

    (a) ASME B31.8S-2004, Section 2

    (b) ASME B31.8S-2004, Section 4 and Appendix A

  - New rule revisions on 10/1/2019 have not changed this.

SCC and EMAT

- *ASME B31.8S-2004: A3.3 Criteria and Risk Assessment: Each segment should be assessed for risk for the possible threat of SCC if all of the following criteria are present:*

  (a) operating stress > 60% SMYS

  (b) operating temperature > 100°F

  (c) distance from compressor station ≤ 20 miles

  (d) age ≥10 years

  (e) all corrosion coating systems other than fusion-bonded epoxy (FBE)

**ASME B31.8S-2004: A3.1 Paragraph A3 provides an integrity management plan to address the threat, and methods of integrity assessment and mitigation, for high pH type stress corrosion cracking (SCC) of gas line pipe (see Fig. A3). Near-neutral type SCC similarly would require an inspection and alternative mitigation plan…*

SCC and EMAT

- ASME B31.8S-2010/12/14/18 clarify that near-neutral criteria is just:

  (a) operating stress level > 60% SMYS.

  (b) age of pipe > 10 yr.

  (c) all corrosion coating systems other than plant applied or field-applied fusion bonded epoxy (FBE) or liquid epoxy (when abrasive surface preparation was used during field coating application). Field joint coating systems should also be considered for their susceptibility using the criteria in this section.

  *But these are not incorporated into 49 CFR Part 192…

SCC and EMAT

- Other industry standards and whitepapers should be used to ensure the most current knowledge and experience is utilized, since code uses a 15-year old standard.
- For Example:
  - CEPA SCC-RP-2007:

    5.1.1.2 Operating Conditions

    Stress Level: No relationship between the operating stress and SCC initiation has been validated however SCC in pipelines operating at a lower stress will require more time for SCC to grow to failure.
  - *PRCI / PHMSA SCC Study – 2010*

    Development of Guidelines for Identification of SCC Sites and Estimation of Re-inspection Intervals for SCC Direct Assessment:

    3.2.2 Susceptibility

    FBE coating, a white or near-white surface finish, MAOP <40% SMYS, temperature of <35oC, and a soil (Na + K) concentration of <0.01 mol/L

SCC and EMAT

- How do you assess for the threat of SCC?
- Prior to 10/1/2019
  - 192.921(a)

    (1) ILI (ASME B31.8S-2004, Section 6.2)

    (2) Pressure Test (Subpart J)

    (3) Direct Assessment (192.929 => ASME B31.8S-2004)

    (4) Other Technology (EMAT???)

  - Many operators have been using EMAT with good confidence.

SCC and EMAT

- Post 10/1/2019
  - 192.921(a)
    - (1) ILI (192.493) (EMAT???)
    - (2) Pressure Test (Subpart J)
    - (3) Spike Hydro (192.506)
    - (4) Direct Examination
    - (5) GWUT (192, Appendix F)
    - (6) Direct Assessment (192.929 => ASME B31.8S-2004)
    - (7) Other Technology

*Only applies to interstate operators until MGSS adopts the Part 192 revisions.

SCC and EMAT

- Best practices:
  - Operators should be using a combined process of opportunistic evaluations (MPI), direct examinations/SCCDA, and ILI technology
  - On pipelines with coatings other than FBE / liquid epoxy
  - On pipelines with stresses as low as 40% SMYS

Manufacturing Seam Threat

- When do you have to assess for the manufacturing seam threat?
  - 192.917 (Threat Identification / Data Gathering)

    (a) ASME B31.8S-2004, Section 2

    (b) ASME B31.8S-2004, Section 4 and Appendix A

    * * *

    (e)(3) 5-year operating history, MAOP increases, cyclic stress increase

    (e)(4) ASME B31.8S-2004, Appendix A4.3 and A4.4

  - New rule revisions on 10/1/2019 have clarified the requirements of (e)(3) and (e)(4).

Manufacturing Seam Threat

- *ASME B31.8S-2004: A4.3 Criteria and Risk Assessment:*

  ** * **

  If the pipe has a joint factor of less than 1.0 (such as lap-welded pipe, hammer-welded pipe, and buttwelded pipe) or if the pipeline is comprised of low-frequency-welded ERW pipe or flash-welded pipe, a manufacturing threat is considered to exist.

  **Industry research and experience indicates pre-1970 EWR is likely LF-ERW*

Manufacturing Seam Threat

- How do you assess for the manufacturing seam threat?
- Prior to 10/1/2019
  - 192.921(a)
    - (1) ILI (ASME B31.8S-2004, Section 6.2)(Not Applicable)
    - (2) Pressure Test (Subpart J)
    - (3) Direct Assessment (Not Applicable)
    - (4) Other Technology

Manufacturing Seam Threat

- *ASME B31.8S-2004: 6.3.2 Manufacturing and Related Defect Threats. Pressure testing is appropriate for use when addressing the pipe seam aspect of the manufacturing threat. Pressure testing shall comply with the requirements of ASME B31.8. This will define whether air or water shall be used. Seam issues have been known to exist for pipe with a joint factor of less than 1.0 (e.g., lap-welded pipe, hammer-welded pipe, and butt-welded pipe) or if the pipeline is comprised of low-frequency welded electric resistance welded (ERW) pipe or flash-welded pipe.*

  When raising the MAOP of a steel pipeline or when raising the operating pressure above the historical operating pressure (i.e., highest pressure recorded in 5 years prior to the effective date of this Standard), ***pressure testing must be performed*** *to address the seam issue.*

Manufacturing Seam Threat

- Post 10/1/2019
  - 192.921(a)
    - (1) ILI (192.493) (CMFL/TFL???)
    - (2) Pressure Test (Subpart J)
    - (3) Spike Hydro (192.506)
    - (4) Direct Examination
    - (5) GWUT (192, Appendix F)
    - (6) Direct Assessment (N/A)
    - (7) Other Technology

*Only applies to interstate operators until MGSS adopts the Part 192 revisions.

Risk Model Upgrades

- Many operators are realizing that their existing risk models need to be improved.
  - Data integration and risk model needs to pull data from many sources and in many formats.
  - Automation is much less labor intensive and faster.
  - Risk methodologies have gotten better and some of the older ones have proven to be incorrectly assessing risk.
  - Probabilistic models better represent the risk of the pipelines.

Risk Model Upgrades

- Questions to ask:
  - Is there data that does not currently feed into the model?
    - How do GIS based risk models use data that can't be entered as an attribute?
    - What about data on forms (paper or electronic)?
    - CP data, patrolling observations, non-leaking corrosion, depth of cover obtained from excavations, lessons learned from incidents?
  - How does the model apply the data to like/similar pipe?
    - Failures due to corrosion / SCC / manufacturing / construction / overpressures / outside force / mechanical damage
  - Can the segment be falsely higher or lower risk by how information is applied?
    - How are unknowns handled?
    - How does segment length affect overall risk?

Inspection Findings

- 192.905(c): Not considering compressor stations or construction activity in HCA determinations.

Inspection Findings

- 192.911(f) / 192.937(b): Plan not containing prescriptiveness for the TIMP periodic evaluation.
- 192.911(i) / 192.945(a): Plan not containing prescriptiveness for the TIMP effectiveness review.
- 192.911(l) / B31.8S-2004, Section 12: Plan not containing prescriptiveness for the TIMP quality assurance process.

Inspection Findings

- 192.911(k) / B31.8S-2004, Section 11: Plan not containing prescriptiveness for the MOC process.
  - This needs to be more than a record to document that a change occurred.
  - The MOC process needs to **manage** the changes, major and minor.
  - There can be separate sub-procedures for specific minor changes.
    - BAP/AP updates
    - Data integration changes
    - Assessment information updates
    - Other continual updates/changes

Inspection Findings

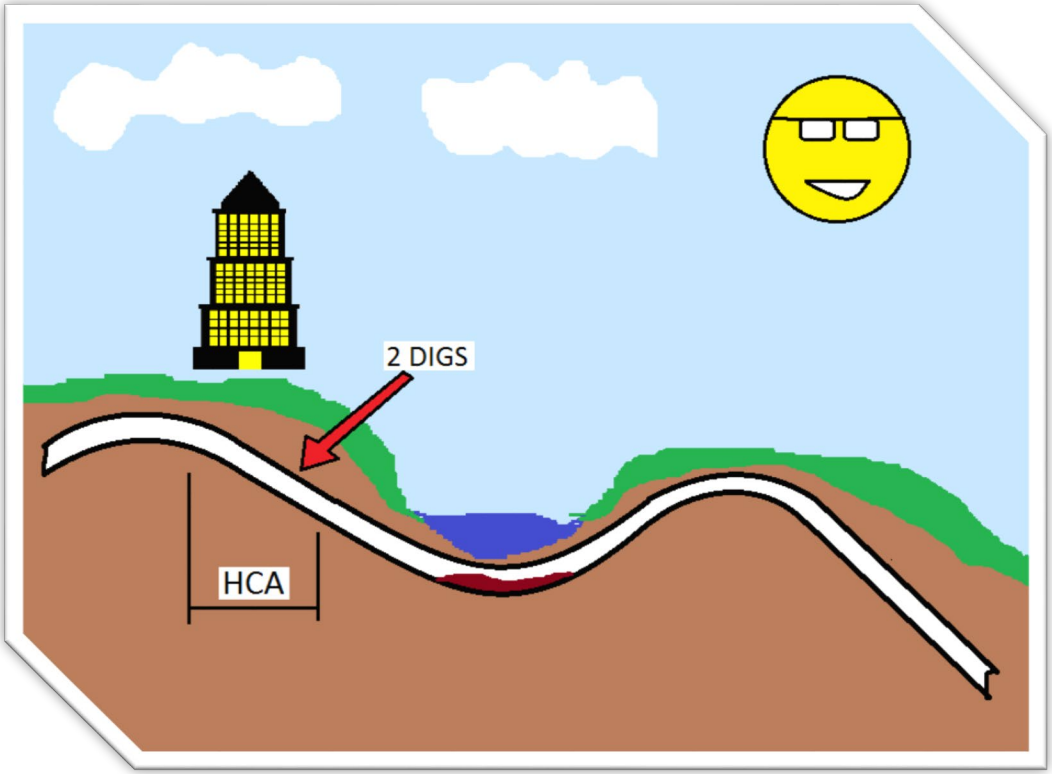
- 192.917(b): Threat identification not including new information.
  - From Incidents
  - From Patrols
  - Identified data gaps
  - Not applying to like/similar pipe
  - See prior slides
- 192.917(c): Risk model gaps.
  - See prior slides

Inspection Findings

- 192.921(a): Not assessing for threats that ILI/PT/DA don't cover.
  - Construction / Equipment / Mechanical Damage / Incorrect Operations / Outside Force
  - Refer to ASME B31.8S-2004, Appendix A1-9 for guidance on what "counts" as an assessment. The plan needs to be prescriptive on the assessment process for each threat.

Inspection Findings

- 192.927(c): Not meeting minimum number of ICDA dig locations.



Inspection Findings

- 192.929(b)(2): Not requiring SCCDA to include direct examinations within the covered segments.
  - The plan needs to be prescriptive on how the covered segments are being assessed.

Inspection Findings

- 192.933(a): Not ensuring a pressure reduction is maintained.
  - Treat it like a reduced MAOP
  - Set SCADA alarms and redundancy to prevent “overpressure.”
  - Maintain records to demonstrate that was maintained.

Inspection Findings

- 192.933(d)(1): Not repairing “immediate repair conditions”
  - LF-ERW seam weld metal loss indications
  - Dents with metal loss

Inspection Findings

- 192.935(a): Not selecting additional actions / P&M Measures to prevent or mitigate risk.
  - Must be able to tie this selection process to the risk assessment and target HCA's.
  - Make sure they are truly over-and-above code requirements, even over 192.917(e) and 192.935(b)-(e).

Inspection Findings

- 192.947(d): Not maintaining documents to support any decision, analysis and process developed and used to implement and evaluate each element of the baseline assessment plan and integrity management program. Documents include those developed and used in support of any identification, calculation, amendment, modification, justification, deviation and determination made, and any action taken to implement and evaluate any of the program elements.
  - TIMP periodic evaluation, effectiveness review, and quality assurance process.
  - HCA identification process, including for ruling out HCA's.
  - Personnel monitoring excavations, including OQ records

Questions?

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