Working Group 5
Legacy Materials Challenges

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Attendance Breakdown

Approximate total attendance	30 plus
Federal Regulators	2
State Regulators	1
International Regulators	0
Pipeline Industry/Service Providers	21
Standard Developing Organizations	0
Researchers	4
Academics	2
Other	+-5 varied

Top 3 Identified Transmission R&D Gaps

Gap #1 – Develop inspection tools to quantify strength and toughness to improve integrity management process (Technology)

Gap #2 – Develop operational guidelines/standards for usage (taking into account limitations)of ILI and pressure testing: based upon MAOP/MOP and an operating safety factor, for defect types, dimensions, inspection parameters, material properties, anomaly dimensions, failure modes, fatigue models, validation(unity plot), and re-assessment intervals, etc. (Consensus Standard)

Gap #3 – In-the-ditch tools – qualification standards and training for NDE including strength & defect specific training and seam type (Consensus Standard / General Knowledge)

Top 3 Identified Distribution R&D Gaps

Gap #1 – Evaluation of Cast Iron Pipe (Technology)

Gap #2 – Vintage PE – such as Aldyl A – standards for direct evaluations, slow crack growth evaluation, FFS, FEM, pressure tests for replacement prioritization (Technology / Consensus Standard)

Gap #3 – Composite Pipe and Liners – develop & standardize (Technology / Consensus Standard)

Associated Details
(Tran Gap #1)

Develop inspection tools to quantify strength and toughness to improve integrity management

1. New or Improved Technology

a. What pipeline type(s) does the technology target?

Steel pipe

b. What operating environment(s) would the technology operate?

All

c. What are any functionality and or performance requirements?

In ditch/near term, ILI/longer term, strength then toughness, body vs seam

d. What road blocks or barriers prevent the technology deployment?

In service vs out? Destructive vs not?

e. What are anticipated targets or timeframes to complete this research?

In ditch/strength exists / ID platforms exist 18 months to meld & demo – toughness is develop within 3 years

Associated Details
(Tran Gap #2)

Develop operational guidelines/standards for usage (taking into account limitations) of ILI and pressure testing: based upon MAOP/MOP and an operating safety factor, for defect types, dimensions, inspection parameters, material properties, anomaly dimensions, failure modes, fatigue models, validation(unity plot), and re-assessment intervals, etc.

2. New or Revised Consensus Standards (standards, guidelines or recommend practices)

a. Does the need address safety or specification related consensus standards?
Yes to both

b. Which standard developing organization and which consensus standard name and number is affected?
API or ASME

c. What scope items should be completed to help improve the standard?
See title

d. What pipeline type(s) does the need or consensus standard target?
Steel

e. What operating environment(s) does the consensus standard target?
All

f. Can any targets or timeframes be identified to complete this research?
Four years

Associated Details
(Dist Gap #1)

Evaluation of Cast Iron Pipe

- FFS based upon graphitization and loss of effective wall thickness
- Evaluation of long term strength
- Frost heave impact on cast iron pipe and connections

1. New or Improved Technology

a. What pipeline type(s) does the technology target?

Cast Iron

b. What operating environment(s) would the technology operate?

All

c. What are any functionality and or performance requirements?

In ditch / with expectation for ILI suitable for condition assessment

d. What road blocks or barriers prevent the technology deployment?

Nondestructive & in-service – accessibility

e. What are anticipated targets or timeframes to complete this research?

Two years

Associated Details
(Dist Gap #2)

Vintage PE – such as Aldyl A – standards for direct evaluations,
slow crack growth evaluation, FFS, FEM, pressure tests for replacement prioritization
-- Develop then Standardize

1. New or Improved Technology

a. What pipeline type(s) does the technology target?
Vintage PE with AVBs
b. What operating environment(s) would the technology operate?
All
c. What are any functionality and or performance requirements?
In ditch suitable for condition assessment
d. What road blocks or barriers prevent the technology deployment?
None
e. What are anticipated targets or timeframes to complete this research?
Two years

Additional Identified Gaps

- Update failure prediction models for: predicting failure pressure and assessing critical defect sizes including models for cyclic fatigue modeling and re-assessment intervals (is it different for legacy / seam) (Transmission)
- PE Pipe Splitting – equipment, best practices, and standards for design, materials, construction and maintenance. (Distribution)
- Tool to find / identify other below ground facilities (cost, portability) that is capable in congested situations (Distribution)
- *Cast Iron **
  - *Understanding graphitization and how it affects useful life*
  - *Model to predict remaining life*
  - *Cornell University, National Grid, Con Ed, PSE&G, Peoples Gas, Washington Gas, Entergy*
- *NDE Methods to determine toughness properties**
- *Coatings – identification of vintage coating disbondment and CP shielding**
- *Coatings – blasting/cleaning level to arrest SCC for repairs**
- *University labs – use as a QC house for testing issues such as probe contamination**

NOTE: Identify gaps with* that may be addressed with University Partnerships