Working Group 4
Anomaly Repair and Remediation

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Attendance Breakdown

Approximate total attendance	28 persons
Federal Regulators	2 persons
State Regulators	0 persons
International Regulators	0 persons
Pipeline Operators	6 persons
Pipeline Industry/Service Providers	10 persons
Standard Developing Organizations	1 persons
Researchers	8 persons
Academics	0 persons
Other	1 persons

Top 3 Identified R&D Gaps

Gap #1 Threat/Anomaly Mitigation Decision Making Process – Consensus Standard

Gap #2 – Considerations for Pre-Regulation Pipe – Consensus Standard

Gap #3 –Trenchless Renewal Methods for Piping Systems – Technology Development

Threat/Anomaly Mitigation Decision Making Process

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

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

Yes – safety and specifications

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

ASME B31.8S, API 1160, other

c. What pipeline type(s) does the consensus standard target?

gathering, transmission and distribution – liquid and gas

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

onshore pipelines, liquid and gas

e. What technical details are necessary and recommended?

An understanding of the following:

interactive anomaly features, environment, loadings, material properties, etc…

Provide guidance for scheduling, i.e. excavating or other action

With and without ILI data

Failure prediction tool for anomaly features (including interactions and growth rates)

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

18-24 month study for current knowledge base, forwarded to standards organization, identify additional needs

Considerations for pre-regulation pipe

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

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

Yes, safety and specification related consensus standards

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

ASME B31.8 , ASME B31.4

c. What pipeline type(s) does the consensus standard target?

Vintage transmission pipelines, gas and liquid

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

Onshore facilities

e. What technical details are necessary and recommended?

TBD based upon fitness for service proposals and standards

(ex. INGAA IMCI FFS white paper, API 579, others)

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

18-24 months

Trenchless Renewal Methods for Piping Systems - Alternatives to Replacement

New or Improved Technology

a. What pipeline type(s) does the technology target?
Transmission, gathering and distribution systems

b. What operating environment(s) would the technology operate?
Gas and liquid systems

c. What are any functionality and or performance requirements?
Must be considered equivalent to current design

d. What road blocks or barriers prevent the technology deployment?
Engineering understanding of the liner/host pipe interaction to demonstrate structural equivalence to current requirements

e. What are anticipated targets or timeframes to complete this research?
18-24 months

Additional Identified Gaps

Repair and remediation of appurtenances (valves, fittings, flanges, sleeves, couplings) – unique considerations and differences from linepipe and distribution pipe – assessment, methods, effectiveness

Repairs on pipeline (considering all materials and pipeline systems)

- Lifecycle of various repairs, QA/QC of repairs
- Deleterious interactions among repairs (e.g., multiple sleeves)
- Assessment of legacy repairs
- Health monitoring of new repairs

Additional Identified Gaps

Composite Repair Considerations

- Repair vs. replace
- Using composite materials to establish MAOP
- Effect of internal pressure on install of repair
- Correlate flaw with performance
- Means/method to evaluate + adopt new composite technology
- Standardization of codes and regs for composite repairs
- Environmental/aging effects on composite repairs

Additional Identified Gaps

Composite Pipe Considerations
- Operator Regs + expectations
- General performance standards
- Standard for fitness – also other materials
- Standard for I.M.
- Standard for applications
- Understanding micro damage
- Material models for damage
- Test methods to quantify defect prop.
- Test methods to validate
- Smart Pig passage damage to liner
  - Methods to validate integrity

Mechanism for introducing new assessment/remediation technology – needs a process that is operator driven and initiated, but can be accomplished in a reasonable time, maybe a reg provision on how to introduce new technologies, standard(?)