Mechanical Damage Technical Workshop

March 1, 2006

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Duke Energy Gas Transmission

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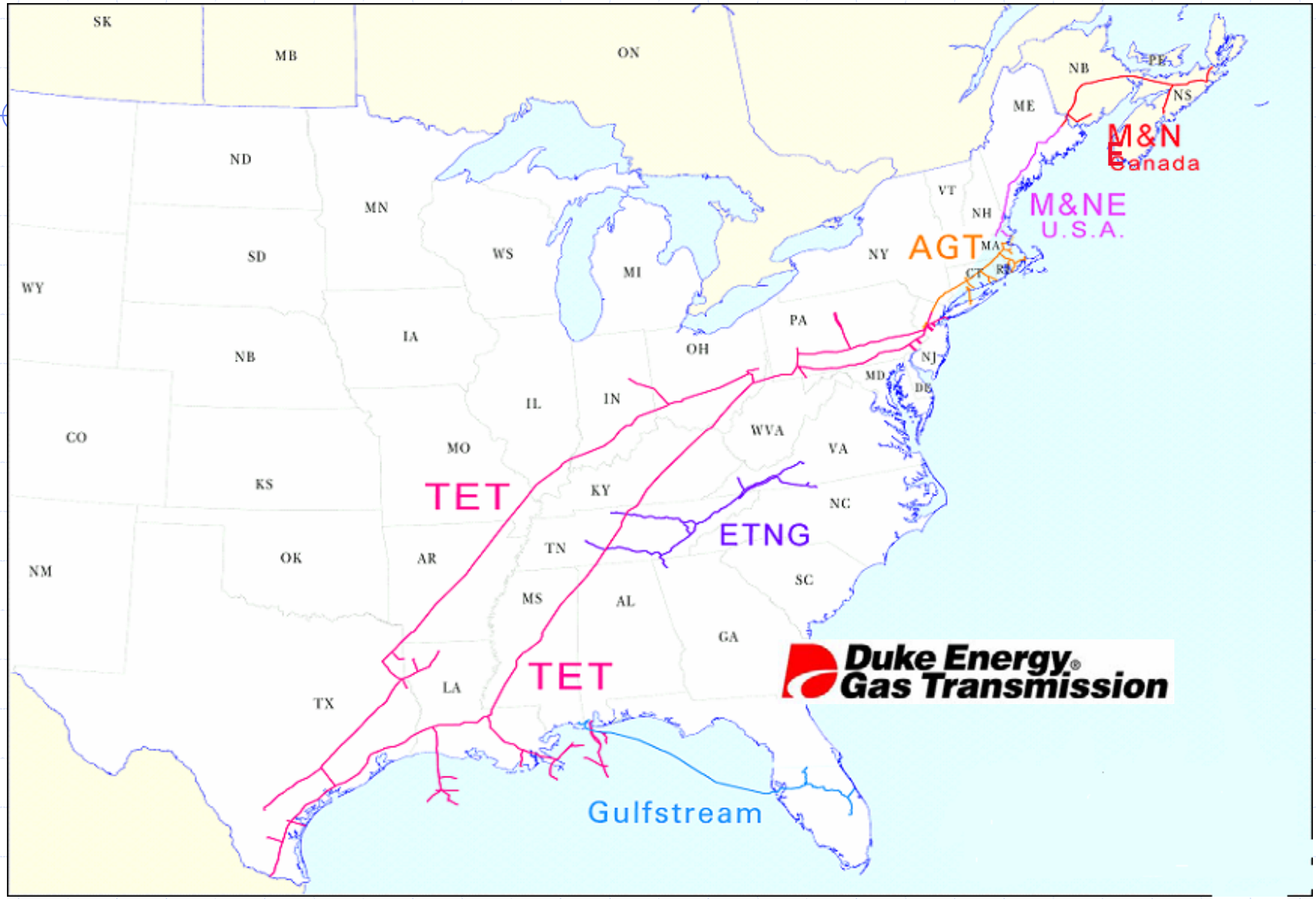
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Historical Overview of DEGT Pipeline Integrity Program

- DEGT has a mature MFL In-Line Inspection (ILI) program
- DEGT has also conducted significant hydrostatic re-tests of in-service lines (1400 miles of transmission pipe re-tested to high pressures with no hydrotest failures due to mechanical damage)
- DEGT has modified its ILI program as a consequence of the IMP regulation, particularly with respect to excavation decisions and scheduling requirements

A Snapshot of 2005 ILI Program

Number of miles inspected by ILI were as follows:

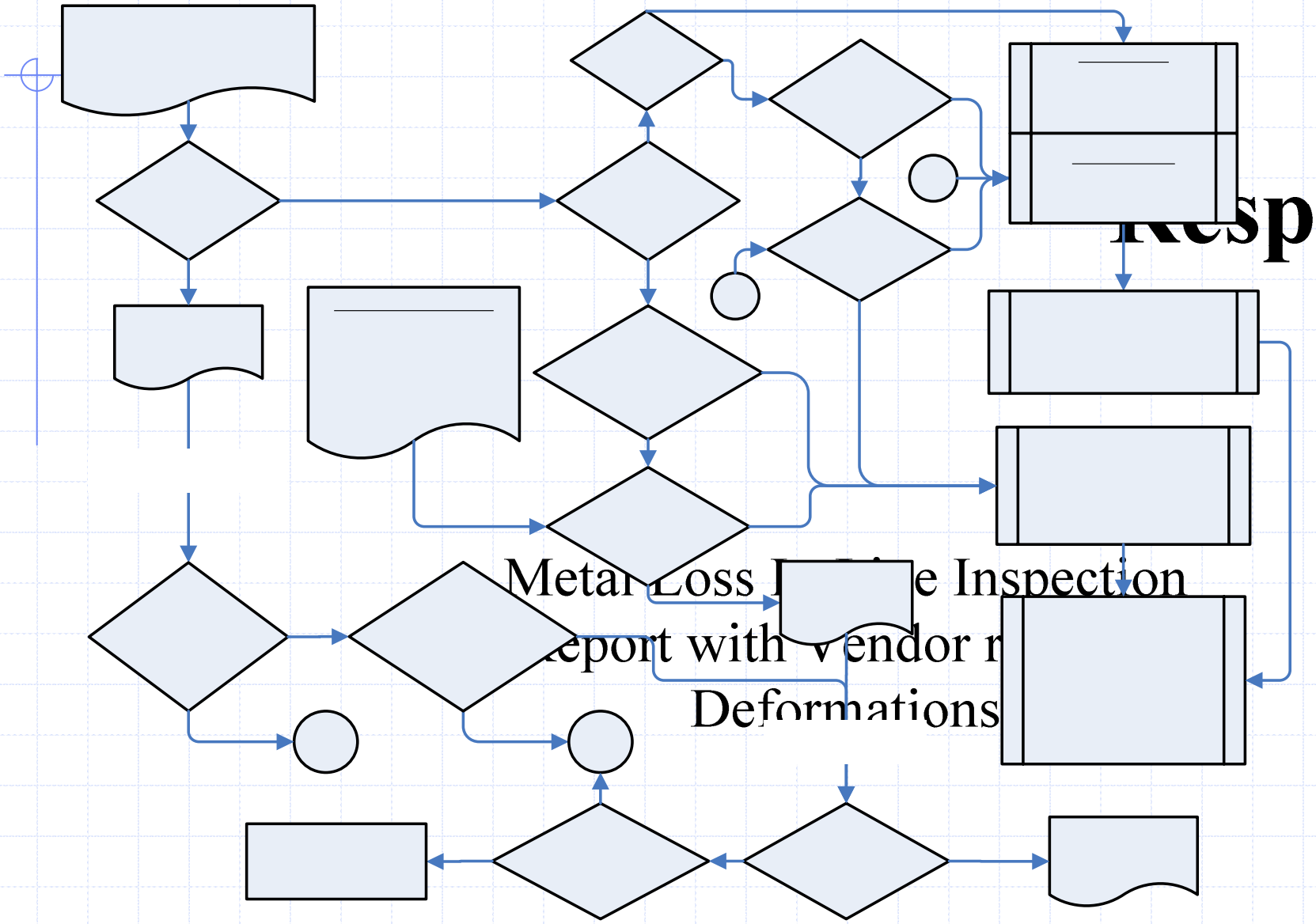
- 1103 miles of HRMFL ILI
- 892 miles of geometry ILI

A Snapshot of 2005 Program

Number of identified anomalies which require immediate response:

- 6 Failure Pressure Ratio < 1.1 (corrosion)
- 16 Topside dent with metal loss
- 70 Bottomside dent with metal loss

Note: To a large degree DEGT applied the same excavation response requirements to locations inside and outside of HCA's.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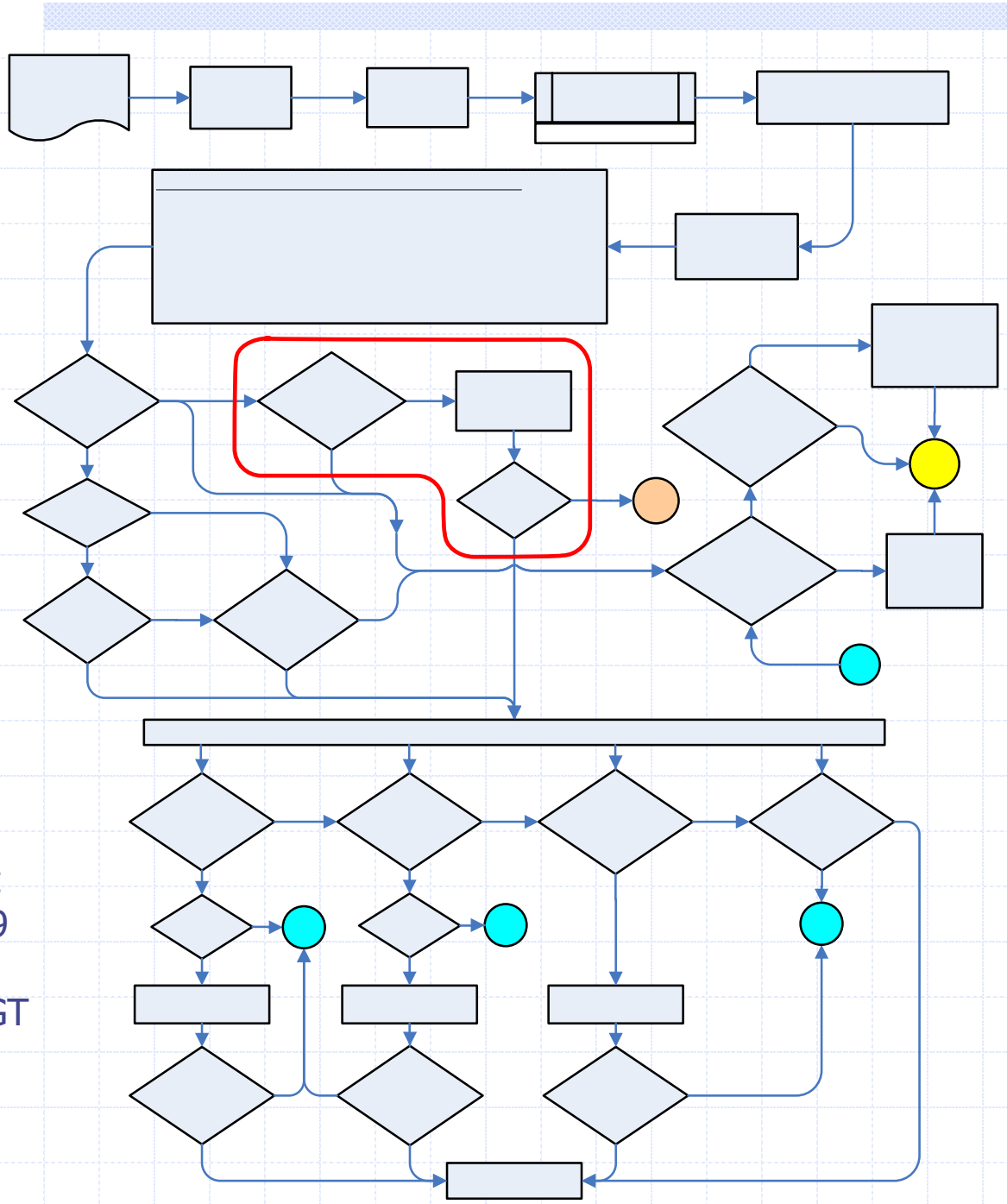
Deformations

Assess

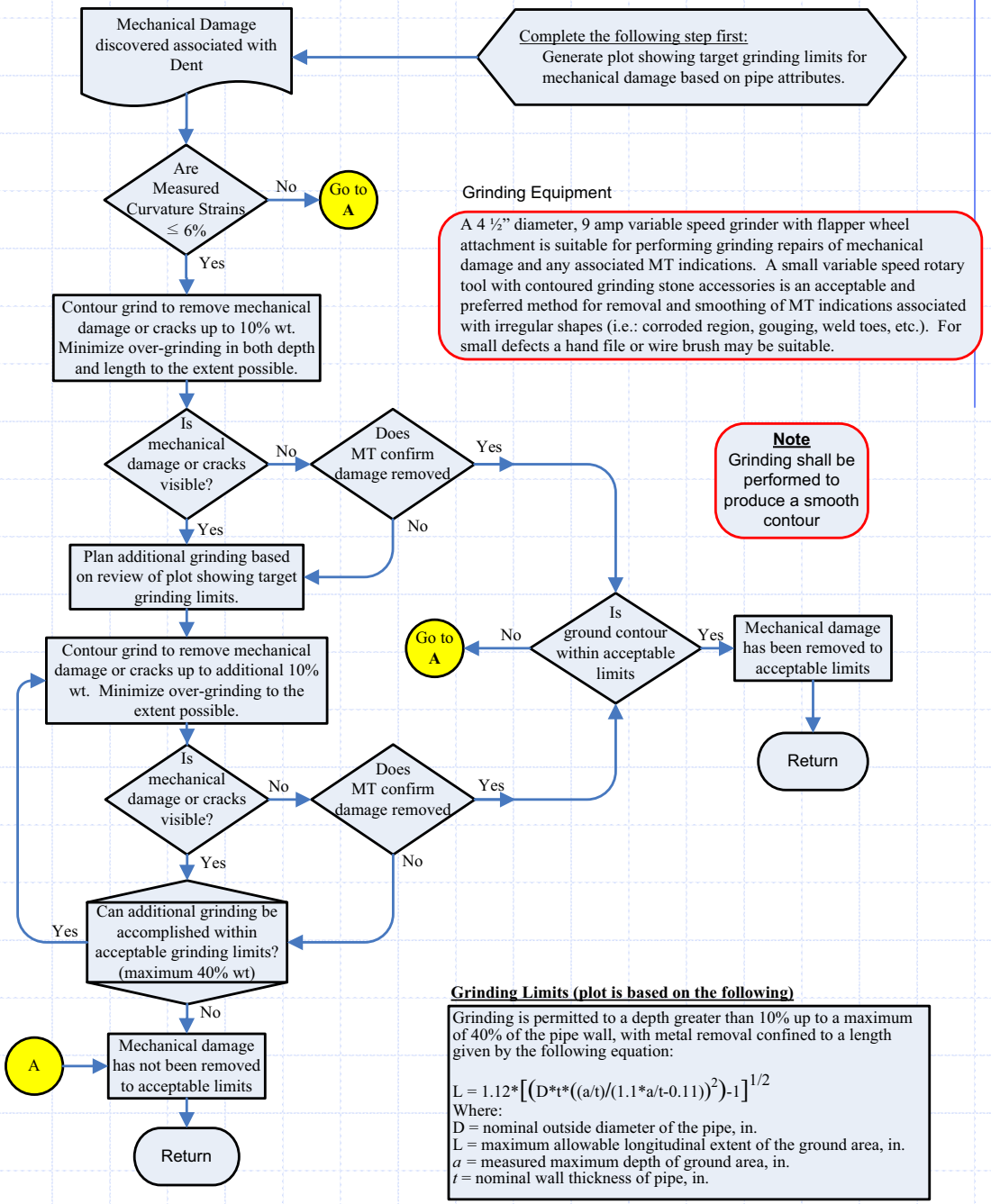
Remediation Requirements for Dent Features During Field Investigation Program



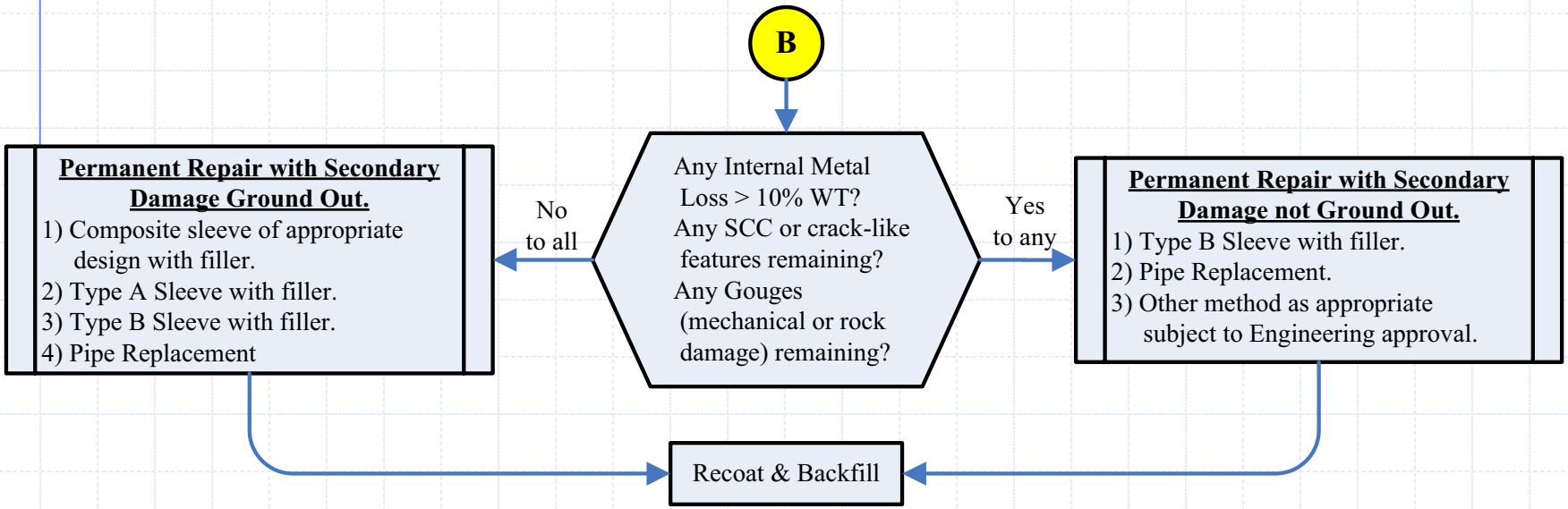
These protocols were developed to be consistent with the requirements of 49 CFR Part 192, Subpart O, ASME B31.8 – 2003 and DEGT Practices

Process for Addressing Dents with Mechanical Damage

These protocols were developed to be consistent with the requirements of 49 CFR Part 192, Subpart O and ASME B31.8 - 2003.



Repair Methods



Results of 2005 ILI Anomaly Investigation Program

- Bottomside dents with metal loss were found to be associated with original construction damage, mostly rock dents from pipeline settlement. There was no evidence of time dependent damage to the pipeline
- DEGT experienced significant disruption (scrambling work crews and implementing significant pressure reductions) to achieve field investigation within 5 days of discovery. This was found to be an un-necessary requirement for damage associated with original construction.
- Excavation of bottomside dents does pose subtle safety hazards to the excavation crew and special pipeline operating pressure reductions should be employed prior to excavation of bottom side rock damage. This is particularly true for bottom side dents with high strain profiles.

Conclusions from the 2005 ILI Program

- HRMFL is capable of reliably detecting a dent footprint and also reliably detects metal loss inside the dent.
- Therefore, HRMFL technology is adequate to meet the current IMP requirements for mechanical damage.
- Some HRMFL tools can provide useful metal loss information inside of dents, but more validation is needed of this capability.
- Deformation tools can be used to compliment the HRMFL data and provide dent depth/strain geometry as input for excavation decisions.

Technology Gaps for Mechanical Damage

- Better prediction models are needed to define failure pressures for dents with gouges.
- More reliable metal loss measurement and characterization is needed when using HRMFL tools.

When these technologies improve, excavation decisions, assessment schedules and repair criteria should be re-considered accordingly.

Recommended IMP Changes for Gas Pipeline Systems

The response criteria for dents with metal loss identified ILI should be reclassified as follows:

Immediate:

- Topside dents with measurable metal loss within the dent perimeter,

Scheduled:

- Bottomside dents with measurable metal loss within the dent perimeter,
- Dents with measurable internal metal loss within the dent perimeter

Recommended IMP Changes for Gas Pipeline Systems (con't)

Excavation , Evaluation and Repair of the "Immediate" Anomalies.

- Field response schedules and pressure reductions should be based upon technically justified criteria. Pressure reductions are designed to provide a longer response time, and pressure reductions may not be necessary when field excavations are completed immediately.

Thank you for your attention!!