



## **2<sup>ND</sup> QUARTERLY REPORT**

DOT Project Number: 729 (GTI 22428)

DOT Contract Number: 693JK31810003

OTD Project Number: 4.14.c.2 (GTI 22429)

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# **Validating Non-Destructive Tools for Surface to Bulk Correlations of Yield Strength, Toughness, and Chemistry**

### **Reporting Period**

November 1, 2018 through January 31, 2019

### **Report Issued**

January 31, 2019

### **Prepared For**

U.S. Department of Transportation Pipeline and Hazardous  
Materials Safety Administration (DOT/PHMSA)

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## Project Objectives

The deliverables of this project will facilitate the use of non-destructive surface testing: micro-indentation, micro-machining, in situ chemistry, and replicate microscopy analysis as accurate, efficient, and cost-effective tools for material property confirmation.

This work will provide benefits to pipeline safety, energy continuity, and integrity assessment programs since the developed techniques and models and validated testing technology will not require a line to be taken out of service or destructively cut out samples from the in-service pipeline.

The results of this project will also be applicable to pending DOT/PHMSA regulations that require operators to backfill their material property records for grandfathered pipeline segments and/or those that do not have adequate material records.

## Completed Work this Quarter

1. Established pipe sample size requirements for NDE technologies that will be tested.
2. Requested and commenced receiving pipe samples from operators.
3. Established preliminary NDE testing schedule for 2019.
4. Developed a calibration/training set for Bayesian model initial development.
5. Commenced development of Bayesian network and models.

## Planned Work for Next Quarter

1. The project team will continue to develop the project database and pipeline sample library.
2. Continue bulk benchmark/lab testing of samples for mechanical and physical properties.
3. Potentially start NDE testing of the pipe sample surfaces.
4. Continue Bayesian network model development and refinement.

**End of Quarterly Update**