Twelfth Quarterly Report June – August 2016

Date of Report: *September 1, 2016*

Contract Number: DTPH56-13-T-000008

Prepared for: *Pipeline and Hazardous Materials Safety Administration, TransCanada Pipe Lines, Enbridge Pipeline, Marathon Pipe Line, and Koch Pipeline*

Project Title: "In-Ditch Validation Methodology for Determination of Defect Sizing"

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Project Status

Item 35, 36, & 37 – Prepare Draft, Address Comments, and Issue Public Version of Phase-1 Report.

A public version of the Phase 1 report uploaded to the PHMSA website on August 24.

Task 12 & 13 Evaluate IWEX performance under laboratory and field conditions

Item 42 –Equipment-IWEX unit for Kiefner metallurgical lab for evaluating IWEX performance under laboratory conditions.

The research unit in Columbus will be used to fulfill this task. Parts for a scanner have been received and 10 MHz transducers ordered. Combined with this will give Kiefner a working IWEX unit that can be used to scan ERW pipe and SCC that comes for metallurgical analysis. This will allow a library of defects to be built, help define the accuracy of IWEX for discrimination and sizing and also identify improvements that need to be made because of misdiagnosis.

Task 14 Enhancement of the current data acquisition IWEX algorithm

Item 45 – Parameter study to find which parameters influence the IWEX image the most.
Item 46 – Develop and test enhanced IWEX data acquisition routines to determine wall thickness variations.
Item 53 – Develop test routines to accommodate for the most important parameters

Item 70 – Immersion IWEX for seam weld inspection.
Item 71 – Develop Materials test setup for Enhanced IWEX data acquisition.
Item 61 Q13 Task 11 – Develop & implement field application software.

An analysis of parameters that affect the IWEX image was completed in Q12. Although images are affected by many parameters, the fit of the wedges to the OD surface is very important in producing a well aligned image. Immersion IWEX studies produced detailed images of the OD and ID profile that appear promising for determining the location of these surfaces and should lead to better alignment of the image, assuming immersion IWEX can be made to work under field conditions.

Item 63 – Coordinate In-Kind Field and lab testing with enhanced data acquisition.

In-Field Trials, were coordinated with in-kind trials (Item 105, Task 13)

- The in-kind field trial of pipe from Minnesota will continue with 15 additional pipe segments with breaks, sections and burst tests of pipe. This field trial is almost complete.
- Rescanning of PRCI TDC pipe was performed with the thick paint removed to examine effects of surface layers.
- A single excavation in-ditch field trial near San Antonio was completed.
- An in-ditch field trial of 4-6 digs on 24-in pipe in Kentucky was completed with 2 pups sent to the Kiefner lab for removal of sleeves.
- A warehouse trial on 2 joints of 16-in pipe in Edmonton, Alberta was completed.
- An additional trial on 6 joints of 16-in pipe near Edmonton, Alberta was completed last week and will be finished in the 13th quarter.

Task 15 Development of an automated defect detection, identification, & sizing module

Item 74 – Develop module for automatic and manual detection of features

Improvements on the automatic detection of features were made during the quarter by collaborations between Ron Ostafichuk and Lars Horchens during a collaboration visit to Rotterdam.

Task 16 Development of an inversion algorithm

Item 66– Improve inversion method.
Item 76 – Evaluate the performance of inversion method and compare to IWEX images.

Improvements to the inversion method were made during the quarter by accounting for the front and back wall in the model and accounting for total reflection off a crack.