

Fifth Quarterly Report September–November 2014

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Contract Number: DTPH56-13-T-000008

Prepared for: *Pipeline and Hazardous Materials Safety Administration, TransCanada Pipeline, Enbridge Pipeline, and PRCI*

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

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Project Status

Item 18 – Implementing recommended improvements for IWEX.

There were two improvements to the IWEX system this quarter: improved C & D scan visualization and improved signal-to-noise ratio by adaptations of filters in the hardware.

These improvements were implemented in software version 1.8. Results from a 12-in ERW sample were compared using the previous version of the software V-1.75 before the samples were broken and after breaking with the new software version V-1.8. The newer version produces clearer images which helps identify the samples as having inclinations from vertical which is typical of hook cracks. The ability to turn off and on various modes made it easier to pick out tip diffractions which helped in sizing the defect depth, resulting in average errors less than ½ mm, smaller than any of the other techniques used.

Item 19 – Gathering and preparing samples for secondary testing

Several different samples were obtained and prepped in the 4th quarter. These include:

- SCC samples at PRCIs repository in Houston are available for testing as part of their NDE-2-2(g) project. This testing will commence first week of December.
- Several joints of SCC samples are available for testing at Rosen’s pull test facility in Lingen, Germany. It has not been decided whether to scan these samples or not at this

time, but the possibility has been discussed. They may make good test cases for potential field trials.

- Over 1000 ft of ERW pipe is still available for testing at a warehouse in Minnesota. This is another potential field trial location, but such are large sample will try the ability of IWEX to perform scans and the NDT technician to interpret the data in a timely manner.

Item 20 – Second Round of Testing

Several different samples were prepped and scanned in the 5th quarter. These include:

- 12-in, 20-in, and 22-in samples at Kiefner’s Ohio metallurgical lab. IWEX, PA and ToFD scans were made of all the samples, this included several joints of 12-in, 2 joints of 20-in and several joints of 22-in.
- A 36-in SCC sample in RTD’s lab in Rotterdam was scanned.
- a 26-in ERW coupon with an ID lack of fusion was scanned. The major defect visible on the ID was detected and sized correctly. Three additional small anomalies were also found using IWEX.
- 24-in SSAW samples were scanned in Edmonton. Only very shallow flaws were found, so only four anomalies were selected for sectioning at the Kiefner lab in Ohio.

Item 22 – Second Round of Validation and Developing Field Tool Specifications

Several different samples were either broken or sectioned in the 5th quarter. These include:

- 12-in, samples at Kiefner’s Ohio metallurgical lab. 8 feet of the 12-in samples were broken and the remainder will be given to PRCI for further testing for the project IM-3 on ERW seam weld integrity. PRCI in return had two additional vendors scan the samples for comparison with the breaks performed as part of this effort.
- The 20-in and 22-in samples have been scanned but have not been broken as of the writing of this report. It has been agreed to break anomalies in one joint of each of the pipe diameters for comparison of IWEX to the actual defects and PA and ToFD. This validation work will be completed in the 6th quarter.
- A 26-in ERW coupon with an lack of fusion visible on the ID were sectioned and compared to actuals.
- From the 24-in SSAW samples undergoing testing in Edmonton, two coupons with 2 anomalies each were sent to Ohio for sectioning. Although many more anomalies were discovered in the samples, none were very deep and none were significant to threaten the integrity of the pipe. 2 samples with 2 anomalies each for a total of 4 anomalies were sent for destructive testing. Results were not conclusive. Additional metallurgical examination may be performed in the 6th quarter to see if additional information can be gained from these samples.