

## Quarterly Report

### Public Page

Date of Report: *June 30, 2016*

Contract Number: *DTPH56-14-H-00003*

Prepared for: *Government Agency: DOT*

Project Title: *Strain-based design and assessment in critical areas of pipeline systems with realistic anomalies*

Prepared by: *Center for Reliable Energy Systems (CRES), C-FER, NIST, and CANMET*

Contact Information: *Ming Liu (mliu@cres-americas.com, 614-376-0767) and Yong-Yi Wang (yywang@cres-americas.com, 614-376-0765)*

For quarterly period ending: *June 30, 2016*

### 1 Work Completed in this Quarter

The focus of the model development work in this quarter was on (1) evaluation of the compressive strain model for transition welds with testing data and (2) model refinement. The simulated compressive strain capacity by finite element analyses was compared with the experimentally measured strain capacity. The cause of the difference was identified. The model was refined.

The development of the guideline document for strain based design and assessment of pipelines with transition welds and realistic anomalies was started. The focus of the work in this quarter was on the refinement of the guidelines, the prerequisite conditions for the application of the guidelines, and the overall structure of guideline document.

The small-scale compression tests of the pipe materials used in the full-scale tests are underway. The small-scale tensile tests of the pipe and weld materials used in the curved wide plate (CWP) tests were completed. The toughness tests (Charpy, CTOD, and SET) of the girth weld materials used for the CWP tests are underway. All 8 CWP specimens were fabricated and received by NIST. The instrumentations are being calibrated.

Monthly reports were submitted online. One review meeting was held on 5/25/2016.

### 2 Work Planned for the next Quarter

The work planned for the next quarter includes: (1) small-scale tests, (2) curved-wide plate tests, (3) evaluation and refinement of the tensile strain models for transition welds,



(4) development of the guideline document, and (5) project management, monthly and quarterly reports, and meetings.

