

Quarterly Report – Public Page

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Project Title: Achieving Maximum Crack Remediation Effect from Optimized Hydrotesting
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Background

Hydrotesting is one of the key techniques widely adopted for pipeline integrity management. A dilemma is created when hydrotesting is performed on pipelines experiencing stress corrosion cracking: hydrotesting eliminates defects of critical size and conditions sub-critical cracks to achieve a post-test period without operating failure; adversely it shortens remaining life because of crack growth during hydrotesting even for small SCC cracks according to the latest research findings. This project is aimed to determine how effective hydrotesting is toward crack remediation. Specifically, efforts will be made to establish a working model that will allow the industry to predict the overall benefits of hydrotesting. When hydrotesting is necessary, the model will help pipeline operators select the hydrotesting parameters that would generate the most effective crack remediation.

Progress in the Quarter

Project activities undertaken through the 1st quarter focused on (1) Design test matrix; (2) Kick-off meeting with partners to select pipeline steels and environments for testing and finalize testing programs; and (3) Shipping of pipes and soil samples, mechanical testing and microstructure evaluation, soil chemistry and corrosion analysis. The project kick-off meeting was held on October 1, 2008 in Calgary. Five different pipeline steels including one X52, three different X-65s and one X-80 were identified and used for project research prior to the kick-off meeting. The microstructures and mechanical properties of these five pipeline steels have been characterized. The three X-65 pipeline steels have similar yield strength but quite different ductility. Preliminary assessment has shown that the growth rate among the three X-65 pipeline steels was more than three times different. Two new pipeline steels, one from TransCanada Pipelines and the other from Spectra

Energy, were selected to be added to the test program. These new pipe sections were received by the University of Alberta on October 7, 2008. Four soil environments will be tested; they were selected based on their corrosivity and pH values. Four presentations were made during the kick-off meeting. Weixing Chen has provided an overview of various projects related to the current DOT project and the test plans for all projects. Two presentations have provided updates on the progress of two on-going projects including the current DOT project. The fourth presentation focused on a new approach for modeling crack coalescence, which is one of the tasks defined in the current DOT project. The kick-off meeting was started late in the quarter primarily because team members wanted to have the meeting to be held during International Pipeline Conference 2008 in Calgary.

Plans for Future Activity

- To test 7 different pipeline steels to establish corrosion crack growth model
- To test selected pipeline steels in 4 different soil environments