

# Third Quarterly Report – Public Page

Date of Report: *June 30, 2011*

Contract Number: *DTPH56-10-T-000010*

Prepared for: *DOT and Co-funders (PRCI, INGAA & Williams Pipeline Company)*

Project Title: *Development of a Model to Accurately Predict the Conditions of Carrier Pipe within Casings based on Conditions at the Casing Ends*

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For quarterly period ending: *June 30, 2011*

## ***Public Page Section***

A preliminary three-dimensional (3D) model was developed to predict the potentials of the carrier pipe and the casing under the three contact conditions between the casing and the carrier pipe: (1) isolation, (2) metallic short, and (3) electrolytic coupling.

The model was used to investigate the effects of the different contact status between the casing and the carrier pipe and of the magnitude of the coating porosity (percent of holiday area).

### **Results and Conclusions:**

Depending on the contact status between the casing and the carrier pipe, the carrier pipe potential measured aboveground can be significantly different. In the isolated condition, the potential measured aboveground along the casing does not depend on the coating condition in the annulus. By contrast, such potentials can highly depend on the coating condition in the annulus vs. that outside the casing, when the casing and the carrier pipe are electrolytically coupled. This dependence can also occur with shorted condition if the point of metallic contact still retains some electrical resistance.

For the carrier pipe in the annulus, its potential measured aboveground can be significantly different from that if measured directly in the annulus; the latter can be much more negative than the former. By contract, the potential of the carrier pipe outside the casing is less dependent on whether it is measured aboveground or directly on the pipe surface; this dependence becomes negligible when the entire coating is in a good condition with a very small current leakage.

The potential of the casing cannot be significantly affected by the different contact status between the casing and the carrier pipe. Due to its large bare metal surface area, only can small polarization be achieved on the casing.

**Plans for Future Activity:**

Continue development of this model and use it to make more realistic predictions.