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CONTRACT NUMBER: DTRS56-04-T-0002

QUARTERLY REPORT FOR QUARTER ENDING JUNE 30, 2006

In the previous periods, documented in the draft final report for contract DTRS56-04-T-0002 in January 2006, SwRI described an approach used to compute internal and external corrosion rates of pipelines for the purpose of estimating reassessment intervals. Prior to this study, the only methods available to determine corrosion rates were based on repeated inspections or estimates of corrosion rates obtained from buried, bare steel objects. When other corrosion rate information is not available, a rate of 0.4 mm/year has been recommended in the regulations as a “default” value. In that report, the following conclusions were drawn:

- ❖ Even in aerated soils, if there is no flow of groundwater in the coating disbonded region, the 0.4 mm/year corrosion rate set by regulations is, in general, conservative (i.e. a rate higher a compared to actual rates),
- ❖ A simple calculation procedure for estimating the actual corrosion rate under field conditions without involving digging has been developed to estimate reassessment intervals, and
- ❖ In aerated soil, the presence of under-flow in disbonded region could result in a corrosion rate greater than 0.4 mm/year. In this case, the reassessment interval determined using this default rate of 0.4 mm/year would be longer than the actual time-to-failure for the pipeline.

In this quarterly report, the computer model was extended to cover the effect of slowly flowing water through the disbonded/shielded areas. A simple relationship was developed between the maximum corrosion rate in the disbonded region and the Peclet number, which is the product of disbondment and average fluid velocity divided by the diffusivity of dissolved oxygen in the water.