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Corrosion Assessment Criteria: Rationalizing Their Use Applied to Early Versus Modern Pipelines
Agreement DTRS56-03-T-0014
2nd Quarterly Status Report
Period December 1, 2003 to February 29, 2004
Contractor: Battelle

Technical Status

Work during this reporting period developed guideline for evaluating corrosion on welds, including both girth welds and long seams. This was developed in part by trending the results developed in the literature review. Consideration of current code criteria for the pipe body indicates there should be no difference between corrosion criteria for the pipe body and weld seams if 1) the seam is defect free, 2) the mechanical properties meet or exceed that of the body, 3) the fracture properties are adequate to ensure plastic-collapse occurs, and 4) the loadings are consistent with design assumptions and the area of the seam is free of unusual stress raisers such as peaking or ovalization. Guidelines identifying scenarios where the above four conditions are met are currently posed in the form of a pass – fail flow-chart that is both simple and practical, and can be implemented without formal training. Trending the literature also indicates the essential difference between corrosion acceptance criteria developed in the 70s for "earlier vintage steels" and those in the 90s for "modern steels" lies in the defect-free "reference stress" used in these criteria. The key difference appears to be that the 70s criteria utilize a "flow stress" as the defect-free "reference stress" whereas the 90s criteria utilize the ultimate tensile stress (UTS) for this purpose. This is a critical outcome, as it provides the basis to bridge the gap between these two criteria, and their respective validation databases, which is the subject of work planned for the next several reporting periods.

Point of Contact:
Brian Leis
Battelle
505 King Ave.
Columbus, Ohio 43201
leis@battelle.org
Voice: 614-424-4421
Fax: 614-458-4421