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## **Butt Fusion Integrity & NDE Evaluation**

### **5<sup>th</sup> Quarterly Report**

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## Public Page

This project started on July 15 2007.

The primary objective of the program is to develop a tightly controlled butt heat fusion process through comprehensive testing and evaluation using novel test methods which will help to validate the safe and long term performance of PE joints under actual field conditions and serve as the basis for an effective reference point for the continued development of advanced Non-Destructive Evaluation (NDE) technologies. Specifically, this program aims to develop comprehensive analytical models to characterize the impact of various types of in-service stress states and fusion process variables; develop comprehensive test data to characterize the long term performance of joints made under parametrically controlled set of fusion variables; develop a set of criterion to identify "suspect joints" – joints that are visually acceptable but fail prior to their intended design life – which can be used as the basis for process improvements and continued technology developments; and integrate novel test methods and fusion parameters within applicable industry standards and specifications (ASTM, PPI, 49CFR Part 192).

### **Project Tasks and Status:**

#### **Task #1: Industry Steering Committee Interactions (Ongoing)**

NYSEARCH/TEJ continue to lead a joint industry steering committee consisting of members from each of the respective stakeholders including gas utility companies, regulatory agencies, and pipe/fitting and equipment manufacturers. This is to ensure an objective review of the data/information that is being developed and to obtain support of gas industry of any potential improvements/changes to Butt Fusion Procedures that will be recommended as a result of the project.

In August 2008, a steering committee meeting was held at Southwest Gas Corporation. A detailed presentation was provided with respect to the correlation between the instrumented testing and analytical modeling results. A brief overview of the preliminary short term empirical test data (McSnapper testing and tensile testing) was also presented. The most significant outcome of the steering committee meeting was that a consensus was developed with respect to the proposed long term testing to evaluate the integrity of butt fusion joints under combined influence of internal pressure and other secondary stresses acting on the joint interface.

### **Task #2: Development of an Analytical Model**

There has been significant progress with respect to analyzing the results of the instrumented testing and analytical modeling efforts. The primary focus of the efforts relative to this task included a comprehensive review of the empirical short term test data from both Tensile and McSnapper testing. Additional instrumented testing has been proposed by the steering committee in order to investigate both axial and radial effects of various fusion parameters as it relates to the thermal profile and corresponding melt-depth penetration.

### **Task #3: Comprehensive Long Term Testing**

Based on a thorough review of various proposed long term testing options, the joint industry steering committee has developed a consensus position with respect to the best possible test methodology. Subsequently, additional analysis was performed to evaluate the feasibility of this approach and its relation to the butt fusion joint interface and actual in-service stress states.

### **Task #4: Integration within Industry Standards**

- Status: Not Initiated

### **Task #5: NDE Evaluation**

- Status: Not Initiated

### **Task #6: Reporting**

- Status: On-going