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Contract Number: DTRS56-04-T-0010

Project Title: Evaluation of Hydrogen Cracking in Weld Metal Deposited using Cellulosic Electrodes

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Quarterly period ending: January 2006, {effective date: October 4, 2004}

Objectives: The objectives of the proposed project can be summarized as follows: (1) To determine the effect of electrode drying and arc length on weld metal chemistry, mechanical properties and hydrogen cracking susceptibility. (2) To determine the effect of electrode re-hydration on weld metal chemistry, mechanical properties and hydrogen cracking susceptibility. (3) To develop practical guidelines on how to prevent hydrogen cracking in welds deposited using cellulosic covered electrodes.

- Technical Status

- Continued technical work on Tasks 2, 3, and 7. Note that Tasks 2 and 5 are funded by a separate project (EWI Project #46354CAP) and are tracked under this effort as a cost-share.
- Task 1: Selection/Procurement of Welding Electrodes
  - This task has been completed.
- Task 2 & 3: Preliminary Welding and Testing of Dried and Re-hydrated Electrodes
  - The rehydration conditions initially selected were overly aggressive, and the rehydration method may not be practical for most users. Additional electrodes have been ordered and are being used to refine the rehydration conditions and explore alternative methods of rehydrating the electrodes.
  - The second phase of this project (Tasks 4, 5 and 6) will be exposing electrodes to a variety of atmospheric conditions in order to simulate climates around the world. This will allow exposure limits for various environmental conditions to be established that can lead to safe handling guidelines for cellulosic electrodes. Some of this work is being coordinated with Lincoln Electric (where a similar activity is underway)
  - Most pipe welding is accomplished using motor-generator (engine driven) welding machines. Indications are that welds produced using inverter-type power sources exhibit different properties than those made with the same electrodes on motor-generator power sources. There is interest in gaining a better understanding of the differences in properties using the same electrode with different power sources. These activities still fall under the overall objectives of the project – funds permitting technical work in this subject area will be undertaken under Tasks 5 and 6.
  - These tasks have been completed.
- Task 7: Reporting
  - No significant activity in this quarter.