



**OTC 19207**

## **DW RUPE: A New Deepwater Pipeline Repair Capability for the Gulf of Mexico and Other Deepwater Regions**

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### **Abstract**

Described herein is a chronology for developing a deepwater pipeline repair system and cooperative ownership group for affecting emergency repairs of damaged pipelines. Using a Joint Industry Project (JIP) funding model, technology development started in 2004, and continued as Hurricanes Katrina and Rita hit in 2005, and resulted in the formation of DW RUPE – Pipelines Co-Ownership Group in May of 2007. Included in this paper is a description of the repair methods developed, and repair tools being procured and developed for affecting 10 to 24 inch ANSI pipeline repairs in 1,000 to 10,000 feet of water. A recently-developed spreadsheet-based pipe lifting analysis laptop computing tool is described for use in planning pipe lifting and cutting operations for a specific emergency pipeline repair operation in deep water.

### **Background on the Formation of DW RUPE**

In 2004 Phase 1 of a JIP was formed to develop a low CAPEX emergency repair capability for pipelines and flowlines in water depths in the 1,000-10,000 ft range, in the US Gulf of Mexico. Stress Subsea, Inc. (SSI) performed a Failure Mode and Effects Analysis, conducted interviews with suppliers and operators and included input from the JIP Steering Committee.

### **Phase 1 JIP Conclusions**

As a result from DW RUPE, Phase 1, the following conclusions were drawn for export pipelines:

- The probability of needing a deepwater repair is low, but the consequences resulting from pipeline damage are high. Because of this, the project agreed upon pursuing a low CAPEX repair solution, recognizing the need to minimize capital expenditures since the probabilities of occurrence are low.
- The most likely damage types are wet and dry buckles caused by anchor snags (the DW RUPE shallower water depth range is 1,000 ft., hence anchoring damage is still a consideration).
- Potential repair solutions for a low CAPEX pipeline repair and a low CAPEX flowline repair are different.
- Traditionally a leak clamp and a spool piece connector set are needed for each pipe size. The project pursued a new paradigm of adapting and employing full structural clamps in place of connectors. This allows two clamps to be used in a spool piece repair or one of the structural clamps to be used alone for a pinhole leak from a cracked weld. Two clamps serve the same function as two connectors and a clamp (Pipeline Repair), thus reducing the CAPEX investment for inventory.
- Cracked welds are the most likely cause for pinhole leaks. Full structural clamps are advised to arrest crack propagation (Pipeline Repair).