

JIP Monthly Progress Report

[Hydrate Blockage Formation: Restart Investigations](#)

The experimental work will be performed in the University of Tulsa's Hydrate Flow Loop Testing Facility with the objective of developing a better understanding of hydrate blockage risk factors. The work consists of three tasks supported by 60 experimental runs with the hydrate flow loop and 100+ runs in the jumper facility. These tasks are:

Task 1: Risk assessment of hydrate plugging during steady-state operations

- Steady-state flow with hydrate experiments (6 months)
 - Variables of interest: Gas-Oil Ratio, flow rate, flow pattern prediction, superficial mixture liquid velocity, no-slip Holdup, diffusion coefficient for gas components, Interfacial tension between hydrocarbon and aqueous phases, fugacity between hydrocarbon and aqueous phases, gas-liquid interfacial area, Water droplet size distribution, onset temperature, cooling rate, fluids viscosities, brine concentration and liquid loading.
- Simulation of past experiments will be performed with TU-PVTSim based simulation tool to derive experimental hydrate formation rates and correlate the results as a function of operating conditions.

Note: The 30 hydrate experiments in the Hydrate Test Loop can be thought of as numbers of experiments that can be allocated depending on need during matrix evaluation from the variable set mentioned above from collaboration of working committee, the University of Tulsa, and project champions.

Task 2: Risk assessment of hydrate plugging during restart operations

- Experimental studies with transient flow facilities (18 months)
 - Effect of liquid loading, water cut, flow velocity
 - Examination of difference between gas and liquid dominated systems during inhibitor displacement and during restart operations in the jumper test facility.
 - Feasibility studies on low-pressure hydrate formation in the restart tests conducted in the jumper test facility.

Task 3: Hydrate Plug Characteristics

- Formation of plugs & measurements of plug characteristics (6 months) by measuring pressure drop for permeability and fluid displacement and gamma densitometer measurements for porosity.
- Evaluation of dissociation methods (18 months) compared to plug dissociation simulation tools and compare pressure dissociation with chemical dissociation with MEG.

Desired Results from this work include:

- Develop a Risk Matrix for hydrate blockages (both transient and steady state operations) to enable application of the study results to actual project work.
- Identify testing Oils by important physicochemical properties rather than field terms. This will help in the identification of analogue oils and understanding the differences in test results correlated with fluid properties.
- Perform more experiments with high liquid loaded systems while maintaining low GOR (<500 SCF/BBL). This will aid in completing the data set obtained from prior experimental work.

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<input type="checkbox"/> 2008 <input checked="" type="checkbox"/> 2009 <input type="checkbox"/> 2010		
<input type="checkbox"/> January <input type="checkbox"/> February <input type="checkbox"/> March	<input type="checkbox"/> April <input type="checkbox"/> May <input type="checkbox"/> June	<input type="checkbox"/> July <input type="checkbox"/> August <input type="checkbox"/> September
<input type="checkbox"/> October <input checked="" type="checkbox"/> November <input type="checkbox"/> December		
Activity Summary & Accomplishments:		
Task 1: Risk assessment of hydrate plugging during steady-state operations <ul style="list-style-type: none"> Experimental phase complete. Report on formation rates completed. Processing and analysis of flow loop test data continued. Documenting of flow loop test findings in final report begun. 		
Task 2: Risk assessment of hydrate plugging during restart operations <ul style="list-style-type: none"> Phase I of the experimental jumper study is complete. Final report completed. Displacement tests with MEG were conducted. Data processing and analysis were begun. 		
Task 3: Hydrate plug characteristics <ul style="list-style-type: none"> Hydrate plug characterization and dissociation experimental studies are complete. All plugs dissociated during this study have been simulated and compared to the experimental results. Documentation of the findings in a final report was begun. 		
Activities Planned Next Period: <ul style="list-style-type: none"> Continue working with Champions Creek, Estanga, and Hernandez on details of test matrix and alternatives for hydrate formation in the test loop. Process THI data and include in final jumper report Development of the risk matrix for hydrate blockages will continue. Work on the final reports will continue. 		
Corrective Action: None, project on schedule and on budget		
Percent Complete: 95 %		