Halliburton’s new AquaStimSM water frac service technologies are already helping operators achieve better fracturing results:

- Improved production
- Improved load recovery
- Reduced fracture face damage

AquaStim service includes the breakthrough GasPerm 1000SM service technology. Other new technologies that can be components of AquaStim service for fracturing unconventional reservoirs include OptiKleen-WF™ viscosity reducing agent and FR-56™ friction reducer.

A new version of SandWedge® enhancer specially formulated for water frac treatments can be highly effective when used with AquaStim service to help maintain long term conductivity and control formation fines material flowback.

GasPerm 1000SM Service

GasPerm 1000 service, an essential component of AquaStim service, has been proved to help boost production and get gas on-line faster and at higher rates.

- Helps increase regained permeability to gas following treatment
- Enhances mobilization of liquid hydrocarbons including condensate
- Reduces fracture face damage due to phase trapping (Figure 1)
- Improves load recovery
- Replaces methanol for water block applications.
- Contains no phenols for improved environmental performance

GasPerm 1000™ additive modifies the contact angle toward 90°. Upper temperature range of the GasPerm 1000 additive is greater than 330°F. It is compatible with both acidic and basic fluid systems and can be used as an acidizing additive or fracturing fluid additive. It has been shown to be nondamaging to formation gas permeability.

OptiKleen-WF™ Viscosity Reducing Agent

Friction reducers have been shown to cause fracture face damage and have demonstrated damaging effects to fracture conductivity. Proprietary OptiKleen-WF™ viscosity reducing agent has been developed to enhance fluid load recovery and reduce damage that can be created by long chain polymers. It helps return the viscosity of solutions containing treating agents, such as friction reducer, to that of water. It can help maximize the effectiveness of water-fracturing treatments several ways:

- Improves load recovery and productivity
- Minimizes friction reducer polymer damage
- Prevents polymer adsorption to the fracture face
- Reduces fluid viscosity
**FR-56™ Friction Reducer**

FR-56 agent, a new, patented friction reducer, is designed to help reduce fracture damage created by long chain polymers. It provides several advantages for water frac treatments:

- Provides friction reduction equivalent to or better than conventional friction reducers
- Contains no phenols for improved environmental performance
- Exhibits less flocculation than conventional friction reducers

**SandWedge® Enhancer**

SandWedge conductivity enhancer is now available in a special formulation designed for water fracs. When used with AquaStim service, this on-the-fly proppant coating technology provides several benefits for water frac treatments:

- Helps increase production
- Increases conductivity
- Helps control the effects of diagenesis (Figure 2)
- Increases load recovery

**Case History**

**AquaStim Water Frac Service Helps Major Independent Operator Boost Gas Production**

Texas Panhandle—After achieving excellent results with specially formulated SandWedge enhancer and Optikleen-WF agent in four-stage water frac completions in the Granite Wash play, the Operator asked Halliburton for new ideas to further enhance the economics of the company’s prospects in the area. After a review of existing conditions, Halliburton recommended AquaStim service which includes GasPerm 1000 technology. Results: The average initial production of gas had been 2,472 mcf/d with the total for the first 30 days averaging 55,380 mcf. The introduction of AquaStim service with GasPerm 1000 technology resulted in initial production of 4,084 mcf/d and a 30 day average total of 92,100 mcf. The average 30-day increase was 36,720 mcf, creating an economic value of approximately $782,000. Based on these results, AquaStim service has been integrated into the operator’s completion process for other unconventional gas wells.

For more information about how AquaStim™ service can help make your water frac treatments more profitable, contact your local Halliburton representative or e-mail stimulation@halliburton.com.