Halliburton has obtained United States Environmental Protection Agency (EPA) registration for the oil field use of BE-7™ bactericide.*

This bactericide is a very effective alternative for the more hazardous glutaraldehyde used by other service companies for on-the-fly treatment for control of bacteria.

BE-7 agent is a quick acting, broad spectrum microbiocide. It destroys bacteria through oxidation of the cellular wall structure. It may be used to treat and control slime-forming, sulfate-reducing, iron-oxidizing and polymer-degrading bacteria encountered in oil field applications.

As a conservation measure, the energy service industry is moving ever more toward using produced water, flowback treatment water and water from uncommon sources. Many of these waters can be a source of severe bacterial contamination and require higher-than-normal levels of biocidal treatment to be usable. This is especially true for on-the-fly biocidal treatments where the contact time for the biocide with the water may be very short.

**BE-7™ Bactericide**

**EPA-Registered Oil-Field-Use Microbiocide Suitable for Batch-Type and On-the-Fly Treatment of Water**

__Bacteria Problems in Fracturing Gels__

In water systems, bacteria exist as members of an aggregate called a biofilm. Biofilms, for the most part, may be invisible to the naked eye, such as in a flowing stream. In extreme cases, the biofilm may be a highly visible, bulky, slimy mass.

For the oilfield, problems associated with biofilms and bacterial growth are bio-fouling and plugging, corrosion of tanks and piping, and destruction of chemicals used to produce oil and gas. Some of the more serious and longer term problems associated with bacteria come in the form of sulfate reducing bacteria (SRB) which reduce the sulfate ion to sulfide. In the presence of iron or steel, this can lead to the corrosion of iron or steel.

SRBs also pose a possible health hazard in the form of hydrogen sulfide (H₂S). While these particular bacteria are not a problem in service chemicals, they may lead to contamination in the wellbore or the producing formation which leads to sour gas or oil production and to corrosion and potential plugging by precipitating iron sulfide (FeS).

*Registered as BE-7 Antimicrobial – EPA Reg. No. 40153-1.
Another culture media useful in evaluating field waters is specific for sulfate reducing bacteria (SRB). For these tests, a positive result is the formation of black precipitate in the test bottle. This precipitate is actually iron sulfide formed when the SRB growth produces hydrogen sulfide and corrodes the iron nail in the test bottle. These results indicate that the original test water had 1,000 SRB/ml. The presence of any SRB may be detrimental for injection into an oil or gas well. BE-7 bactericide can be used effectively to control SRB.

Bacteria can cause viscosity instability in fracturing gels. In fact, in a favorable environment, bacteria can be the chief cause of gel degradation. The problem is generally the most severe in the summer months since bacteria are most active in fluids at temperatures of 60° to 100°F.

The most likely location for bacteria are frac tanks and mixing water. Frac tanks often contain several gallons of bacteria-ridden gel from previous jobs. When new gel is added, the bacteria have a new food source and begin to multiply rapidly.

Bacteria feed on gels by releasing enzymes which degrade the gels to sugars. The bacteria then can absorb the sugar through their cell walls.

For more information about how more-environmentally-acceptable BE-7 bactericide can help make your wells more productive, contact your local Halliburton representative or email stimulation@Halliburton.com.