Case History

Stimulation

Successful Restimulation of Barnett Shale Well Using Biodegradable BioVert® NWB Diverting Agent
Location: Texas: Restimulation of a Shale Well

OPERATORS CHALLENGE – A Barnett Shale Operator was contemplating available options for wells that have been producing for a number of years. If an efficient recompletion program with a successful restimulation technique could be identified and utilized, many wells could be reinvigorated. The candidate well was a vertical completion with over 200 perforations from the original completion. The unknown condition of the casing and perforations raised concerns over using mechanical barriers such as bridge plugs or perf-balls to isolate portions of the interval; however, it was vitally important to use the casing as the main fluid conduit for the stimulation treatment due the anticipated 100+ barrels per minute treating rates that are typically utilized.

Other important consideration included the following:
• Is the rig required to stay on location during the stimulation treatment?
• What additional operations would be required to successfully bring the well on line after the treatment?
• Could the treatment(s) be conducted with one trip to the wellsite?

HALLIBURTON’S SOLUTION – Halliburton recommended its BioVert® NWB near field biodegradable diverting system to separate stages of a high rate water frac treatment. The bimodal particle distribution of BioVert NWB agent enables the material to bridge off irregular geometries like the eroded perforations in the casing and fractures only partially full of proppant. BioVert NWB agent would be deployed between frac stages to temporarily block off the already treated portion of the reservoir redirecting the subsequent stage to a new portion of the reservoir.

BioVert NWB agent is compatible with the treated water fracturing fluid. It is self-removing in that it will self-degrade with time and temperature, not requiring subsequent intervention. The near field diverter is compatible with most production chemicals like scale inhibitors, biocides, tracers and most fracturing chemicals.

The BioVert NWB diverting system is seamlessly integrated into the pumping schedule without having to utilize rig intervention or having to stop pumping. The existing fracturing equipment can be utilized to deliver and place the temporary diverting system.

When the reservoir returns to its normal static temperature, BioVert NWB diverter will begin the process of degradation. Temperature and in-situ water will cause the material to degrade to a benign by-product which is compatible with production chemicals.
Halliburton completed the four-stage fracturing treatment including three BioVert NWB agent diverting stages in 4 hours. Pressure responses created by the temporary plugging of the perforations were noted on the pressure charts. Each diverter stage resulted in a pressure increase of 50 to almost 500 psi indicating the effectiveness of the diverting material.

**ECONOMIC VALUE CREATED** – The treatment was pumped to completion without interruption or need for a rig, shortening the time until the well could be put on production. The rig was used to re-insert the production tubing but no additional operation steps were required to remove the BioVert NWB temporary diverter. This too shortened the time for the well to be back on line.

Production from the well increased from negligible to over 1000 mcf/d for several weeks before settling out at 500 mcf/D.

*Multiple particle sizes of BioVert NWB material help achieve bridging for a highly effective seal and diversion to another designed zone.*