BioVert® NWB Biodegradable Diverting Agent
Manage Fluid and Proppant Placement to Improve Multi-stage Fracturing Efficiency

BioVert® NWB near-wellbore temporary diverting agent is the industry’s first chemical diverter proved to meet the requirements of fracturing. This biodegradable material provides effective diversion by sealing perforations and then dissolving and disappearing, leaving the perforations, fractures and wellbore open.

**Completions Optimization Application**
BioVert NWB agent enables faster completion operations at a lower cost by facilitating a reduced number of pumping stops during multi-stage fracturing. Traditional plug-n-perf operations require multiple well operations between fracturing stages. BioVert NWB agent can be used to provide temporary isolation of newly stimulated perforation clusters within the treatment interval. The perforations receiving the early fluid and proppant volumes of the treatment stages can be temporarily isolated, diverting further treatment to additional sets of perforations. Using this procedure can facilitate longer intervals, reducing the number of perforating runs and frac plugs required.

Field applications have indicated that as many as two out of every three frac plugs can be replaced by diversion techniques.

With time and temperature, BioVert NWB agent auto-degrades leaving the perforations, fractures and wellbore unobstructed.

This diversion process is evaluated using real-time assessments of the pressure response of the diverter as it bridges off on the perforations being treated, and the subsequent increase in average treating pressure for the remaining perforations.

For more certainty, real-time FracTrac® microseismic mapping service can indicate the effectiveness of the diversion and the resulting increase of SRV (stimulated reservoir volume).

BioVert NWB agent degrades to a benign by-product compatible with most treating fluids and production chemicals and does not interfere with recycling, reuse or disposal of flow-back water.

![Figure 1 - BioVert NWB self degrading diverting material can be used to reduce the number of perforating runs and frac plugs required for multi-stage fracturing. This presents a significant opportunity for reduced costs and improved operational efficiency.](image1)

![Figure 2 - Multiple particle sizes of BioVert NWB diverter help achieve bridging for a highly effective seal and diversion to another designed zone.](image2)
**Case History**

**BioVert® NWB Diverter Helps Solve Operator Challenge in the Barnett Shale**

During a ten stage fracturing treatment performed by Halliburton in an operator’s horizontal well, a casing leak developed preventing the pump down composite plug and perforating guns for the sixth stage from being pumped into place. Without a quick solution, the customer would have been forced to delay the remainder of the treatment at a significant cost.

Halliburton recommended combining the next three stages (6, 7, and 8) into a single tubing conveyed perforating (TCP) run and treat all three clusters with a new pumping schedule using BioVert NWB diverter to separate the individual fracturing stages. Covering the next three stages with this process would ensure the casing leak risk was mitigated based on its estimated location.

By the next morning, the TCP assembly and BioVert NWB agent were deployed to allow the completion operations to resume. The diverting stages were seamlessly integrated into the fluid train using the equipment already on location. Subsequently, stages 9 and 10 were completed in a similar manner due to another casing leak discovery (Figure 3).

This well is producing comparable to other wells in the production unit completed with the pump down plug-n-perf technique. The solution saved the customer the added expense and lost production from a delay in the treatment. In addition, the BioVert NWB diverter replaced the expense of running four composite plugs and the cost associated with drilling out the additional plugs.

**For more information about how BioVert NWB diverter can help you achieve optimum treatment results, contact your local Halliburton representative or email stimulation@halliburton.com.**

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