**CASE STUDY**

**BroadBand Shield Service Improves Production by 12% in Infill Well and 5% in Parent Well**

Aggressive engineered stimulation design maximizes infill production and avoids detrimental well-to-well communication, Eagle Ford Shale

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**CHALLENGE**

Stimulate maximum oil production from two infill wells without impairing production from an existing well just 330 ft away.

**SOLUTION**

- Use Kinetix Shale* reservoir-centric stimulation-to-production software to model the reservoir.
- Engineer an aggressive stimulation design with BroadBand Shield* fracture-geometry control service.
- Use the WellWatcher Stim* stimulation monitoring service to verify diversion and lack of well-to-well communication.

**RESULTS**

- Produced 12% more oil from one infill well as compared with the average of similar offset infill wells.
- Met production expectations for a second infill well that was landed in an area with different reservoir properties.
- Stimulated a 5% production increment from the parent well.

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**Stimulating infill wells risks a consistent producer**

The success of the Eagle Ford Shale has led to a land rush, with economics and rig availability dictating development progress and timing. One result is the practice of drilling a single well to hold the lease rights by production (HBP). Often this initial parent well produces for several months or years before additional wells are drilled.

For one Eagle Ford Shale operator, infill wells compounded the risk for the completion program. When an infill well is stimulated, its fractures tend to grow toward and into the depleted reservoir around the parent well, sometimes resulting in well-to-well communication known as a “frac hit.” A recent study (SPE 180200) determined that, in some reservoirs, this well-to-well communication is likely to improve production in the parent well, but in the Eagle Ford, it tends to reduce production from the parent well.

One way to minimize the risk of impairing a parent well when stimulating an infill well is to scale down the fracture design for the infill well. However, this practice also scales down the infill well’s potential drainage area and may make it uneconomic to produce.

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**The aggressive BroadBand Shield service improved production in both the infill well (up 12% compared with similar offset infill wells) and the producing parent well (5% compared with the extrapolated curve of its production before the infill treatments).**
CASE STUDY: BroadBand Shield service improves production by 12% in infill well and 5% in parent well, Eagle Ford Shale

For two new infill wells just 300 ft from a parent well that had been producing consistently for 26 months, an operator asked Schlumberger for an alternative stimulation solution that would maximize reserve recovery from all three wells.

**Diversion technique enables aggressive fracture design**

Schlumberger engineers modeled the reservoir using Kinetix Shale software and reviewed infill stimulation options aimed at maximizing reservoir recovery. The modeling determined that an aggressive conventional stimulation design would cause the fractures to grow toward the pressure sink around the producing parent well, making detrimental communication a near certainty.

Instead, engineers recommended the BroadBand Shield service to deliver engineered fracture stimulation treatments that constrain fracture growth with far-field diversion. The fluid system includes a proprietary blend of multimodal particles designed to bridge only the fracture tip and thereby prevent excessive fracture length and height growth while promoting fracture complexity.

The modeling indicated that adding engineered diversion pills to the aggressive stimulation design would control fracture growth, reducing the risk of detrimental communication and improving fracture complexity in the stimulated area.

To assess well-to-well communication, engineers installed WellWatcher Stim service modules on the wellheads.

**Production improves in infill and parent wells**

The infill wells were stimulated in stages, alternating between wells, using the plug-and-perf technique. During each operation, engineers used the WellWatcher Stim service to monitor pressure signals in the infill and parent wells that were not undergoing treatment. When the signals indicated that interwell communication occurred, engineers used the data to adjust diversion delivery for subsequent stages.

To evaluate the stimulation effectiveness, production from one of the infill wells was compared with averaged production of 15 comparable infill wells within 3 miles of the treated pad. The results indicate that the new infill well produced a 12% oil increment after 4 months compared with analog offset infill wells treated without far-field diversion. This clearly demonstrated the benefit of maintaining an aggressive stimulation treatment rather than reducing the treatment as a means of avoiding well-to-well communication.

The second infill well was landed in a different part of the reservoir, and its production was not compared. However, the well’s production met the operator’s expectations.

To evaluate the impact of any well-to-well communication on the parent well, its production was graphed against an extrapolation of the prejob production curve, indicating that the infill well stimulation operations added a 5% increment to the parent well’s oil production.

For more information or detail of the case, see URTeC 2670497.

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![Pressure communication](image1)

![No communication](image2)

At left, monitoring with the WellWatcher Stim service shows a stage treated conventionally and resulting in detrimental communication with a neighboring well. At right, data from another stage indicates that the BroadBand Shield service treatment avoided well-to-well communication.