An operator working in the Woodford Shale in Oklahoma drilled an extended-reach well to access more pay zone and to increase production potential. The well had a total measured depth (TMD) of more than 22,200 ft (6772 m) with a 7,109 ft (2167 m) horizontal section. But the limited reach of coiled tubing (CT) presented an issue for the farthest depths of the well.

In traditional plug-and-perf completions, composite plugs have to be drilled out with CT-conveyed milling tools before production can flow. Applying sufficient weight on a milling bottomhole assembly to enable drillouts becomes unreliable in wells with extended horizontal wellbores. And composite plugs left in the well create a production barrier for the stages below, preventing recovery of hydrocarbons from that area.

To eliminate plug-related obstruction risks and the need for CT intervention in the farthest section of the well, Baker Hughes recommended installing SPECTRE™ disintegrating frac plugs in the lower stages. The plugs, which are constructed of high-strength controlled electrolytic metallic (CEM) material, can reliably withstand the rigors of fracturing, and then fully disintegrate downhole in the presence of well fluids. No production-inhibiting plug debris, such as metal slips or ceramic buttons, are left in the wellbore.

The final completion design had a total of 45 stages and included a combination of SPECTRE plugs and composite plugs. Ten SPECTRE plugs were run first and successfully set in the lower section of the well. The deepest plug was set at 22,224 ft (6773 m) and the shallowest at 20,091 ft (6123 m). This section, which would have been too risky to complete using composite plugs, spanned more than 2,100 ft (640 m) of the 7,109 ft lateral.

As the lower stages were pumped, pressure signatures at the surface indicated successful diversion of treatments into each stage. SPECTRE plugs use IN-Tallic™ disintegrating frac balls to divert treatments, providing a completely disintegrating isolation solution. The remaining upper section of the wellbore was completed with 34 traditional composite plugs.

After fracturing operations were complete, the composite plugs were milled out and the well was put on production, exposing the SPECTRE plugs and IN-Tallic frac balls to reservoir fluids. After the
disintegration process is complete, no plug or ball debris will be left behind, ensuring an unobstructed, fullbore production inside diameter (ID) without intervention. During the disintegration process, hydrocarbons are still able to pass through the SPECTRE plug’s enlarged flow-through ID.

The operator’s choice to use SPECTRE plugs in this well enabled 11 interventionless stages that were beyond the safe reach of CT in the long lateral. The plugs effectively increased pay zone coverage and production potential by more than 30%. And elimination of post-frac intervention in the lower stages provided greater efficiency, saving approximately 8 hours of completion time.

The operator was pleased with the performance of the SPECTRE plugs, and plans to use them in future wells.