Case Study
APEX™

The APEX™, an all composite fracture isolation plug, is a patent pending pump down frac plug that is capable of performing in the most challenging well bore environments. APEX™ has the ability to be set using conventional wireline methods with Baker, Owen Compact and Disposable Setting Tools. Its novel design allows it to be the smallest overall size and volume of any composite product on the market with both the 4.5" and 5.5" APEX™ composites weighing less than 5 pounds each. Compared to conventional composite plug technologies, operators are able to reduce their drill out debris by up to 75% and eliminate heavy metal cuttings from being left downhole.

The APEX™ tool isolates the stage above it by using a frac ball that lands on the large inner bore and provides a full 10,000 psi differential rating between stages at up to 350 degF. The large ID of the ball drop plug also provides a cleaner ball seat signature by eliminating ball seat masking that is seen with pressure drops caused by small ID mandrels.

The APEX™ plug's large ID and bottom set design is based off our highly successful Set-a- Seat large bore plug and has just surpassed 13,000 runs across all North American Basins. Like the Set-a-Seat, when using the APEX™ in conjunction with Peak's proprietary line of Fantom™ dissolvable frac balls, the need for wellbore intervention can be eliminated due to the large ID through the tool. This is also a good contingency plan for extended reach laterals when there is a chance of not being able to drill out the toe stages.

When drilling out APEX™ plugs, the tool features unique engineering that allows it to stay together throughout the drill out process guaranteeing more consistent drill out debris size. This, in addition to the tool's compact size, provides a cleaner wellbore with a significant reduction in debris and bit wear. Average drill out times are 3-8 minutes on coiled tubing or stick pipe.

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WELLS 1 AND 2

Challenge

To verify the integrity of qty 132 X 5.5", 20-23# APEX™ and Peak XCF™ Ball in two horizontal wellbores using conventional zipper frac timing and installation methods in the Permian Basin – Midland Basin. Secondly, verifying APEX™ drill out performance in a depleted reservoir with stick pipe drill out.

TVD:	10,110'
Max Setting Depth:	21,113'
BHT:	164degF
Frac:	Fresh Water

Result

The APEX™ was installed successfully with an average pump down rate of 18 BPM and 485 FPM in the lateral, and successfully held a fracturing differential pressure of approximately 8,900 psig. All APEX™ installed showed good ball action, proper formation breakdowns. Upon completion of the final stage, a pulling unit was moved in and stick pipe was run with a PDC style mill to drill out. Average drill out time was 11.32 minutes per plug, all plugs were cleaned out in a single run. All APEX™ were tagged at their setting depth.

WELLS 3-5

Challenge

To verify the integrity of qty 233 X 5.5", 20.0-23.0# APEX™ and XCF™ Ball in a horizontal wellbore using conventional WL deployment methods in the Midland Basin, Permian Basin.
Also, verifying APEX™ performance in a 165 degF temperature reservoir and coiled tubing clean out.

TVD:	10,100'
Max Setting Depth:	21,893'
BHT:	165degF
Frac:	Fresh Water

Result

The APEX™ tools were successfully pumped down with good ball action, formation breakdowns and zonal isolation. Upon completion of the frac treatment, Coiled Tubing was rigged up to complete the drill out. Average drill out time was 3.00 minutes per APEX. These APEX™ were drilled out using a 3-1/8" Bico motor and a 4.625" Varel SlipStream™ drill bit. The combination of 3 min drill up times and reduced debris allowed for production to market 8 days ahead of schedule.

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WELL 6

Challenge

To verify the integrity of the qty 23 x 4.5", 11.6-13.5# APEX™ and Peak XCF™ Ball in a horizontal wellbore using conventional pump down installation methods in the Mississippi Lime. Well construction included a Peak Sentinel™ Liner Hanger set at 90 degrees. This was a good test to show the bottom tapers allowed for guidance into the PBR.

TVD:	6,311'
Max Setting Depth:	11,550'
BHT:	134degF
Fluid:	Fresh Water

Result

The APEX™ and the XCF™ balls were successfully deployed on wireline at an average pump down rate of 14 bpm @ 499 ft/min. XCF™ Ball seat signatures were excellent and APEX™ tool integrity was confirmed. After shutting the well in for 10 days, re-entry was made with coil tubing for drill out, averaging 4.50 minutes per APEX™ and XCF™ ball. All tools were drilled in a single trip.

WELL 7

Challenge

To verify the integrity of the qty 32 x 5.5", 20-23# APEX™ and F7 Fantom™ Ball in a horizontal wellbore located in Pecos County, TX. Additionally, verifying APEX™ performance in a low temperature reservoir utilizing coiled tubing drill out techniques.

TVD:	9,455'
Max Setting Depth:	17,500'
BHT:	185degF
Fluid:	Fresh Water

Result

The APEX™ composites were conventionally pumped to depth on wireline, then ball was allowed to fall from surface and isolate the deeper stage for a 1.5 hour pump time frac job. Isolation was solid, and the subsequent coiled tubing drill out proved our APEX™ composites were doing their job, as they were all tagged in place and drilled out with a 3-1/8" Bico Motor and Varel SlipStream™ drill bit, at an average of 5.25 Minutes per Apex™.

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