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Please fill in your 5-digit IPTC manuscript number.	IPTC-19607	
Please fill in your manuscript title.	High Differential Pressure Retrievable Bridge Plugs - Increasing Operational Envelopes and Lowering Overall Costs for Intervention Work	
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## Abstract

### Objectives/Scope:

When Well Servicing work is carried out on high pressure wells, conventional retrievable bridge plugs often do not have a large enough differential rating, this often forces the use of higher rated permanent plugs or the use of fluid as an additional barrier/to reduce the differential across the plugs. This results in increased time and costs as permanent plugs must be milled and fluids must be unloaded to prevent formation damage. By using a higher rated retrievable bridge plug rig time is saved as operations can again be carried out with Slickline.

### Methods, Procedures, Process:

In 2017 Weatherford began development of a high pressure retrievable bridge plug, capable of differential pressures up to 15,000-psi and qualified per ISO14310/API11-D1 V0 validation. Development of the plug was based on an established 5,000-psi bridge plug. However it was identified at an early stage that conventional gauge ring design would not provide sufficient support to the element, the anchoring system would also need to be re-designed to handle the increased loading generated by such high differentials. By developing a novel expanding and collapsible element support system and an extended contact slip system, this new bridge plugs has managed to successfully pass ISO14310/API11-D1 V0 testing requirements to 15,000-psi (104-MPa) up to 350-F (177-C).

### Results, Observations, Conclusions:

Deployed and recovered on Slickline, this new bridge plug design will help to eliminate the need for high cost intervention work to remove permanent bridge plugs or perform Nitrogen lifting operations, traditionally carried out using coiled tubing. Development and testing of the new bridge plug design has shown that the previous perceived limitation of traditional HNBR sealing elements has been massively increased. In addition, the expanded slip contact area has shown that high pressure barrier devices can be used without the risk of damage to the tubing.

### Novel/Additive Information:

Expansion of the capabilities of retrievable bridge plugs will help to simplify well servicing operations carried out on high pressure wells, by eliminating the need for coiled tubing or rig based intervention work. By completing the entire intervention operation using only slickline, an average of three to four days can be saved per well, saving time, reducing costs, increasing efficiency and minimising risk.