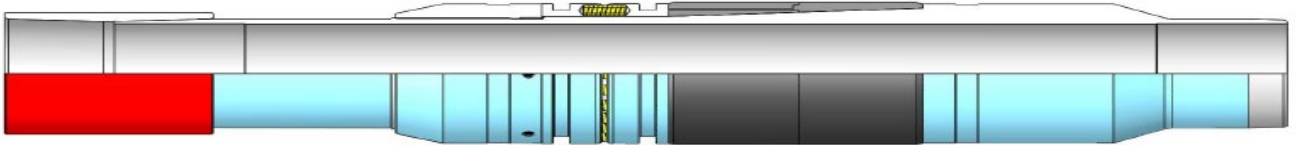


Flow Control Hanger with Clutch Assist



Optimal distribution of steam can significantly improve the recovery factor of a heavy oil or bitumen reservoir. Thermal recovery utilizing steam has been extensively and successfully used, but thermal liner hanger failures are common due to thermal expansion and contraction. The thermal heat will cause expansion of the liner system. Subsequent movement of the liner hanger and components can allow for steam bypass at the hanger affecting uniform steam distribution into the formation. This results in costly work-overs associated with down hole equipment malfunctions, failures, and reduced recovery. The liner system has a tendency to expand upwards into the intermediate casing. A specifically designed and engineered Polished Bore Receptacle (PBR), set directly above the float equipment in the intermediate casing string, provides for proper seal ability of the thermal liner hanger against the intermediate casing. The thermal liner hanger is positioned inside this PBR to provide a pressure and debris seal, coupled with unrestricted thermal expansion/movement of the liner system without compromising the main function of the thermal liner hanger.

The new advanced casing hanger, named Flow Control Hanger (FCH), manufactured from hardened steel material, will not wash or fail under high steam temperatures and pressures during movement inside the PBR. The FCH steel seals have a positive-seal-memory when set and installed inside the PBR. Only string weight is required to set the steel seals of the FCH within its matched and specifically honed PBR. The FCH steel seals are engineered to permit movements within the PBR while providing for continual seal. The FCH can be rotated within the PBR during installation. The FCH steel seals will not collapse smaller than the “no-go” located at the bottom of the PBR, which can ensure proper placement of the FCH inside the PBR.

The Flow Control Hanger with Clutch Assist (FCC) was specifically designed to allow control over installation forces and injection pressure seal ability. For shallower wells, or when string weight is too low to install the FCH to the PBR, the FCC can be adjusted for lower installation forces to place the FCC into the PBR. In cases where injection pressures need to be higher, the clutch assist can be adjusted to seal higher injection pressures with a predetermined amount of clutch pressure prior to installation into the well. The different design features of the FCC compared to the FCH allows the steel seals of the FCC to ride on a tapered mandrel body. With the assist of the clutch springs, the steel seals are forced up the tapered mandrel to create a tighter seal to the PBR ID wall.

APPLICATION

- Thermally enhanced oil recovery applications – steam injection wells.
- High temperatures and pressures wells – wells requiring heel seal ability, optimal steam injection wellbores – uniform steam distribution wells.

FEATURES

- Hardened and non-corrosive finish of steel seals eliminating washing and leakage.
- Positive memory steel seals and applied seal pressure with the use of the clutch.

BENEFITS

- Expansion and contraction - thermal movement of liner and FCH hanger - up to 5 m.
- Ease of deployment - can be achieved by any system, however, the FCH is commonly deployed hydraulically using Hydraulic Release Tool (HRT).
- Positive continuous seal - durability to endure extreme heats and pressures, positive memory assembly - continual seal pressure with the PBR - clutch seal pressure assist.
- Optimal steam distribution – uniform steam distribution due to pressure seal.



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