Circulating/flowback tool cuts surge pressures

A CIRCULATING AND FLOWBACK tool has been proven to be a practical method of reducing surge pressure while running liners. It can also increase safety.

The CFT™ developed by **Offshore Energy Services**, Lafayette, La features an extending and retractable seal unit that allows normal pipe handling and provides a seal for diverting fluid to the mud system in a flowback operation or when circulating while running or pulling pipe.

The tool is normally used in conjunction with auto-fill float equipment, thereby allowing the drilling fluids to enter the casing/landing string in order to reduce the surge from the formation while running tight tolerance casing strings.

TOOL FEATURES, BENEFITS

The CFT tool is easy to rig up and rig down. The extending and retracting seal unit eliminates the need to make or break a connection to circulate or take fluid.

A mechanical stop limits the travel of the seal unit so that the seal is always at the top of the tool joint.

Use of the circulating/flowback tool allows pipe to be run or pulled faster without the loss of expensive mud.

It allows circulation while pulling a tight bottom hole assembly and allows fluid to be diverted to the mud system while running a tight bottom hole assembly.

A string can be washed down while circulation is still in progress.

The pneumatic operating system provides rapid extension and retraction of seal unit and opens and closes the safety valve to prevent fluid from being spilled on the rig floor.

Internal pressure forces the seal unit into sealing contact with the tool joint while circulating. The body of the tool can be made up to the drill pipe at any time to provide well control. An integral safety valve is optional as a well control feature. Outer components of the tool can be stripped from assembly allowing the body and safety valve to be run in the hole.

OPERATING POSITIONS

Figure 1 shows the system in several of its operating positions. The tool is attached to the top drive and has an integral safety valve that operates in conjunction with the extendable seal unit to prevent spillage of mud on the rig floor. In the retracted position, pipe can be run or pulled as usual. In the extended position, the mud system is attached to the drill pipe and mud can be circulated on demand or transferred to the pits.

When connected, the top drive is directly connected to the drill pipe through the integral drill pipe stem inside the tool.

The tool is shown with the stem and safety valve connected to the drill pipe and the outer components removed to allow the stem and safety valve to be stripped into the well.

Maximum operating temperature of the seal unit is 200 degrees F; maximum circulating pressure for the seal is 3,000 psi.

The 5-in. tool is used with 6¼-6⅝-in. tool joints; the 5½-in. with 7-7¼-in. tool joints and the 6⅝-in. tool is used with 7⅞-8½-in. tool joints.

A new tool for 3½-in. drill pipe is under construction.

EXAMPLE JOBS

Three case histories show how the CFT is used and how it benefits drilling operations.

On one job, a 9⅝-in. liner (4,161 ft) was run to a total depth of 21,998 ft. Lost circulation problems occurred while drilling this hole section. Autofill float equipment and the CFT tool were used to reduce the surge on the formation and to eliminate expensive mud losses.

The mud was a 15-lb synthetic based fluid; the liner was run inside a 7,190 ft, 11¾-in. liner previously set at 18,200 ft. The landing string consisted of 17,800 ft (188 stands) of 5½-in. drill pipe.

Flow back occurred at the rig floor on the 44th stand in the hole and the CFT tool sealed on the last 148 stands enabling them to divert the mud through the top drive back to the pits.

Only 8 bbl of drilling fluid were lost to the formation. Autofill float equipment was also used on the 11¾-in. liner, but was converted due to well control issues.

It was estimated that approxi-

Figure 1: CFT allows normal pipe-handling operations to be conducted as if the unit were not installed. Seal prevents mud spillage on the rig floor.

mately 1,500 bbl of fluid were lost to the formation.

On the 9⅝-in. run, it was also estimated that 6-8 hours of rig time were saved by sealing over each tool joint rather than making a top drive connection to each stand.

Mud spillage was eliminated and a safe working environment was created.

In another project, 9⅝-in. casing was previously set at 14,168 ft. While next drilling an 8½-in. hole section, lost circulation became a problem.

The OES CFT and autofill float equipment were used to run 2,600 ft of the 7⅝-in. liner to a total depth of 16,442 ft.

The landing string consisted of 13,668 ft (147 stands) of 5-in. drill pipe.

The CFT sealed on 144 stands and 16.1-lb mud flowed back the entire time while tripping in the hole. The liner was landed successfully with full returns during the running operations.

The OES circulating/flowback tool can allow pipe to be run or pulled faster while avoiding the loss of expensive drilling mud.

In another project, 11⅞-in. casing was set at 11,483 ft. The CFT was used with autofill float equipment to run 6,857 ft of 9⅝-in. liner to a total depth of 18,027 ft. The rig utilized 5½-in. drill pipe landing string totaling 116 stands.

Flow back (13.0-lb synthetic base mud) occurred at the rotary on all stands and the CFT sealed on all connections. The liner was run successfully with no mud loss.

On two previous liner jobs without the use of the CFT, an average of 2,400 bbl of synthetic mud was lost to the formation. Significant rig time savings occurred by not having to make a connection with the top drive to capture flow back at the tool joint.

An estimated 8 hours of rig time were saved by utilizing the CFT.