intervention

real results

A Quick Fishing Trip

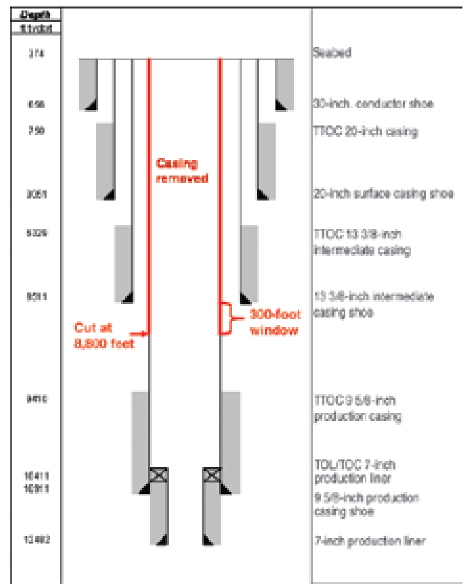
A unique casing spear and casing cutter combination does the job in a single trip, saving a North Sea operator eight hours of rig time and about US$100,000.

Sidetracking from an existing well to reach a new part of the reservoir is a great way to cut rig time and drilling costs; but what about the rig time it takes to "kick off" from the existing well and get the sidetrack started?

One operator faced that challenge on a semi-submersible rig in the North Sea. The operator wanted to kick off from an existing cased well 8,500 feet (2,591 meters) below the rig floor and wanted to do so from an open hole. This meant that a 300-foot (91-meter) section of casing would have to be removed to provide a window for the sidetrack. (A cement plug would then be set in that window to isolate the abandoned portion of the well, and then the well would be directionally drilled off the cement plug in the correct direction to reach the new target in the reservoir.)

"Cutting and pulling casing and open-hole sidetracks are done fairly regularly in the North Sea, but they are still significant challenges," says Jamie Stewart, Operations Manager for Weatherford's Fishing & Re-entry product line. "Even if there's no cement bonding the casing to the formation, the formation itself can settle and stick the casing in the open-hole section of the wellbore so that it takes several trips to cut and pull the casing free."

For this well the challenge entailed cutting the 9 5/8-inch casing 8,800 feet (2,682 meters) beneath the surface; then ensuring that the casing was free to move and could be pulled out; and, finally, removing the entire string in as few trips as possible—preferably one. Then the sidetrack could commence.



Each concentric casing string is hung from a casing hanger in the wellhead (in this case on the seafloor), and the casing "shoe" is attached to the bottom joint of casing of each casing size. Gray areas show where the casing is cemented to the formation. For this operator, an uncemented portion of the 9 5/8-inch casing would have to be removed to make a window for an open-hole sidetrack.

Depicted below, the bottom of the casing swage protruding below the bottom of the rotary shoe (part of the box-tap BHA).

Fishing Operation Saves Russian Operator Six Months and $10 Million

A Russian workover crew had labored on a remote well in Western Siberia for two months, but to no avail. Collapsed casing at 12,590 feet (3,837 meters) blocked all access to the bottom of the hole. The crew tried to restore the original casing ID by jarring a casing swage down through the obstruction; but the casing swage became stuck, and in the effort to rotate it free, the drillpipe that was attached to the top of the casing swage twisted off. The crew then tried to mill through the blockage, which resulted in the casing being cut and then parted. Because there was no cement behind this casing, the cut section of casing shifted, leaving the top of the fish (the twisted drillstring and the casing swage) no longer centered and easily accessible. Now removal of the debris and repair of the well seemed impossible.

Weatherford brought in a well-trained fishing tool supervisor and the right equipment. The supervisor successfully milled off the top of the fish, using a special rotary shoe and stabilizers to keep the cutting surfaces of the rotary shoe in place over the stuck drillpipe and away from the walls of the casing. Then a box tap was run, a catch tool with interior threads to screw onto the stuck drillpipe. With a firm grip on the twisted-off drillpipe, the crew was able to recover both it and the casing swage. With that done, a taper mill and stabilizers were used to mill out the collapsed casing to a normal ID.

The expertise and equipment Weatherford supplied saved the client $10 million in lost production and workover costs.

Beyond-the-Box Thinking

A conventional approach to this job would require at least two trips: In the first trip, a bottomhole assembly (BHA) with a cutter would be run in the hole to 8,800 feet (about 300 feet beyond the casing shoe of the 13 3/8-inch casing), and the casing would be cut. Then the casing cutter would be pulled out of the hole, back to the rig floor, and a new BHA would be made up with a casing spear to engage and pull on the casing. In the second trip, the casing spear would be lowered to just below the casing hanger (at about 400 feet, or 122 meters), where it would engage onto the top of the casing string, which could then be pulled out (assuming there were no collapsed-formation issues or other problems).

The operator wanted to avoid making the two trips required with a conventional approach to cutting and pulling casing. Weatherford's response was to use its deepwater STR (single-trip recovery) casing spear.

Providing a Single-Trip Option

The deepwater STR casing spear was made up to the BHA just above Weatherford's industry-leading A-1 casing cutter. Both tools were run into the hole to 8,800 feet (300 feet below the 13 3/8-inch casing shoe to provide a 300-foot window for the sidetrack). Then the casing spear was engaged, gripping the casing securely to make the cut. When the cut was completed, the drillstring was pulled back a few feet, with the casing spear still engaged, to verify that the casing was free to move. Then the casing spear was disengaged from the casing, pulled out of the hole to 400 feet (just below the 9 5/8-inch casing hanger) and re-engaged. The 8,800 feet of casing was pulled clear of the hole—all in a single trip.

"There are two big advantages to using the deepwater STR casing spear in a casing-cutter BHA," says Stewart. "First, you can prove that the casing cut is successful without pulling the casing-cutter BHA out of the hole and running the casing-spear BHA in a separate trip. Second, if the casing is not free at that point, you can make other casing cuts up the hole until the casing can be cut and pulled freely. In the end we saved the client a minimum of one trip, equating to eight hours of rig time, which represented approximately $100,000."

What It Takes to Be a Fishing Tool Supervisor

Fishing is not an ordinary nine-to-five job. It requires people who are adaptable to unknown conditions and odd working hours. Par for the course is never knowing where the next job will be or what challenges lie ahead. Essentially, fishing tool supervisors are the emergency technicians of the oil field.

Remote locations often do not provide the full picture from the operator about what has gone wrong in the well. Operating in such locations means limited resources and a limited support system. The fishing tool supervisor is the person responsible for providing sound advice to the client and acting on it, often without much information to go on. Well records may be dubious, and the fishing tool supervisor cannot actually see what is happening downhole. Making the right decisions at the well site and picking the right equipment at the right time are essential.

"We put a lot into training fishing tool supervisors. We've got a well set up at the fishing tool training center in Houston, and we've built a good support network," says Stewart. "One of the biggest helps is the Weatherford Performance Tracking System, which is a global database where we track every single fishing job. It's available to everyone as a knowledge base. But you can't discount the experience of the individual. Fishing definitely has an art component to it. The ability to visualize conditions they cannot see requires a very keen sense of downhole conditions and experience over a broad range of situations."