Harpoon Cut and Pull Spear was Set Twice and Retrieved Casing in One Trip, Saved USD 650,000
Location: Norwegian Sea

An offshore well operator in the Norwegian Sea needed to remove the top section of casing to make way for a planned openhole sidetracking operation in a deviated well. The operator and the Baker Hughes wellbore intervention team agreed to use our newly introduced Harpoon™ cut and pull spear to efficiently remove a string of 9 5/8-in. 53.5 lb/ft casing to perform a slot recovery operation.

This versatile spear can be set and reset several times through simple mechanical manipulation, enabling multiple cut and pull attempts in a single trip for reduced non-productive time (NPT).

Once on site, the Baker Hughes team ran the Harpoon spear to the desired depth of 4,017 ft (1225 m) in a bottomhole assembly (BHA) comprised of a multistring cutter and the Harpoon spear. The cutting assembly does not require a stop ring, enabling the BHA to be positioned deep in the casing, just above the cut point. Rotation and upward movement were applied to activate the FLEX-LOCK slips, which engage the casing inside diameter (ID) uniformly to prevent casing deformation. Rotation was stopped when overpull was recorded and the force of the overpull energized the packing element stack, eliminating HSE concerns inherent to chemical and explosive setting and cutting techniques.

Benefits
- Minimized NPT by reducing a two-run operation to a single trip
- Saved 19.5 hours rig time and an estimated USD 650,000

Background and challenges
- Offshore, deviated well with settled barite and solids
- Slot recovery operation

Baker Hughes solution
- Deployed the Harpoon cut and pull spear because of its advanced ability to perform multiple recovery attempts in a single trip
- Reset the spear farther up the casing due to difficulties with the retrieval of the cut casing in its initial location
- Cut the casing while applying tension, set the spear twice in different locations, and retrieved 1,134 ft of casing in a single trip in only 16.5 hours

The Harpoon cut and pull spear saved 19.5 hours of rig time in a single-trip slot recovery operation.

CASE HISTORY
After the packing elements were actuated, the Harpoon spear was prepared for the cut by unjaying the mandrel from the rest of the tool. Tension was applied to the casing string to enhance cutting performance and the cutting tool cleanly severed the casing at 4,021 ft (1225.6 m) in only three minutes.

Due to difficulties with the retrieval of the cut casing in the initial location, the Baker Hughes team proceeded to release the spear without issue in the same run by setting down 2,000 lbf (907 kg) and rotating to the right slowly until the spear released and moved down the casing. The team continued rotating 15 more turns, set-down weight was applied, and the spear fully disengaged. Rotation was stopped and the string was picked up to neutral weight of 168,000 lbf (76 204 kg), and the element was allowed to relax for ten minutes. The team pulled up to relocate the Harpoon spear higher in the casing at 2,933 ft (894 m) without any issues and reset the spear in overpull mode. With 343,000 lbf (155 582kg) overpull, the 9½-in. casing was released and recovered.

The advanced capability of the Harpoon cut and pull spear enabled the operator to set the tool at depth, make a clean casing cut, unset and reposition the spear farther uphole, reset the tool to lock it to the casing ID, and retrieve the top casing section, all in a single trip. Without the Harpoon spear the operation would have required two separate runs—the first to cut the casing and the second to retrieve it—a process expected to take an estimated 36 hours. Using the Harpoon cut and pull spear to complete the slot recovery operation in a single run saved 19.5 hours of rig time and an estimated USD 650,000.