High-Expansion Section Mill Left Production Riser Intact, Saved USD 1,000,000
Location: Gulf of Mexico

An operator with a deepwater well in the Gulf of Mexico needed to perform a section milling job during a plug and abandonment (P&A) operation. The plan required an 11.75-in. 65 lbm/ft section of casing to be milled after running the milling tool through a production riser with a 9.745-in. inside diameter (ID). Baker Hughes recommended our high-expansion section mill to perform the job.

In wells where the production riser ID is narrower than the casing below it, conventional milling processes require the operator to remove the production riser and blowout preventers (BOPs) before tripping in the section mill. The Baker Hughes high-expansion section mill eliminates preparation and rig time by leaving the production riser intact. The mill passes through the narrow riser and is then activated hydraulically to cut out and mill down the larger ID casing.

Once on site, the Baker Hughes team conducted a job safety analysis and mill test while still on the surface before beginning the operation. The team ran in with the section mill and passed through the 9.745-in. ID production riser without incident. After locating a casing collar at 4,685 ft (1428 m), the milling assembly was picked up slightly per standard operating procedure to make the initial cut. Cut out was performed at 4,681 ft (1427 m) in only four minutes at 60 rpm and torque at 1,500 – 2,000 ft-lbf. Following the cut out, a total of 70 ft (21m) was milled.

The team monitored the well for 30 minutes, then cleaned the pit and replaced the fluid with 10.2 lbm Baker Hughes MILL-SWEEP™ milling fluid. To reduce packing off, the Baker Hughes team used back reaming from 4,700 ft (1433 m) to 4,751 ft (1448 m) to break up balled and nested cuttings.

Results
- Eliminated need to remove and replace production riser, reducing NPT and operational risk
- Saved three days and an estimated USD 1,000,000 based on saved rig time and equipment costs
- Completed operations with no health, safety, and environment (HSE) incidents

Challenges
- P&A deepwater well in the Gulf of Mexico
- Operational requirement to run through a 9.745-in. ID production riser to mill a 70-ft section in 11.75-in. 65-lbm casing
- Operator needed a solution to reduce time, cost, and HSE risk

Baker Hughes solution
- Deployed first-to-market high expansion section mill, saving time and rig costs
- Milled a 70-ft section averaging 2.11 ft/hr in a single trip
By eliminating the preparation and rig time required to remove the production casing and BOPs, the Baker Hughes high expansion section mill saved an estimated three days rig time and USD 1,000,000 while successfully milling a 70-ft section in one trip.

Cross-sectional view of high-expansion mill with cutter arms extended