METAL MUNCHER AMT milled perforated casing in a single trip, saved rig time

An operator in Aberdeen needed to cut a section in 9 ¾-in. N-80 casing at 3,149 ft (960 m). The casing had perforations at 12 shots per foot (SPF), so cutting the section without damaging the section mill knives would be a challenge.

To cut and mill the section, Baker Hughes, a GE company (BHGE), deployed a Model D™ section mill designed for milling perforated casing in production zones. The knives were dressed with special METAL MUNCHER™ advanced milling technology (AMT) carbide to provide the robustness and enhanced cutting performance needed to mill through the perforated casing.

After conducting a surface test, the BHGE team tripped the bottomhole assembly (BHA) in hole to the cutting depth, then began rotating the string at 80 rpm with 450 gal/min and 3,500 to 5,000 lb (1587.6 to 2268 kg) of torque. The rpm was then increased to 120 and 500 gal/min, and the team observed a 50 psi (3.45 bar) pressure drop at surface, confirming the cut was successfully made.

Following the cut, BHGE set 4,000 lb (1814.4 kg) down on the casing stub and continued to mill the casing to 3209.8 ft (978.35 m)—a total of 60 ft (18.3 m). The average weight-on-mill throughout the job was 5,000 to 9,000 lb (2268 to 4082.3 kg) at 130 rpm with 635 gal/min. Mud weight was 1.25 SG with a viscosity of 65 and a yield of 30.

After milling the casing to the required depth, the BHA was pulled out of the hole. The section mill stabilizer on the Model D mill showed only 1/16-in. (0.16 cm) wear, and the near-bit stabilizer and taper mill were still in full gauge. The section mill knives were only 70% worn after milling through 60 ft (18.3 m) of perforated casing.

The total milling time for the job was 27.5 hr, or a rate of penetration (ROP) of 2.18 ft (0.664 m) per hour. The one-trip cutting and milling operation saved the operator nonproductive time (NPT) and demonstrated the ruggedness and dependability of the Model D section mill and METAL MUNCHER cutters.

Challenges
- Operator needed to cut a section in 9 ¾-in. 40# N-80 casing
- Casing was perforated (12 SPF, 39-in. diameter, 45° spacing)
- Low yield point for circulating out cuttings

Results
- Lowered NPT through single-trip operation
- Increased ROP with rugged cutters
- Successfully cut the casing at 3,149 ft (960 m)
- Milled 60 ft of casing in 27.5 hr
- Used jets sub above tools to help circulate cuttings out of the well
- Mill showed only 1/16-in. wear
- Near-bit stabilizer and taper mill maintained full gauge