

HEAVY METAL swarf-free section milling service

Leave the swarf. Lower the risks.
Take the savings.

Section milling is a conventional method for casing removal during plug and abandonment (P&A) operations where annular well integrity is compromised or questioned. The removal of casing by milling a window provides full access to the virgin formation, enabling placement of a rock-to-rock barrier. Swarf is an unavoidable byproduct of section milling, generating thousands of pounds of these sharp metal cuttings that have to be removed from the well. Retrieving and handling the swarf is a time-consuming and costly process and poses additional health, safety, and environmental (HSE) risks, and often times operators will opt for less reliable options, like perf-and-wash, just to avoid swarf.

Baker Hughes offers the **HEAVY METAL™ swarf-free section milling service** to provide a reliable solution without the negative side effects of swarf. It eliminates swarf to surface through a unique upwards milling process, depositing swarf deep in the rathole, while still enabling a secure rock-to-rock barrier. This unique service reduces time and costs in half—eliminating the need for swarf removal and the risks that swarf presents to people, equipment, and the environment.

How it works

The bottomhole assembly (BHA) consists of multiple tools providing different functions to enable upwards section milling using normal right hand drill pipe connections without any rotation at surface.

A torque isolator allows uninterrupted axial movement and continuously isolates reactive torque of the left-hand mud motor, while milling upwards.

The mud motor requires circulation from surface and provides downhole left-hand-rotation and torque to the section mill and auger.

The system's section mill features upward-facing knives that utilize **METAL MUNCHER™ advanced milling technology (AMT) carbide cutting structures**, and allow upward milling and reaming in one run—even in long laterals. The section mill cuts through the casing at the bottom of the window, mills upward to the desired distance, and then reliably retracts its knives at the top of the window.

The auger continuously transports any swarf created from the window to the bottom of the rathole, leaving it all in the well, while providing a window free

Applications

- Permanent P&A operations
- Casing removal where annular well integrity is compromised
- Wells where casing has been partially cemented without achieving desired isolation

Benefits

- Provides a robust rock-to-rock barrier
- Eliminates the need for swarf cleaning, transport, and disposal
- Reduces swarf-related costs and time by more than 50% through reduced swarf exposure
- Decreases HSE exposure to personnel
- Omits the need for special equipment and fluids to circulate swarf to surface

of swarf. Because the swarf does not have to be circulated to surface, there is no need to change over to a high viscosity milling fluid, saving additional cost and logistics.

A comprehensive solution

A Baker Hughes dedicated project management team can oversee the entire P&A project—from planning phase through final abandonment—all with a strong focus on safety and efficiency. With a single point of contact, customers achieve a simplified, streamlined process that helps reduce time and minimize risk.

Contact your Baker Hughes representative to learn more about how the HEAVY METAL swarf-free section milling service can help lower your risks so you can take the savings.

