

RED | BARON

**WELL ABANDONMENT
& SLOT RECOVERY
SYSTEMS**



Efficient Systems for Well Abandonment and Slot Recovery

Wellbore Integrity Solutions' comprehensive well abandonment and slot recovery services are designed to address the challenges of **decommissioning aging wells**, following three key pillars: **efficiency**, ensuring **reliability**, and **minimizing environmental impact**. We are committed to transforming the decommissioning process into a seamless and environmentally conscious endeavor.

Efficiency:

Streamlined workflows and new technologies are designed to minimize operational time and costs for our customers by reducing the number of trips and combining operations where practical.

Reliability:

Our experienced professionals assess and implement robust P&A methodologies, adhering to industry standards and regulations. WIS takes pride ensuring abandoned wells remains secure and poses no threat to the environment.

Emissions Reduction:

Through innovative engineering solutions and practices, WIS minimizes the carbon footprint of P&A operations. Our emissions reduction strategies encompass various aspects with an emphasis on reduced operational time, reduction of energy consumption and consequently, reduced emissions. We align our practices with global sustainability goals.

Wellbore Integrity Solutions' expertise, capabilities, and innovative technologies drives WIS to deliver unparalleled well abandonment and slot recovery solutions for our customers and for a greener future.

Essential Planning & Analysis

Our Well Abandonment & Slot Recovery operations include a rigorous planning process:

- Customer objectives and wellbore data evaluation
- Risk and jobsite safety analysis
- Equipment selection to maximize operational efficiency
- Proprietary software modeling for hydraulics analysis*
- Rigsite procedures and parameter optimization

*Our proprietary hydraulics modeling package is tailored to the specific elements of the BHA and the systems we provide. It provides calculations for hydraulics, cuttings transport, mud properties and operating parameters. Optional Rheological and cuttings transport models can be selected by the user. The program output shows the results of the hydraulics calculations at both beginning and ending depths, and in addition, the friction pressure models for both the bore and annulus.



Wellbore Integrity Solutions is ready for all your **well integrity** requirements.

Advanced Section Milling

ProMILL*

The ProMILL system combines multiple operations into a single trip to maximize operational efficiency, eradicate all leak paths and deliver a true rock-to-rock barrier, comprising of:

- A Taper Mill and Optional Bridge Plug
- A Section Mill
- A ProMILL Underreamer (PMUR)

The PMUR remains dormant during milling operations and is activated using a ball-drop mechanism. When activated, it provides a high opening expansion ratio. The section is underreamed, removing residual cement and formation. The targeted wellbore access is achieved, and the operation is concluded.

Milling Elements

Proprietary TruEdge* and WavEdge* milling elements are utilized across the family of WIS Well Abandonment & Slot Recovery Systems. (ProMILL, ProMILL Duo, ProMAXX, and ProLATCH)

TruEdge and WavEdge elements are the result of a detailed research project, that included materials science, chemistry, and geometry optimization. Full scale laboratory testing and an extensive field-testing campaign was successfully concluded prior to commercial release. These technologies offer durability, a high milling rate of penetration (ROP), superior hole cleaning qualities and the ability to perform dual and triple casing cuts in an efficient manner.

Both TruEdge and WavEdge milling elements have delivered record breaking performances since their introduction.



ProMILL Duo*

The ProMILL Duo provides an innovative efficient solution where the integrity of the abandonment zone requires the creation of a milled section in two casing sizes. Significant rig time and cost savings are realized in comparison to conventional solutions that require a long, inner string casing to be milled. The system comprises:

- A Taper Mill
- An Active Stabilization Module
- A High Expansion Ratio Section Mill
- A ProMILL Underreamer (PMUR)

The high expansion ratio of the ProMILL Duo Section Mill allows it to drift through the inner casing in the retracted state and upon actuation, open up to a larger diameter to mill the outer casing and the coupling. The active stabilization module optimizes the dynamic behavior and minimizes BHA vibration.

The enlargement of the borehole, to enable a rock-to-rock barrier is accomplished by using the PMUR.



A rock-to-rock barrier is enabled by using the ProMILL Underreamer (PMUR).



The extended reach section mill and hydraulic stabilizer provides an efficient milling system in dual casing abandonment applications.



Casing Cutting and Recovery

ProMAXX-Hydraulic Spear*

The ProMAXX-Hydraulic Spear is designed to maximize efficiency by reducing trips during cut and pull operations. It is activated hydraulically and has a wide catch range. Through rotation is enabled while engaged in the casing.

When combined with the ProMAXX-Pipe Cutter, the system provides a one trip solution for cutting, anchoring, and retrieving the casing without pulling to the surface to change tools.

The ProMAXX-Hydraulic Spear may be disengaged and re-engaged numerous times in the same run.

With flow through bore access, and a ball-drop activation mechanism, other operations such as cementing, cement plug dressing or bridge plug setting, can all be carried out before activating the ProMAXX- Hydraulic Spear.

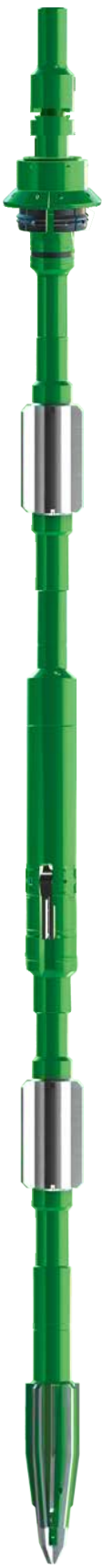
ProMAXX-Pipe Cutter*

The ProMAXX-Pipe Cutter is designed to cut single and multiple strings of pipe. It operates hydraulically, using a ball drop mechanism and pump pressure to actuate and allows full flow through its bore to the string below.

The flow through feature of the ProMAXX-Pipe Cutter enables other operations such as cementing, cement plug dressing or bridge plug setting before activating the pipe cutter. By combining multiple operations in a single trip, rig time, cost and emissions produced is reduced significantly.

The knives of the ProMAXX-Pipe Cutter are equipped with WIS proprietary TruEdge element technology and is fully stabilized. Multiple cuts can be made in the same trip.

Interchangeable Elements



ProLATCH*

The ProLATCH wellhead retrieval system simplifies mechanical abandonment operations. When a subsea well has been successfully isolated, the wellhead and guide base must be removed for site restoration. The compact ProLATCH system cuts and recovers the surface casing and the wellhead in a single trip.

When the ProLATCH spear is engaged, an overpull can be applied to enable cutting in tension. After the casing string(s) are cut the ProLATCH spear remains engaged to recover the surface casing and the wellhead.

PullMaster

The PullMaster hydraulic pulling tool provides a high downhole pulling load, up to 1.2M lbs, and is used to recover long intervals of casing in Well Abandonment and Slot Recovery operations. It can be reset and activated multiple times.

The ability to recover extended lengths of casing offers significant time savings when compared to casing milling operations.

The PullMaster system comprises a pull section, anchor section and a relief valve.

The pull section includes multiple piston assemblies that converts hydraulics pressure into pull load.

The anchor section has hydraulically activated slips that engage the casing ID to transmit the pulling load that is applied. A control valve permits slip release.

The relief valve provides a positive indication of the stroke position of the tool. Additional applications for the PullMaster include, pulling liners, packers, tubing, casing and other objects stuck in the wellbore, particularly on rigs with limited pulling or jarring capacity.



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For more wellbore intervention information:
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**THOMAS
TOOLS**