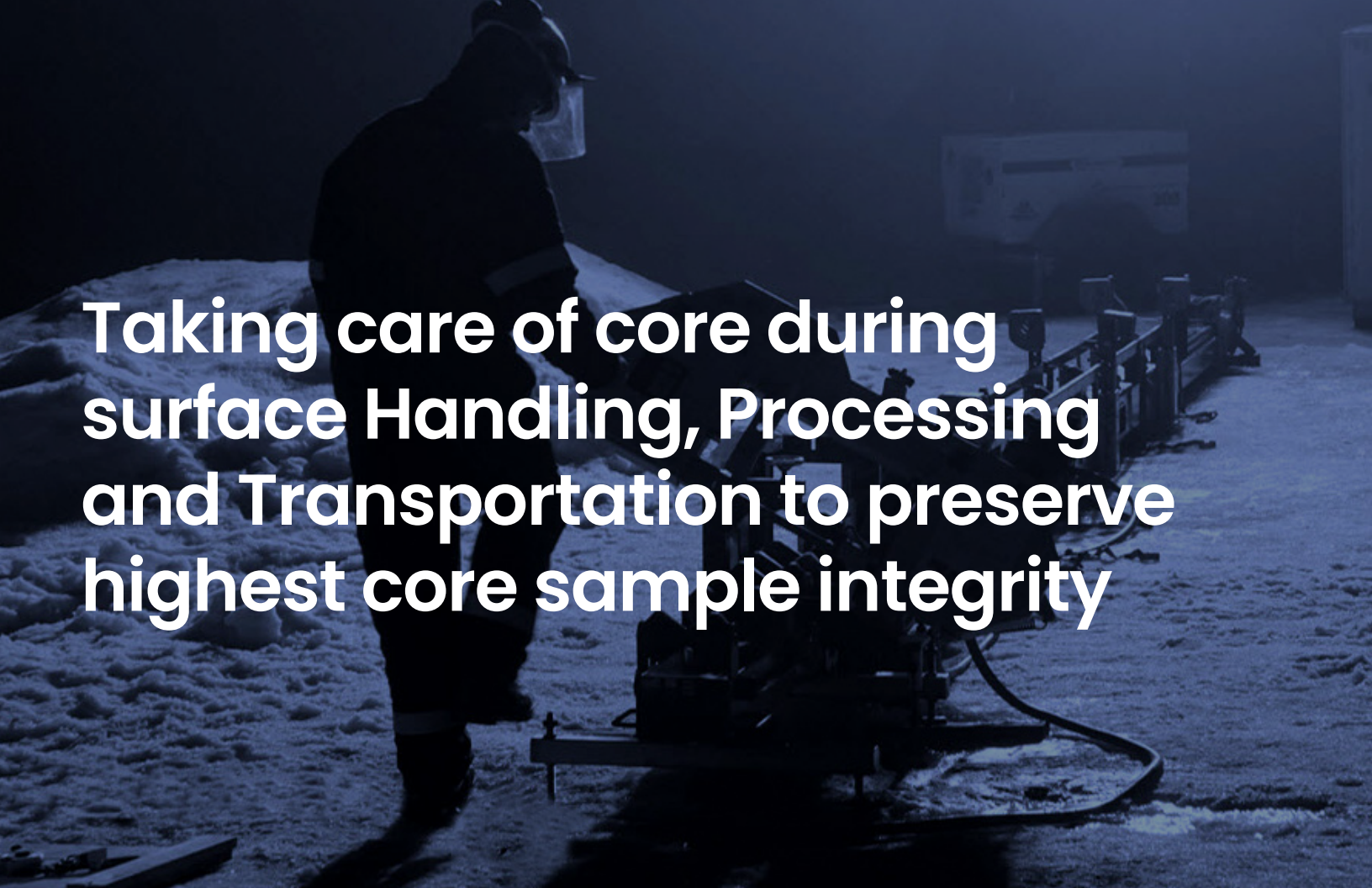


# CoreCare services

Surface Handling, processing,  
and transportation





# Taking care of core during surface Handling, Processing and Transportation to preserve highest core sample integrity

For geologists, petrophysicists, and reservoir engineers, a core is the DNA of a reservoir. Thorough knowledge of the reservoir DNA confirms formation characteristics, enabling engineers to fine-tune drilling and well placement operations to minimize risk and maximize the return on investment.

Like DNA, any alteration of the core sample can skew lab results, invalidating hours of rig time and injecting guesswork into the drilling process.

But just as the downhole-core-acquisition process is crucial to preserve core sample integrity, the processes and equipment used for surface wellsite handling, processing, and transportation are equally vital to the quality of the sample and the information that can be obtained for accurate reservoir analysis.

The **CoreCare™ Wellsite Handling and Processing Service** from Baker Hughes delivers the highest quality core during four key processes: Recovery, Laydown, On-Site Processing, and Transportation.

Baker Hughes commitment and focus to core quality and health, safety and environment (HSE) safeguards guided the design of equipment and processes. The service also features modular solutions that can be combined to satisfy varying customer needs and match different operational settings.

# Core recovery

Recovery operations can be performed in different ways, depending on the inner barrel assembly configuration. In all cases, Baker Hughes equipment delivers safe recovery of core sample. Core recovery operations require the inner barrel assembly to be laid out in 30-ft (9-m) lengths, and consequently, the core sample needs to be severed in the same sizes.

## Core splitter

The Baker Hughes specialized and modular core splitter uses hydraulic or mechanic (manual) force to push a severing blade, in a controlled and smooth fashion, through the formation sample (core), which is inside the inner barrel.

## Nonrotating inner tube stabilizers

For inner barrel assemblies, using inner barrel stabilization our nonrotating inner tube stabilizers (NRITS) are typically used. NRITS stabilize the inner assembly and reduce damage to the sample while coring downhole. On surface, during recovery operations, a special design eliminates the inner barrel rotation when breaking the stabilizer's connections (preventing torsional stress to core sample) to be

able to continue with severing of the core into sections before laydown.

The Baker Hughes core splitter works in conjunction with NRITS. When the special connection is screwed downward to expose a window and core sample, the core splitter's blade cleanly cuts the core in one cut. The two inner barrels are then easily separated without torsional damage. A cap-and-core cushion is added to the bottom of the freed inner tube to securely hold the 30-ft (9-m) core in place while being laid down for processing.

## Alignment bracket

For inner barrel assemblies with no inner barrel stabilization, the Baker Hughes alignment bracket is used in conjunction with the core splitter. The alignment bracket firmly holds both sections of the inner barrel connection while the aluminum inner barrel is being cut with a pipe cutter to expose the core. When the aluminum inner barrel is cut and core sample exposed, the core splitter is mounted to sever the sample for laydown.

## Pollution catch pan

During recovery operations, Baker Hughes recommends the use of a pollution catch pan, specifically designed to enable drilling mud spillage and drain coming from the

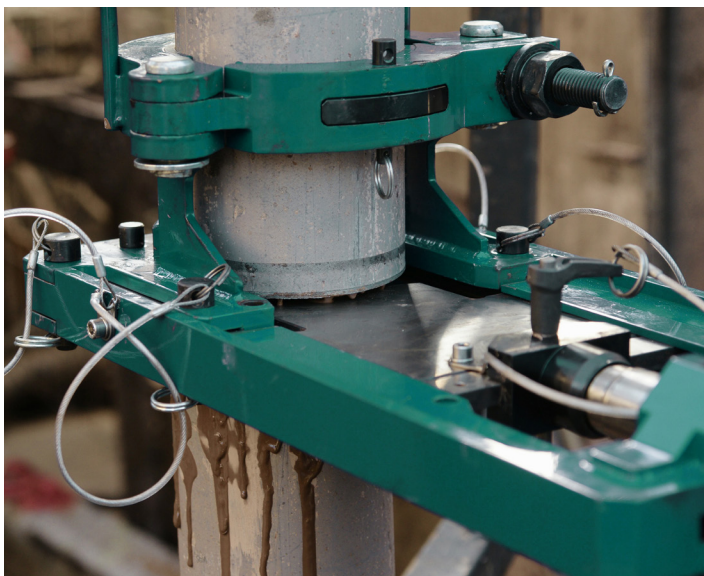
annulus between core sample and inner barrel to be properly disposed. The pollution catch pan can be quickly and easily installed.

## Outer tube recovery

The CoreCare service includes tools for the safe recovery of samples in rare and unexpected events, such as when the inner barrel or inner barrel's shoes become disconnected during operation downhole. The inner barrel would be pulled empty out of the outer barrel and the core sample would be left inside the outer barrel tubes. To be able to safely recover and lay down the core inside the outer barrels in this emergency situation, the core splitter system includes a specially designed adaptations for outer tube recovery.



Core recovery: Outer tube recovery kit



Core recovery: Core splitter



Core recovery: Pollution catch pan



# Core laydown

Immediately after recovering each 30-ft (9-m) lengths of core-filled inner barrels, the laydown operations take place. Baker Hughes offers two different tools to accommodate for different rig environments and customer needs: laydown frame and laydown shuttle.

The laydown equipment is primarily utilized to eliminate bending load on the core while moving the core-filled inner barrel from a free-hanging vertical position at the rig floor into a secured horizontal position in the designated processing area.

## Laydown frame

Designed to work in conjunction with other tools and handling processes and with stringent HSE safeguards, the Baker Hughes laydown frame is equipped with spring-loaded flaps across the entire length of the frame to automatically secure the inner barrel, eliminating the need of getting a man in the riding belt to secure the upper section of the inner barrel to the frame.

The modular approach enables the laydown frame to be used for additional tasks:

- **Core cutting operations.** Laydown frame can be connected to the Baker Hughes circular core saw with



the use of trunnions securely seated in the core saw's laydown frame bracket. The Baker Hughes band saw was also designed to work in conjunction with the laydown frame for one of its setups.

- **GammaTrak™ 3 wellsite core gamma logging unit.** The laydown frame has been designed to allow the GammaTrak 3 unit to be rolled over the inner barrel when it is located in the laydown frame in the core handling area or on the catwalk.
- **Workbench for preparing subsequent inner core barrel assemblies.** The working height and stability of the laydown frame provides a safe and rigid workspace for the coring personnel.

## Laydown shuttles

Shuttles satisfy varying customer's needs, such as working in small onshore rigs where space constraints and rig configuration makes the laydown shuttles a better fit.

# On-site core processing

Baker Hughes understands customer need to provide a more integrated offer for coring services by a single vendor and that is why we offer solutions for this important part of the coring service.

Just after the core-filled inner tube has been laid out at the processing area, Baker Hughes offers standard processes and equipment to perform the cutting of inner barrels into 3-ft (1-m) sections (or any length) per customer requirements, with the use of circular or band saws. We have the ability to perform all tasks needed before and after the cutting of inner barrels (cleaning, measuring, marking of inner barrels, labeling, fitting rubber end caps) in a standardized fashion so that our customers and core laboratory technicians can easily identify depths, orientation, and well information of every section cut.

Baker Hughes circular and band saw solutions are capable to cut all standard inner tube materials (aluminum, steel, and fiber glass) and sizes from 1-3/4 to 6 in. (4.4 to 15.2 cm). They were designed considering the highest HSE standards, to cut the core in a safe and controlled manner, while maintaining core quality.

## Circular core saw

Baker Hughes circular core saw, driven by a 15-hp air motor, is designed to perform a large number of cuts at the rig site efficiently. The reduced processing time is especially relevant in high-cost environments. Some of its main features are: height adjustable feet, capable of inclined cuts (to ease alignment of cut segments at the lab), DNV 2.7-1 certification (to ship the whole unit offshore without placing it into another transportation container),



Core laydown: Laydown frame



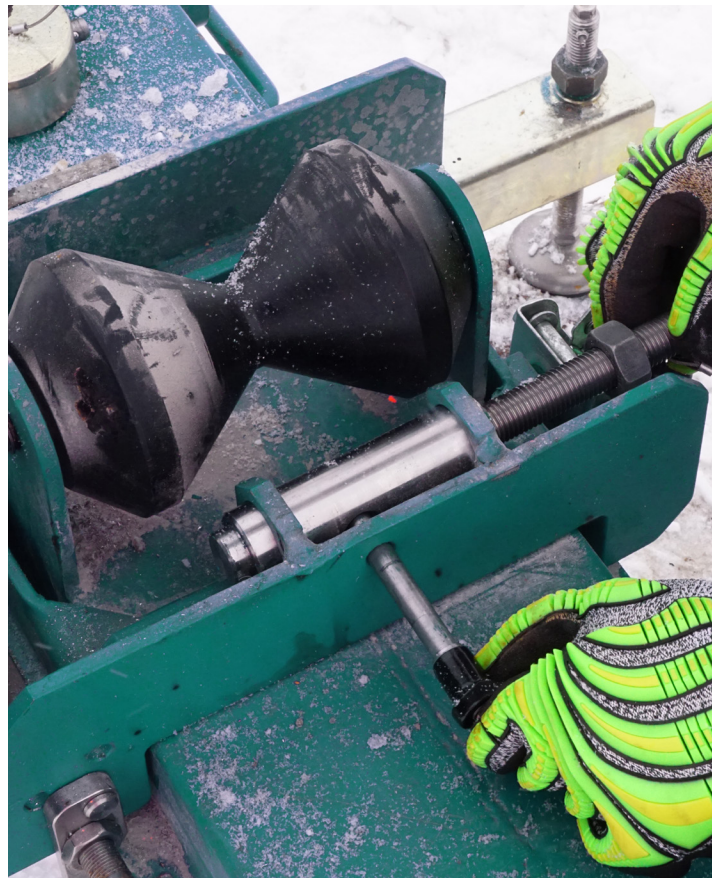
fully encapsulated blade, dust extraction system, and dead man switch.

The laydown frame can be connected to the circular saw, supplying the saw operator with a saw feeder that is easily aligned and secured to the core saw delivering a high performance, self-contained core cutting solution.

### **Band saw**

The Baker Hughes band saw is powered by an air motor and delivers smooth clean cuts during processing. Some of its main features are: height adjustable feet, capable to perform inclined cuts (to ease alignment of cut segments at the lab), different blade options to match different formations, emergency stop, and hands free operation of the saw.

Baker Hughes developed its band saw to work in conjunction with our laydown frame. The band saw can be easily mounted and secured to work over the laydown frame in order to reduce footprint space when needed. It can also be mounted over a single stand with rollers and connected to the laydown frame, or alternatively it can be used as a stand-alone setup with a series of stands with rollers to properly support the core-filled inner barrel while performing the cutting operations.



On-site core processing: Setting up the band saw



## Transportation

Based on the feedback from operators and laboratories, damage to full-diameter cores that results in loss of lab analysis accuracy is often traced back to poor handling of the core during transport. Baker Hughes CoreCare transportation equipment ensures that the quality of the core being retrieved at the surface is maintained during the handling and transportation from the field to the laboratory.

The transportation container is equipped with foam inserts customized for every inner barrel size to absorb shocks and prevent the core from moving during transport. It was design with high focus on HSE elements, enabling the user to load the core from the front of the container in a horizontal orientation (as opposed to from the top), which mitigates back safety issues by reducing the need to bend over. Additionally the typical large swinging doors have been replaced with roller ports to eliminate pinch points.

### CoreCare tracking service

The optional CoreCare tracking service provides a time-based record of vibrations, shocks, and temperature changes experienced during transportation. The tracking and recording system can either be attached to the transportation container or to a dummy core stored in the container.

Proper handling of the core at the wellsite is as critical as its acquisition and must be planned with the goals of the evaluation program in mind. A core that is damaged by inappropriate handling techniques, exposed to air, or otherwise contaminated by external materials can become useless for evaluation. Experienced Baker Hughes wellsite coring experts are solidly trained in the surface handling and processing of cores for immediate evaluation or shipment for off-site analysis.

For more information on how our CoreCare services can help you ensure pristine core samples, contact your Baker Hughes representative today.



Transportation: CoreCare transportation equipment

