Waste Management Solutions and Services

**Challenge**
As environmental regulations continue to tighten around the globe, operators are faced with the challenge of balancing environmental impact with fluid performance. Waste Management is a fundamental component to addressing this challenge. It is important to recognize the impact of various pieces within the Waste Management system and the interdependencies of fluids, equipment, and services. The most effective Waste Management solutions and services set out to address multiple factors, including strict environmental regulations, waste treatment logistics and expenses, drilling efficiency and performance, and remote locations with infrastructure limitations.

**Overview**
Every well has unique requirements. Standard, off-the-shelf equipment solutions often miss opportunities to maximize efficiencies or performance. Halliburton Baroid offers a range of customized solutions and services to help improve and streamline waste management systems. Baroid is committed to providing innovative and integrated solutions, leveraging a broad portfolio of capabilities, to help operators extend environmental leadership, optimize drilling performance and reduce overall costs.

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<th>Capability</th>
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<td>BaraSphere&lt;sup&gt;SM&lt;/sup&gt; Service</td>
<td>Comprehensive fluids and waste management planning and engineering service designed for optimum drilling performance, operational efficiency, and environmental leadership</td>
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<tr>
<td>BaraSolve&lt;sup&gt;SM&lt;/sup&gt; Service</td>
<td>Engineered solids control and waste management service targeted for improved efficiency and environmental compliance</td>
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<td>Solids Control Equipment and Services</td>
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**BaraSphere™ Service**

Baroid’s holistic approach to fluids and waste management begins before you turn on any equipment. The BaraSphere™ service is our all-encompassing solution to analyze and support the entire operation from start to finish. We help engineer and deploy the right fluids, technologies, infrastructure, and services to deliver the most efficient project solution available. We customize our substantial portfolio of drilling fluids along with our extensive solids control and waste management options to optimize every aspect of your drilling operation. Improvements gained with our BaraSphere™ service can help increase drilling efficiencies, establish environmental leadership, and reduce your total cost of ownership.

**BaraSolve™ Service**

Solids control and waste management solutions bring the most benefits when engineered together. BaraSolve™ services can help identify efficiency or environmental gaps in your waste stream and adjust your operations to address specific challenges. From site surveys to rig audits, feasibility studies to equipment installation, we can help ensure that your solids control and waste management systems are designed and delivered correctly from the start. BaraSolve™ services are tailored for each individual project to improve efficiencies and ensure environmental compliance.

**Solids Control Equipment and Services**

We pride ourselves on our independence. At Baroid, we are not tied to a specific equipment manufacturer. Instead, we focus on collaborating with each customer to identify and deliver the right solution to optimize solids control systems and maximize fluid performance. This flexibility allows us to offer a wide selection of traditional solids control equipment such as shakers, screens, and centrifuges. For operations looking for greater efficiencies or performance, we can also supply a number of Baroid-specific technologies, including:

- **BaraMesh™ Shaker screens** – for longer screen life and reduced plugging
- **Fully-automated centrifuges** – for improved barite recovery and reduced HSE risk

**Waste Handling and Transport**

Waste handling and transport brings a unique set of economic, environmental, and safety considerations to each project. We carefully plan every solution according to local conditions to ensure sustainability, maximize drilling efficiency, and meet or exceed safety and environmental regulations. We can deploy standard solutions including augers and screw-type conveyance, skip & ship, and skip & truck services for traditional operations. We can further optimize waste handling and transport with advanced solutions incorporating unique and customized designs.

- **BaraStream™ SV400** – pneumatic conveyance for reduced HSE risk and no exposure to rotating equipment
- **BaraStream™ HCB Tanks** – high-capacity, modular cuttings storage for reduced crane lifts
- **BaraStream™ CTT Tanks** – high-capacity storage tanks (up to 16 per boat) used in conjunction with HCB tanks for reduced crane lifts and environmental liability with fewer opportunities for spills
Waste Treatment and Disposal
Baroid follows industry-leading processes to address safety, environmental, and economic impacts to design and deploy the best waste treatment and disposal solution for every well. Our goals are consistent for each project: maximum fluid recovery and minimal environmental impact. Composting, landfill, and solids stabilization options can be used in a variety of situations, however we bring additional value when we incorporate our more advanced treatment and disposal solutions. Zero discharge, offshore discharge, and environmentally-sensitive locations greatly benefit from our customized solutions that leverage the latest Baroid technologies, such as:

- **BaraG-Force™ Cuttings Dryers** – Vertical cuttings dryers for reducing retained oil-on-cuttings (ROC) and potential discharge in select locations (<6.9% ROC)
- **BaraG-Force™ Mobile VCD** – Mobile vertical cuttings dryer for remote locations and multi-rig projects
- **BaraPhase™ TCC** – Offshore thermomechanical cuttings cleaner for reduced waste transportation liability and potential discharge with <1% ROC
- **BaraPhase™ TDU** – Land-based thermal desorption unit for reduced waste transportation liability and potential discharge with <1% ROC
- **BaraCRI™** - Comprehensive cuttings reinjection service for zero discharge locations
- **BaraH₂O™ Slop Units** – Offshore slop treatment for up to 95% reduction in slop waste sent to shore
- **BaraH₂O™ Dewatering Units** – Advanced dewatering unit for reduced waste transportation liability with up to 90% waste water recovery and potential re-use of base fluid from water-based mud systems

Filtration Services
Clean fluids are critical to enable successful completions and workovers. Baroid filtration services can help identify and apply targeted solutions to clean the wellbore of contaminants and prevent particles from blocking pores in the formation. Traditional options such as dual-cartridge filtration units and filter presses can help prepare wells for production. BaraClear™ Filtration Services can customize advanced solutions for technically challenging wells and low-permeability formations to help ensure maximum filtration and minimum formation plugging.

- **BaraClear™ Hi-Flow Filtration Unit** – high-flow (up to 32+ bbl/hr) filtration unit for improved flow rates in deep water reservoirs
- **BaraClear™ Oil & Grease Monitoring service** – targeted oil & grease removal with unique additives and monitoring

Benefits
Baroid’s comprehensive suite of Waste Management solutions and services has been developed to provide truly impactful benefits. By focusing on a collaborative approach and a process-driven solution design, we are able to deliver solutions that help demonstrate environmental leadership, optimize drilling performance, lower waste volumes, reduce waste transportation liability, and ultimately reduce overall project costs.

The Baroid Advantage
With more than 30 years of engineering waste management solutions for the upstream E&P industry, we are one of the industry’s most experienced service providers. What makes us different and gives us the edge can be categorized in three ways:

- **Engineered and Customized Waste Management Solutions.** We are not a one size fits all solids control equipment provider. We engineer and commission waste management solutions according to your specific operational needs.
- **Mainstay Process.** Our processes are interlinked, working together to ensure consistent and reliable delivery of customized solutions around the world.
- **Innovation and Expertise.** Our trained personnel take a collaborative approach and leverage unique processes to bring together your needs and knowledge with our ability to plan, execute and refine the solution.

The bottom line: by staying true to our identity, you can be assured that we engineer and deploy waste management solutions that meet or exceed your performance and environmental standards, and your expectations, every time.