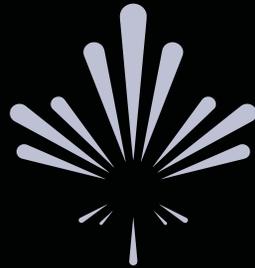


EnerSEAL HDD

MMH TECHNOLOGY

NEXT GENERATION



AES DRILLING FLUIDS





AES DRILLING FLUIDS

EnerSEAL HDD[†] MMH Technology

Description

EnerSEAL HDD is an advanced mixed metal hydroxide (MMH) water-base drilling fluid optimized for horizontal directional drilling. EnerSEAL HDD features superior stability and performance over previous systems. Using a proprietary chemistry, EnerSEAL HDD delivers challenging crossings where MMH technology performs but old systems could not deliver.

EnerSEAL HDD provides ideal flow properties for HDD applications: superior cuttings suspension, low pump pressures, a unique ability for the fluid to dramatically reduce formation losses, reduced torque and drag, and lower waste volumes.

DESCRIPTION

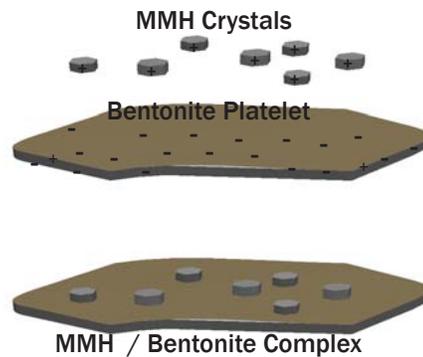
- Robust mixed metal hydroxide system designed for HDD applications
- Simple to mix and maintain on basic HDD rig systems
- Ideal shear thinning properties enhance hole cleaning

BENEFITS

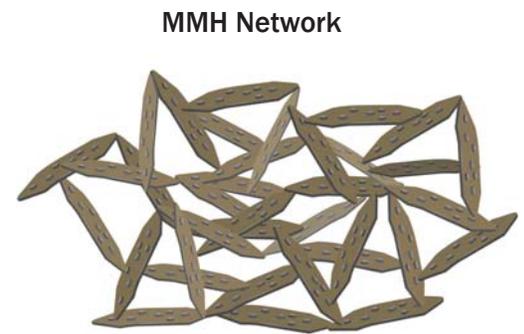
- Superior cuttings suspension
- Reduced water usage and waste generation
- Minimizes risk of environmental release
- Key additives feature NSF Certification

APPLICATIONS

- Challenging and large diameter HDD crossings
- Critical projects sensitive to waste generation and environmental impact
- Difficult formations with risk of losses or instability, such as unconsolidated sands



MMH crystals attach to the bentonite platelets by ionic exchange in which the naturally occurring cations on bentonite are exchanged with MMH. This forms a strong association on the face of the clay platelets.



The MMH complex entangles a network of clay platelets. The electrostatic charge maintaining the network readily breaks with shear. This is what provides the unique rheological properties of EnerSEAL HDD.



The robust nature of EnerSEAL HDD maintains its special properties as contaminants are encountered while drilling. Some compounds, such as those of an anionic nature, disrupt the MMH network, resulting in sudden and dramatic loss of properties such as viscosity. EnerSEAL HDD is built to tolerate common debris, allowing the system to perform where other systems fail. One system achieves all of these properties - without the use of harsh chemistry.

The unique rheology complements solids control equipment for efficient solids separation and minimal dilution. The shear-thinning nature of EnerSEAL HDD minimizes waste. As solids control equipment exerts high shear conditions, EnerSEAL HDD releases entrained solids for improved separation. Removal of this material reduces dilution requirements relative to conventional fluids, lowering disposal and transportation costs.

Applications

The AES Drilling Fluids team provides full service planning and rigsite execution to address the most challenging crossings. Monitoring and maintenance programs are designed to insure optimal fluid properties and mitigate the effects of unplanned events. EnerSEAL HDD is suited for almost any application, offering significant time savings through improved drilling efficiency and cost savings through reduced transportation of materials.

EnerSEAL HDD offers superior hole cleaning compared to conventional systems, making it an ideal candidate for large diameter crossings. A clean wellbore reduces drag and eliminates the need for added cleanout runs. In challenging crossings prone to inadvertent environmental release, EnerSEAL HDD acts as a loss prevention fluid as it thickens when it enters areas of low shear. This thickening effect limits fluid propagation into the formation, dramatically lowering the risk and rate of losses.



Performance

EnerSEAL HDD continues to enhance horizontal directional drilling programs, from the drilling and reaming processes to waste reduction and fluid reuse. Clients cite eliminated trips and reaming using EnerSEAL HDD as a direct contributor to eliminating days ahead of plan. The flexibility of the system enables quick adjustment to fluid properties if hole conditions dictate further optimization.

In a river crossing application, a customer was unable to drill an initial pilot hole and drilled a second pilot hole with no returns drilling a nearby offset well. Using EnerSEAL HDD the new well was drilled 8 days ahead of schedule in a single trip with 71% less waste volume versus plan.

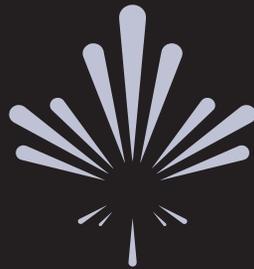
8 Days Saved

From 28 Day Plan

71% Less Waste

1480 bbl Versus
4375 bbl Planned





AES DRILLING FLUIDS

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