

Case Study



Clean Harbors Surface Rentals: Performance Profiles

Canada: Clean Harbors' closed-loop dewatering site reduces costs and minimizes impact in a remote drilling environment.

BACKGROUND:

Location: Alberta, Canada

Well Type: SAGD

Products/Services Used:

- High G Shakers
- Vacuum Trucks
- Centrifuges
- Generators
- Fluid Processing and Storage Tanks

In drilling operations, many operators are turning to closed-loop dewatering systems to eliminate the practice of using reserve pits for their drilling mud and fluids disposal. These closed-loop dewatering systems use screen shakers, centrifuges and storage tanks to separate liquids and solids, a process that increases drilling mud use while segregating the cuttings that require disposal. The benefits of using closed-loop dewatering systems include:

- Eliminate the cost, complexity and liability of building reserve pits
- Minimize surface disturbances
- Reduce the cost and safety risks of deploying heavy earth-moving equipment
- Remove the environmental risk of storing materials onsite
- Decrease water and drilling mud additive use
- Provide environmental and public relations benefits to nearby communities

Clean Harbors has been designing and deploying closed-loop dewatering systems for 20 years. In addition to the benefits of the system listed above, our approach:

- Increases drilling mud capture for reuse
- Reduces the need for solidifiers, some of which require hazardous materials handling procedures
- Significantly decreases total waste volumes, transportation and disposal costs
- Reduces manpower
- Saves money through reduced site remediation costs

SITUATION:

A customer's drilling delineation program in the Fort McMurray area was in a remote location that made trucking and offsite drilling mud disposal impractical. Clean Harbors was contracted to design, construct and operate a central dewatering plant that would meet two objectives: 1) provide cost savings for disposal; and 2) deliver drilling mud recycling capabilities that decreased environmental impact.

RESPONSE:

Clean Harbors Surface Rentals designed a dewatering plant that included the following components:

- **Mud handling and processing capabilities:** The site was constructed to handle two different types of mud – gel and polymer. The gel mud from surface-hole drilling was stripped back to water and conditioned. The polymer-based mud from main-hole drilling was de-weighted and reconditioned. The plan's design also included:

- An inlet shaker tank specifically built for unloading mud. The tank had two separate compartments and a 600 BBL (95 m^3) capacity. Sitting on top of the tank were four high G shakers, which allowed for the mud being off loaded to be prescreened for contaminants that could potentially cause equipment damage. The tank design also provided the option to re-circulate the fluid over the shakers to further reduce solids percentages prior to the dewatering and mud conditioning process.
- A centrifuge processing tank. This premix tank paired a midsized ($0.8 \text{ m}^3/\text{min}$) variable speed centrifuge with a big bowl ($1.4 \text{ m}^3/\text{min}$) centrifuge on an elevated stand. The tank had four components that held 450 BBL (71 m^3) of fluid and also had a built-in polymer injection system. It had the capability of processing two separate mud types at the same time.

- **Prefabricated structure:** The two tanks were fitted with prefabricated structures for winter use. The enclosures kept employees out of the elements and made working conditions more favorable, helping morale and minimizing the potential for weather-related incidents. An elevated walkway connected the processing unit to the shaker inlet tank and allowed the technicians to move freely between the tanks without extensive use of stairs, resulting in safer and more productive work area. Heated by roughneck steam heaters, the equipment ran more efficiently and smoothly, resulting in less downtime and fewer shaker screen replacements. This delivered cost savings for both the customer and Clean Harbors.
- **Drilling fluid collection:** Clean Harbors vacuum trucks collected drilling fluids at the drilling sites for delivery to the dewatering plant. The tank configuration gave Clean Harbors the capability of unloading four vacuum trucks simultaneously, which minimized delays or wait time.

The plant was operated by experienced senior solids control technicians who had attended a drilling mud school to gain superior knowledge on the different types of drilling mud and their properties. This allowed Clean Harbors to work hand-in-hand with the mud company personnel to control chemical consumption and maintain a quality product.

Clean Harbors' preventative maintenance program, coupled with the versatility of the equipment and the technicians' knowledge, enabled the dewatering plant to receive and export fluid during the three month project period without an interruption.



The tank layout gave Clean Harbors the capability to unload four vac trucks at a time with little delay or wait time.



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RESULTS:

- **Increased water recovery and drilling mud recapture:** During its three months of operation, the Clean Harbors dewatering plant received 35,627 BBLs (5,664 m³) of surface mud, exported 26,675 BBLs (4,241 m³) of strip water and recovered 75% of the water. Total main-hole polymer mud received was 43,451 BBLs (6,908 m³) with 32,815 BBLs (5,217 m³) of polished polymer mud exported. This resulted in a total volume of drilling mud received at 79,078 BBLs (12,572 m³). While these were significant volumes, the site could have handled more drilling mud during the course of the project – up to 3,145 BBLs (500 m³) of drilling mud per day. Over the 90-day period, the Clean Harbors dewatering plant could have processed 283,050 BBLs (45,000 m³).
- **Reduced mud processing/reclamation costs:** The onsite location, continuous operation and recycling efficiency of the Clean Harbors central strip site reduced corehole delineation costs and allowed the customer to complete their project within budget. The dewatering operations also eliminated the need for reserve pits for waste drilling mud, which resulted in the reduction of mud-processing/reclamation costs by half.
- **No negative environmental impact or recordable incidents:** Clean Harbors completed the central strip site operation without any negative environmental impact. Additionally, there was not a recordable incident at the site over the course of the 90-day project.

