FluidControl Uses Hot Oil Thermal Desorption Unit to Clean Cuttings and Recover Base Oil in Shale Gas Drilling Operation in China

Challenges

- Efficiently process oil-based cuttings with minimal downtime at centralized site servicing drilling rigs in remote mountainous location near Chongqing, China.
- Transport equipment through extreme geographic conditions allowing for use of medium sized trucks only.

Well Information

- Location: Fuling, Chongqing District, China
- Operator: Chinese Major

Solution & Results

- Mobilization of a fully skid mounted hot oil thermal unit transported by truck into the mountains
- 24/7 operation to keep up with timeline
- Equipment operating efficiency above 90% on average
- Reuse of recovered diesel base oil in mud system and for the process burner, reducing the need of hauling diesel to the site
- Reduction of waste volumes and associated transportation costs and risks
- Final water treatment for rehydrating the solids after treatment thus reusing all excess water from the cuttings
- Treated solids with less than 1 % oil on cuttings to be disposed in engineered landfill site

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In the third quarter of 2014, National Oilwell Varco was invited to bid on a package for thermal treatment of future diesel-based mud cuttings from remote locations for a shale gas drilling operator in China. The equipment was to be installed on a central treatment facility—designed and operated by the contractor—with large scale and state of art cuttings storage tanks during the contract period. The drilled diesel cuttings were collected in the in-ground pits, handled by portal crane with bucket and covered against heavy rainfall in the area. The equipment and services offered were based on NOV's expertise as the largest Original Equipment Manufacturer (OEM) of thermal treatment systems with more than 25 years of manufacturing and operational experience.

The package included:

- Collection of cuttings from cuttings pit and operation of skid mounted Thermal Treatment Unit including collection and storage of recovered oil and water
- Recovery of valuable base oil for reuse in the drilling mud
- Associated tankage and pipework, gantry crane and ancillary equipment to complete the collection and storage processes
- Mobilization of the complete treatment site

The NOV Soil Recovery A/S Model 500 Hot Oil Thermal Desorption Unit (HTDU) was initially installed in the second quarter of 2015. The mobile HTDU plant has a capacity of up to 2.5 MT/h input, with the average being 1.5 to 2.0 MT/h depending primarily on the water content of the cuttings. The HTDU can treat all oil-based mud and synthetic-based mud cuttings.

Thermal treatment is a continuous process, requiring instantaneous loading from the pit and even in-feed by portal crane (or alternatively excavator). The plant itself is fully automated, and comprehensive production data is filed and reported. Given the remote location and formidable terrain, minimizing waste volumes and decreasing the need for haul off have been high priorities for the operator. The efficiency of the HTDU has effectively accomplished this and drastically reduced the expenses of waste transportation as well as the associated risks. The recovered base oil is returned to the mud company and the recovered water is sprayed over the cleaned solids which are disposed to local landfills.

The energy provided to the whole operation (including generator consumption) was less than 40 liters of diesel per metric ton of cuttings treated.

The complete package is built into standard container sized loads to facilitate mobilization, site installation and operation.