

Case History

Baroid Industrial Drilling Products



N-SEAL™ pill seals loss zone in flooded R/C drilled shaft

Location: Queensland, Australia



Project Scope

The 300 Mains Deep Shaft project was considered a very difficult shaft sinking project due to the high potential for hole collapse and loss of circulation in the region's unconsolidated formation (sand, weathered basalt). In light of these risks, the operator chose to drill using the flooded annular reverse circulation (RC) technique to help provide bore hole support. The decision to use this technique raised concerns about the ability of a water-based drilling fluid to stabilize the water-sensitive shale/clay and sand for weeks or possibly months until the steel casing was grouted into the first 76 meters of the hole. The cased section would have a diameter of 3.8 meters and the remaining 144 meters (220m TD) would have a diameter of 3.2 meters.

Baroid IDP Solution

To suit to the flooded annular RC technique, a low viscosity fluid was programmed which would provide all the necessary clay stabilization, filtration control and cuttings settling in 2 x 600 cubic meter settling pits.

The customized drilling fluid included the following product amounts per 1000 liters of make-up water: Soda Ash alkalinity agent (0.5 kg)/AQUAGEL® viscosifier (15 kg) / BDF™-437 fluid loss agent (0.5 kg) / EZ-MUD® GOLD clay and shale stabilizer (0.5 kg)

pH: 9.5 Specific Gravity: 1.02-1.05 Viscosity: 32-35 sec/liter Filtration Rate: 10-15 cc/30 minutes

N-SEAL™ lost circulation material (LCM) was programmed for regular sweeps to prevent hole damage before fractures became a problem, however the contractor wanted to measure the effectiveness of the product once a problem was encountered rather than possibly perform unnecessary sweeps. In the upper hole section, around 20m depth, significant loss of circulating fluid occurred in weathered basalt. This was identified by the lowering of pit levels and a rapid drop in the standing fluid level when circulation ceased. At this time a 14,000 liter N-SEAL pill was prepared by adding 1 sack of N-SEAL LCM (13.6 kg) per 1000 liters to the existing mud system and quickly applying it to the annulus. No losses were recorded when circulation recommenced after applying the N-SEAL pill.

Economic Value Created for Customer

Using the customized water-based fluid the hole was successfully drilled and cased to 76 meters with no collapse and little fluid loss once the lost circulation zone at 20m was sealed with N-SEAL LCM. Casing was lowered to bottom over 2 days with the rate of penetration slowing only in hard rock and plastic clay. Operator savings are estimated at \$200, 000 AUD.

N-SEAL™ lost circulation material can be purchased through any Baroid Industrial Drilling Products Retailer. To locate the Baroid IDP retailer nearest you contact the Customer Service Department in Houston or your area IDP Sales Representative.



Customer Service: 800-735-6075 Toll Free
Technical Service: 877-379-7412 Toll Free

www.baroididp.com