ENTERED

Kulis, Jerzy, NMENV

From: Kulis, Jerzy, NMENV
Sent: Monday, May 17, 2010 1:06 PM
To: 'Everett, Mark C'; Cobrain, Dave, NMENV; Dale, Michael, NMENV
Cc: Mignardot, Edward R Jr; Shen, Hai; Ball, Theodore T; Lynnes, Kathryn D
Subject: RE: R-3 drilling: need for drilling mud

Mark,

NMED approves the use of a drilling mud with clay inhibitors in drilling of the R-3 borehole as described in your e-mail of May 17, 2010, 12:16 PM, with the following condition:

> LANL must collect a sample of the cleanup water at the completion of the drilling fluids cleanup phase, before continuing with the previously approved modified reverse-circulation with casing-advance using recirculated municipal and formation water, and analyze the collected sample for TOC, sodium, potassium, chloride, sulfate, nitrate (as N), alkalinity (HCO3+CO3 as CaCO3), phosphate (as P), and ammonia (as N) in order to assess the need for additional cleanup of residual drilling fluids during well development. LANL must submit to NMED the analytical results for the cleanup water sample as soon as they become available.

Please let me know if you have any questions.

Thanks,
Jerzy Kulis
Environmental Scientist
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, NM 87505-6303
Phone: 505-476-6039
Fax: 505-476-6030

From: Everett, Mark C [mailto:meverett@lanl.gov]
Sent: Monday, May 17, 2010 12:16 PM
To: Everett, Mark C; Kulis, Jerzy, NMENV; Cobrain, Dave, NMENV; Dale, Michael, NMENV
Cc: Mignardot, Edward R Jr; Shen, Hai; Ball, Theodore T; Lynnes, Kathryn D
Subject: RE: R-3 drilling: need for drilling mud

All,

In my previous e-mail I incorrectly stated the total depth for R-3 as **110** feet. The correct target depth is **1,100** feet. I have made the change below (highlighted in yellow). My apologies for the error.

Mark Everett, PG
Drilling Project Technical Lead
EP-WSP
LANL
(505) 667-5931 (office)
(505) 231-6002 (mobile)

From: Everett, Mark C
Sent: Monday, May 17, 2010 11:46 AM
To: 'Kulis, Jerzy, NMENV'; 'Cobrain, Dave, NMENV'; 'Dale, Michael, NMENV'

33608

Cc: Mignardot, Edward R Jr; Shen, Hai; Ball, Theodore T; Lynnes, Kathryn D
Subject: R-3 drilling: need for drilling mud

Jerzy,

BACKGROUND

The LANL drilling team is unable to get through the clay (617-744 feet?) near the top of the regional aquifer at R-3. They drilled a 17 inch open hole from the base of the 18 inch casing at 627 feet to 744 feet in continuous clay and then tried to advance 12 inch casing. The 12 inch casing began to stick about 20 feet (648 feet bgs) into the open hole. This is likely due to swelling of the hydrated clay.

During the time they were working to get the 12 inch casing into the hole and through the clay a range of water levels were measured. The predicted top of the aquifer is 647 feet and the field crew measured top of groundwater from 430 to 630 feet. The current interpretation is that a combination of the swelling clay, the drill casing, and difficulties getting the tagline downhole are contributing to this uncertainty.

PROPOSAL

To preserve the final two strings of casing (10 inch and 12 inch), the drillers would like to get the 16 inch casing to the bottom of the clay. To accomplish this they will need to drill flooded reverse using a drilling mud with clay inhibitors. The proposed drilling fluid is as follows:

- Soda ash - 2 lb/100 gal
- QUIK-GEL - 30 lb/100 gal
- QUIK-TROL - 1 lb/100 gal
- QUIK-TROL LV - 2 lb/100 gal
- EZ-MUD GOLD - as needed (2 lb/100 gal)
- KCl (potash) - 40 lb /100gal

The expected drilling fluid properties will be the following.

- Marsh Funnel Viscosity: ~ 35-40 sec/qt
- Filtrate loss: ~11-13 cc
- Cl concentration: ~20,000 ppm

Once the 16 inch casing is advanced to the bottom of the clay it will be landed and the hole will be flushed of drilling fluids. Additionally, the hole will be treated with Aqua-Clear PFD followed by sodium hypochlorite to remove as much residual drilling fluid as possible. Both MSDS and product data sheets for all proposed products are available at http://www.baroididp.com/ From the bottom of the 16 inch to the total anticipated depth of 1.100 feet the drilling method will be the previously approved flooded-reverse with casing-advance using recirculated municipal and formation water.

Please respond to this e-mail with your approval or any questions or comments.

Thanks,

Mark Everett, PG
Drilling Project Technical Lead
EP-WSP
LANL

(505) 667-5931 (office)
(505) 231-6002 (mobile)