Mogi 9 1H Rathole Data

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

RCVD 11/5/13

JXN UNIT 15H
RPLCMNT PGS

SEE IF IN SCANNED COPY

R. T. Hicks Consultants, Ltd.

901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745

February 28, 2013
Revised November 1, 2013

Murchison Oil and Gas, Mogi 9 State Com 1H Rat Hole Evaluation and Brinninstool 4 State 3H Observations

The Mogi 9 State Com #1H well site has an elevation of 3606 and located 1 mile due south of the Brinninstool 4 State 3H site. The Brinninstool 4 State 3H site is 30 feet higher, with an elevation of 3636.3. The Mogi 9 State Com #1H rat hole location is:

- Lower in elevation than the Brinninstool well site,
- Closer to the center of the Bell Lake depression area
- Closer to the closed topographic contour that defines the edge of the ancient collapse feature

Within the eastern portion of the Bell Lake Sink shallow (Ogallala or Alluvium) groundwater is known to be present at an elevation of 3,566 feet (see Table 1 and Figure 1 in the C-144 application). In the western portion of the Sink, groundwater is likely deeper, as the surface elevation of Bell Lake is about 3565 and the lake is dry. Based on this information it is expected that the shallow groundwater, if present at the Brinninstool 4 State 3H site would be approximately 50 to 70 feet below the surface.

On February 27, 2013 Dale Littlejohn witnessed the drilling of the rat hole at the Mogi 9 #1H site. Ready Drill LLC of Monahans, Texas performed the work using a track-mounted 30-inch auger drilling rig as shown in the adjacent photograph.

Mr. Littlejohn arrived at the site at 10:30 am and found the operations shut down (waiting on fuel for the drilling rig) with the auger in the hole at a depth of approximately 70 feet. This provided an excellent opportunity to check for any groundwater that may have accumulated in the bottom of the while the drilling rig was not operational.

At 11:25 am the rig had been re-fueled and the bottom 1 foot was cut, removed, and inspected for possible moisture. The photograph from the 70 to 71-foot depth interval (shown to the right) demonstrates that the soil cuttings were completely dry. Also, a mirror was used to reflect sunlight in to the boring in order to inspect the walls and bottom. There were no indications of water seeps in the walls or an accumulation of water at the total depth.

Over the next 2.5 hours the boring was advanced to a total depth of 120 feet by removing approximately 1 to 1.5 feet of material per trip into the hole. Mr. Littlejohn carefully inspected each auger for the appearance of moisture in the soil prior to it being spun off

and removed from the drilling pad. Had the slightest indication of moisture been identified in the soil, the operation would have been suspended to allow for the accumulation of measurable water.

The photograph to the left was taken from the soil recovered at a depth of 98 feet as it is being spun from the auger. This photograph demonstrates the lack of moisture in the cuttings. It is believed that any potential moisture from the bottom or walls of the boring would have been easily identified during the drilling process as each trip into the hole should contact wet soil if it is present at any depth.

During the drilling operations, soil samples were collected and described as shown on the adjacent log. Based on the evaluation of the cuttings it appears that the Ogallala (or alluvium) is present at least seven feet above the Bell Lake well groundwater elevation. The top of the Triassic is identified by the hard purple shale at a depth of 33 feet and extends to the total depth of the boring.

Photo	Lithologic Description
	**0 - 12 Ft:** CALICHE with some sand.
	12 - 33 Ft: SAND, Light brown to pinkish brown, fine grained, poorly sorted.
	33 - 37 Ft: SHALE, Dark purple, hard, friable.
	37 - 39 Ft: SANDSTONE, Gray, fine grain, very hard drilling,
	39 - 94 Ft: SILTY SHALE, Grayish brown, interbedded with gray siltstone, and very fine grain sand.
	94 - 112 Ft: SHALE, Gray, friable, interbedded with grayish brown silty shale.
	112 - 120 Ft: SHALE, Dark reddish brown, friable, platty.

In light of the geology observed from the rat hole samples and the absence of any detectable moisture throughout the drilling operation, it was determined that the additional costs associated with suspending the installation of the conductor pipe for 24 to 72 hours in order to allow the accumulation of potential groundwater was not justified at this site. Had any moisture been observed during drilling, or had porous rocks been present below the groundwater elevation observed in Bell Lake water wells, the installation of conductor pipe would have been suspended.

On April 2, 2013, Randall Hicks and Kristin Pope examined the cuttings from the Brinninstool 3H conductor pipe auger boring. Because the pit lining was occurring at the same time, we could not catch the auger rig while drilling, thus there are no photographs. The drillers reserved samples from the auger boring at 5-foot intervals. Our examination documented that the cuttings to 120 feet were dust/dry. There is no evidence of groundwater as defined by New Mexico Rules/Regulations from ground surface to a depth of 120 feet at the Brinninstool 4 State 3H location.