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Mr. Philip Egidi
Environmental Protection Specialist
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Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Subject: Additional actions to characterize groundwater at the Piñon Ridge Uranium Mill site

Dear Phil:

This letter provides an update of the groundwater characterization activities at the Energy Fuels Resources (EFR) Piñon Ridge site through this date, a summary of the hydrogeologic setting as we now understand it, and our plan for additional activities to complete the characterization.

Original Groundwater Characterization Program

As you will recall, the original groundwater characterization program consisted of six monitoring wells located around the future mill and tailings area in a roughly oval pattern. Since little was known at that time about the subsurface geology or groundwater, this pattern was intended to characterize the depth to water, gradient, and background water quality. Of those six wells, two (MW-5 and MW-6, both at the south end of the site) encountered water within 600 feet of the ground surface. The other four bottomed in the Hermosa Group, the Permian-age sequence of salt, gypsum, anhydrite, and carbonaceous shale. None of the four wells in the Hermosa Group encountered water, which is not surprising since the Hermosa has been diapirically uplifted and is known to be a poor host for groundwater. Monitoring well installations were completed in all six wells in accordance with state regulations.

Monitoring of all six original monitoring wells has been conducted since their installations in Sept.-Oct. 2007. MW-6 has been monitored and sampled quarterly since Oct. 2007 and MW-5 since Jan. 2008. The other four have also been monitored quarterly, but have remained without measurable water. The quarterly reports on groundwater monitoring are being submitted to the CDPHE as they are completed.



Recent Activities

In support of EFR's efforts to identify and evaluate potential groundwater resources to supply the make-up water for the mill, EFR geologists and Golder Associates (Golder) have been conducting hydrogeological field exploration on and near the Piñon Ridge site. Since February 2008, a number of exploratory borings have been drilled in the south half of the EFR property and to the west and east of this property. In addition to identifying potential groundwater resources, this exploratory drilling provided additional deep (>150 feet) stratigraphic and structural geologic data to expand and refine the site geologic model. The attached map (Figure F-1) shows the location of the original six monitoring wells and the more recent exploration drill holes. The three seismic refraction/reflection lines surveyed in late 2007 are also shown.

In accordance with the plans that we presented to you during our May 1, 2008 meeting, Exploratory boring EX-08-05 was converted to a monitoring well (MW-7). We also attempted to install a monitoring well in the vicinity of boring EX-08-07; however, the driller experienced difficulties in completing the well (the casing apparently cracked after installation) and the well will be abandoned. Based on the additional information that we have collected since May 1st, we now believe that a monitoring well at boring EX-08-07 is unnecessary (i.e., the existing wells provide adequate coverage in this area).

Figure F-1 also shows the location of three production wells (P-1, P-2, and P-3) that will be installed at, or in the vicinity of, borings EX-08-06, EX-08-08, and EX-08-12, respectively. It is our understanding that Golder plans to conduct aquifer tests on these production wells. Although wells P-1, P-2, and P-3 are being installed as water supply wells, monitoring data collected from these wells will be used to augment and compliment the data collected from the site's monitoring wells.

Preliminary Geologic and Hydrogeologic Model

The attached figures (Figures F-1, F-2, and F-3) provide our preliminary interpretation of the geology and the hydrogeologic (groundwater) conditions underlying the future mill site. This interpretation will be refined as more data are collected. The site geology conforms to the larger scale geology of the Paradox Valley, which was formed by the diapiric uplift of Paleozoic through Mesozoic age sediments accompanied by folding and faulting. The uplift was seated in the thick evaporite sediments of the Hermosa Group of Permian age, which deformed plastically into the anticline that forms the axis of the northwest-southeast trending Paradox Valley. Located along the south flank of the Paradox anticline, the Piñon Ridge site is underlain by the Hermosa at or close to ground surface at the north end of the site and by Mesozoic (Triassic age) sediments at the south end. Based on seismic reflection and refraction survey data, we have identified a succession of faults under the site trending parallel to the valley, as illustrated on the attached map, Figure F1. Geologic studies on site, including trenching, have established that these faults are pre-Quaternary. These faults have been labeled as follows:

- Fault #1 – lying at the foot of the steep mesa slope, at the south edge of the flatter pediment. Apparently a normal fault with about 50 feet of vertical displacement,
- Fault #2 – lying under the footprint of the future mill and trending WNW-ESE, upthrown to the south approximately 40 feet.
- Fault #3 – lying under the southwest part of tailings cell A and the northeast corner of the mill footprint, and trending WNW-ESE with the north side upthrown by 130 to 300+ feet.
- Faults #4, 5, and 6 – closely spaced and lying under tailings cells B and C, likely en echelon with displacement up to the north and probably dipping steeply to the south. These faults are mostly likely shear zones between the more plastic Hermosa core of the anticline and the more rigid Mesozoic sediments on the flanks.

These faults and the hydrogeologic conditions interpreted from data collected to date are illustrated on cross sections in Figure F-2 and F-3. Several other small, closely spaced shears were implied in the seismic survey profiles of the Hermosa Group in the north part of the site. All of the faults are consistent with the structural development of the Paradox anticline, which evolved from late Permian Period through the Mesozoic Era. No discontinuities in the soil profiles above the bedrock were identified in the seismic surveys. Trench mapping was conducted in December 2007 and June 2008; no evidence was found to indicate faulting in the Quaternary soils at the site.

For ease of identification and discussion, we have identified the fault blocks delineated by the above named faults as follows:

- Block 0-1 – bounded on the south by one or more faults penetrating the mesa slope (and not on the project site) and Fault #1 on the north
- Block 1-2 - bounded by Fault #1 on the south and Fault #2 on the north
- Block 2-3 - a graben bounded by Fault #2 on the south and Fault #3 on the north
- Block 3-4 - bounded by Fault #3 on the south and Fault #4 on the north
- Block 4-6 - bounded by Fault #4 on the south and Fault #6 on the north

These fault blocks are imposed on the dominant structural feature of the valley, the diapiric anticline that is evident in the successively deeper contacts with the Hermosa Group found in the exploratory and well drill holes going from north to south across the site.



Monitoring well and exploration drilling data indicate that groundwater under the site consists of two hydrogeologic units:

- Mesa Unit – Limited to Block 0-1 only, groundwater in this unit occurs in the lower Chinle Formation (TrC) with a phreatic surface at approximately elevation 5,280 feet. Based on water levels observed in MW-5, MW-7 (EX-08-05), EX-08-06, and EX-08-07 the phreatic surface has little, if any, gradient.
- Valley Unit – Within Block 1-2, the phreatic surface of the groundwater in this unit is at an elevation of approximately 5,140 feet, which is approximately 140 feet lower than the groundwater in the Mesa Unit. The only exploration drill hole to show a water level in Block 2-3, EX -08-22, indicates that the Valley Unit may be hydrologically continuous from Block 1-2 into Block 2-3. If this is verified by additional observations, then Fault #2 is not a hydraulic barrier or is a partial barrier only. Water levels in MW-6 and EX-08-20, -21, and -22 are all close to an elevation of 5,140 feet.

Based on the observations of MW-1 through MW-4 and EX-08-23, groundwater is absent north of Block 2-3. Although a small amount of water accumulated in the bottom of EX-08-23 several days after drilling; we interpret this as connate water, trapped in the sediments at the time of deposition that drained into the open exploration hole in response to the relief of confinement caused by drilling. MW-1 through MW-4 were drilled dry into the Hermosa Group and have remained dry (less than a foot of accumulated moisture) since completion. Very small amounts of moisture can accumulate in dry monitoring wells due to condensation and to migration of water entrapped in sediments, especially evaporite mineral salts.

Additional Activities

Kleinfelder, together with EFR and Golder, plan to conduct additional field activities and geologic analyses to address several issues:

1) Northern limit of the Valley Unit of groundwater. Although the information obtained to date is consistent in delineating Fault #3 as the north limit of groundwater, we believe that the hydrogeologic data on Blocks 2-3 and 3-4 are not yet sufficient to confirm that assessment. We plan to drill and install:

- One new monitoring well (MW-8) east of the mill footprint within Block 2-3 to a depth of approximately 420 feet, or into the Hermosa, installing 100 feet of screen to span 300-400 foot interval consistent with the water level observed in EX-08-20.
- One new monitoring well (MW-9) west of the mill footprint within Block 2-3 to a depth of approximately 450 feet, or into the Hermosa, installing 100 feet of screen to span both the Chinle/Moenkopi contact and the water level observed in EX-08-22.



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We will also bail the water standing in EX-08-23 in Block 3-4 and insert a temporary casing to stabilize the hole and observe any water level recovery. Based on the amount of water that subsequently collects in the hole and the observed static water level, we will either make a decision to convert this exploratory hole to a monitoring well (MW-10), or will abandon and backfill the hole. The latter will be the course of action if only small amounts of water collect in the bottom few feet of the temporary casing, indicating a connate water source, or if the initial chemical fingerprint (if a sample can be collected) indicates unusable quality water.

No additional monitoring wells are needed in the Mesa Unit (Block 0-1). Golder has conducted extensive drilling in the Mesa Unit block and plans to conduct pumping tests of production wells to develop the hydrologic parameters needed for the water resources study. Before and after these tests, some of these wells will be used for longer-term monitoring, providing additional data on the Mesa Unit. Therefore, EX-08-07 will not be converted to a monitoring well, as previously planned.

The groundwater monitoring plan has been developed and executed to identify and characterize the hydrologic and chemical properties of the uppermost water-bearing unit underlying the mill site. As more data were gathered and evaluated, it became apparent that the Hermosa anticline core has truncated, either structurally or stratigraphically, the potentially water-bearing Mesozoic age sediments (Wingate, Chinle, and Moenkopi formations) underlying the site. These units thin to the north across the site and are elevated by the Hermosa diapir, leaving only dry remnants north of Block 4-6. The Hermosa itself does not host usable amounts of groundwater. Therefore, the focus on future activities will be to refine the groundwater characteristics of the uppermost water-bearing units in Blocks 2-3 and 3-4.

Please contact me if you have any comments or questions. The additional activities described above are scheduled to begin with drill rig mobilization on Monday, 7/14/08. This date is constrained by drill rig availability. Drilling will start late on 7/14 or the following day. We will welcome your comments and questions, and we will call you on 7/10 to discuss.

Sincerely,

A handwritten signature in black ink, appearing to read "Alan K. Kuhn". The signature is fluid and cursive.

Alan Kuhn, PhD, P.E., R.G., C.E.G.
Program Manager

Attachments: Figures F-1, F-2, F-3

C: Edgar Ethington, CDPHE