STATE OF COLORADO

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FEB 26 2010

Mr. Frank Filas
Environmental Manager
Energy Fuels Resources
44 Union Boulevard, Suite 600
Lakewood, CO 80228

Subject: Request for additional information

Mr. Filas,

As part of the Division's review of the Piñon Ridge uranium mill application, our review to this point has revealed three areas that require additional information. Our comments are provided in the attachment.

Your response is expected within 45 days of this request, unless you provide justification for an alternate delivery schedule. If you have any additional questions, please contact Phil Egidi in Grand Junction at (970) 248-7162 or electronically at phil.egidi@state.co.us.

Sincerely,

Steve Tarlton, Manager
Radiation Control Program

SFT/pve

Cc:
Phil Egidi
Clay Trumpolt
Larry Bruskin

Request for additional information:

1. Geotechnical Considerations

Comparing the submitted application to Section 2.0 of NUREG 1620 (Geotechnical Stability), some of the details provided are not sufficient to satisfy the guidance. Two areas of particular concern are: 1) the identification and characterization of each material needed for the various components of the project (e.g., liner, cover, erosion protection), and; 2) the evaluation of the tailings cell settlement with respect to the integrity of the radon barrier.

For the proposed tailings pond cover, seven different layers are currently planned. These are, from bottom to top: 1) the interim cover; 2) radon barrier; 3) capillary break/drainage layer; 4) filter layer; 5) bio-intrusion layer; 6) native soil; and 7) rock mulch. The material for several of the layers, including the interim cover, radon barrier, and native soil, has been described as material consisting of "native soil." The capillary break/drainage layer was described as being material that will be imported from off-site. For the other layers (filter layer, bio-intrusion layer, and rock mulch) there is no discussion at all as to the origin of the material.

Besides the location of the material or borrow sources, the engineering properties of each layer must be described and analyzed to assure that there are sufficient quantities of material available for use. This would include site-specific sampling and laboratory testing of each material at appropriate frequencies. Since the Division is unaware of NRC sampling/testing frequency guidance, the use of EPA guidance for generic "waste containment" may be a logical alternative. In particular, Table 2.3 of EPA (1993)[i] lists the recommended minimum testing frequencies for investigation of borrow sources. In an updated version of EPA (1993) guidance, Daniel and Koerner (2007)[ii] also recommend the same testing frequencies in their Table 3-3 as those recommended in EPA (1993). If there are technical justifications to vary the sampling and testing frequencies from recommended guidance, then this should be explained. If existing data satisfying these requirements exists, new data collection is not necessary.

The other major area requiring additional information concerns the settlement properties of the foundation, tailings, cover system, and overall cell. Section 2.3 of NUREG 1620 presents the complete guidance needed for settlement evaluation. In general, both total and differential settlement should be analyzed and evaluated with respect to the cracking potential of the radon barrier and the other engineering components of the cell (e.g., GCL, geomembrane, leachate collection and recovery system, entire cover system, etc.). The analysis should verify that the components can maintain their integrity when subjected to the induced strain associated with the calculated settlement.

2. Engineering Detail

A revised *Geotechnical Design Recommendations Mill and Infrastructure Pinon Ridge Project Montrose County Colorado* or a new supplemental report to this document should first provide the foundation type (of the three proposed) selected for each major structure. Next, the report should rigorously support their selection(s) with engineering rationales. The Division wants to understand why the foundation type for each major structure was selected. A decision matrix is an excellent tool for this purpose. Criteria for the selection should include all the elements typically considered, such as but not limited to, calculated loadings (break out all live, static, and temporary loads to arrive at

maximal design loadings) geology, geotechnical test results, geohydrology, etc. Energy Fuels should consider limiting movement of all slabs in terms of vertical and lateral displacement as part of the selection criteria for each foundation type. The Division's goal is to have a design that minimizes movement of the foundations and the concrete support slabs to achieve isolation from the environment to the extent possible as well as provide adequate structural support.

Generally existing engineering drawings provide sufficient detail for review purposes. However, some drawings are not provided in the current set:

- Concrete Foundations and Slabs – scaled plan (layout), typical cross sections, and details drawings for each structure are to be provided. Include but not limited to full dimensions, locations, materials of construction, etc.
- Concrete Rebar Plan Drawings – scaled plan view, cross sections, and details for each foundation and slab showing but not limited to dimensions, rebar sizes and locations, waterstop (to be used at all construction, expansion, and other joints), etc. Include all curbing and secondary containment details.

3. Hydrology

Please provide an estimate of vertical hydraulic conductivity of the alluvium, Chinle, Moenkopi, and Paradox Formations at the proposed site. These estimates should be based on reliable measurement.

Elevated gross alpha measurements are noted in site groundwater. What constituents are causing these elevated measurements?

Please provide reliable ambient chemical and radiometric measurements of Dolores River waters in the Paradox Valley. The existing surface water analytical suite plus common anions and cations is recommended.

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[i] EPA, 1993, Technical Guidance Document, *Quality Assurance and Quality Control for Waste Containment Facilities*, EPA/600/R-93/182.

[ii] Daniel, D.E. and Koerner, R.M., 2007, *Waste Containment Facilities, Guidance for Construction Quality Assurance and Construction Quality Control of Liner and Cover Systems*, 2nd Edition, ASCE Press.