ENERGY FUELS RESOURCES CORPORATION

November 3, 2010

Mr. Steve Tarlton, Program Manager
Radiation Control Program
Hazardous Materials & Waste Management Division
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South HMWMD-B2
Denver, CO 80246-1530

Re: Response to Request for Additional Information
Process Engineering and Geotechnical Comments
Piñon Ridge Mill License Application, Montrose County, Colorado

Dear Steve:

This letter and attached exhibits (4 copies each) address process engineering and geotechnical issues and concerns raised by the Radiation Control Program (RCP) of the Colorado Department of Public Health and Environment (CDPHE) in the following Requests for Information (RFIs).

a. Follow up comments from RCP on Energy Fuels' Response No. 2 to RFI #1. These comments were received from Clay Trumpolt during a RFI #3 clarification meeting held on September 9, 2010 at the CDPHE. RCP's comments are addressed in this response letter and attached Exhibits 1 – 3.

b. RFI #3, Attachment 2 and the remaining comments from RFI #3, Attachment 1. These responses are addressed in Exhibit 4, which includes revised Technical Specifications by Golder Associates Inc. (Golder).

c. RFI #2 included comments on the closure cover design that were addressed in Response No. 2 to RFI #2. In Exhibit 5, Golder has incorporated these changes and additions into revised Specifications for Closure and Reclamation of Mill Facilities.

d. RFI #4. Attachments 1 and 2 of RFI #4 are addressed in this response letter and in Exhibit 6.

As we pointed out in our response letter of October 18, 2010, many of the process engineering comments can only be addressed in general terms at this time. Energy Fuels would be happy to supply more detailed plans once the final design for construction purposes has been completed.

The RCP's comments are indented and listed in italics below. Energy Fuels' responses are provided at full page width in regular font.

<u>Comments to Piñon Ridge Mill Radioactive Material License Application Response No. 2 to Request for Additional Information No. 1</u>

> *Comment 1) Re drawing 1000-S-003 Detail 4 Preloading of Foundation, The Division appreciates the conservative elements incorporated into the foundation design including the use of preloading of soils to assist in minimizing settlements. While the loadings of 1500 psf are conservative, we question the time frame of "…a minimum period of 1 month prior to construction of the foundation" as stated under Area 300 – CCD Thickener Area last paragraph page 7. Information on preloading of soils indicates that 6 – 9 months is more typical to achieve consolidation. Why would the one month period be appropriate in this instance and is this time frame proposed for all the areas with preloading?*

Please reference Golder's Responses to Specific Comments attached as Exhibit 1.

> *Comment 2) Re Section 4.0 Foundation Design and Detailing, page 10, bullet 5, It is proposed to use slopes of 1 – 2% for slab drainage to sumps. The Division finds that 1% is difficult to achieve in practice with 2% being preferred to ensure positive drainage without ponding at intermediate points before sumps. There are techniques that can achieve 1% such as a laser screed, precise surveying on a tight grid, or other mechanisms that could be proposed. If 1% grade is still desired, please provide how 1% slope will be achieved across slopes in a consistent manner.*

Please reference Golder's Responses to Specific Comments attached as Exhibit 1.

> *Comment 3) Please provide some detail about the type of pump and liquid level detection to be employed in the sump pits. The Division is specifically interested in the minimum depth of liquid accumulation before pumping ensues and this is dependent upon the type of level detection and elevation positioning as well as pump type. The goal here should be to minimize the liquid head as part the protection system to assist in preventing release to the environment. If it is envisioned that the many sumps will not have the same type pumps and level indicators, then please provide that information for each type.*

The Piñon Ridge Mill will utilize submersible sump pumps constructed of suitable materials of construction for the conditions of service throughout the mill. The sump pumps will normally start when the liquid level is within 4 – 12 inches from the top of the sump and stop when the liquid level is within 5+ inches from the sump bottom. (Refer to the Tsurumi Pump SFQ-Series Dimensions Cut Sheet attached as Exhibit 2.) There must be enough liquid in the sump for the pump to efficiently pump the sump contents by first- filling the discharge pipe line and secondly- discharging the fluid into the receiving vessel or tank before reaching the sump's low level. The specific sump pump and sump pump discharge pipeline routing will be determined during detailed engineering.

Rosemount 3100 Series Ultrasonic Level Transmitters or equivalent will be utilized in the sumps to control sump pump operations throughout the Piñon Ridge Mill.

Comment 4) Re Drawing No. 1000-S-001 Sump Plan and Details, the Division notes the waterstop details provided include the type of waterstop, dimensions, and the fact that it will be welded. Welding implies that the waterstop will be continuous and the Division assumes this will be the case. If not intended please revise intent to state that all waterstop will be continuous. Secondly, we note the use of natural rubber as the waterstop material of construction. What is the projected lifespan of this material in the intended application and will it accommodate the allowed differential slab settlement of ¾ inch maximum according to design? Will the material carry this stretching property over its lifespan or will it become fatigued or hardened through environmental exposure including low temperatures?

Please reference Golder's Responses to Specific Comments attached as Exhibit 1.

Comment 5) Re Drawing No. 1000-S-001 Sump Plan and Details, Section A-A. Review of this detail leads the Division to suggest that the detail be revised to depict the 3 inch HDPE pipe for leak detection as extending to the top of the underlying concrete below the drain gravel. The reason for this is to improve liquid detection response time since the goal is to promote earliest detection. To facilitate setting the pipe on the concrete surface will require notching the base of the pipe to allow liquid free access. The gravel should be specified such that fines will not migrate to impede liquid entering the pipe bottom. The slots should be closer together. Please revise distance from 2 inches to 1 inch between slots. Please confirm all sumps in process areas will be double containment with interstitial monitoring as per this detail.

Please reference Golder's Responses to Specific Comments attached as Exhibit 1.

Comment 6) Re Drawing No. 1000-S-001 Sump Plan and Details, What type of leak detection sensor will be used in the detection pipe? Please provide information re these sensors. Will they be the same for each sump in the facility? The liquid sensor should be mounted as close to the concrete surface as possible to ensure rapid detection response. Please provide mounting information. Maintenance needs to be allowed for also.

SDX Submersible Depth Transmitters, manufactured by Stevens Water Monitoring Systems or equal, will be utilized in leak detection systems throughout the Piñon Ridge Mill. The SDX Submersible Depth Transmitter will be installed and maintained per the Manufacturer's recommendations- reference Exhibit 3.

Comment 7) Re all drawing depicting process area slabs and secondary containments, The design of the facility is to prevent migration of chemical and radiological constituents used at the facility from entering the environment including air, soil, and surface/groundwater. This protection goal is accomplished through a *defense in depth e.g. layers. The concrete foundations and support slabs and secondary containments (often serve both purposes) are designed for minimal settlement and differential movement (1 inch and ¾ inch respectively) and construction joints to allow the concrete to crack to those lines are incorporated into the design. Likewise the slabs and secondary containments are sloped towards collection sumps not only to facilitate accumulation for liquid removal but to prevent liquid head build up. Since they are constructed of concrete, they will crack at least minimally. These cracks will compromise the protection system to allow liquids to migrate beneath. With this in mind, a chemically compatible coating system should be applied to all process slabs. This will prevent deterioration of the concrete surface, prevent constituents from entering into the concrete (concrete being porous), assist with gravity flow to sumps, and provide a surface for repair (including crack repair) and maintenance. The coating aspect is missing as a design element in the drawings (except as generally indicated on interior of sump, Section A-A of drawing 1000-S-001 Sump Plan and Details) and will need supporting narrative with specifications. Alternatively, a secondary containment system under all slabs could be implemented.*

Please reference Golder's Responses to Specific Comments attached as Exhibit 1.

Request for Additional Information #3, Attachment 2 and Remaining Comments from RFI #3, Attachment 1

Please reference Golder's response provided in Exhibit 4.

Request for Additional Information #2, Revised Specifications for Closure and Reclamation of Mill Facilities

Please reference the revised specifications by Golder in Exhibit 5.

Request for Additional Information #4, Attachment 1, Tailings and Evaporation Pond Delivery and Return Piping Conceptual Plan

Comment 1 – Regarding design concept of placing single-wall HDPE pipes in trenches with the trenches serving as secondary containment: The Department proposes that it would be less expensive and as or more environmentally protective to use buried double-wall HDPE piping. Advantages include protection from impacts, exposure to weather and sunlight degradation, and the thermal effects of low (freezing) and high (thermal expansion along length of pipe) temperatures, maintenance of the ditch HDPE liner and culverts, etc. Please provide a supportive narrative detailing why the method chosen is better than buried double-walled HDPE piping including cost. The Department has positive experience at other regulated facilities where use of double-walled HDPE piping has shown a good track record.

Energy Fuels elected to design the tailings cells and evaporation pond pipelines as single-wall HDPE pipes within concrete and lined trenches rather than double-wall buried pipes for the following reasons.

- The tailings lines will transport a slurry carrying sands that can plug the pipeline from time to time. Having the pipes in a lined trench facilitates access to the pipes for cleaning and repairs. If a leak is detected in a double-walled buried pipe, the exact location of the leak may be difficult to determine thereby requiring considerable time and excavation to locate and repair the leak and rebury the line afterwards.
- Tailings and raffinate delivery and return lines will change in location and possibly diameter and thickness over the life of the facility as tailings cells and evaporation ponds are taken out of service and new ones put into service (reference our Response to Comment 10 below). There is also the potential for future expansion of the mill and processing rate, which could require change out of one or more pipelines. Having the pipe within concrete and lined trenches will provide the flexibility necessary to make modifications in the piping system as the mill disposal system changes over time.

Your concerns regarding physical impacts, sunlight degradation, freezing, and thermal contraction and expansion are well taken; however, Energy Fuels believes that these potential issues are relatively minor and do not warrant pipe burial. Our observations in this regard follow.

- A metal grate over the top of the concrete trench will protect the pipe between the mill and Tailings Cell A. Vehicle traffic along the remainder of the pipelines will be limited to small all-terrain vehicles (ATVs) and pickup trucks for the most part. Although damage to a pipe could occur in the event of a vehicle sliding into or running over a pipe, the operator would be required to immediately inform the control room, which would result in shut down of that line until repairs could be effected. Also please see our response to Comment 11 below.
- The specified HDPE pipeline material is stabilized with carbon black, which makes it resistant to ultra-violet (UV) radiation and acceptable for long-term outdoor applications.
- Tailings and raffinate discharges from the mill will be at a relatively high temperature and the pipes will gravity drain, therefore, the potential for freezing is limited to plugged tailings lines. Please also see our responses to Comments 6 and 7 below.
- Given the length of the pipelines, they are expected to expand or contract in length by approximately 1 inch per 100 feet for every 10°F change in temperature. The concrete and HDPE lined trenches have sufficient width to allow for “snaking” of the pipelines caused by thermal expansion and contraction over the length of the pipelines. As discussed in our response to Comment 8 below, sandbags will be utilized in the non-trench areas (i.e., along the top of the tailings cell embankments) to limit snaking so that the pipe does not extend outside of the lined area and onto the service road.

Comment 2 – There is insufficient detail in the figures. Please provide a plan view of the two tailings cells showing the relationship of the tailings slurry delivery pipe, the supernatant tailings water return pipeline, and the raffinate water delivery piping systems. Please label the systems. Include information on the location and number of spigots, all valve locations and types, and other pertinent information.

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Comment 3 – Please provide information in the form of a plan view of the evaporation ponds showing the location of the two piping lines. Provide the same level of detail as per comment 2 above.

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Comment 4 – Please provide normal operating and maximal flow rates in cfm for each pipeline to the tailings cells and evaporation ponds. Please provide data on the anticipated percent solids in the tails?

The raffinate stream to the evaporation ponds is designed to operate at 7.2 cfm (53.5 gpm) and zero percent solids (0%). The tailings stream to the tailings cells is designed to operate at 33.6 cfm (251.3gpm) and twenty-seven percent (27%) solids. The above flow rates for the 500 ton per day option are 50% of the design values shown on CH2M Hill's Process Flow Diagram 300-PF-002, Rev. C, for the 1000 ton per day option, located in Volume 1 of Energy Fuels Resources Piñon Ridge Mill Radioactive Mill License Application.

Comment 5 – Please provide a short narrative of how the spigots would be operated for the first tailings cell under normal operating conditions.

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Comment 6 – Is it anticipated that "sanding up" problems will occur in the 3 inch tails distribution line and if not why?

The tailings pump size and tailings pump discharge line diameter will be verified during detail engineering in order to provide sufficient slurry velocity to maintain the solids in suspension while being transported from the tailings pump discharge flange through the pipeline to deposition in a tailings cell. The tailings pump will be specified with a variable speed drive unit.

Comment 7 – Will cold temperatures impact flows through these lines and if not why? What about during stoppages or shutdowns?

The slurry exiting the tailings pump discharge flange is calculated to be roughly 88.1˚F as shown on CH2M Hill's Process Flow Diagram 300-PF-002, Rev. C. Under normal operating conditions, minimal heat loss is anticipated through the pipe wall to the surroundings during the short transport time in the tailings pipeline. The tailings pipeline will be flushed with solution prior to a shutdown to remove sand particles that could solidify in the pipeline over an extended period of time and increase the difficulty in restarting the tailings disposal system.

Comment 8 – When the ambient temperature is hot, the HDPE will expand significantly along its length (especially given the length of the pipelines) due HDPE's expansion coefficient. How will HDPE pipe be prevented from falling into the tailings ponds from the crest of the berms and from "snaking" out of the lined piping trench?

The HDPE pipeline resting atop the tailings cell between the anchor trench and tailings cell crest will be wedged in place with sand bags placed on both sides of the pipeline. Based on experience at similar mill sites with similar or greater temperature ranges, gravity and friction will hold the pipelines in place between the sandbags and prevent snaking outside of the lined area.

Comment 9 – What method will be employed to connect the HDPE pipe sections?

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Comment 10 – What is the wall thickness of each of the proposed pipelines?

The tailings pipeline wall thickness will be determined during detailed design. The final design engineering firm will undertake a study to determine the best tailings pipeline design based on capital cost, operating cost, pipeline wear, and transitioning from Tailings Cell A to B and then from Cell B to C. The tailings pipeline system will operate at the lowest pipeline system pressure when Cell A is filling and at the highest pipeline system pressure when Cell C is filling. The study will determine the difference in pressure between the initial and final operating conditions and recommend a piping system that is constructed for Cell C operating conditions or one that is modified as the tailings cells fill from A to B to C.

Comment 11 – Regarding the HDPE piping in the lined trench, how will vehicles be prevented from sliding off the maintenance road during slick or icy conditions and impacting and potentially cutting/severing the HDPE pipelines and liner resulting in a potential release scenario?

The tailings cell road is an all-weather graveled road used by mill personal to access the tailings cells and evaporation ponds. Travel on this road is limited to the Mill Foreman, Radiation Technician and Tailings Operator on a shift basis. The Tailings Operator will be the most frequent user of this road and will normally ride a full-time, four-wheel drive ATV. A four-wheel drive pickup will be available during inclement weather conditions or if small tools or piping materials are required by the Tailings Operator. Signage will be posted warning the drivers to be cautious upon entering this road and heed all posted speed limits and clearances.

Comment 12 – When lining the trenches with HDPE, the number of seams should be minimized by running the long dimension of the roll down the length of the trench. How will the HDPE liner in the lined trench be fitted to the rectangular trench?

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Comment 13 – Will thrust blocks be required at tee junctions for the HDPE pipelines?

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Comment 14 – Please provide typical detail of HDPE pipeline 90 degree bends and tee junctions showing HDPE joints.

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Request for Additional Information #4, Attachment 2, Liquefaction Analysis

Consistent with Section 2.4 of NUREG-1620, Revision 2, the liquefaction potential of the subsurface, tailings pile, and embankment materials must be evaluated. Although Appendix E of the Phase 2 Geotechnical Investigation (Volume 4) evaluates liquefaction with respect to the overburden soils, the subsurface material and actual tailings materials were not discussed. The evaluation should consider operational conditions (e.g., saturated tailings) as well as post-closure conditions. NUREG-1620 suggests that the evaluation be based on results from laboratory and/or field tests, with interpretation of the test data consistent with current practice. If global liquefaction is identified, mitigation measures or redesign of potentially impacted structures should be proposed in order to provide reasonable assurance that the liquefaction potential has been eliminated or mitigated. If minor or local liquefaction is identified, the license applicant should ensure that its effect is accounted for in the analysis of both differential and total settlement, and is shown not to compromise the performance of the final cover components. Please provide an updated evaluation of the items discussed herein.

Please reference Golder's Responses to Specific Comments attached as Exhibit 6.

Sincerely,

Robert R. Monok
Process Plant Project Manager

Attachments (Exhibits 1 - 6)

Cc: K. Morrison (Golder)
F. Filas, Z. Rogers, S. Antony (Energy Fuels)