ENERGY FUELS RESOURCES CORPORATION

September 22, 2010

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

Transmittal: Response No. 2 to Request for Additional Information No. 2
Piñon Ridge Mill License Application, Montrose County, Colorado

Dear Steve:

Enclosed are four copies of Kleinfelder West, Inc.'s (Kleinfelder's) responses to the questions and concerns raised by the Radiation Management Program regarding the closure cover (i.e., Primary Cover Considerations Vol. 13, K2) over the tailings cells. Dr. Alan Kuhn has worked closely with Larry Bruskin of your staff to revise the cover design, which now includes two feet of additional soil cover for plant growth and a geosynthetic liner within the radon barrier. The revised "Tailing Cell Closure Design Report" text, figures, and attachments (Attachments B and D) are also included. To facilitate your review, a second copy of the text is provided with revisions highlighted.

Once the revised design has been reviewed and approved by the Radiation Management Program, Energy Fuels will provide a revised 'Specifications for Closure and Reclamation of Mill Facilities" document (Volume 13, K3) and a revised "Decommissioning and Reclamation Cost Estimate" document (Volume 13, K4) that incorporate the changes made in the cover design.

The cover revisions also incorporated several modifications to ensure consistency with permitting documents submitted to the U.S. Environmental Protection Agency (EPA) and recommendations made by the Colorado Division of Wildlife (CDOW). These modifications include:

1. Our recent Application for Approval of Construction of Tailings Facility with the EPA contained more detailed information as to how we will operate the tailings cells during the pre-closure period plus radiation flux modeling based on stratification of coarse and fine tailings. The pre-closure period will include the construction of internal berms in the tailings cell, which will result in the deposition of coarser-grained tailings in the central portion of the cell. With this refinement and the grading of coarse tailings over the finer tailings during closure, Energy Fuels plans to place a

minimum of five feet of coarse tailings over the finer-grained tailings in the interior areas of the tailings cell prior to placing the interim cover.

The flux modeling included a 4 to 1 ratio between the radiation levels in the fine-grained tailings and those in the coarse-grained tailings, which is consistent with what has been observed at historic uranium tailings facilities. This ratio exists because radium-226 attenuates much more strongly to the finer-grained silts and clays than the coarser sands. Based on the 4/1 ratio, a 37.9% silt and clay content, and an average radium content of 647 ρCi/g, the following radiation levels were predicted for the fine and coarse tailings.

Fine-grained tailings (clays and silt): 1,210 ρCi/g

Coarse-grained tailings (sands): 302.5 ρCi/g

Weighted Average = (0.379 x 1210 ρCi/g) + (0.621 x 302.5 ρCi/g) = 647 ρCi/g

The 1,210 and 302.5 ρCi/g activity levels for fine and coarse-grained tailings, respectively, were used in the revised closure cover modeling conducted by Kleinfelder.

2. Several concerns have been expressed regarding the seed mixes proposed for the project area. In the Radiation Management Program's comments of May 25, 2010, concern was expressed regarding specific species names and rooting depths of some species in excess of three feet in the closure cover seed mix. As discussed above, the soil cover was increased to 4 feet of thickness in response to this concern. Edge Environmental Inc. (Edge) also researched rooting depths and had the following comments.

> "Table 1 provides the various rooting depths for the species included in the proposed seed mixture based on an internet literature search. There are 4 species in the proposed seed mixture that have rooting depths of more than 3 feet, with the maximum rooting depths reported as: Needle and Thread (5'), Indian Ricegrass (5'), Bottlebrush squireltail (39") and Blue Grama (6'). However, as reported for Blue Grama by Kusler (2009) and Weaver (1958) about 90 percent of the root mass occurs in the top 1 foot of the soil profile. Reports for Needle and Thread also indicate that the majority of root mass occurs within the top six inches of soil (see Table 1).
>
> Therefore, the number and size of the roots that may penetrate to 3 feet or greater would be very small. Further, because the rooting depth is thought to be limited by the depth of the wetting front (Portas and Taylor, 1976), roots should not reach depths of 3 feet or greater unless moisture is present. Because the purpose of the vegetation "layer" is to extract moisture from the tailings cap to prevent deep water percolation/infiltration, it would be appropriate for the seed mixture to have some species with deeper roots.
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> .

If potential root penetration to 3 feet or greater is unacceptable in the cap design, the following species could be used as substitutes and should be adaptable to the site conditions.

1) Prairie Junegrass (*Koeleria cristata*) which has a rooting depth report of about 1.5 to 2 feet (Weaver, 1926 and)to 28 inches with 15 inches determined as the average maximum (substitute for Indian Ricegrass at 1.0 lbs/acre).

2) Sand dropseed (Sporobolus cryptandrusm) which root depth has been reported to about 31 inches (substitute for Needle and Thread at 0.9 lbs/acre)."

We did not make these two substitutions because the soil cover thickness was increased to four feet. However, as part of our discussions with CDOW, we did add Slender Wheat, Utah Sweetvetch, Blue Flax, and Palmer Penstemon to the seed mix. These species, which are highlighted on Table 1, provide for a more diverse vegetative cover.

During the review process, several parties requested that the seed mix specified for the project be modified for those areas of the site outside of the tailings closure cover. It was argued that inclusion of more shrubs and forbs in these areas of the site would provide for better wildlife habitat. Edge prepared a preliminary seed mix for these areas, which was then reviewed and modified by the Colorado Division of Wildlife. The resulting seed mix for the non-tailings portions of the site is presented in Table 2. Energy Fuels proposes to use this seed mix for closure of the mill, ore pad, soil stockpile, and evaporation pond areas of the site. The seed mix proposed in Table 1 would be limited to the tailings cover area plus a 200-foot buffer area around the perimeter of the regraded tailings embankments. If the seed mixes proposed in Tables 1 and 2 are acceptable to the Radiation Program, they will be incorporated into the revised closure specifications for the project.

Please contact me should you have any questions or require additional information.

Sincerely,

Frank Filas, P.E.
Environmental Manager

Attachments

Cc: S. White, Montrose County
A. Kuhn, Kleinfelder
M. Bloomstran, Edge
K. Morrison, Golder
R. DelPiccolo, CDOW (cover letter & Tables 1 and 2)
B. Monok, Z. Rogers, S. Antony – Energy Fuels

Table 1 - Closure Cover Seed Mixture and Rooting Depths

Common name (*Scientific Name*)[1]	Variety	Seeding Rate (LBS/Acre – PLS)[2]	Rooting Depth	References
Needle and Thread *(Stipa comate)*		1.8	5’	Weaver, J. E. 1919. The Ecological Relations of Roots. Carnegie Institution of Washington. Publication No. 286.
			3.5-5’	Weaver J. 1926. Root Development of Field Crops. McGraw-Hill, New York. (http://www.soilandhealth.org/01aglibrary/010139fieldcroproots/010139ch4.html) Weaver, J. E., 1958. Summary and Interpretation of Underground Development in Grassland Communities. Agronomy – Faculty Publications. Agronomy and Horticulture Department. University of Nebraska – Lincoln.
			Shallow root mass with 71% of roots within first 6” with some feeder roots reaching 60”	Kusler J. 2009. Comparing Simple and Complex Native Forage Mixtures for Grazing Cattle n Southwestern Saskatchewan. Master Thesis University of Saskatchewan Saskatoon
			3-5’ more than 50% of the total root biomass is within the first 0.6 foot	http://www.fs.fed.us/database/feis/plants/graminoid/hescom/all.html
Indian Ricegrass *(Oryzopsis hymenoides)*		1.8	Minimum 18”	http://plants.usda.gov/java/charProfile?symbol=ACHY
			48”-60”	Reynolds, T. D. and L. Fraley, Jr. 1989. Root Profiles of Some Native and Exotic Species in Southeastern Idaho. Environmental and Experimental Botany. Vol. 29, No. 2 pp 241-248. Pergamon Press.
			“deep, fibrous, extensive roots”	http://www.fs.fed.us/database/feis/plants/graminoid/achhym/all.html

Table 1 (Continued)

Common name (*Scientific Name*)[1]	Variety	Seeding Rate (LBS/Acre – PLS)[2]	Rooting Depth	References
Thickspike Wheatgrass *(Elymus lanceolatus)*	Critana	1.8	15”	http://www.fs.fed.us/database/feis/plants/graminoid/elylan/all.html *(Average maximum root depth of mature, well-developed thickspike wheatgrass is approximately 15 inches (38 cm). Most of the root mass is confined to the upper 8 inches (24 cm) of soil and is so dense in well-established plants that percolation through the root system is slow and encroachment of other species with deeper root systems may be inhibited)*
			16-20” minimum	http://plants.usda.gov/java/charProfile?symbol=ELLAL
			”dense fibrous but shallow root system”	Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pages 295– 698 plus index.
Slender Wheat *(Elymus trachycaulus)*	Pryor	0.5	15’	Brown, P . L., A. D. Halvorson, F . H. Siddoway H, . F. Mayland, and M. R. Miller. 1982. Saline-Seep Diagnosis, Control, and Reclamation. U.S. Department of Agriculture Conservation Research Report No. 30~ 22p., illus. Available: http://www.wsi.nrcs.usda.gov/products/W2Q/downloads/Salinity/Saline_Seeps.pdf [2010, September 17]
			Dense coarse and fine roots that extend beyond 12”	Howard, Janet L. 1992. Elymus trachycaulus. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2010, September 17.]
			45 cm	http://millerseeds.com/grassseeds.html
			18”	http://www.animalrangeextension.montana.edu/articles/forage/Species/Grasses/Slender-wheatgrass.htm
Sandberg Bluegrass *(Poa Secunda)*	Sandberg	0.9	Minimum 10”	http://plants.usda.gov/java/charProfile?symbol=POSE
			1.5-2’	Weaver, J. E., 1958. Classification of Root Systems of Forbs of Grassland and a Consideration of Their Significance. Agronomy – Faculty Publications. Agronomy and Horticulture Department. University of Nebraska – Lincoln.
			“shallow, spreading root system”	http://www.fs.fed.us/database/feis/plants/graminoid/poasec/all.html

Table 1 (Continued)

Common name (*Scientific Name*)[1]	Variety	Seeding Rate (LBS/Acre – PLS)[2]	Rooting Depth	References
Bottlebrush Squirreltail *(Elymus elmoides)*		0.9	39.4" (Plus)	http://www.fs.fed.us/database/feis/plants/graminoid/elyely/all.html *(Depths below 39.4 inches (100 cm) were not seen due to a subsurface layer of basalt, suggesting rooting depths greater than 39.4 inches (100 cm) are possible.)*
			39"	Reynolds, T. D. and L. Fraley, Jr. 1989. Root Profiles of Some Native and Exotic Species in Southeastern Idaho. Environmental and Experimental Botany. Vol. 29, No. 2 pp 241-248. Pergamon Press.
Blue Grama *(Bouteloua graceilis)*	Alma	0.9	3-6'	http://www.fs.fed.us/database/feis/plants/graminoid/bougra/all.html
			4'	Weaver J. 1926. Root Development of Field Crops. McGraw-Hill, New York. (http://www.soilandhealth.org/01aglibrary/010139fieldcroproots/010139ch4.html)
			Seminal roots can reach 6' 84% of root mass within first 6" and 9% within 6 – 12"	Kusler J. 2009. Comparing Simple and Complex Native Forage Mixtures for Grazing Cattle n Southwestern Saskatchewan. Master Thesis University of Saskatchewan Saskatoon
			79 % of root mass weight occurred in first 6"; 10% in second 6" the second foot yielded 7% the third about 3% and the forth only 1%.	Weaver, J. E., 1958. Summary and Interpretation of Underground Development in Grassland Communities. Agronomy – Faculty Publications. Agronomy and Horticulture Department. University of Nebraska – Lincoln.

Table 1 (Continued)

Common name (*Scientific Name*)[1]	Variety	Seeding Rate (LBS/Acre – PLS)[2]	Rooting Depth	References
Galleta *(Hilaria jamesii)*	Viva	0.9	Few roots below 18”	http://www.fs.fed.us/database/feis/plants/graminoid/plejam/all.html
			12”	Monsen, Stephen B.; Stevens, Richard; Shaw, Nancy L., comps. 2004. Restoring western ranges and wildlands. Gen. Tech. Rep. RMRS-GTR-136-vol-2. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pages 295– 698 plus index.
			4’	Weaver J. 1926. Root Development of Field Crops. McGraw-Hill, New York. (http://www.soilandhealth.org/01aglibrary/010139fieldcroproots/010139ch4.html)
Blue Flax *(Linum lewisii)*	Appar	0.5	“woody Taproot”	USDA-NRCS. ‘Appar’ Blue Flax, Linum perenne. Plant Fact Sheet. http://plant-materials.nrcs.usda.gov/pubs/idpmcfs5632.pdf.
				Stevens Richard and Stephens B. Monson. 2004. Forbs for Seeding Range and Wildlife Habitats. USDA Forest Service Gen. Tech. Rep. RMRS-GTR-136. 2004. Robson Sara and James Kingery. 2006. Available: http://www.fs.fed.us/rm/pubs/rmrs_gtr136_2.html [September 19, 2010]
				Native Plants for Idaho Roadside Restoration and Revegetation Programs. Idaho Transportation Department, The National Institute for Advanced Transportation Technology, University of Idaho Department of Rangeland Ecology and Management.
				Reeves, Sonja L. 2006. Linum lewisii. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2010, September 19]

Table 1 (Continued)

Common name (*Scientific Name*)[1]	Variety	Seeding Rate (LBS/Acre – PLS)[2]	Rooting Depth	References
Utah Sweetvetch (*Hedysarum boreale*)	Timp or native	1.0	46” Minimum	Metcalf, Sarah, Clain Jones and Larry Holzworth. 2006. Symbiotic Nitrogen Fixation and Establishment of six Native Legumes Species. USDA. Natural Resource Conservation Service. Plant Materials Technical Note No. MT-54. February. Available: http://www.mt.nrcs.usda.gov/technical/ecs/plants/technotes/pmtechnoteMT54.html [September, 18,2010]
			16” minimum	http://www.sagebud.com/utah-sweetvetch-hedysarum-boreale/
			“deep taproot”	USDA. Utah Sweetvetch (Hedysarum boreale) NRCS Plant Fact Sheet. Available: http://plants.usda.gov/factsheet/pdf/fs_hebo.pdf (September 18, 2010)
				Stevens Richard and Stephens B. Monson. 2004. Forbs for Seeding Range and Wildlife Habitats. USDA Forest Service Gen. Tech. Rep. RMRS-GTR-136. 2004. Robson Sara and James Kingery. 2006. Available: http://www.fs.fed.us/rm/pubs/rmrs_gtr136_2.html [September 18, 2010].

Table 1 (Continued)

Common name (*Scientific Name*)[1]	Variety	Seeding Rate (LBS/Acre – PLS)[2]	Rooting Depth	References
Palmer Penstemon *(Penstemon palmerii)*		1.0	Minimum 14”	http://www.thegrowspot.com/know/f7/all-about-palmers-penstemon-penstemon-palmeri-36628.html
			Fibrous Roots	Stevens Richard and Stephens B. Monson. 2004. Forbs for Seeding Range and Wildlife Habitats. USDA Forest Service Gen. Tech. Rep. RMRS-GTR-136. 2004.
				USDAPalmer’s Penstemon *(Penstemon palmeri.)* NRCS Plant Fact Sheet. Available: http://plants.usda.gov/java/factSheet (September 18, 2010)
			40 – 72”	Tollefson, Jennifer E. 2006. Sphaeralcea coccinea. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2010, September 18 http://www.fs.fed.us/database/feis/plants/forb/sphcoc/all.html
			Taproot woody and stout, may remain unbranched for 3’ before it divides into lateral roots	USDA. Scarlet Globemallow (*Sphaeralcea cocinea*) NRCS Plant Fact Sheet. Available: http://plants.usda.gov/java/factSheet (September 19, 2010)
			extensive fibrous root system and taproot capable of reaching 7 to 8 m in depth	Kitchen, Stanley G. and G. L. Jorgensen. 1999. Annualization of Rodent Burrow Clusters and Winterfat Decline in a Salt-Desert Community. USDA Forest Service. Proceedings RMRS-P-11.
			Extensive fibrous root system and a deep penetrating taproot	USDA. Winterfat (Krascheninnikovia lanata) NRCS Plant Fact Sheet. Available: http://plants.usda.gov/java/factSheet (September 19, 2010)
	Total	**12.0 lbs/Ac**		

1) Highlighted species were added to the original proposed seed mix.
2) Double rate if broadcast seeded.

Table 2 – Non-Tailings Cell Seed Mixture

Common name (Scientific Name)	Variety [1]	Seeding Rate (LBS/Acre – PLS)[2]
Needle and Thread *(Stipa comate)*		1.8
Indian Ricegrass *(Oryzopsis hymenoides)*		1.8
Thickspike Wheatgrass *(Elymus lanceolatus)*	Critana	1.8
Sandberg Bluegrass *(Poa Secunda)*	Sandberg	0.9
Bottlebrush Squirreltail *(Elymus elmoides)*		0.9
Blue Grama *(Bouteloua graceilis)*	Alma	0.9
Galleta *(Hilaria jamesii)*	Viva	0.9
Forbs		
Blue Flax (*Linum lewisii)*	Appar	0.5
Palmer Penstemon (*Penstemon palmerii)*		1.0
Scarlet globemallow (*Sphaeralcea coccinea*)		1.0
Utah Sweetvetch (Hedysarum boreale)	Timp or native	1.0
Shrubs		
Fourwing saltbush (*Atriplex canescens*)		2.0
Gardner's saltbush *(Atriplex gardneri)*		2.0
Wyoming sage (*Artemisia tridentate spp wyomingensis*) [3]		0.25
Black Sage (*Artemisia nova*) [3]		0.25
Winterfat *(Krascheninnikovia lanata)*[4]		0.5
Total		**17.5. lbs/Ac**

[1] Where variety is not specified, use native seed genetically appropriate seed source/seed zone for all species to be planted.

[2] Double rate if broadcast seeded.

[3] Sagebrush if drill seed should be seeded through a separate drill box to permit very shallow seeding (i.e., < 1/8 inch) and proper seed placement for plant establishment (Lambert, 2005, and USDA http://plants.usda.gov/java/profile?symbol=ARTRW8). Best seeding results comes from surface broadcast seeding that is pressed into the soil to provide for a good soil-seed contact. Sagebrush seed can also be broadcasted directly onto snow or broadcast seeding followed by a cultipacker or drag chain (USDA . http://plants.usda.gov/java/profile?symbol=ARTRW8).

[4] Seeding rate in mixture is recommended as 0.5 lbs/acre if drilled and 1.0 if broadcasted. When drill seeded seed at depths < ¼ inch. Winterfat may also be broadcast on snow http://plants.usda.gov/plantguide/pdf/pg_krla2.pdf