10 November 2010 Project No. 073-81694.0022

Mr. Robert R. Monok
Project Manager
Energy Fuels Resource Corporation
44 Union Boulevard, Suite 600
Lakewood, Colorado 80228

RE: RESPONSES TO ADDITIONAL COMMENTS BY CDPHE
CLARIFICATION OF TAILINGS LIQUEFACTION POTENTIAL DISCUSSED IN RFI #4
PIÑON RIDGE PROJECT, MONTROSE COUNTY, COLORADO

Dear Bob:

Golder Associates Inc. (Golder) has prepared this letter to provide additional clarification of our responses to the Colorado Department of Public Health and Environment (CDPHE) regarding liquefaction potential of Tailings Cell materials, as requested by Mr. Larry Bruskin on 8 November 2010.

1.0 SUSCEPTIBILITY OF SITE MATERIALS TO LIQUEFACTION

Tailings Cell materials can be divided into three basic categories: native soils, structural fill materials and tailings materials. The Maximum Considered Earthquake (MCE) has a peak seismic acceleration of 0.161g with a return period of 2,475 years based on an $\mathbf{M_w}$ 4.8 earthquake located 15.5 km from the project site (Kleinfelder, 2008). The Design Earthquake (DE) (taken as two-thirds of the MCE) has a peak ground acceleration of 0.107g (Kleinfelder, 2008). For the design strong motion, native soils are not likely to liquefy, as reported by Golder (2008). Golder (2008) reports unadjusted blow counts for the native soils which range from 9 to over 50, i.e., one can conclude that even relatively loose soils (see Table 1) are not likely to liquefy when subjected to the anticipated strong motions. In addition, native soils should be at or very close to saturation for liquefaction to occur, which is not likely to be the case for the Tailings Cell foundation materials due to relatively deep groundwater.

Table 1: Relationship between Standard Penetration Blow Count and Density (Peck, et al., 1974)

SPT Penetration N-Value	Density
<4	Very Loose
4 – 10	Loose
10 – 30	Medium
30 – 50	Dense
>50	Very Dense

Structural fill materials used for Tailings Cell construction consist of processed native soils compacted to a minimum of 95 percent of the standard Proctor maximum dry density as outlined in Section 02200.0 (Earthworks) of the project Technical Specifications (Golder, 2010a). These compacted soils will exhibit densities that are larger than those of loose native soils. Consequently, the structural fill materials are also not likely to liquefy.

Tailings liquefaction potential is discussed in greater detail in Golder (2010b). Golder (2010b) indicates that tailings are not likely to liquefy after gaining sufficient strength during the consolidation process with confining stresses caused by both the self-weight of the tailings and the closure cover placement.

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During operations, however, the tailings are likely to remain liquefiable, with the liquefaction potential limited to a depth of approximately 55 feet (Golder, 2010b). Noting that tailings are delivered to the Tailings Cells as slurry, i.e. in a liquefied state, this result is not surprising. The anticipated low strength of the tailings during operations, however, is not likely to influence the Tailings Cell stability as demonstrated in Figure 1. The pseudostatic/seismic factor of safety of approximately 2.9 was evaluated for an operating Tailings Cell assuming fully liquefied tailings (i.e. with tailings modeled as a no-strength material).

2.0 CLOSING

We appreciate the opportunity to provide continued engineering services for the Piñon Ridge Project. If you have questions or comments regarding these responses, please contact the undersigned via phone at 303-980-0540, or via e-mail at kmorrison@golder.com.

Sincerely,

GOLDER ASSOCIATES INC.

Gordon Gjerapic, Ph.D., P.E.
Senior Project Engineer

Kimberly Finke Morrison, P.E., R.G.
Associate - Senior Project Manager

Attachments: Figure 1 – Tailings Cell Embankment Stability Assuming Fully Liquefied Tailings

GG/KFM/rjg

REFERENCES

Golder Associates Inc. (Golder). 2008. *Phase 2 Geotechnical Field and Laboratory Test Program, Piñon Ridge Project, Montrose County, Colorado*. Prepared for Energy Fuels Resources Corporation. October. Project No. 073-81694.0001.

Golder Associates Inc. (Golder). 2010a. *Response to Comments Included in Attachment 2 to CDPHE RFI#3, Piñon Ridge Project, Montrose County, Colorado*, letter response prepared for Energy Fuels Resources Corporation. October 27, 2010. Project No. 073-81694.0022.

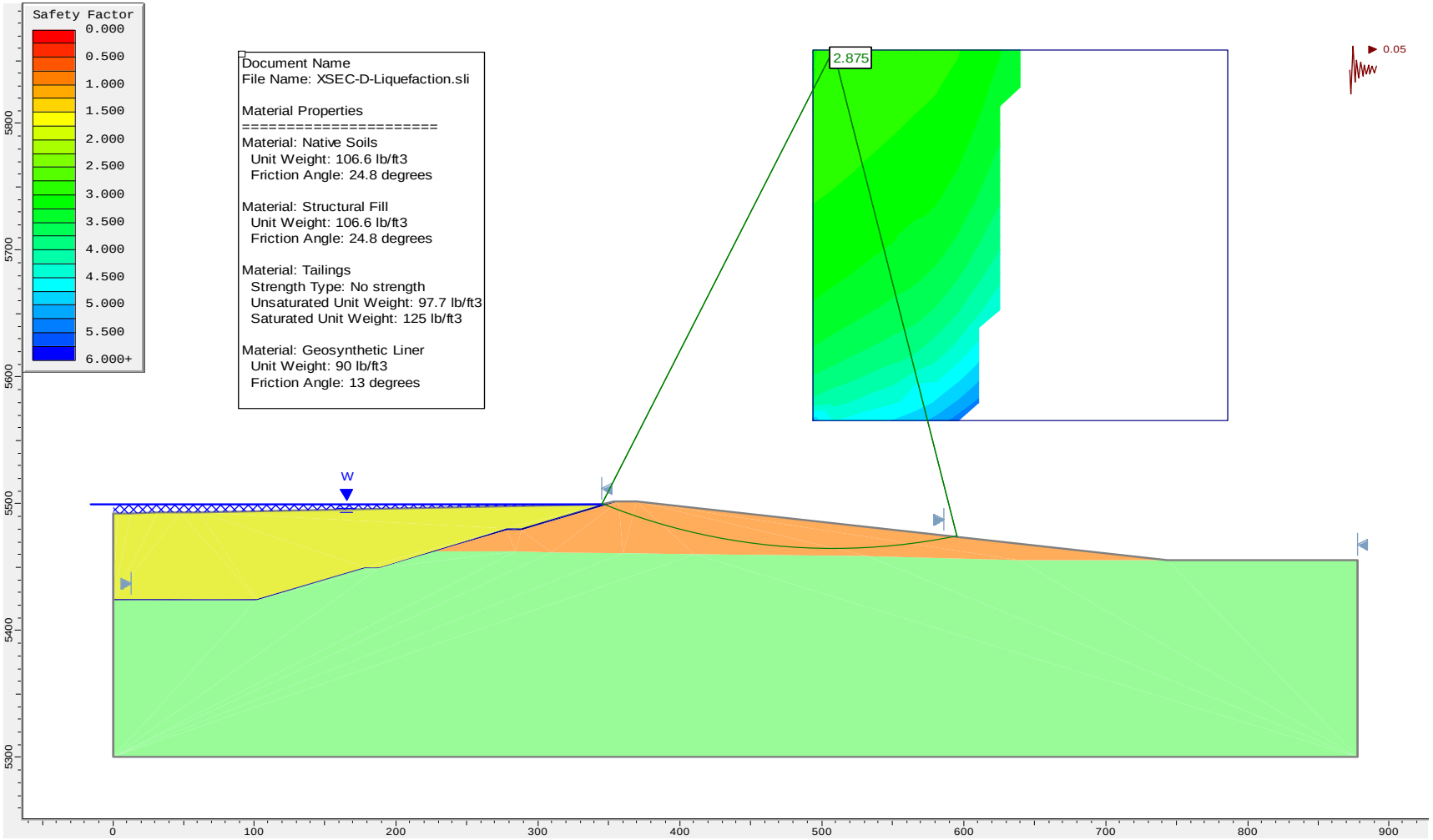
Golder Associates Inc. (Golder). 2010b. *Response to Specific Comments Included in CDPHE RFI#4, Piñon Ridge Project, Montrose County, Colorado*, letter response prepared for Energy Fuels Resources Corporation. November 1, 2010. Project No. 073-81694.0022.

Kleinfelder, Inc. (Kleinfelder) 2008. "*Design Ground Motions at Piñon Uranium Mill, Colorado*." Memorandum to Golder, January 14, 2008.

Peck R.B., W.E. Hanson, and T.H. Thornburn. 1974. *Foundation Engineering*, John Wiley & Sons, Inc., pp. 514.

FIGURE 1

TAILINGS CELL EMBANKMENT STABILITY ASSUMING FULLY LIQUEFIED TAILINGS



Golder Associates

Denver, Colorado

TITLE

TAILINGS CELL EMBANKMENT STABILITY ASSUMING FULLY LIQUEFIED TAILINGS

CLIENT/PROJECT

ENERGY FUELS RESOURCES CORPORATION
PIÑON RIDGE PROJECT - MONTROSE COUNTY, COLORADO

DRAWN	GG	DATE	Nov-10	JOB NO.	073-81694
CHECKED	DLG	SCALE	AS SHOWN	DWG. NO.	
REVIEWED	KFM	FILE NO.		FIGURE NO.	FIGURE 1