21 October 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 SPECIFIC ADDITIONAL COMMENTS ON RESPONSE NO. 2 TO REQUEST FOR ADDITIONAL INFORMATION #1, PIÑON RIDGE PROJECT, MONTROSE COUNTY, COLORADO

Dear Bob:

1.0 INTRODUCTION

Golder Associates Inc. (Golder) has prepared this letter to provide responses to specific comments from the Colorado Department of Public Health and Environment (CDPHE) as part of their additional request for information subsequent to issuance of comments on their Request for Information (RFI) #1. These comments were received from Clay Trumpolt during a meeting held on 9 September 2010 with Bob Monok of Energy Fuels Resources Corporation (EFRC). This letter includes responses prepared by Golder, SM&RC Engineers Inc. (SM&RC), and EFRC to the comments included as part of CDPHE's second request for information stemming from RFI #1.

2.0 RESPONSES TO COMMENTS

The comments and associated responses are provided in the following sections.

Comment No. 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?

Response No. 1

Since relatively loose soils were encountered at shallow depths at the Piñon Ridge site, preloading was recommended to reduce both the total and differential settlements (i.e., to reduce or alleviate undesirable effects of potentially large deformations due to loose surface soils, and settlement gradients due to anticipated variability of subsurface conditions). The recommended preloading timeframe of one month is considered sufficient for this application because the preloading is provided to enhance densification of the soils, not consolidation of the soils. The consolidation process, which can take a significant period of time for clayey soils, is not relevant for the recommended preloading procedure as the groundwater level is deep across the site, the soils have low saturation levels, and the soils consist in large part of silty and sandy soils that are free draining in comparison to clayey soils. The hydrogeologic site characterization report prepared by Golder (2009) documents that the measured groundwater levels beneath the mill area are on the order of 400 feet below the existing ground surface (ranges from about 385 ft to 407 ft).

Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, CO 80228 USA
Tel: (303) 980-0540 Fax: (303) 985-2080 www.golder.com

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Because the site soils are unsaturated, positive pore pressures are not likely to be generated during loading of the subsurface soils. In these and similar conditions, relatively short preloading periods on the order of 8 to 14 days are likely to be sufficient (see e.g., Wilson, 1953). Consequently, the proposed minimum preloading time of one month should be viewed as a conservative estimate.

Available information on subsurface soils within the mill area that may potentially exhibit consolidation behavior (clayey soils) is summarized in Table 1 (see Attachment 1) based on geotechnical information from Kleinfelder (2008). Information in Table 1 indicates that the thickness of soil layers containing clays or significant clay fraction is not likely to be in excess of 6 feet. A conservative consolidation estimate was performed to estimate the time for 90 percent consolidation based on the laboratory data by Kleinfelder (2008) and Golder (2008) summarized in Tables 2 and 3 (see Attachment 1). The resulting consolidation calculations are included in Table 4 of Attachment 1 indicating that 90% consolidation is likely to be reached within a couple of days from the commencement of loading.

Comment No. 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.

Response No. 2

The following response was obtained from SM&RC Engineers Inc. (SM&RC): The ACI Manual of Standard Practice 302.1R-69, Concrete Floor and Slab Construction states that positive drainage requires a slope of ¼-inch per foot for exterior slabs, and 1/16-inch per foot minimum is adequate for interior slabs. The ACI does indicate that it is preferred to use interior slab slopes of 1/8-inch per foot to obtain drainage. One-eighth (1/8) inch per foot is equivalent to a 1 percent slope. The slabs for this project are classified as interior. The design for the project slabs calls for a minimum of 1 percent slope, which is the preferred slope, and in many cases, the slope is higher because of the geometry of the slab containment structures.

The key elements that need to be addressed during construction to produce the desired slopes are noted in ACI 302.1R-69. In general, these elements include the following:

- Set the grades for forms and screeds properly
- Maintain grades for forms and screeds during concrete placement
- Maintain consistent slump of concrete mix during slab placement
- Frequently check grades, levels and slopes with long straightedge during concrete placement
- Concrete should be screeded immediately after placement using a laser guided screed supported on edge forms

Procedures to obtain the design slab slopes require relatively standard care during construction. To verify that the contractor performs the standard construction methods required, the engineer will review slab placement methods proposed by the contractor for the slab construction. The above notes (1 through 5) and the requirement for the contractor to submit their slab construction procedures for review will be added to the project notes drawing (000-S-001).

Comment No. 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.

Response No. 3

This comment will be addressed by EFRC.

Comment No. 4

Re Drawing No. 1000-S-001 Sump Plan and Details, the Division notes the water stop details provided include the type of water stop, dimensions, and the fact that it will be welded. Welding implies that the water stop will be continuous and the Division assumes this will be the case. If not intended please revise intent to state that all water stop will be continuous. Secondly, we note the use of natural rubber as the water stop 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?

Response No. 4

The following response was obtained from SM&RC: Welding does mean that all rubber water stops will be continuous. Water stop materials used for the project will be verified to be chemically compatible and retain strength and serviceability over the combined temperature range and movement they will see. Experience has shown that the life expectancy of the water stop material will be the service life of the project. Natural or synthetic rubber water stops are typically used in dams and containment structures for water treatment facilities that have a design life of 50 years. The manufacturer's independent chemical compatibility test for natural or synthetic water stops with the fluids requiring containment for this project show that the water stops are rated in the excellent to good category. The detail for the water stop will be revised to allow for synthetic or natural rubber. During final design, the water stop materials for each containment area using a water stop will be evaluated and specifically noted on the design drawings as being synthetic or natural rubber.

All water stops are embedded in concrete and will remain flexible for the temperature ranges anticipated for the project. The water stops as installed for this project that are located in construction joints will not see an abrupt ¾-inch displacement. Dowels have been placed across construction joints to limit local differential movement. In general, water stops at the concrete foundation containment joints will see little to no abrupt differential movement. The allowable design service movement at water stop joints is typically equal to the interior diameter of the center bulb. For this project, that would be ¼- to 3/8-inch. All joints will be evaluated specifically during final design to meet these requirements. If required, water stops with greater allowable service movement will be specified and used.

Comment No. 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.

Response No. 5

The following response was obtained from SM&RC: Drawing No. 1000-S-001 Sump Plan and Details, Section A-A has been revised to depict the 3-inch HDPE pipe for leak detection to extend to the top of the

underlying concrete. The pipe has been detailed with notching to provide for flow. The gravel within the sump has been specified on the drawing to be smaller than ¾-inch, but greater than ½-inch. The distance between the notches has been decreased to the recommended 1 inch.

Comment No. 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.

Response No. 6

This comment will be addressed by EFRC.

Comment No. 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.

Response No. 7

The following response was obtained from SM&RC: To facilitate the containment function of the slab, all concrete in areas that are required to contain fluid in the event of a spill will be batched and mixed at the concrete production plant with an additive that will reduce the permeability of the concrete including those cracks that may develop of a size up to 4mm. The additive to be selected will create a crystalline structure deep within the pores and capillary tracts of the concrete mass to prevent the penetration of water and aggressive chemicals. The additive is not dependent on surface adhesion to achieve its waterproofing and it is resistant to extreme hydrostatic pressure. Additionally, the additive will provide an internal membrane that is not subject to the deterioration problems encountered by exterior coating and membranes. Additives that will be specified included Rheomac 300D and Xypex Admix C-500.

In addition, all concrete will be designed to be acid resistant. This means that aggregates will be pretested during the mix design to enhance acid resistance. In high concentration areas where the concrete could be exposed to acid for long periods of time, a supplemental coating will be considered.

3.0 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: 1 – On-Site Soil Data and Consolidation Evaluation

GG/KFM/rjg

4.0 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, September.

Golder Associates Inc. (Golder). 2009. "*Hydrogeologic Report, Piñon Ridge Project, Montrose County, Colorado*." Prepared for Energy Fuels Resources Corporation. Revision 1. October.

Kleinfelder. 2008. "*Geotechnical Design Recommendations, Mill and Infrastructure, Piñon Ridge Project, Montrose County, Colorado.*" 31 October 2008.

Wilson, S.D. 1953. "*Control of Foundation Settlements by Preloading,*" Journal of the Boston Society of Civil Engineers, Vol. 40, No. 1, January, pp. 396-410.

ATTACHMENT 1

ON-SITE SOIL DATA AND CONSOLIDATION EVALUATION

Table 1 Summary of Kleinfelder (2008) Borehole Data - Mill Area Subsurface Layers Containing Clay

Borehole	Material	Depth (ft)	Thickness (ft)	Blow	Dry Density (pcf)	Moisture (%)
TB-1	Clayey sand	16	4	50/9"	107	7.5
TB-3	Clay (sandy)	13	3	50/9"		
TB-4	Clay (sandy)	14	3	27/12"	106	3.3
TB-6	Clay (sandy)	17	4	36/12"	108	5.2
TB-7	Clay (sandy)	8	2	24/12"	93	7.5
TB-7	Clay (sandy)	18	2	50/7	92	5.8
TB-8	Clay (sandy)	8	2	28/12"		
TB-9	Clay (sandy)	2	2.5	20/12"	90	5.8
TB-9	Clay (sandy)	12	3	50/8"		7.8
TB-11	Sand (silty to clayey)	6	6	18/12"		
TB-13	Sand (clayey to sandy clay)	8.5	4.5	25/12"	98	6.9
TB-14	Clay (sandy)	0	6	26/12	101	5.3
TB-18	Silt and Clay (sandy)	0	6	12/12"	85	4.9
TB-19	Silt and Clay (sandy)	8	4	20/12"	91	3.1

Table 2 Summary of Kleinfelder (2008) data

Borehole	Classification	Depth	Moisture	Density	VoidRatio	Hs (inch)	% settle_0	%_settle_1	H_init	H_end	e_init	e_end	Cc	Collapse (%)	LL	PI
TB-1	SC	19	7.50%	107	0.57	0.64	-0.20%	5%	1.002	0.95	0.578	0.496	0.082	0.60%	24	0
TB-3	CL	4	4.80%	100.4	0.68	0.60	4.50%	10%	0.955	0.9	0.603	0.510	0.092	3.60%		
TB-4	SM	19	3%	78.8	1.14	0.47	2.20%	8%	0.978	0.92	1.091	0.967	0.124	2.20%		
TB-5	SM	4	2.90%	98.1	0.72	0.58	11%	19.50%	0.89	0.805	0.529	0.383	0.146	7.10%		
TB-6	CL	19	5.20%	107.7	0.56	0.64	-1.50%	5%	1.015	0.95	0.588	0.486	0.102	-0.10%	18	5
TB-7	SM	4	2.30%	97.7	0.72	0.58	7.70%	15.80%	0.923	0.842	0.592	0.452	0.140	6.20%		
TB-7	CL	9	7.50%	92.6	0.82	0.55	-1.80%	10.50%	1.018	0.895	0.852	0.628	0.224	0.30%		
TB-9	CL	3	5.80%	89.7	0.88	0.53	5.40%	18.50%	0.946	0.815	0.777	0.531	0.246	3.60%		
TB-9	SM	9	4.20%	96.5	0.75	0.57	4.20%	13.70%	0.958	0.863	0.673	0.507	0.166	4.10%		
TB-9	CL	14	7.60%												27	13
TB-11	SM	19	3%	95.4	0.77	0.57	-1%	7.60%	1.01	0.924	0.784	0.632	0.152	0.60%	23	2
TB-13	SC	9	6.90%	98.2	0.72	0.58	11.20%	20.40%	0.888	0.796	0.524	0.366	0.331	9.90%		
TB-13	SM/ML	14	4.80%	95.1	0.77	0.56	4.20%	10%	0.958	0.9	0.697	0.594	0.103	3.40%		
TB-14	CL	4	5.30%	100.6	0.67	0.60	7.50%	19.50%	0.925	0.805	0.549	0.348	0.201	6.40%	20	3
TB-15	SM	14	2%	102.4	0.65	0.61	5.30%	10.50%	0.947	0.895	0.558	0.473	0.086	3.90%		
TB-15	SM	19	2.70%	100	0.68	0.59	7%	14.10%	0.93	0.859	0.567	0.447	0.120	5%		
TB-16	SM	4	2.60%	96.7	0.74	0.57	2.10%	8%	0.979	0.92	0.706	0.603	0.103	2.30%	21	5
TB-18	ML/CL	4	4.90%	85	0.98	0.50	10%	20.50%	0.9	0.795	0.784	0.576	0.208	8.40%	21	4
TB-18	SM	19	5.60%	101.9	0.65	0.60	1%	9%	0.99	0.91	0.637	0.505	0.132	1.50%		
TB-19	ML/CL	9	3.10%	91.4	0.84	0.54	4%	15%	0.96	0.85	0.770	0.567	0.203	2.90%	21	6
TP-19	SM	14	6.40%	106	0.59	0.63	1%	10.50%	0.99	0.895	0.574	0.423	0.151	1.90%		
TB-11-12, 19-20	SC	0 to 5 ft	9.70%	121.6	0.39	0.72	0.50%	2.50%	0.995	0.975	0.379	0.351	0.028	0.10%	20	3

Notes:

1) Assumed Gs 2.7
2) Assume 1 inch high sample
3) Extrapolate values H_init, H_end from maximum loads to calculate Cc values, i.e. extend normal consolidation part of the curve to 1 ksf (for H_init) and 10 ksf (for H_end).

Table 3 Saturated Permeability Values (Golder, 2008)

	Golder lab	SWCC testing Univ. of Wisconsin
k min (cm/sec)	3.40E-05	2.70E-05
kmax (cm/sec)	5.90E-04	1.80E-04

Notes:

1) Permeability values for on-site soils (samples collected outside the mill-pad area)

Table 4 Consolidation Calculation

Job No:	073-81694
Made By:	GG
Checked By:	DLG
Reviewed By:	KFM
Date:	10/14/2010

Material Parameters and Geomety:

Compression index	Cc	0.331	
Column height	H	1.8288	m
Hydrulic cond.	k	2.33E-02	m/day
Water density	γ_w	9.81	kN/m^3
Soil density	γ_s	20	kN/m^3
Average initial stress	σ'_0	50	kN/m^2
Load on surface	p	71.82	kN/m^2
Final stress	σ'_1	121.82	
Initial void ratio	e_0	0.7	
Final void ratio	e_1	0.57	
Compressibility	m_v	1.05E-03	m^2/kN
Consolidation coef.	cv	2.27	m^2/day
		0.26	cm^2/sec
Total Displacement		0.14	m

Lab Data:

Void ratio (end load)	0.366	
Dry Density	19.39	kN/m^3
Moisture	6.90%	
Soil Density	20.73	

Loading Conditions:

Load	1500	psf
	71.82	kPa

	Pore Pressures (kPa)		
t (days)	z=H	z=H/2	%Consol
0	71.59	71.50	0%
1	17.16	12.13	83%
2	3.22	2.28	97%
5	0.02	0.02	100%
10	0.00	0.00	100%
20	0.00	0.00	100%
50	0.00	0.00	100%
100	0.00	0.00	100%
200	0.00	0.00	100%
400	0.00	0.00	100%
1000	0.00	0.00	100%
2000	0.00	0.00	100%
3000	0.00	0.00	100%
4000	0.00	0.00	100%
5000	0.00	0.00	100%

$$c_v = \frac{k}{\gamma_w m_v}$$

$$m_v = \frac{1}{1+e_0}\frac{e_0 - e_1}{\sigma'_1 - \sigma'_0}$$

$$m_v = \frac{d\varepsilon_v}{d\sigma_v'} = \frac{1}{(1+e)}\frac{de}{d\sigma_v'} = \frac{1}{\ln(10)(1+e)}\frac{C_c}{\sigma_v'}$$

$$\Delta e = C_c \log\left(\frac{\sigma_1}{\sigma_0}\right)$$

$$T_v = \frac{c_v t}{d^2}$$