2008 SURFACE WATER QUALITY SUMMARY
ENERGY FUELS RESOURCES CORPORATION
URANIUM MILL LICENSING SUPPORT
PIÑON RIDGE MILL
MONTROSE COUNTY, COLORADO

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1.0 INTRODUCTION

Energy Fuels Resources Corporation (EFR) plans to construct and operate a conventional acid leach uranium mill at the Piñon Ridge Mill Site. The mill will process ore produced from mines within a reasonable truck-hauling distance of the Site and will have a capacity of 500 tons per day. The operating life of the mill is expected to be 40 years.

The Site is located at 16910 Highway 90, approximately 14 miles west of Naturita, Colorado on Colorado State Highway 90. The Site comprises approximately 880 acres and is located approximately 12 miles west-northwest of Naturita, Colorado. Surface water sampling for baseline characterization is required as part of the application for the mill license and the radioactive source materials license to be issued and administered by the Colorado Department of Public Health and Environment (CDPHE).

The sampling program has been developed to collect surface water on a run-off event basis, rather than a fixed calendar schedule, due to the intermittent nature of run-off events in the area. The intent is to characterize the baseline chemistry of seasonal runoff from snow melt and spring and summer storms.

The four surface water samplers were installed on February 12, 2008 in selected drainages on the site. These locations were selected based on the following criteria:

- least likely to incur damage in the near future as a result of construction activities;
- located in water courses where evidence of recent water flow exists; and
- characteristic of the upstream and downstream conditions for water flow across the Site.

A standard rain gauge is located adjacent to each sampling site to record storm intensity in the immediate area of the sampler. Refer to Figure 1 for the surface water sampler locations and associated watershed boundaries.

The surface water samplers consist of a polyethylene catchment box, nested inside a Quazite polymer concrete vault. Details of the samplers are shown on Figure 5-2 of the Surface Water Sampling Work Plan. The double-box arrangement is installed below grade and at sufficient depth to resist displacement during storm events. The top of the catchment is protected by a Quazite lid, secured to the liner by screws and punctured with holes over the inner liner to allow water collection and exclude large debris from dropping into the catchment. The inner liner is removable for sampling and

decontaminating after the samples are collected. Within the liner is a series of three 0.020-inch slotted 4-inch diameter polyvinyl chloride (PVC) tubes, threaded and capped on both ends, which are used for pre-filtration to reduce sediments in the water samples.

Three surface water run-off events of sufficient intensity to sample were recorded on the site in 2008 following installation of the samplers. Corresponding surface water samples were collected for each run-off event. Surface water was not present at all fours sampling sites for each event. Table 1 documents the type of run-off event, rain gauge recording, and presence or lack of run-off at each sampling location for each event.

2.0 FIELD ACTIVITIES

The presence of run-off at each sampler location is dependent on the intensity of the storm or snow melt event, recent events and their intensity, and the specific conditions at each sampler location.

2.1 Precipitation Gauging

The standard rain gauges at each sampler location were checked during daily site checks whenever there was a precipitation event occurring or one had occurred in the past 24 hours. In addition, the sampler locations were checked during daily site checks when snowmelt conditions existed. The rain gauges were checked on 27 occasions between May and November, 2008. Recordable amounts of precipitation (i.e. greater than "trace") were observed in the rain gauges on 22 of those occasions. On only two occasions was run-off, or evidence of recent run-off, in volumes sufficient to be collected in the samplers observed in any of the drainages. The rain gauges were not operational in February through April 2008 and December 2008 due to freezing conditions. During these months, the drainages were checked for run-off during and after rain and snowmelt events.

2.2 Surface Water Sampling

Surface water sampling was conducted in accordance with the Work Plan for Surface Water Sampling (Work Plan), as revised on December 18, 2008. Three surface water samples were collected in 2008. Sample collection data sheets are included in Appendix A.

<u>February 12, 2008 Sampling Event</u>

Kleinfelder and Energy Fuels personnel arrived on-site on February 12 to complete installation of the surface water samplers. The Quazite vaults had been previously installed and they planned to install the liners and PVC pre-filtration apparatus. Upon arrival they found that surface water was present due to snowmelt at samplers S-1, S-2 and S-3. There was no flow at sampler S-4, but snow cover was present at that location. The field personnel proceeded to collect surface water samples directly from the Quazite vaults at sample sites S-1, S-2 and S-3. Because the field crew was not planning to sample, they did not have a sampling pump to field filter samples or a water quality meter to measure field parameters. As a result, only raw samples were collected

and were filtered in the laboratory, where necessary, and no field parameters were recorded. In addition, only a single polyethylene bailer was available to collect the samples. The bailer was decontaminated between sample locations and an equipment rinsate sample was collected during a decontamination rinse. During the sampling event, it was noted by the sampling personnel that the samples were likely too heavily sediment-laden to field filter.

The sample liners and pre-filtration apparatus were decontaminated and installed into the Quazite boxes following the conclusion of the snowmelt event on February 25, 2008.

September 29, 2008 Sampling Event

Energy Fuels conducted sampling of the surface water samplers on September 29, 2008. The surface water samples were collected as soon as practical following the storm event that occurred on September 27 and 28, 2008. The samplers collected surface water at sites S-1 and S-3. The storm event measured 0.6 inches and 0.5 inches at sample locations S-1 and S-3, respectively. Although rainfall of 0.5 inches and 0.3 inches was recorded at samplers S-2 and S-4, respectively, the samplers did not contain any surface water and the associated drainages did not show signs of recent run-off. Each sampler was sampled using a peristaltic pump with dedicated tubing. In addition to the surface water samples, duplicate samples were collected at each site. The samples contained high amounts of sediment. Efforts to filter the samples in the field proved unsuccessful. Filtering of the dissolved constituent samples was performed in the laboratory where more robust filtering equipment was available. Field parameters were measured from a grab sample during the sampling event.

Following sample collection, pre-cleaned liners and pre-filtration apparatus were installed in samplers S-1 and S-3. The used apparatus from the samplers were decontaminated in the following days, placed in clean plastic bags, and stored for use following the next sampling event.

October 7, 2008 Sampling Event

Energy Fuels conducted sampling of the surface water samplers on October 7, 2008. The surface water samples were collected as soon as practical following the storm event that occurred on October 5 and 6, 2008. The samplers collected surface water at sites S-1 and S-3. The storm event measured 0.7 inches and 0.8 inches at sample

locations S-1 and S-3, respectively. Although rainfall of 0.8 inches was recorded at samplers S-2 and S-4, the samplers did not contain any surface water and the associated drainages did not show signs of recent run-off. Each sampler was sampled using a dedicated disposable poly bailer. Both of the samples contained high amounts of sediment and were determined to be unfilterable using available field equipment. Filtering of the dissolved constituent samples was performed in the laboratory. Field parameters were measured from a grab sample during the sampling event.

Following sample collection, pre-cleaned liners and pre-filtration apparatus were installed in samplers S-1 and S-3. The used apparatus from the samplers were decontaminated in the following days, placed in clean plastic bags, and stored for use following the next sampling event.

3.0 DATA SUMMARY

Surface water samples collected in 2008 were analyzed for field parameters, general chemistry parameters, total and dissolved metals, and radionuclides. The analytical results are summarized in Table 2 and laboratory data sheets are included in Appendix B.

3.1 Surface Water Quality Field Parameters

Field parameters were measured at the time of sample collection. Surface Water field parameters include temperature, pH, specific conductance, dissolved oxygen, and oxidation reduction potential. Because the field parameters were measured on grab samples, the dissolved oxygen and oxidation-reduction potential are considered to be qualified data.

Field parameters were not collected during the February 12, 2008 sampling event. A water quality meter was not available during the February 12 event because field personnel only intended to complete installation of the samplers, not to collect samples.

3.2 Surface Water Analytical Results

Surface water samples were analyzed for:

- Dissolved aluminum, antimony, arsenic, barium, beryllium, cadmium, copper, iron, lead, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, thallium, uranium, vanadium, and zinc;
- Total chromium;
- Total antimony, arsenic, cadmium, lead, mercury, selenium, and thallium (February 12 and October 6 samples only)
- General Chemistry (fluoride, nitrate/nitrite, total dissolved solids, and total suspended solids) by applicable methods;
- Dissolved/Total radionuclides (gross alpha, radium 226, radium 228, thorium 230, and thorium 232).

The duplicate samples were analyzed only for dissolved metals. A summary of the laboratory analytical results relative to CDPHE and US EPA surface water standards applicable to the receiving portion of the Dolores River (Lower Dolores River Stream

Segment 3a) is presented in Table 2. Copies of the laboratory analytical reports for the monitoring wells are provided in Appendix B.

3.3 Quality Assurance/Quality Control Review

A review of the ACZ Level 3 quality control indicates the instruments appear to be functioning properly because method blanks, spike, and duplicate concentrations were generally within the acceptable ranges per the specified methods. Where quality control samples were outside of acceptable ranges, the laboratory provided case narratives that indicated or resolved the discrepancies.

Data completeness is measured as a percentage of the targeted parameters for which unqualified data are obtained. The data completeness target for this project is 90 percent. The data completeness for all of the surface water samples collected in 2008 is summarized below.

The data completeness for the February 12 samples is 76% for each of the three samples (S-1, S-2, and S-3) due to inability to collect field pH, exceedance of hold time for nitrate + nitrite, and no analyses for dissolved iron, manganese, nickel, zinc, radium-226, radium-228, and thorium. The field pH of the samples could not be measured because a water quality meter was not available as the February 12 event was intended to be a sampler installation event, not a sampling event. The samples did not arrive at the laboratory within the specified hold time for nitrite. For this reason, the samples could not be analyzed with the specified hold time for nitrate + nitrite. This issue is addressed in further detail below. The dissolved metals and radionuclides that were not analyzed for in these samples were not included on the analyte list at the time of this sampling event as the work plan had not yet been finalized. Total, rather than dissolved, radium-226, radium-228, and thorium were analyzed for in these samples. If total radiological analyses are accepted in lieu of dissolved radiological analyses, the data completeness will increase to 84% for each sample. This issue is discussed in further detail below.

The data completeness for the September 29 samples is 87% due to improper lab handling of the radiological samples and exceedance of hold time for nitrate + nitrite. The radiological samples could not be filtered in the field due to high sediment load. The samples were sent to the lab unpreserved with instructions to filter in the lab. However, the lab preserved the samples before they could be filtered. As a result, only total radiological analyses are available for these samples. Acceptance of these

analyses is discussed in further detail below. If these radiological analyses are accepted, the data completeness for these two samples will increase to 97% for each sample. The samples arrived at the laboratory in time, but could not be analyzed by the laboratory within the specified hold time for nitrite. For this reason, the samples were not analyzed within the specified hold time for nitrate + nitrite. This issue is addressed in further detail below.

The data completeness for the October 7 samples is 97% and 100% for S-1 and S-3, respectively. The reduced data completeness for the S-1 sample is due to exceedance of the hold time for nitrate + nitrite. This issue is discussed in further detail below.

Energy Fuels discussed the issues regarding total instead of dissolved radionuclides results and exceedance of nitrate + nitrite hold times with CDPHE. The following actions were taken as a result of those discussions:

- Data completeness was reduced for the February 12 and September 29 samples due in part to analysis for total radionuclides instead of dissolved radionuclides. Surface water samples collected in early 2009 were analyzed for both dissolved and total radiological analytes. If further sampling and analyses indicate a direct correlation between the dissolved and total radiological levels, then the total radiological analytes in the February 12 and September 29 samples may be acceptable for use.

- Due to the very short hold time for nitrite (48 hours), it was found that getting the samples shipped to the laboratory from the site with adequate time remaining for analysis within the hold time was impractical. As a result, the work plan was modified on December 18, 2008 to include nitrate + nitrite analysis, as opposed to analysis of nitrate and nitrite separately. As a result, the samples can be preserved in the field and the hold time extended to 28 days.

4.0 DISCUSSION

Following additional surface water sample collection and analysis, a summary of the surface water sampling results will be prepared. Due to the low number of precipitation events resulting in run-off in 2008 and reduced data completeness, only limited observations can be made at this time. Field observations and analytical results for the 2008 sampling events indicate:

- Only storm events of 0.5 inches of precipitation or more and an extended snow melt event produced enough volume of water to cause run-off at sample stations S-1 and S-3 in 2008;

- No storm events produced a sufficient volume of water to cause run-off at S-2 in 2008. The largest recorded storm event at S-2 was 0.8 inches. An extended snow melt event did produce enough water for run-off at S-2 on 2/12/08;

- No storm or snow melt events produced sufficient volume of water to cause run-off at S-4 in 2008. The largest recorded storm event at S-4 in 2008 was 0.8 inches;

- Concentrations of total suspended solids in the surface water samples were high in all of the stormwater samples ranging from 700 to 36,000 mg/L. These high levels prevented field filtering of samples;

- Elevated levels of total chromium were observed in all of the surface water samples collected in 2008;

- Total radium-226 and radium-228 were elevated in nearly all samples although dissolved radionuclides were not;

- Duplicate samples were collected from S-1 and S-3 on 9/29/08. Duplicate sample analyses were highly variable ranging from 0 to 78 relative percent difference (RPD). The highest degree of variability was observed in the analyses for dissolved arsenic, barium, iron, lead, and zinc. The high sediment load and resulting inability to field filter the samples may have been contributing factors.

TABLES

Table 1
Surface Water Sampling Record

Date	**2/12/08**		**9/29/08**		**10/7/08**	
Sampler ID	Sample	Event	Sample	Event	Sample	Event
S-1	Yes	Snow melt	Yes	Rain 0.6”	Yes	Rain 0.7”
S-2	Yes	Snow melt	No	Rain 0.5“	No	Rain 0.8”
S-3	Yes	Snow melt	Yes	Rain 0.5”	Yes	Rain 0.8”
S-4	No	Snow melt	No	Rain 0.3“	No	Rain 0.8”

Note: Storm and snow melt events that did not produce run-off at any of the samplers are not included

Table 2
Piñon Ridge Mill Site
Surface Water Analytical Results

Well ID		S-1			S-2	S-3			Equipment Rinsate	DUP-1 (S-3)	DUP-2 (S-1)	CDPHE Agriculture	CDPHE Dolores Segment 3a	CDPHE Aquatic Class 2	CDPHE Recreational Class E	EPA 40 CFR Part 440
Date		2/12/08	9/29/08	10/6/08	2/12/08	2/12/08	9/29/08	10/6/08	2/12/08	9/29/08	9/29/08					
Type of Event		SM	P - 0.6"	P - 0.7"	SM	SM	P - 0.5"	P - 0.8"	SM	P - 0.5"	P - 0.6"					
Parameter	**Unit**															
Field Parameters																
Temperature	deg C	NM	16.1	4.7	NM	NM	15.2	2.3	NM	15.2	16.1					
pH	s.u.	NM	7.83	8.51	NM	NM	7.72	8.48	NM	7.72	7.83		6.5-9.0	6.5-9.0	6.5-9.0	6.0-9.0
Specific Conductivity	µS/cm	NM	188	198	NM	NM	193	135	NM	193	188					
Dissolved Oxygen	mg/L	NM	6.24	7.62	NM	NM	6.09	4.41	NM	6.09	6.24	3.0	5.0	6.0	3.0	
Oxidation-reduction Potential	mV	NM	148	191	NM	NM	188	165	NM	188	148					
General Water Quality																
Nitrate+Nitrite as N	mg/L	0.7	9.16	1.91	0.4	0.4	60.2	0.79	NA	NA	NA	100	100			
Total Dissolved Solids (TDS)	mg/L	1240	4720	1170	930	1580	1280	1320	NA	NA	NA					
Total Suspended Solids (TSS)	mg/L	920	36000	3500	1600	700	1940	1800	NA	NA	NA					30 (1) ; 20 (2)
Fluoride	mg/L	0.1	<1	<1	<0.1	<0.1	0.1	<1	NA	NA	NA					
Dissolved Metals																
Aluminum	mg/L	0.08	<0.2	0.14	0.08	0.14	0.12	1.16	NA	0.21	0.58					
Antimony	mg/L	0.0005	<0.002	0.0012	<0.0004	0.0005	0.0008	0.0016	NA	0.0006	0.0006					
Arsenic	mg/L	0.0062	0.0067	0.0120	0.0047	0.0031	0.026	0.0231	NA	0.0117	0.0290			0.34 (3) ; 0.15 (4)		1.0 (max) ; 0.5 (1)
Barium	mg/L	0.119	0.29	0.133	0.102	0.061	0.101	0.486	NA	0.295	0.251					
Beryllium	mg/L	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	NA	<0.002	<0.002					
Cadmium	mg/L	<0.0001	<0.0005	0.0002	<0.0001	0.0002	<0.0001	0.0004	NA	0.0001	0.0004			(5)		
Copper	mg/L	<0.01	<0.05	<0.01	<0.01	0.02	<0.01	<0.01	NA	0.02	<0.01			(5)		
Iron	mg/L	NA	0.14	0.09	NA	NA	1.69	0.10	NA	0.12	0.45					
Lead	mg/L	<0.0003	0.0009	0.0007	0.0002	0.0003	0.0002	0.0026	NA	0.0002	0.0024			(5)		
Manganese	mg/L	NA	0.641	0.228	NA	NA	0.025	0.645	NA	0.080	0.848			(5)		
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002			0.0014 (3) ; 0.00001 (4)		
Molybdenum	mg/L	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01					
Nickel	mg/L	NA	0.0041	0.0017	NA	NA	0.004	0.0034	NA	0.0031	0.0050			(5)		
Potassium	mg/L	17.5	17	15.0	9.1	8.4	13.0	9.8	NA	17.0	17.6					
Selenium	mg/L	<0.001	<0.0005	0.0003	<0.001	<0.001	0.0007	0.0002	NA	0.0006	0.0005			0.0184 (3) ; 0.0046 (4)		
Silver	mg/L	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	NA	<0.01	<0.01			(5)		
Thallium	mg/L	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	NA	<0.0001	<0.0001			0.015 (4)		
Uranium	mg/L	0.0032	0.0005	0.0001	0.0020	0.0004	0.0003	0.0002	NA	0.0003	0.0004			(5)		
Vanadium	mg/L	0.023	<0.03	0.018	0.010	0.010	0.015	0.019	NA	0.021	0.014					
Zinc	mg/L	NA	0.003	0.010	NA	NA	0.02	0.026	NA	0.007	0.024			(5)		1.0 (1) ; 0.5 (2)
Total Metals																
Antimony	mg/L	<0.004	NA	<0.002	<0.004	<0.004	NA	<0.002	<0.0004	NA	NA					
Arsenic	mg/L	0.033	NA	0.050	0.020	0.029	NA	0.048	<0.0005	NA	NA	0.1 (2)	0.1			
Cadmium	mg/L	0.003	NA	0.0045	0.003	0.003	NA	0.0034	<0.0001	NA	NA	0.01 (2)	0.01			
Chromium	mg/L	0.12	0.6	0.08	0.10	0.11	0.12	0.10	<0.01	NA	NA	0.1 (2)	0.1			
Lead	mg/L	0.041	NA	0.0891	0.043	0.052	NA	0.0925	<0.0001	NA	NA	0.1 (2)	0.1			
Mercury	mg/L	<0.0002	NA	<0.0002	<0.0002	<0.0002	NA	<0.0002	<0.0002	NA	NA					
Selenium	mg/L	0.001	NA	0.0024	<0.001	<0.001	NA	0.0022	<0.0001	NA	NA	0.02 (2)	0.02			
Thallium	mg/L	0.003	NA	0.0033	<0.001	<0.001	NA	0.0024	<0.0001	NA	NA					
Radionuclides - Dissolved																
Gross Alpha	pCi/L	73	2.3	0.26	56	75	150	0.0	0.76	NA	NA					
Radium 226	pCi/L	NA	NA	0.23	NA	NA	NA	0.52	NA	NA	NA					10 (1) ; 3.0 (2)
Radium 228	pCi/L	NA	NA	0.6	NA	NA	NA	2.3	NA	NA	NA					
Thorium 230	pCi/L	NA	NA	-0.12	NA	NA	NA	-0.36	NA	NA	NA					
Thorium 232	pCi/L	NA	NA	0.04	NA	NA	NA	-0.15	NA	NA	NA					
Radionuclides - Total																
Radium 226	pCi/L	20	21	NA	9.4	12	19	NA	0.08	NA	NA	5	5	5	5	30 (1) ; 10 (2)
Radium 228	pCi/L	7.8	2.5	NA	11	11	6	NA	2.5	NA	NA					
Thorium 230	pCi/L	11	21	NA	5.2	11	13	NA	-0.33	NA	NA	60	60	60	60	
Thorium 232	pCi/L	1.98	3.83	NA	2.71	2.99	4.93	NA	-0.04	NA	NA					

Notes:
(1) - Maximum value
(2) - 30-day average value
(3) - Acute
(4) - Chronic
(5) - Hardness dependent standard
NA - Not Analyzed
NM - Not Measured
P - 0.5" - Precipitation and Intensity (in total inches)
SM - Snowmelt
Shading indicates a concentration or activity level above of a surface water standard applicable to the Lower Dolores River Stream Segment 3a.

Regulatory References:
CDPHE WQCD Regulation No. 31 - The Basic Standards and Methodologies for Surface Water (amended 1/14/08)
CDPHE WQCD Regulation No. 35 - Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins (amended 2/12/07)
EPA CFR40 Part 440 Subpart C - Uranium, Radium and Vanadium Ores Subcategory