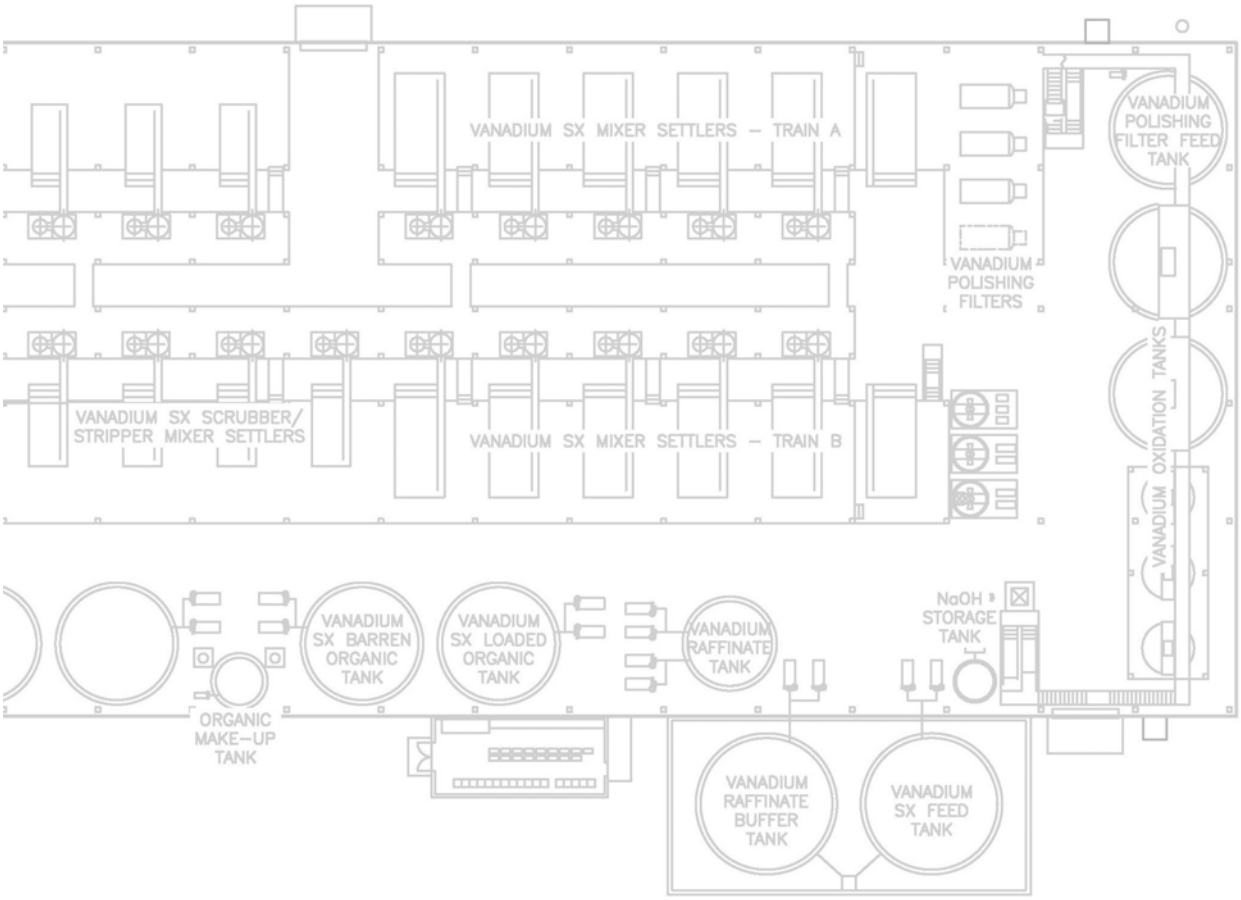
RAFFINATE CHARACTERIZATION
PIÑON RIDGE MILL
MONTROSE COUNTY, COLORADO



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Prepared For:

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1595 Wynkoop Street
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August 2010

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1.0 INTRODUCTION

The Piñon Ridge Mill will extract both uranium and vanadium from ores mined in western Colorado and eastern Utah. The uranium is extracted first followed by the vanadium. Most of the barren wastewater from the vanadium circuit, commonly referred to as vanadium raffinate or simply raffinate, will be recycled; however, an estimated 30 percent will be disposed of in evaporation ponds. Characterization of the vanadium raffinate at the proposed Piñon Ridge Mill is necessary for engineering purposes and to study the potential environmental and health effects associated with the operation of the evaporation ponds. Among the effects considered is the need to evaluate the potential radon flux from the ponds during milling operations. Energy Fuels researched historical data for raffinate at uranium/vanadium mills but was unable to find data from other mills that correlated well with the proposed operations at the Piñon Ridge Mill. As a result, bench-scale testing was initiated to produce raffinate solution for characterization.

Energy Fuels contracted with J.E. Litz and Associates, LLC (J.E. Litz) to perform bench-scale testing of regional Uravan Mineral Belt ores similar to those that will be processed at the Piñon Ridge Mill. J.E. Litz originally performed ore amenability bench-scale testing for mill design purposes. Regional ore samples from five local uranium mines were used for the bench-scale test. The ore amenability testing produced excess leach filtrate solutions that were used for the raffinate sample preparation. The raffinate sample preparation consisted of simulating the uranium and vanadium solvent extraction circuits. The resulting raffinate from the bench-scale vanadium solvent extraction circuit was sent to Energy Laboratories, Inc. for analysis of radium-226. Total dissolved solids and major ions were also analyzed in some of the samples for purposes unrelated to radon flux estimations. In addition, J.E. Litz evaporated a composite raffinate solution sample to produce a raffinate crystal sample that is representative of the salt crystals that would be created in the evaporation ponds. The raffinate crystal samples were analyzed for radium-226, radium-228, thorium-230, throium-232, and lead-210.

Radium-226 activities ranged from 59 to 600 ρCi/L in the raffinate samples from the five ores. A composite raffinate sample had an activity level of 234 ρCi/L. The raffinate crystals contained 7.9 ρCi/g of radium-226. This data was provided to SENES Consultants Limited (SENES) for their use in modeling radon flux from the proposed evaporation ponds (SENES 2010).

2.0 MILLING PROCESS

A brief overview of the milling process is provided in this section, as the physical changes and chemicals added during processing ultimately control the radon chemistry of the vanadium raffinate.

The proposed Piñon Ridge Mill is a conventional acid-leach operation. The milling process starts with mixing the ore with water and grinding it into a fine-grained slurry (commonly referred to as pulp). The pulp is leached with sulfuric acid, causing the uranium and vanadium to separate from the rock particles and enter into solution. The minerals are then recovered from the leach solution using solvent extraction methods and precipitated as uranium oxide (U_3O_8) concentrate (called yellowcake) and vanadium oxide (V_2O_5) concentrate, respectively. These dry concentrates are sealed in 55-gallon, steel drums and transported off site for further processing by others. The primary milling and process stages include:

- Grinding;
- Pre-leaching and Thickening;
- Leaching;
- Separation and Purification;
- Uranium Recovery; and
- Vanadium Recovery.

Following is a brief description of each primary component of the milling process. The vanadium solvent extraction process is described in more detail because it is the stage in which the raffinate is produced. Figure 1, Process Flowsheet, illustrates the milling and process stages.

<u>Grinding</u>

Run-of-mine ore is fed into the mill from on-site stockpiles using a front-end loader and/or trucks. The ore is dumped into a feed hopper and delivered by belt conveyor to a semi-autogenous grinding (SAG) mill. In the SAG mill, the ore is combined with water and tumbled with steel balls. The tumbling action causes the larger ore pieces and steel balls to grind the ore into fine particles, exposing the uranium and vanadium mineral surfaces in the host rock.

Pre-leaching and Thickening

The resulting pulp from the SAG mill, consisting of minus 0.03-inch sized particles and water, is distributed to one of two large pulp storage tanks. The pulp is pumped from the storage tanks to two pre-leach tanks where the pulp reacts with pregnant leach solution from the leaching circuit that contains excess sulfuric acid. The pulp is then pumped to a thickener tank where the aqueous overflow from the thickener is clarified and sent to a feed tank for use in the uranium recovery circuit. The partially dewatered underflow from the thickener is pumped to the leaching circuit for further extraction of uranium and vanadium.

Leaching

The leach circuit consists of eight tanks with agitators. The tanks are arranged in a cascading and staggered configuration so that individual tanks can be bypassed if necessary. In the leaching circuit, the pulp pumped from the pre-leach thickener tank is heated with steam and leached with sulfuric acid to dissolve the uranium and vanadium minerals. Sodium chlorate is added as an oxidant, as necessary, to improve the dissolution process.

Liquid/Solid Separation and Purification

The leached pulp is pumped to a series of counter-current decantation (CCD) thickeners, where liquids and solids are separated. The uranium- and vanadium-bearing (or pregnant) solution is separated from the remaining solids, called tailings, which consist of a variety of other minerals that were present in the ore. The pregnant solution is pumped to the pre-leach tanks and subsequently to the uranium recovery feed tank while the tailings are disposed of in the tailings cell.

Uranium Recovery

A solvent extraction (SX) process is used to concentrate and recover the uranium from the pregnant aqueous solution. In the SX process, the aqueous solution is filtered and the uranium extracted and purified using a kerosene-based solvent, commonly referred to as the organic solution or simply the “organic.” Following scrubbing, the uranium is stripped from the organic and concentrated using a sodium carbonate solution. The uranium is precipitated from the sodium carbonate solution, partially dewatered, washed, filtered, and then dried in a vacuum dryer. The dried yellowcake is packed, weighed, and sealed in 55-gallon steel drums for shipment.

Vanadium Recovery

After the uranium has been removed from the aqueous solution in the uranium SX circuit, the vanadium-bearing solution from that process (also known as the uranium raffinate) is pumped to the vanadium SX circuit for extraction of vanadium. Figure 2 shows the layout of the vanadium SX portion of the mill.

Before the dissolved vanadium can be extracted from the aqueous solution, it must first be oxidized and re-filtered. The oxidation is performed in a series of five agitated tanks where sodium chlorate is added. Ammonia is also added in these tanks to increase the pH level. After oxidation, the solution is filtered to remove suspended solids and pumped to the vanadium SX feed tank for use in the vanadium SX circuit.

The vanadium SX circuit is very similar to the uranium SX circuit. An organic solution, consisting primarily of kerosene with an amine extractant, is circulated counter-current to the pregnant solution. The organic selectively removes the vanadium from the aqueous solution and concentrates it by two- to three-fold in the organic solution. The process starts by pumping the pregnant solution from the vanadium SX feed tank to the first of five vanadium mixer-settler tanks, and pumping the barren organic solution to the fifth mixer settler tank. The aqueous solution then advances from mixer-settler tanks No. 1 through No. 5 while the organic extracts the vanadium as it advances from mixer-settler tanks No. 5 through No. 1. The organic is less dense that the aqueous solution, so it separates from the aqueous solution within the settling portion of each tank and floats on top. The loaded organic is skimmed off the top of mixer-settler tank No. 1 while the aqueous solution, depleted of vanadium, is removed from the base of mixer-settler tank No. 5.

The loaded organic is pumped to the loaded organic tank and then to the vanadium scrub and strip circuit. In the vanadium scrub and strip circuit, vanadium is scrubbed in a mixer-settler with an aqueous solution and then stripped from the organic carrier in three stripper-mixer-settlers using a caustic sodium carbonate/sodium hydroxide solution. The vanadium is then precipitated, dewatered, and dried in a kiln. The V_2O_5 discharging from the kiln is melted in a furnace and solidified into a black-flake product, which is packed, weighed and sealed in 55-gallon, steel drums for shipment.

The depleted aqueous solution (i.e. the vanadium raffinate) flows from the mixer-settlers into a raffinate settler for removal of residual organics and then is pumped to the tailings collection box and/or the evaporation ponds. As shown on Figure 2, the aqueous

solution increases from a pH of 1.1 to a final pH of 4.44 during the vanadium extraction process. This increase in pH plays an important role in determining the final radiochemistry of the raffinate, as radium, like most metals, precipitates out of solution with an increase in pH. Most of these metal-laden precipitates are removed in the polishing filters and pumped to the tailings cell for disposal. The remaining precipitates are either entrained in the organics and removed in the scrubbing stage or remain as suspended solids in the raffinate.

3.0 SAMPLE PREPARATION AND ANALYSIS

The ores used in the ore amenability bench-scale testing included ore samples from the following regional mines:

- Pandora Mine (near La Sal, Utah)
- Packrat Mine (near Gateway, Colorado)
- West Sunday Mine (near Slick Rock, Colorado)
- JD-8 Mine (near Naturita, Colorado)
- Energy Queen Mine (near La Sal, Utah)

The ore samples were sent to Hazen Research, Inc. for crushing, blending, splitting portions for test purposes, and preparing head analytical pulps. Hazen Research then performed analyses of the ore for selected metals, ions and minerals. The ore samples were then transferred to J.E. Litz where bench-scale ore amenability testing was performed.

J.E. Litz ground each of the ore samples in an 8-inch batch rod mill. Additional water was added, as necessary, to each pulp sample to approximate the pulp density specified in the mill design. The pulp samples were then continuously agitated and heated to 85º C. During the heating, sulfuric acid and sodium carbonate were added to achieve free acid content and oxidation potential goals. The leach process continued for 24 hours total.

The ore amenability bench-scale testing was used primarily to collect data for refining the mill design. However, extraction of the uranium and vanadium using an organic solvent allowed for the production and testing of the vanadium raffinate. In the first test, raffinate samples were neutralized to various pH levels and the resulting solutions were analyzed for metal concentrations. The metal concentrations, especially those for selenium, proved to be elevated above ecological screening levels even at a neutral pH. Given these results, Energy Fuels incorporated bird netting into the evaporation pond design to exclude birds and bats from the raffinate solutions.

A second test, which is the subject of this characterization report, was run to test for radionuclides in the raffinate and its precipitates. In this test, excess leach solutions from the ore amenability bench-scale test were used to prepare raffinate samples, which were subsequently submitted to a laboratory for analysis of radium-226 and other analytes. The extractions were done at different pH levels than those specified in the

mill design because the test could not perfectly replicate all of the steps involved in the uranium and vanadium solvent extraction processes. However, the pH of the raffinate was increased to 4.5 after the extractions to approximate the raffinate pH specified in the mill design (pH = 4.44).

Raffinate Preparation

The leach solutions from each ore were filtered and the resulting filtrates were neutralized to a pH of 1.8 with hydrated lime. Extraction of the bulk of the uranium was performed by contacting with a solvent containing Alamine-336, decyl alcohol and kerosene. The solvent was subsequently stripped of the uranium with a sodium carbonate solution.

The leach filtrates barren of uranium, i.e. the uranium raffinates, were oxidized by heat and sodium chlorate. The vanadium was then extracted from each of the uranium raffinates by one to two contacts with the stripped solvent from the uranium extraction. The solvent solution was subsequently stripped with a sodium carbonate solution. The vanadium barren solutions, i.e. vanadium raffinates, had a resulting pH of 1.67 to 2.19.

Aliquots of the five vanadium raffinates were taken and composited and a sample was collected for analysis. The remaining vanadium raffinates were neutralized to a pH of 4.5, the approximate design pH of the vanadium raffinate, with hydrated lime. Aliquots from each of the five pH 4.5 raffinates were composited. Samples of pH 4.5 raffinates from each of the five ores and the composited pH 4.5 raffinate were collected for analysis. Aliquots of the remaining pH 4.5 raffinates were composited and neutralized to a pH of 7.5 with hydrated lime and a sample was collected for analysis. Additional aliquots of the pH 4.5 raffinates were composited and evaporated to crystals in an oven at 50º C.

The raffinate and crystal samples were packaged and sent in an ice chest to Energy Laboratories Inc. for analysis. Additional sample preparation details are provided in a June 1, 2010 Memorandum by J.E.Litz, which is included as Appendix A to this report.

Analytical Results

Radium-226 is the element of concern for the purposes of estimating radon flux from the raffinates. The radium-226 analytical results for the raffinate samples are summarized in Table 1 and the raffinate crystal analytical results are summarized in Table 2. Total dissolved solids (TDS) and major ions were also analyzed in several of the raffinate

samples for other uses. The complete laboratory report is included as Appendix B to this report.

Table 1
Ra-226 Raffinate Analytical Summary

Sample ID	**Radium-226 Activity** (ρCi/L)
Pandora Raffinate – pH 4.5	81
Packrat Raffinate – pH 4.5	59
West Sunday Raffinate – pH 4.5	258
JD-8 Raffinate – pH 4.5	600
Energy Queen Raffinate – pH 4.5	208
Composite Raffinate – pH 2	840
Composite Raffinate – pH 4.5	234
Composite Raffinate – pH 7.5	211

Table 2
Raffinate Crystal Analytical Summary

Parameter	**Activity** (ρCi/g)
Radium-226	7.9
Radium-228	0.05
Thorium-230	19
Thorium-232	0.1
Lead-210	3.5

A review of the Energy Laboratories quality control indicates the instruments appear to be functioning properly because method blanks, spike, and duplicate concentrations were within the acceptable ranges per the specified methods. Where quality control samples were outside of acceptable ranges, the laboratory provided notes that indicated or resolved the discrepancies. The laboratory QA/QC Summary Report is included in Appendix B with the Laboratory Data Report.

4.0 DATA INTERPRETATION

The radium-226 activities in the pH 4.5 vanadium raffinates ranged from 59 to 600 ρCi/L. The average activity of the five raffinates was 241 ρCi/L which is consistent with the composite pH 4.5 raffinate sample at 234 ρCi/L. The large variation in activity levels of the individual samples is not attributable to the ore grade, as the JD-8 raffinate had the highest radium-226 level but the JD-8 ore had the lowest uranium concentration (0.186 percent U_3O_8) of the five samples tested. Similarly, the Packrat raffinate had the lowest radium-226 level but the Packrat ore had the second highest uranium concentration (0.527 percent U_3O_8) of the five samples tested. Upon review of the laboratory QA/QC Summary report, it was discovered that the JD-8 Sample was received at the laboratory with a pH of 2. It appears that that sample may inadvertently have not been treated with the hydrated lime during sample preparation.

Uranium and vanadium mills such as the proposed Piñon Ridge Mill typically process ore in batches whereby ore from each separate source is stockpiled until a sufficient quantity exists to feed the mill for an extended period of time (e.g., 20 days). This is done because each ore is chemically and physically different and requires slightly different reagent application rates, resident times, and other process adjustments to maximize recoveries. Accordingly, the radium-226 activity level in the evaporation pond water is expected to vary depending on the ore being processed. For purposes of estimating a conservative radon flux rate, the maximum observed value (600 ρCi/L) was used by SENES as the radium activity in their modeling of the evaporation pond raffinate (SENES 2010). As discussed above, the maximum observed activity level was likely due to the depressed pH of the sample; however, it is possible that the mill may occasionally run ore from the Chinle Formation from eastern Utah. The Chinle ore does not contain vanadium and therefore would produce a lower pH raffinate similar to that of the JD-8 sample.

The three composite raffinate samples at various pH levels indicate a 70% drop (from 840 ρCi/L to 234 ρCi/L) in radium-226 activity between pH 2 and pH 4.5 and only a 10% drop between pH 4.5 and pH 7.5. This clearly demonstrates the influence of pH on the solubility of radium. It also shows the large effect that the vanadium circuit has on lowering radium-226 levels in the evaporation pond. Interestingly, the amount of radium-226 in the evaporation pond, assuming an activity level of 234 ρCi/L, is only about 10% of the radium-226 found in the surrounding native soils for an equivalent volume. The calculations demonstrating this relationship are provided in Appendix C.

The raffinate crystal sample had relatively low levels of radionuclides with a radium-226 activity level of only 7.9 ρCi/g. By comparison, the tailings are expected to have an average radium-226 level of 647 ρCi/g (Golder 2010), almost 100 times greater. As another point of reference, background soil samples collected in the vicinity of the evaporation ponds had a median activity level of about 1 ρCi/g but background activity levels as high as 24 ρCi/g were recorded in samples collected in the drainages on the south end of the site. This is not unexpected or unusual for this area of the State, as the drainages carry eroded soil and rock from the mineralized Salt Wash sandstone exposed on the side of the mesa above. This is the same geologic unit that is being mined for the uranium and vanadium (ERG 2009).

Thorium-230, which is in the same decay chain as radium-226, had a slightly higher activity level than radium at 19 ρCi/g. If we assume equilibrium, these radionuclides would have identical activity levels. A small amount of disequilibrium is, however, not unusual. As a second check, the composite pH 4.5 raffinate was converted to an activity in the raffinate solids using the TDS of the raffinate of 15.2 g/L with a result of 15.4 ρCi/g (i.e., 234 ρCi/L divided by 15.2 g/L). Although slightly higher, this value is generally consistent with the measured 7.9 ρCi/g. The difference is primarily attributable to the inherent inaccuracy in measuring radioactivity levels. The radium-226 activity level of 7.9 ρCi/g was used in the SENES study (SENES 2010), as this was the measured value.

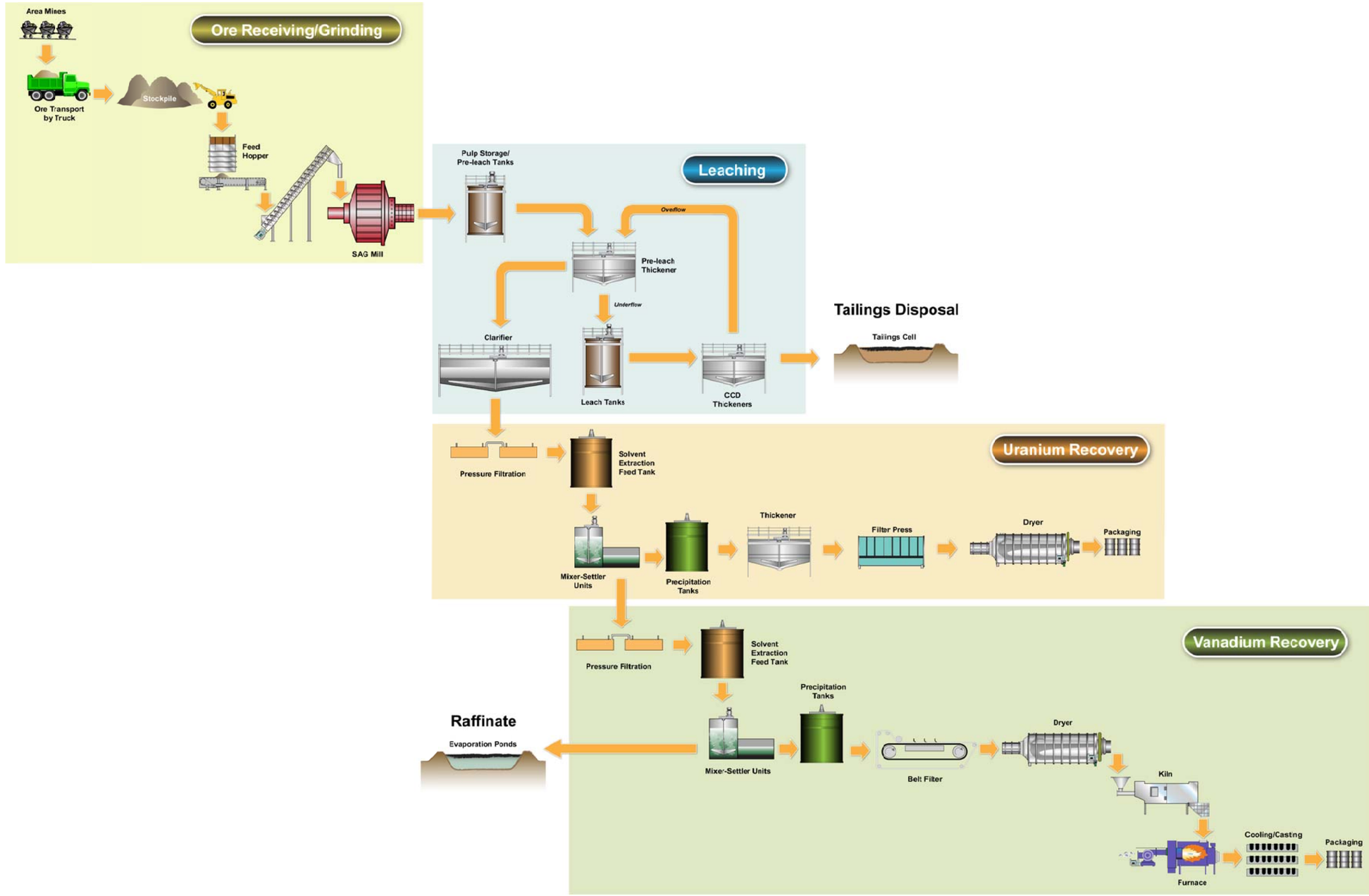
5.0 REFERENCES

Environmental Restoration Group, Inc (ERG) 2009. Baseline Radiological Investigation Report. Piñon Ridge Uranium Mill. Montrose County, Colorado. October 5.

Golder Associates Inc. (Golder) 2010. Uranium Mill Tailings Radon Flux Calculations, Piñon Ridge Project, August 17.

SENES Consultants Limited (SENES) 2010. Evaporation Pond Radon Flux Analysis. Piñon Ridge Mill Project. Montrose County, Colorado. August 4.

FIGURES

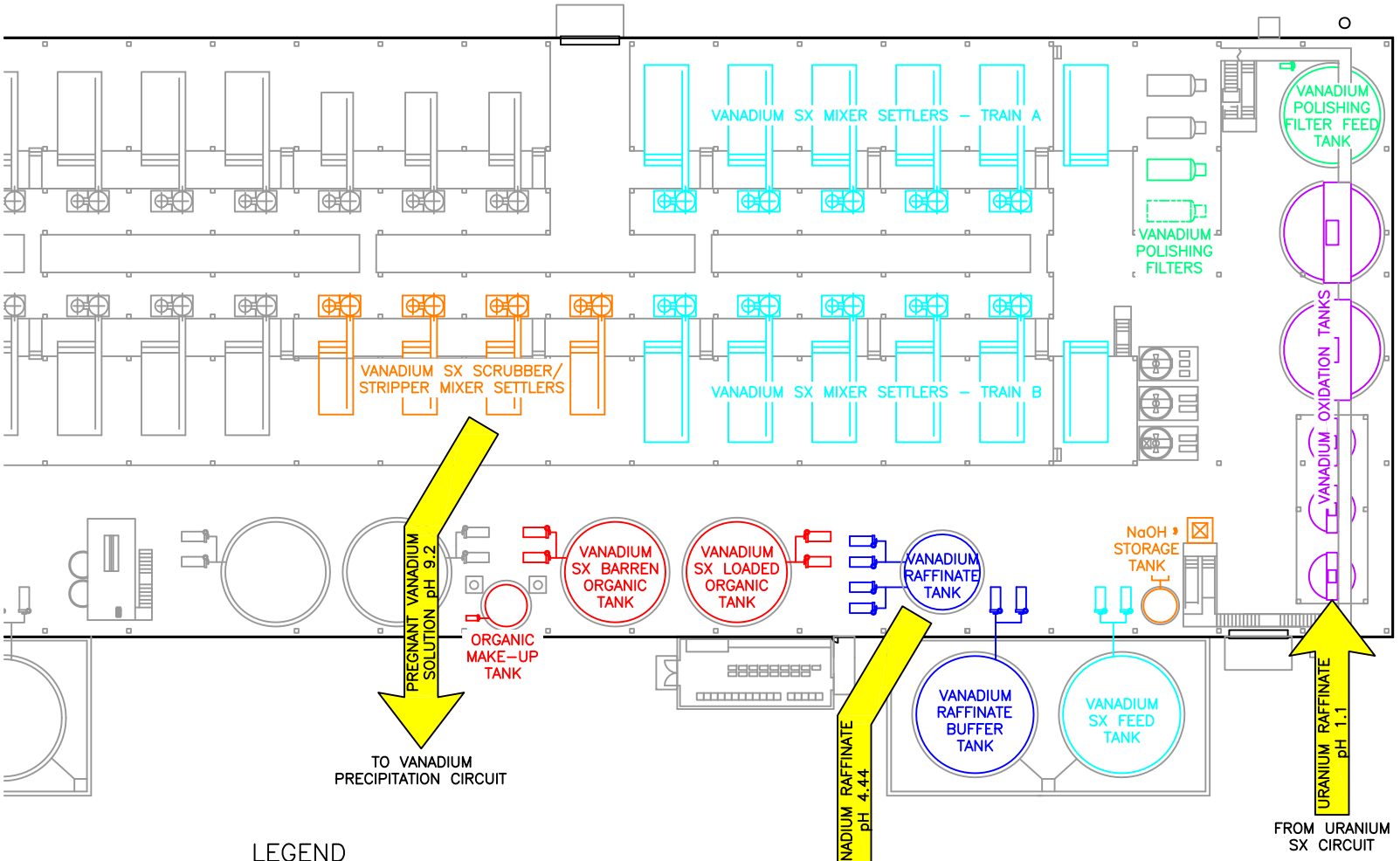


Energy Fuels Resources Corporation

FIGURE 1
PROCESS FLOWSHEET

Scale	Created	Drawn by
None	August 23, 2010	ZTR

Fig 1_Process Flowsheet.dwg



LEGEND

- VANADIUM SX OXIDATION
- VANADIUM SX FILTRATION
- VANADIUM SX MIXING/SETTLING
- VANADIUM SX RAFFINATE
- VANADIUM SX ORGANIC SOLUTIONS
- VANADIUM SX SCRUBBING/STRIPPING

URANIUM RAFFINATE pH 1.1 – VANADIUM SX CIRCUIT INFLOW/OUTFLOW WITH SOLUTION AND DESIGN pH

NOTE: GRAYED OUT EQUIPMENT IS NOT PART OF THE VANADIUM SX CIRCUIT

Energy Fuels Resources Corporation

FIGURE 2
VANADIUM SX CIRCUIT

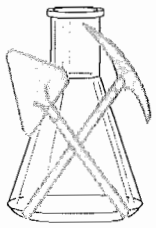
Scale	Created	Drawn by
None	August 23, 2010	ZTR

Fig 2_Vanadium SX Circuit.dwg

APPENDIX A

J.E. Litz & Associates Raffinate Sample Preparation Memo

J. E. LITZ & ASSOCIATES, LLC
5906 McINTYRE STREET GOLDEN COLORADO 80403
303.854.2035 FAX 303.273.0494



MEMORANDUM

TO: Zach Rogers

FROM: John Litz

DATE: June 1, 2010

SUBJECT: Preparation of Raffinate Samples

You requested that raffinate samples be prepared for radium, TDS and major ion analyses. The earlier program for Energy Fuels did not include studies on the uranium and vanadium solvent extraction. Therefore, previously prepared samples for analysis were done at a scale just large enough to provide the necessary sample volumes.

For this program 1250 mL volumes of leach filtrate from each of the five ore samples tested were treated for uranium and vanadium extraction. The filtrates first were adjusted to about 1.8 pH by addition of a hydrated lime slurry. The additions were 6.4 to 10.4 grams of $Ca(OH)_2$/liter. The solutions were filtered and the uranium extracted by one or two contacts with 3% Alamine 336 and 2% Decyl Alcohol in kerosene. The uranium was stripped from the solvent with a sodium carbonate solution.

The raffinates from the uranium extraction were oxidized by heating to 60°C and the addition of 2.6 to 3.3 grams sodium chlorate/liter. The pH of the solutions was not adjusted after the oxidation. The oxidized solutions then had the vanadium extracted by one or two contacts with the stripped solvent from the uranium extraction. This solvent also was stripped with a sodium carbonate solution to provide barren solvent for reuse. The pH of the raffinates from the vanadium extraction ranged from 1.67 to 2.19.

Composite of the raffinates was made and submitted as Sample #2.

The balance of the raffinate from each test was adjusted to 4.5 pH by the addition of a hydrated lime slurry. The additions ranged from 3.6 to 10 grams $Ca(OH)_2$/liter. A 500-mL portion of each raffinate, after filtration, was submitted as Samples 1-A through 1-E.

130 mL volumes of the adjusted and filtered raffinates were composited and submitted as, Sample #3.

130-mL portions of the filtered 4.5 pH samples were composited and adjusted to 7.5 pH by the addition of hydrated lime slurry. Less than 2 mL of lime slurry (less than 0.7 g $Ca(OH)_2$/liter) was required for the adjustment. This composite was filtered and submitted as Sample #4.

200-mL portions of each raffinate were composited and evaporated to dryness at 50°C. The 1000-mL volume weighed 1018 grams. The crystals from the evaporation weighed 23 grams and had a tapped volume of 30 mL.

Data from the preparation of the 7.5 pH raffinate and the evaporated crystals are included on the 5-10-E (Energy Queen) data sheet.

J.E. Litz & Associates, L.L.C.		Raffinate Preparation	Project No.:	10-4-2
Metallurgical & Chemical Processing Consultan		West Sunday	Date:	5/10/2010
5906 McIntyre Street	(303) 279-2581			
Golden, CO 80403	FAX (303) 279-6061			

0.6 g/L U3O8 1.9 g/L V2O5 **5-10-A**

Raffinate neutralization	Starting volume	1250 mL	Initial pH	1.03	
	Lime slurry added	50 mL	pH	1.69-1.81	
		`10 g Ca(OH)2			
Uranium extraction	3% Alamine 336	330 mL contact 1	org #	fresh	2.01 pH
Oxidation	4.09 g NaClO3	1.56 pH	g Na2CO3 to adjust pH		
Vanadium extraction	3% Alamine 336	500 mL contact 1	org #	fresh	1.94 pH
Raffinate					
Adjustment to	4.5 pH	55 mL lime slurry		4.46 Final pH	
		~11 g Ca(OH)2			

J.E. Litz & Associates, L.L.C.		Raffinate Preparation	Project No.:	10-4-2
Metallurgical & Chemical Processing Consultant		Pandora	Date:	5/10/2010
5906 McIntyre Street	(303) 279-2581			
Golden, CO 80403	FAX (303) 279-6061			

0.6 g/L U3O8 0.9 g/L V2O5 **5-10-B**

Raffinate neutralization	Starting volume	1250 mL	Initial pH	0.92	
	Lime slurry added	65 mL	pH	1.66-1.77	
	Adjusting raffinate??	~13 g Ca(OH)2			
Uranium extraction	3% Alamine 336	330 mL contact 1	org #	fresh	2 pH
Oxidation	3.44 g NaClO3	1.66 pH		g Na2CO3 to adjust pH	
Vanadium extraction	3% Alamine 336	250 mL contact 1	org #	2.19	pH
Raffinate					
Adjustment to	4.5 pH	28 mL lime slurry		4.6 Final pH	
		~11 g Ca(OH)2			

J.E. Litz & Associates, L.L.C.		Raffinate Preparation	Project No.:	10-4-2
Metallurgical & Chemical Processing Consultant		Pack Rat	Date:	5/10/2010
5906 McIntyre Street	(303) 279-2581			
Golden, CO 80403	FAX (303) 279-6061			

1.1 g/L U3O8 4.4 g/L V2O5 **5-10-C**

Raffinate neutralization	Starting volume	1250 mL	Initial pH	0.98	
	Lime slurry added	52 mL	pH	1.73-1.94	
	Adjusting raffinate??	~11 g Ca(OH)2			
Uranium extraction	3% Alamine 336	330 mL contact 1	org #	D+1/4(A+B)	pH
		495 mL contact 2	org #	fresh	2.09 pH
Oxidation	4.0 g NaClO3	1.58 pH	____ g Na2CO3 to adjust pH		
Vanadium extraction	3% Alamine 336	350 mL contact 1	org #	fresh	1.84 pH
		500 mL contact 2	org #	fresh	1.85 pH
Raffinate					
Adjustment to	4.5 pH	80 mL lime slurry ~16 g Ca(OH)2		____ Final pH	

J.E. Litz & Associates, L.L.C.		Raffinate Preparation	Project No.:	10-4-2
Metallurgical & Chemical Processing Consultant		JD-8	Date:	5/10/2010
5906 McIntyre Street	(303) 279-2581			
Golden, CO 80403	FAX (303) 279-6061			

0.4 g/L U3O8 1.3 g/L V2O5 **5-10-D**

Raffinate neutralization
Starting volume 1250 mL Initial pH 0.96
Lime slurry added 58 mL pH 1.78-1.89
Adjusting raffinate?? `12 g Ca(OH)2

Uranium extraction 3% Alamine 336 330 mL contact 1 org # fresh 2.17 pH

Oxidation 3.85 g NaClO3 1.77 pH _____ g Na2CO3 to adjust pH

Vanadium extraction 3% Alamine 336 350 mL contact 1 org # 1.89 pH

Raffinate

Adjustment to 4.5 pH 20 mL lime slurry 4.8 Final pH
~4 g Ca(OH)2

Evaporation _____ mL each raffinate

_____ mL initial volume _____ g inital volume _____ mL final volume
_____ g final volume

J.E. Litz & Associates, L.L.C.		Raffinate Preparation	Project No.:	10-4-2
Metallurgical & Chemical Processing Consultant		Energy Queen	Date:	5/10/2010
5906 McIntyre Street	(303) 279-2581			
Golden, CO 80403	FAX (303) 279-6061			

2.2 g/L U3O8 1.8 g/L V2O5 **5-10-E**

Raffinate neutralization
Starting volume 1250 mL Initial pH 1.00
Lime slurry added 40 mL pH 1.79-1.90
Adjusting raffinate?? `8 g Ca(OH)2

Uranium extraction 3% Alamine 336 495 mL contact 1 org # 3/4(A+B) pH
495 mL contact 2 org # fresh 2.02 pH

Oxidation 3.26 g NaClO3 1.66 pH _____ g Na2CO3 to adjust pH

Vanadium extraction 3% Alamine 336 495 mL contact 1 org # fresh 1.67 pH

Raffinate

Adjustment to 4.5 pH _____ mL lime slurry _____ Final pH
~11 g Ca(OH)2

Raffinate composite 140 mL of each 4.5 pH raffinate
Adjustment to 7.5 pH ~2 mL lime slurry 7.8 Final pH
~0.4 g Ca(OH)2

Evaporation 200 mL each raffinate

1000 mL initial volume 1018 g inital weight 30 mL final tapped volume
23 g final volume

APPENDIX B

Raffinate Analytical Data Reports

ANALYTICAL SUMMARY REPORT

June 16, 2010

Energy Fuels Resources Corporation
44 Union Blvd Ste 600
Lakewood, CO 80228

Workorder No.: C10050360

Project Name: Pinon Ridge Mill

Energy Laboratories, Inc. received the following 9 samples for Energy Fuels Resources Corporation on 5/12/2010 for analysis.

Sample ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C10050360-001	Pandora-4.5 pH 1-B	05/10/10 00:00	05/12/10	Aqueous	Radium 226, Total
C10050360-002	Packrat-4.5 pH 1-C	05/10/10 00:00	05/12/10	Aqueous	Same As Above
C10050360-003	West Sunday-4.5 pH 1-A	05/10/10 00:00	05/12/10	Aqueous	Same As Above
C10050360-004	JD-8-4.5 pH 1D	05/10/10 00:00	05/12/10	Aqueous	Metals by ICP/ICPMS, Total Alkalinity Fluoride E300.0 Anions Nitrogen, Nitrite Nitrogen, Nitrate + Nitrite Metals Preparation by EPA 200.2 Radium 226, Total Solids, Total Dissolved
C10050360-005	Energy Queen-4.5 pH 1-E	05/10/10 00:00	05/12/10	Aqueous	Same As Above
C10050360-006	Composite-Raff 2	05/10/10 00:00	05/12/10	Aqueous	Metals by ICP/ICPMS, Total Acidity, Total as CaCO3 Alkalinity Fluoride E300.0 Anions Nitrogen, Nitrite Nitrogen, Nitrate + Nitrite Metals Preparation by EPA 200.2 Radium 226, Total Solids, Total Dissolved
C10050360-007	Composite-4.5 pH 3	05/10/10 00:00	05/12/10	Aqueous	Metals by ICP/ICPMS, Total Alkalinity Fluoride E300.0 Anions Nitrogen, Nitrite Nitrogen, Nitrate + Nitrite Metals Preparation by EPA 200.2 Radium 226, Total Solids, Total Dissolved
C10050360-008	Composite-7.5 pH 4	05/10/10 00:00	05/12/10	Aqueous	Same As Above
C10050360-009	Raffinate Crystals 5	05/11/10 00:00	05/12/10	Solid	Digestion For RadioChemistry Lead 210 Radium 226 Radium 228 Thorium, Isotopic

ANALYTICAL SUMMARY REPORT

This report was prepared by Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-001
Client Sample ID: Pandora-4.5 pH 1-B

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
RADIONUCLIDES - TOTAL							
Radium 226	81	pCi/L				E903.0	05/24/10 16:11 / jah
Radium 226 precision (±)	2.8	pCi/L				E903.0	05/24/10 16:11 / jah
Radium 226 MDC	0.44	pCi/L				E903.0	05/24/10 16:11 / jah

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-002
Client Sample ID: Packrat-4.5 pH 1-C

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
RADIONUCLIDES - TOTAL							
Radium 226	59	pCi/L				E903.0	05/24/10 16:11 / jah
Radium 226 precision (±)	2.4	pCi/L				E903.0	05/24/10 16:11 / jah
Radium 226 MDC	0.46	pCi/L				E903.0	05/24/10 16:11 / jah

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-003
Client Sample ID: West Sunday-4.5 pH 1-A

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
RADIONUCLIDES - TOTAL							
Radium 226	258	pCi/L				E903.0	05/24/10 16:11 / jah
Radium 226 precision (±)	5.1	pCi/L				E903.0	05/24/10 16:11 / jah
Radium 226 MDC	0.48	pCi/L				E903.0	05/24/10 16:11 / jah

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-004
Client Sample ID: JD-8-4.5 pH 1D

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Alkalinity, Total as CaCO3	5	mg/L		5		A2320 B	05/20/10 11:30 / ljl
Bicarbonate as HCO3	6	mg/L		5		A2320 B	05/20/10 11:30 / ljl
Calcium	660	mg/L		1		E200.7	05/17/10 13:54 / cp
Chloride	367	mg/L		1		E300.0	05/15/10 12:14 / ljl
Fluoride	0.8	mg/L		0.1		A4500-F C	05/18/10 14:34 / ljl
Magnesium	1990	mg/L		1		E200.7	05/17/10 13:54 / cp
Nitrogen, Nitrate+Nitrite as N	1.4	mg/L		0.1		E353.2	05/17/10 16:41 / ljl
Nitrogen, Nitrite as N	ND	mg/L		0.1		A4500-NO2 B	05/12/10 15:44 / ja
Phosphorus	ND	mg/L	D	0.2		E200.7	05/17/10 13:54 / cp
Potassium	348	mg/L		1		E200.7	05/17/10 13:54 / cp
Sodium	933	mg/L	D	3		E200.7	05/17/10 13:54 / cp
Sulfate	10500	mg/L	D	6		E300.0	05/15/10 12:14 / ljl
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	14700	mg/L	D	490		A2540 C	05/14/10 14:18 / kre
RADIONUCLIDES - TOTAL							
Radium 226	600	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 precision (±)	3.8	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 MDC	0.17	pCi/L				E903.0	05/24/10 20:54 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-005
Client Sample ID: Energy Queen-4.5 pH 1-E

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Alkalinity, Total as CaCO3	10	mg/L		5		A2320 B	05/20/10 11:32 / ljl
Bicarbonate as HCO3	12	mg/L		5		A2320 B	05/20/10 11:32 / ljl
Calcium	743	mg/L		1		E200.7	05/17/10 14:06 / cp
Chloride	471	mg/L		1		E300.0	05/15/10 12:29 / ljl
Fluoride	0.2	mg/L		0.1		A4500-F C	05/18/10 14:38 / ljl
Magnesium	1050	mg/L		1		E200.7	05/17/10 14:06 / cp
Nitrogen, Nitrate+Nitrite as N	0.6	mg/L		0.1		E353.2	05/17/10 16:43 / ljl
Nitrogen, Nitrite as N	ND	mg/L		0.1		A4500-NO2 B	05/12/10 15:44 / ja
Phosphorus	ND	mg/L	D	0.2		E200.7	05/17/10 14:06 / cp
Potassium	232	mg/L		1		E200.7	05/17/10 14:06 / cp
Sodium	787	mg/L	D	3		E200.7	05/17/10 14:06 / cp
Sulfate	6680	mg/L	D	3		E300.0	05/15/10 12:29 / ljl
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	10400	mg/L	D	32		A2540 C	05/12/10 15:05 / kre
RADIONUCLIDES - TOTAL							
Radium 226	208	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 precision (±)	2.3	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 MDC	0.18	pCi/L				E903.0	05/24/10 20:54 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-006
Client Sample ID: Composite-Raff 2

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Alkalinity, Total as CaCO3	ND	mg/L		5		A2320 B	05/20/10 11:33 / ljl
Bicarbonate as HCO3	ND	mg/L		5		A2320 B	05/20/10 11:33 / ljl
Calcium	568	mg/L	D	6		E200.7	05/14/10 18:01 / cp
Chloride	568	mg/L	D	3		E300.0	05/15/10 12:45 / ljl
Fluoride	ND	mg/L	D	0.5		A4500-F C	05/18/10 14:41 / ljl
Magnesium	1520	mg/L	D	5		E200.7	05/14/10 18:01 / cp
Nitrogen, Nitrate+Nitrite as N	1.5	mg/L	D	0.4		E353.2	05/17/10 16:46 / ljl
Nitrogen, Nitrite as N	ND	mg/L		0.1		A4500-NO2 B	05/12/10 15:44 / ja
Phosphorus	37.0	mg/L	D	0.8		E200.7	05/14/10 18:01 / cp
Potassium	550	mg/L	D	5		E200.7	05/14/10 18:01 / cp
Sodium	1960	mg/L	D	20		E200.7	05/14/10 18:01 / cp
Sulfate	31400	mg/L	D	10		E300.0	05/15/10 12:45 / ljl
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	39300	mg/L	D	480		A2540 C	05/14/10 14:18 / kre
RADIONUCLIDES - TOTAL							
Radium 226	840	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 precision (±)	3.7	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 MDC	0.11	pCi/L				E903.0	05/24/10 20:54 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-007
Client Sample ID: Composite-4.5 pH 3

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Alkalinity, Total as CaCO3	10	mg/L		5		A2320 B	05/20/10 11:35 / ljl
Bicarbonate as HCO3	12	mg/L		5		A2320 B	05/20/10 11:35 / ljl
Calcium	590	mg/L		1		E200.7	05/17/10 14:15 / cp
Chloride	537	mg/L		1		E300.0	05/15/10 13:00 / ljl
Fluoride	0.6	mg/L		0.1		A4500-F C	05/18/10 14:49 / ljl
Magnesium	1340	mg/L		1		E200.7	05/17/10 14:15 / cp
Nitrogen, Nitrate+Nitrite as N	0.9	mg/L		0.1		E353.2	05/17/10 16:48 / ljl
Nitrogen, Nitrite as N	ND	mg/L		0.1		A4500-NO2 B	05/12/10 15:45 / ja
Phosphorus	ND	mg/L	D	0.2		E200.7	05/17/10 14:15 / cp
Potassium	486	mg/L		1		E200.7	05/17/10 14:15 / cp
Sodium	2010	mg/L	D	3		E200.7	05/17/10 14:15 / cp
Sulfate	10700	mg/L	D	6		E300.0	05/15/10 13:00 / ljl
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	15200	mg/L	D	50		A2540 C	05/12/10 15:06 / kre
RADIONUCLIDES - TOTAL							
Radium 226	234	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 precision (±)	1.7	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 MDC	0.09	pCi/L				E903.0	05/24/10 20:54 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-008
Client Sample ID: Composite-7.5 pH 4

Report Date: 06/16/10
Collection Date: 05/10/10
DateReceived: 05/12/10
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Alkalinity, Total as CaCO3	35	mg/L		5		A2320 B	05/20/10 11:43 / ljl
Bicarbonate as HCO3	43	mg/L		5		A2320 B	05/20/10 11:43 / ljl
Calcium	766	mg/L		1		E200.7	05/17/10 14:31 / cp
Chloride	536	mg/L		1		E300.0	05/15/10 13:15 / ljl
Fluoride	0.4	mg/L		0.1		A4500-F C	05/18/10 15:15 / ljl
Magnesium	1300	mg/L		1		E200.7	05/17/10 14:31 / cp
Nitrogen, Nitrate+Nitrite as N	1.4	mg/L		0.1		E353.2	05/17/10 16:51 / ljl
Nitrogen, Nitrite as N	ND	mg/L		0.1		A4500-NO2 B	05/12/10 15:45 / ja
Phosphorus	ND	mg/L	D	0.2		E200.7	05/17/10 14:31 / cp
Potassium	495	mg/L		1		E200.7	05/17/10 14:31 / cp
Sodium	2020	mg/L	D	3		E200.7	05/17/10 14:31 / cp
Sulfate	10100	mg/L	D	6		E300.0	05/15/10 13:15 / ljl
PHYSICAL PROPERTIES							
Solids, Total Dissolved TDS @ 180 C	16300	mg/L	D	47		A2540 C	05/12/10 15:06 / kre
RADIONUCLIDES - TOTAL							
Radium 226	211	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 precision (±)	1.7	pCi/L				E903.0	05/24/10 20:54 / trs
Radium 226 MDC	0.09	pCi/L				E903.0	05/24/10 20:54 / trs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

LABORATORY ANALYTICAL REPORT

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill
Lab ID: C10050360-009
Client Sample ID: Raffinate Crystals 5

Report Date: 06/16/10
Collection Date: 05/11/10
DateReceived: 05/12/10
Matrix: Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
RADIONUCLIDES - TOTAL							
Lead 210	3.5	pCi/g-dry				E909.0M	05/28/10 20:23 / dm
Lead 210 precision (±)	1.4	pCi/g-dry				E909.0M	05/28/10 20:23 / dm
Lead 210 MDC	2.3	pCi/g-dry				E909.0M	05/28/10 20:23 / dm
Radium 226	7.9	pCi/g-dry				E903.0	06/02/10 15:49 / trs
Radium 226 precision (±)	0.3	pCi/g-dry				E903.0	06/02/10 15:49 / trs
Radium 226 MDC	0.06	pCi/g-dry				E903.0	06/02/10 15:49 / trs
Radium 228	0.05	pCi/g-dry	U			RA-05	05/27/10 16:42 / plj
Radium 228 precision (±)	0.3	pCi/g-dry				RA-05	05/27/10 16:42 / plj
Radium 228 MDC	0.4	pCi/g-dry				RA-05	05/27/10 16:42 / plj
Thorium 230	19	pCi/g-dry				E907.0	05/24/10 13:19 / dmf
Thorium 230 precision (±)	3.2	pCi/g-dry				E907.0	05/24/10 13:19 / dmf
Thorium 230 MDC	0.1	pCi/g-dry				E907.0	05/24/10 13:19 / dmf
Thorium 232	0.1	pCi/g-dry	U			E907.0	05/24/10 13:19 / dmf
Thorium 232 precision (±)	0.09	pCi/g-dry				E907.0	05/24/10 13:19 / dmf
Thorium 232 MDC	0.1	pCi/g-dry				E907.0	05/24/10 13:19 / dmf

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B									Batch: 100520_2_ALK-W	
Sample ID: MBLK	2	Method Blank				Run: TTR-ALK_100520B			05/20/10 11:11	
Alkalinity, Total as CaCO3		1	mg/L	1						
Bicarbonate as HCO3		1	mg/L	1						
Sample ID: LCS1		Laboratory Control Sample				Run: TTR-ALK_100520B			05/20/10 11:19	
Alkalinity, Total as CaCO3		197	mg/L	5.0	98	90	110			
Sample ID: LCS		Laboratory Control Sample				Run: TTR-ALK_100520B			05/20/10 11:26	
Alkalinity, Total as CaCO3		50.0	mg/L	5.0	98	90	110			

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C									Batch: 100512_1_SLDS-TDS-W	
Sample ID: MBLK1_100512		Method Blank				Run: BAL-1_100512B			05/12/10 15:01	
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	10						
Sample ID: LCS1_100512		Laboratory Control Sample				Run: BAL-1_100512B			05/12/10 15:01	
Solids, Total Dissolved TDS @ 180 C		995	mg/L	10	100	90	110			
Sample ID: C10050358-002CMS		Sample Matrix Spike				Run: BAL-1_100512B			05/12/10 15:04	
Solids, Total Dissolved TDS @ 180 C		3270	mg/L	10	105	90	110			
Sample ID: C10050358-002CMSD		Sample Matrix Spike Duplicate				Run: BAL-1_100512B			05/12/10 15:04	
Solids, Total Dissolved TDS @ 180 C		3280	mg/L	10	105	90	110	0.1	10	
Sample ID: C10050369-004AMS		Sample Matrix Spike				Run: BAL-1_100512B			05/12/10 15:08	
Solids, Total Dissolved TDS @ 180 C		5700	mg/L	10	106	90	110			
Sample ID: C10050369-004AMSD		Sample Matrix Spike Duplicate				Run: BAL-1_100512B			05/12/10 15:08	
Solids, Total Dissolved TDS @ 180 C		5740	mg/L	10	108	90	110	0.7	10	
Method: A2540 C									Batch: 100514_2_SLDS-TDS-W	
Sample ID: MBLK1_100514		Method Blank				Run: BAL-1_100514A			05/14/10 14:17	
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	10						
Sample ID: LCS1_100514		Laboratory Control Sample				Run: BAL-1_100514A			05/14/10 14:17	
Solids, Total Dissolved TDS @ 180 C		977	mg/L	10	98	90	110			
Sample ID: C10050436-001AMS		Sample Matrix Spike				Run: BAL-1_100514A			05/14/10 14:20	
Solids, Total Dissolved TDS @ 180 C		2560	mg/L	10	104	90	110			
Sample ID: C10050436-001AMSD		Sample Matrix Spike Duplicate				Run: BAL-1_100514A			05/14/10 14:21	
Solids, Total Dissolved TDS @ 180 C		2580	mg/L	10	105	90	110	1	10	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-F C										Batch: R132857
Sample ID: MBLK		Method Blank				Run: MANTECH_100518A				05/18/10 11:10
Fluoride		ND	mg/L	0.05						
Sample ID: LCS		Laboratory Control Sample				Run: MANTECH_100518A				05/18/10 11:14
Fluoride		1.04	mg/L	0.10	104	90	110			
Sample ID: C10050358-001CMS		Sample Matrix Spike				Run: MANTECH_100518A				05/18/10 14:19
Fluoride		1.33	mg/L	0.10	108	80	120			
Sample ID: C10050358-001CMSD		Sample Matrix Spike Duplicate				Run: MANTECH_100518A				05/18/10 14:23
Fluoride		1.33	mg/L	0.10	108	80	120	0	10	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-NO2 B									Analytical Run: HACH DR3000_100512B	
Sample ID: ICV-2	Initial Calibration Verification Standard								05/12/10 15:43	
Nitrogen, Nitrite as N		0.990	mg/L	0.10	99	90	110			
Method: A4500-NO2 B									Batch: A2010-05-12_6_NO2_01	
Sample ID: MBLK-1	Method Blank					Run: HACH DR3000_100512B			05/12/10 15:43	
Nitrogen, Nitrite as N		ND	mg/L	0.001						
Sample ID: C10050355-001AMS	Sample Matrix Spike					Run: HACH DR3000_100512B			05/12/10 15:45	
Nitrogen, Nitrite as N		0.0453	mg/L	0.10	95	90	110			
Sample ID: C10050355-001AMSD	Sample Matrix Spike Duplicate					Run: HACH DR3000_100512B			05/12/10 15:45	
Nitrogen, Nitrite as N		0.0453	mg/L	0.10	95	90	110		10	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: 26100
Sample ID: MB-26100	5	Method Blank				Run: ICP2-C_100514A				05/14/10 17:41
Calcium		ND	mg/L	0.1						
Magnesium		ND	mg/L	0.09						
Phosphorus		ND	mg/L	0.02						
Potassium		ND	mg/L	0.1						
Sodium		ND	mg/L	0.3						
Sample ID: LCS3-26100	5	Laboratory Control Sample				Run: ICP2-C_100514A				05/14/10 17:45
Calcium		25.0	mg/L	1.0	100	85	115			
Magnesium		24.4	mg/L	1.0	98	85	115			
Phosphorus		5.02	mg/L	0.10	100	85	115			
Potassium		24.2	mg/L	1.0	97	85	115			
Sodium		24.7	mg/L	1.0	99	85	115			
Sample ID: C10050216-001BMS3	5	Sample Matrix Spike				Run: ICP2-C_100514A				05/14/10 17:53
Calcium		84.4	mg/L	1.0	107	70	130			
Magnesium		44.5	mg/L	1.0	103	70	130			
Phosphorus		22.9	mg/L	0.10	117	70	130			
Potassium		70.2	mg/L	1.0	109	70	130			
Sodium		615	mg/L	1.0		70	130			A
Sample ID: C10050216-001BMSD	5	Sample Matrix Spike Duplicate				Run: ICP2-C_100514A				05/14/10 17:57
Calcium		87.1	mg/L	1.0	118	70	130	3.2	20	
Magnesium		44.9	mg/L	1.0	105	70	130	1.1	20	
Phosphorus		23.0	mg/L	0.10	120	70	130	0.7	20	
Potassium		67.9	mg/L	1.0	100	70	130	3.3	20	
Sodium		615	mg/L	1.0		70	130	0	20	A

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

A - The analyte level was greater than four times the spike level. In accordance with the method % recovery is not calculated.

MDC - Minimum detectable concentration

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Batch: R132821
Sample ID: MB-100517A	5	Method Blank				Run: ICP2-C_100517A				05/17/10 12:43
Calcium		ND	mg/L	0.2						
Magnesium		ND	mg/L	0.05						
Phosphorus		ND	mg/L	0.03						
Potassium		ND	mg/L	0.02						
Sodium		ND	mg/L	0.3						
Sample ID: LFB-100517A	5	Laboratory Fortified Blank				Run: ICP2-C_100517A				05/17/10 12:48
Calcium		48.2	mg/L	0.50	96	85	115			
Magnesium		46.9	mg/L	0.50	94	85	115			
Phosphorus		0.953	mg/L	0.10	95	85	115			
Potassium		44.6	mg/L	0.50	89	85	115			
Sodium		48.4	mg/L	0.50	97	85	115			
Sample ID: C10050360-004BMS2	5	Sample Matrix Spike				Run: ICP2-C_100517A				05/17/10 13:58
Calcium		1150	mg/L	1.2	95	70	130			
Magnesium		2430	mg/L	1.0	87	70	130			
Phosphorus		9.92	mg/L	0.16	97	70	130			
Potassium		748	mg/L	1.1	78	70	130			
Sodium		1410	mg/L	3.2	94	70	130			
Sample ID: C10050360-004BMSD	5	Sample Matrix Spike Duplicate				Run: ICP2-C_100517A				05/17/10 14:02
Calcium		1140	mg/L	1.2	94	70	130	0.4	20	
Magnesium		2440	mg/L	1.0	88	70	130	0.2	20	
Phosphorus		9.81	mg/L	0.16	96	70	130	1.1	20	
Potassium		758	mg/L	1.1	80	70	130	1.4	20	
Sodium		1420	mg/L	3.2	96	70	130	0.8	20	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration

ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0										Batch: R132791
Sample ID: LCS	2	Laboratory Control Sample				Run: IC1-C_100514A				05/14/10 16:49
Chloride		9.83	mg/L	1.0	98	90	110			
Sulfate		38.4	mg/L	1.0	96	90	110			
Sample ID: MBLK	2	Method Blank				Run: IC1-C_100514A				05/14/10 17:20
Chloride		0.8	mg/L	0.01						
Sulfate		ND	mg/L	0.06						
Sample ID: C10050358-002CMS	2	Sample Matrix Spike				Run: IC1-C_100514A				05/15/10 01:18
Chloride		207	mg/L	1.0	95	80	120			
Sulfate		411	mg/L	1.0	104	80	120			
Sample ID: C10050358-002CMSD	2	Sample Matrix Spike Duplicate				Run: IC1-C_100514A				05/15/10 01:33
Chloride		205	mg/L	1.0	91	80	120	1	20	
Sulfate		410	mg/L	1.0	104	80	120	0.1	20	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Batch: R132820
Sample ID: MBLK-1	Method Blank					Run: TECHNICON_100517A				05/17/10 16:16
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.04						
Sample ID: LCS-2	Laboratory Control Sample					Run: TECHNICON_100517A				05/17/10 16:18
Nitrogen, Nitrate+Nitrite as N		2.48	mg/L	0.10	99	90	110			
Sample ID: C10050356-001BMS	Sample Matrix Spike					Run: TECHNICON_100517A				05/17/10 16:33
Nitrogen, Nitrate+Nitrite as N		2.09	mg/L	0.10	98	90	110			
Sample ID: C10050356-001BMSD	Sample Matrix Spike Duplicate					Run: TECHNICON_100517A				05/17/10 16:36
Nitrogen, Nitrate+Nitrite as N		2.08	mg/L	0.10	98	90	110	0.5	10	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0										Batch: RA226-4529
Sample ID: C10050372-001CMS		Sample Matrix Spike				Run: BERTHOLD 770-1_100514A				05/24/10 16:11
Radium 226		16	pCi/L		101	70	130			
Sample ID: C10050372-001CMSD		Sample Matrix Spike Duplicate				Run: BERTHOLD 770-1_100514A				05/24/10 16:11
Radium 226		18	pCi/L		113	70	130	11	26.1	
Sample ID: MB-RA226-4529	3	Method Blank				Run: BERTHOLD 770-1_100514A				05/24/10 22:06
Radium 226		-0.1	pCi/L							U
Radium 226 precision (±)		0.1	pCi/L							
Radium 226 MDC		0.2	pCi/L							
Sample ID: LCS-RA226-4529		Laboratory Control Sample				Run: BERTHOLD 770-1_100514A				05/24/10 22:06
Radium 226		8.7	pCi/L		111	70	130			
Method: E903.0										Batch: RA226-4533
Sample ID: C10050346-001EMS		Sample Matrix Spike				Run: TENNELEC-3_100518B				05/24/10 20:54
Radium 226		12.5	pCi/L		62	70	130			S
- Spike response is outside of the acceptance range for this analysis. Since the LCS and the RPD for the MS MSD pair are acceptable, the response is considered to be matrix related. The batch is approved.										
Sample ID: C10050346-001EMSD		Sample Matrix Spike Duplicate				Run: TENNELEC-3_100518B				05/24/10 20:54
Radium 226		11.9	pCi/L		58	70	130	4.7	17.1	S
Sample ID: MB-RA226-4533	3	Method Blank				Run: TENNELEC-3_100518B				05/24/10 20:54
Radium 226		0.2	pCi/L							
Radium 226 precision (±)		0.05	pCi/L							
Radium 226 MDC		0.06	pCi/L							
Sample ID: LCS-RA226-4533		Laboratory Control Sample				Run: TENNELEC-3_100518B				05/24/10 20:54
Radium 226		7.8	pCi/L		98	70	130			
Method: E903.0										Batch: 26121
Sample ID: C10050312-001AMS		Sample Matrix Spike				Run: TENNELEC-3_100520F				06/02/10 15:49
Radium 226		12	pCi/g-dry		115	70	130			
Sample ID: C10050312-001AMSD		Sample Matrix Spike Duplicate				Run: TENNELEC-3_100520F				06/02/10 15:49
Radium 226		12	pCi/g-dry		106	70	130	6.4	19.6	
Sample ID: LCS-26121		Laboratory Control Sample				Run: TENNELEC-3_100520F				06/02/10 15:49
Radium 226		1.5	pCi/g-dry		99	70	130			
Sample ID: MB-26121	3	Method Blank				Run: TENNELEC-3_100520F				06/02/10 15:49
Radium 226		0.0001	pCi/g-dry							U
Radium 226 precision (±)		0.0002	pCi/g-dry							
Radium 226 MDC		0.0002	pCi/g-dry							

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E907.0										Batch: 26121
Sample ID: C10050312-001AMS		Sample Matrix Spike				Run: EGG-ORTEC_100520B				05/24/10 09:03
Thorium 230		8.74	pCi/g-dry		117	70	130			
Sample ID: C10050312-001AMSD		Sample Matrix Spike Duplicate				Run: EGG-ORTEC_100520B				05/24/10 13:19
Thorium 230		8.66	pCi/g-dry		140	70	130	0.9	45	S
- Spike response is outside of the acceptance range for this analysis. Since the LCS and the RPD for the MS MSD pair are acceptable, the response is considered to be matrix related. The batch is approved.										
Sample ID: LCS-26121		Laboratory Control Sample				Run: EGG-ORTEC_100520B				05/24/10 13:19
Thorium 230		0.500	pCi/g-dry		104	70	130			
Sample ID: MB-26121	6	Method Blank				Run: EGG-ORTEC_100520B				05/24/10 13:20
Thorium 230		-0.004	pCi/g-dry							U
Thorium 230 precision (±)		0.02	pCi/g-dry							
Thorium 230 MDC		0.03	pCi/g-dry							
Thorium 232		0.004	pCi/g-dry							U
Thorium 232 precision (±)		0.01	pCi/g-dry							
Thorium 232 MDC		0.02	pCi/g-dry							

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration

ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E909.0M										Batch: PB-210-0708
Sample ID: C10050383-001AMS		Sample Matrix Spike				Run: PACKARD 3100TR_100525A				05/29/10 00:31
Lead 210		108	pCi/g-dry		103	70	130			
Sample ID: C10050383-001AMSD		Sample Matrix Spike Duplicate				Run: PACKARD 3100TR_100525A				05/29/10 02:34
Lead 210		135	pCi/g-dry		129	70	130	23	16.4	R
- The RPD for the MSD is high. However, the individual spike recoveries are within range therefore the batch is approved.										
Sample ID: MB-26109	3	Method Blank				Run: PACKARD 3100TR_100525A				05/29/10 04:38
Lead 210		ND	pCi/L							U
Lead 210 precision (±)		10	pCi/L							
Lead 210 MDC		20	pCi/L							
Sample ID: LCS-26109		Laboratory Control Sample				Run: PACKARD 3100TR_100525A				05/29/10 08:45
Lead 210		470	pCi/L		90	70	130			

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
U - Not detected at minimum detectable concentration
ND - Not detected at the reporting limit.
R - RPD exceeds advisory limit.

QA/QC Summary Report

Client: Energy Fuels Resources Corporation
Project: Pinon Ridge Mill

Report Date: 06/16/10
Work Order: C10050360

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: RA-05										Batch: 26121
Sample ID: LCS-26121		Laboratory Control Sample				Run: TENNELEC-3_100520E				05/27/10 16:42
Radium 228		1.2	pCi/g-dry		84	70	130			
Sample ID: MB-26121	3	Method Blank				Run: TENNELEC-3_100520E				05/27/10 16:42
Radium 228		-0.0006	pCi/g-dry							U
Radium 228 precision (±)		0.001	pCi/g-dry							
Radium 228 MDC		0.002	pCi/g-dry							
Sample ID: C10050360-009AMS		Sample Matrix Spike				Run: TENNELEC-3_100520E				05/27/10 16:42
Radium 228		6.4	pCi/g-dry		88	70	130			
Sample ID: C10050360-009AMSD		Sample Matrix Spike Duplicate				Run: TENNELEC-3_100520E				05/27/10 16:42
Radium 228		5.9	pCi/g-dry		82	70	130	7.8	34	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

Workorder Receipt Checklist

C10050360

Energy Fuels Resources Corporation

Login completed by: Edith McPike
Date Received: 5/12/2010

Reviewed by: BL2000\tparke
Received by: em

Reviewed Date: 5/17/2010
Carrier name: Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature:	12°C		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Contact and Corrective Action Comments:

Samples split and preserved as necessary. Sample JD-8-4.5 pH 1-E was received with a natural pH of 2

Chain of Custody and Analytical Request Record

PLEASE PRINT- Provide as much information as possible.

Company Name: Energy Fuels Resources	Project Name, PWS, Permit, Etc.: Piñon Ridge Mill	Sample Origin: State: CO	EPA/State Compliance: Yes ☐ No ☒
Report Mail Address: 44 Union Blvd, Suite 600, Lakewood, CO 80228	Contact Name: Zach Rogers; Phone/Fax: 303-974-2151	Email: zrogers@energyfuels.com	Sampler: (Please Print) John Litz
Invoice Address: Same	Invoice Contact & Phone: Same	Purchase Order:	Quote/Bottle Order:

Special Report/Formats – ELI must be notified prior to sample submittal for the following:

☐ DW ☐ GSA ☐ POTW/WWTP ☐ State: _____ ☐ Other: _____

☐ A2LA ☐ EDD/EDT (Electronic Data) Format: _____ ☐ LEVEL IV ☐ NELAC

Number of Containers
Sample Type: A Air W Water S Soils/Solids V Vegetation B Bioassay O Other

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	Radium 226	TDS	Major Ions – Alk, HCO_3, Ca, Cl, F, Mg, NO_2, NO_3, P, K, Na, SO_4	Ra-226, Ra-228, Th-230, Th-232, Pb-210	SEE ATTACHED	Normal Turnaround (TAT)
1	Pandora – 4.5 pH 1-B	5/10		W	X					X
2	Packrat – 4.5 pH 1-C			W	X					X
3	West Sunday – 4.5 pH 1-A			W	X					X
4	JD-8 – 4.5 pH 1-D			W	X	X	X			X
5	Energy Queen – 4.5 pH 1-E			W	X	X	X			X
6	Composite - Raff 2			W	X	X	X			X
7	Composite – 4.5 pH 3			W	X	X	X			X
8	Composite – 7.5 pH 4			W	X	X	X			X
9	Raffinate Crystals 5	5/11		S				X		X
10										

RUSH

Contact ELI prior to RUSH sample submittal for charges and scheduling – See Instruction Page

Comments:

Please contact Zach Rogers prior to disposing of any of these samples.

Shipped by: UPS GRD

Cooler ID(s): C-1399

Receipt Temp: 12 °C

On Ice: Yes (No)

Custody Seal Y (N) Intact Y N Signature Match Y N

LABORATORY USE ONLY

C1005236

Custody Record MUST be Signed

Relinquished by (print): John Litz	Date/Time: 11 May 16:00	Signature: John Litz	Received by (print): / Date/Time: / Signature:
Relinquished by (print):	Date/Time:	Signature:	Received by (print): / Date/Time: / Signature:
Sample Disposal: Return to Client: _____ Lab Disposal: _____			Received by Laboratory: / Date/Time: 5.12.10 915 / Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.
This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.
Visit our web site at www.energylab.com for additional information, downloadable fee schedule, forms, and links.

APPENDIX C

Radium Content Calculation Brief

Energy Fuels Resources

Calculation Brief

By: Zach Rogers

Date: August 23, 2010

Re: Radium-226 concentration in soil vs. raffinate at the Piñon Ridge Mill

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The purpose of this calculation brief is to compare the activity of radium-226 expected to be in the raffinate to that in the background surface soil per unit volume at the proposed Piñon Ridge Mill. Using available data, the radium-226 activity per cubic meter of raffinate and surface soil were calculated for comparison.

The expected radium-226 activity in the raffinate is 234 ρCi/L based on laboratory analysis of a composite sample at pH 4.5 from a bench-scale raffinate sample preparation performed by J.E. Litz and Associates, LLC (ELI 2010, Litz 2010). This value was converted to an activity of 2.34×10^5 ρCi/m^3 using a conversion factor of 1,000 L/m^3.

The radium-226 activity in the background soil at the Piñon Ridge Mill is derived from the Baseline Radiological Investigation Report (ERG 2009). The radium-226 activities used were averaged from locations in which both surface soil and radon flux measurements were taken. These locations are included in Table 1.

Table 1
Radium-226 in Soil

Sample Location	Ra-226 Activity (1) (pCi/g)	Ra-226 Activity (pCi/m^3)	Average Ra-226 Activity (pCi/m^3)
PRB-13	2.2	3.52E+06	
PRB-14	2.1	3.36E+06	
PRB-16	0.9	1.44E+06	
PRB-17	1.7	2.72E+06	
PRB-18	2.4	3.84E+06	2.35E+06
PRB-19	0.64	1.02E+06	
PRB-20	0.49	7.84E+05	
PRB-21	1.2	1.92E+06	
PRB-23	1.6	2.56E+06	

(1) ERG 2009

The radium-226 activities in these background surface soil samples range from 0.49 to 2.4 ρCi/g and average 1.5 ρCi/g. Although these locations are biased, they are generally consistent with randomly located surface soil samples collected at locations across the site that range from 0.13 to 4.6 ρCi/g and average 1.1 ρCi/g. Conversion of the surface soil activities required an estimated density of the soil. A value of 1,600 kg/m^3 (2,700 lb/yd^3) was used based on the bank density of dry, loose sand (CAT 2006). The average radium-226 activity per cubic meter of soil was estimated to be for the 2.4 x 10^6 ρCi/m^3 (based on 1.5 ρCi/g).

The relative difference in radium activity by volume in the background surface soil to the raffinate is approximately 10:1.

References

Caterpillar (CAT) 2006. Caterpillar Reference Handbook, page 27-4. April.

Energy Laboratories Inc. (ELI) 2010. Analytical Summary Report, Workorder No. C10050360. June 16.

Environmental Restoration Group, Inc (ERG) 2009. Baseline Radiological Investigation Report. Piñon Ridge Uranium Mill. Montrose County, Colorado. October 5.

J.E. Litz Associates, LLC 2010. Memorandum to Zach Rogers from John Litz regarding Preparation of Raffinate Samples. June 1.