Energy Fuels Resources (USA) Inc.
225 Union Blvd. Suite 600
Lakewood, CO, US, 80228
303 974 2140
www.energyfuels.com

December 21, 2015

VIA PDF AND FEDERAL EXPRESS

Eric Massey, Director
Division of Air Quality
Arizona Department of Environmental Quality
Technical Services Unit
1110 West Washington Street
Phoenix, AZ 85007

Subject: Energy Fuels Resources (USA) Inc. Pinenut Mine Air Quality Control Permit No. 51803

Dear Mr. Massey:

As requested during teleconferences with your staff on Friday December 18, 2015, Energy Fuels Resources (USA) Inc. ("EFRI") is submitting this letter summarizing the 2015 soil sampling activities, which were conducted pursuant to the Arizona Department of Environmental Quality ("ADEQ")-approved Radiation Survey Plan.

Attachment 1 to this letter presents a summary of the activities completed to date, the associated analytical results, and delineates additional activities that will be completed to provide supplementary soil analytical data.

If you have any questions or comments, please do not hesitate to contact me at 303-389-4134.

Yours very truly,

Kathy Weinel

ENERGY FUELS RESOURCES (USA) INC.
Kathy Weinel
Quality Assurance Manager

cc: D. Frydenlund, H. Roberts, S. Bakken, D. Turk, J. Massey (EFRI)
Steve Rose, Michael Orman, Balaji Vaidyanathan (ADEQ)

ATTACHMENT 1

INTRODUCTION

Energy Fuels Resources (USA) Inc.'s ("EFRI's") Pinenut Mine (the "Mine") is an underground uranium mine, located on the Kanab Plateau, 35 miles south of Fredonia, in Mohave County, Arizona. The Mine is capable of producing a maximum of 300 tons per day of uranium ore. Ore is hauled to the White Mesa Mill (the "Mill"), near Blanding, Utah for processing. No ore processing occurs on site. The site contains a mine shaft, a ventilation shaft, an office building, a head-frame and associated hoist and maintenance building, a septic system, ore stockpiles, development rock stockpiles, topsoil stockpiles, other facilities associated with the mine operation and a lined non-stormwater impoundment. EFRI commenced hauling ore from the Mine to the Mill in early 2013. It is important to note that 25,000 tons of ore were mined and hauled in the late 1980s by Energy Fuels Nuclear. The mine was then placed on stand-by status until it was re-opened in 2011.

RADIATION MONITORING ACTIVITIES REQUIRED BY THE APPROVED RADIATION SURVEY PLAN

Pursuant to the Air Permit Attachment B, Section II.C.1, EFRI has prepared a Radiation Survey Plan. The Radiation Survey Plan was approved by ADEQ on September 19, 2011. The Radiation Survey Plan requires that the following activities be conducted annually:

1. Quarterly gamma monitoring using thermoluminescent dosimeter ("TLD") measurements.
   Note: TLDs have been replaced by Optically Stimulated Luminesce ("OSL") dosimeters.
2. Mine vent radon measurements in compliance with U.S. Environmental Protection Agency ("EPA") NESHAPS requirements.
3. Annual soil sampling at the locations of the five Mine site OSL monitors.
4. Soil sampling as necessary, to ensure clean-up of any accidental releases.
5. Establishment of a Trucking Emergency Response Plan.

2015 RADIATION MONITORING ACTIVITIES

Pursuant to the Radiation Survey Plan requirements, the activities specified above were completed in 2015 as necessary. The 2015 activities are summarized below:

- Item 1 – OSL Monitoring – 2015 OSL data collection is ongoing. Assessment of the 2015 results will be completed upon receipt of the fourth quarter 2015 data and reported in the Annual Radiation Survey Report due on or before March 30, 2016.
- Item 2 - Annual radon measurements and reporting for 2015 are submitted under separate cover on or before March 30, 2016.
- Item 3 – Annual soil sampling was conducted on July 21, 2015.
- Item 4 - No accidental releases occurred in 2015 and as such additional sampling was not required.

- Item 5 - The Mine has an established Transportation Policy that requires trucking contractors to prepare an Emergency Response Plan to manage potential truck accidents that could result in ore spills along the truck route from the Mine to the Mill. Each ore hauling contractor has been provided a copy of the Mine's Transportation Policy and has provided EFRI with a copy of its Trucking Emergency Response Plan. Each contractor has been instructed on the proper notification procedures relating to a trucking accident.

As noted above, the annual soil samples were collected on July 21, 2015. EFRI reviewed the July 21, 2015 soil results upon receipt. The July 21, 2015 results for one constituent in one location exceeded the location-specific background as described below. Pursuant to the ADEQ-approved Radiation Survey Plan, additional data are required when a location-specific limit is exceeded. The following sections describe the soil data collection procedures, analytical methods, data assessment procedures and results for the 2015 annual soil samples as well as additional activities that will be completed to provide supplementary soil analytical data needed to determine if future actions are necessary.

As previously stated, the 2015 OSL data collection is ongoing. The assessment of the 2015 results will be completed upon receipt of the fourth quarter 2015 data and reported in the Annual Radiation Survey Report due on or before March 30, 2016. No further discussion of the 2015 OSL data will be included herein.

Radon measurements are assessed pursuant to EPA NESHAPS requirements as outlined in the ADEQ Air Permit and in 40 CFR 61.22. No further discussion of the 2015 radon data will be included herein.

SOIL SAMPLING LOCATIONS AND DESCRIPTION

In order to determine if an increase of radiation is detected outside of the disturbed area, OSLs were placed at the four main compass points for the Mine site approximately 100 feet outside of the Mine disturbed area (fence line). One additional OSL was placed southeast of the mine site 200 feet outside of the Mine disturbed area. Soil samples were taken at the same locations as the five OSL badges outside of the Mine disturbed area as shown on Figure 1. All soil samples were analyzed for uranium and radium-226. Samples were collected using standard methods and sent to ACZ Laboratories (AZ License No. AZ0102), an ADEQ Certified laboratory, for analysis.

Analytical methods for the analysis of soil samples are as follows:

- Hot plate digestion for metals analysis – M3050B ICP-MS (equivalent to EPA 3050B)
- Uranium (total) by ICP-MS M6020B (equivalent to EPA Method 6020B)
- Percent solids by ASTM D2216-80
- Digestion for radium-226 by EPA 3050
- Radium-226 by M903.1 (equivalent to EPA 903.1)

ASSESSMENT OF ANNUAL SOIL RESULTS

The soil sample results are assessed in accordance with the Radiation Survey Plan by comparing the results to 4 times the highest 2011 or 2012 concentration to determine if additional steps are required to be taken.

The ADEQ-approved Radiation Survey Plan stated that background determination was previously performed for the Mine during a radiological assessment reported on November 25, 1985[1] for Energy Fuels Nuclear, Inc. It is important to note that the 1985 radiological assessment did not contemplate soil background levels for uranium or radium-226 in soil and none were established. The background presented in the 1985 report was limited to gamma radiation determined by a micro-R meter. As noted in the annual reports, since there were no background levels for uranium and radium-226 in soil, the values from the 2011 and 2012 sampling events were used for comparison to the annual data results collected under the approved Radiation Survey Plan. Specifically, the annual soil uranium and radium-226 results are compared to 4 times the highest result for that location collected during 2011 or 2012. The soil data that have been used for comparison to the annual results are shown in Table 1.

2015 SOIL RESULTS

The July 2015 uranium result for location 60 (the south location at 100 feet outside of the fenceline) of 5.33 mg/kg exceeded 4 times the highest value from 2011. The 2011 uranium result is 1.19 mg/kg and the 4 times that result is 4.76 mg/kg. The radium-226 value from the July sample is 3.6 pCi/g, which is well below 4 times the 2011 value of 7.2 pCi/g used in the previous annual reports. All of the other July results were below 4 times the 2011 or 2012 values for both uranium and radium-226.

EFRI requested that the laboratory re-prep and re-analyze the July samples, which were still within the method-specific holding times to verify the initial results and rule out a laboratory error. The reanalysis uranium value for location 60 was 5.40 mg/kg.

EFRI collected an additional soil sample at location 60 on October 22, 2015. The uranium result for the October 22, 2015 sample was 8.52 mg/kg and the radium-226 result was 3 pCi/g. The October 2015 uranium result was above 4 times the 2011 value and the radium-226 was well below 4 times the 2011 value (it was in fact less than the July 2015 radium-226 result).

The 2015 data collected to date are shown on Table 1.

[1] The ADEQ-approved Radiation Survey Plan noted the date for the radiological assessment as January 25, 1988. This reference is a typographical error and refers to the radiological assessment for the Arizona I project. The correct date for the Pinenut radiological assessment is November 25, 1985 as noted above.

RADIATION SURVEY PLAN REQUIREMENTS

The Radiation Survey Plan states that the following actions will be taken if elevated levels of radiation (higher than four times the highest 2011/2012 value) are detected:

- Additional soil samples will be taken to confirm the existence of a statistically significant upward trend; and
- If the trend is confirmed then the Mine will: (1) review its dust control policies and procedures to determine if any additional dust control measures can be taken to reduce windblown dust during mine operations that could contribute to soil contamination in the vicinity of the Mine; and (2) perform additional soil surveys to determine the areal extent of the soil contamination and develop a plan for reclamation of such contamination to background levels within 6 months of the determination of soil contamination. Such additional soil surveys may involve a combination of soil surveys and micro-R monitoring, in accordance with established guidance. micro-R monitoring will be conducted with the use of a Ludlum Model 19, or equivalent, meter.

As previously stated, one additional sample was collected on October 22, 2015. The results were within analytical error limits but did not provide a sufficient amount of data to determine if a statistically significant upward trend exists or is confirmed as required by the Radiation Survey Plan (see bullet 1 above).

In addition, the radium-226 results are less than half the four-times background criterion, and the October 2015 radium-226 results are more than 15% less than the July 2015 results. Any dust generated from the site would be from uranium ore, which is expected to be in natural equilibrium. As a result, uranium and radium-226 concentrations should be expected to move in tandem. The fact that radium-226 results are less than two times background and are recently decreasing, while uranium is more than four times background and recently increasing, raises questions about the reliability of the limited number of results to date. More data is therefore needed in order to determine if the uranium results indicate a statistically significant upward trend.

Further, EFRI has collected preliminary alpha and gamma measurements in the area using a Ludlum Model 3 for alpha measurements and a Ludlum Model 19 micro-R meter for gamma measurements. No alpha measurements were detected. Gamma measurements were less than 4 times background. If uranium contamination were present above background, elevated measurements of alpha and gamma above background would also be present. There were no alpha measurements at the soil sample location and the gamma was less than background. Due to the inconsistencies between the analytical and alpha and gamma measurements, for these reasons in addition to the reasons stated above, additional data are needed to determine if there is uranium present or if there has been sufficient data collected to accurately reflect the true, variable background conditions at the site.

As a result of the 2015 analytical results, and to determine if there is a statistically significant upward trend, additional soils data are therefore needed as contemplated by the Radiation Survey Plan. Once collected, the data can be used to confirm or deny a trend.

Accordingly, additional uranium and radium data will be collected as described below.

ADDITIONAL DATA COLLECTION ACTIVITIES

Soil Sampling for Uranium and Radium-226

Additional soil samples will be collected at the south annual soil sampling location (location 60) once each quarter for the next three quarters, starting with the first quarter of 2016. Along with the five sample results to date since 2013, this will provide eight data points, which is the minimum number of data points EFRI considers necessary to perform a statistical analysis.

Samples will be collected using the Standard Operating Procedure included as Attachment 2 to this letter. Soil samples will be analyzed for uranium and radium-226 using the same laboratory (ACZ) and methods used for the annual sampling events. The methods are described above.

EFRI will provide the analytical data to ADEQ, along with statistical analysis indicating whether or not there are any statistically significant upward trends and other conclusions, in a report (the "Report") within 60 days after receipt of the laboratory data for the samples taken in the third quarter of 2016.

A determination will be made, after ADEQ review of the Report, whether any additional sampling will be required or whether it will be necessary to determine the areal extent of any contamination.

ADDITIONAL ACTIONS

Mining is completed at the Pinenut Mine and all ore on the ore storage pad at the mine is in the process of being transported to the White Mesa Mill. EFRI will continue to review its dust control policies and procedures to ensure that any windblown dust during these activities is kept to a minimum.

DISCUSSION AND ASSESSMENT OF CURRENT BACKGROUND VALUES

As part of this investigation, EFRI has reviewed the data collected in 2011 and 2012 which are considered "background" for the purposes of the Radiation Survey Plan and are currently used for comparison to the annual soils data. EFRI believes these data may not accurately reflect background uranium concentrations in the area, based on other samples collected by EFRI at un-impacted areas within the region and on the United States Geological Survey's ("USGS's") recent determination of regional soil background for uranium. Regional radiological data for 104 surface soil samples collected and analyzed in the 1970s was recently compiled by the USGS (Alpine 2010). These data represent regional background, as very little uranium mining had occurred in the region at that time. Uranium concentrations in this study ranged from 1.4 to 3.4

parts per million with an average of 2.4 mg/kg. As can be seen in Table 1, the samples from the Mine, which were collected at a depth interval of 1 foot below ground surface, do not agree and are less than the surface soil samples collected by USGS. The 2011 and 2012 sample set was comprised of one sample at each of 5 locations. The USGS data collected over 100 regional samples which would provide a more statistically sound and representative background concentration.

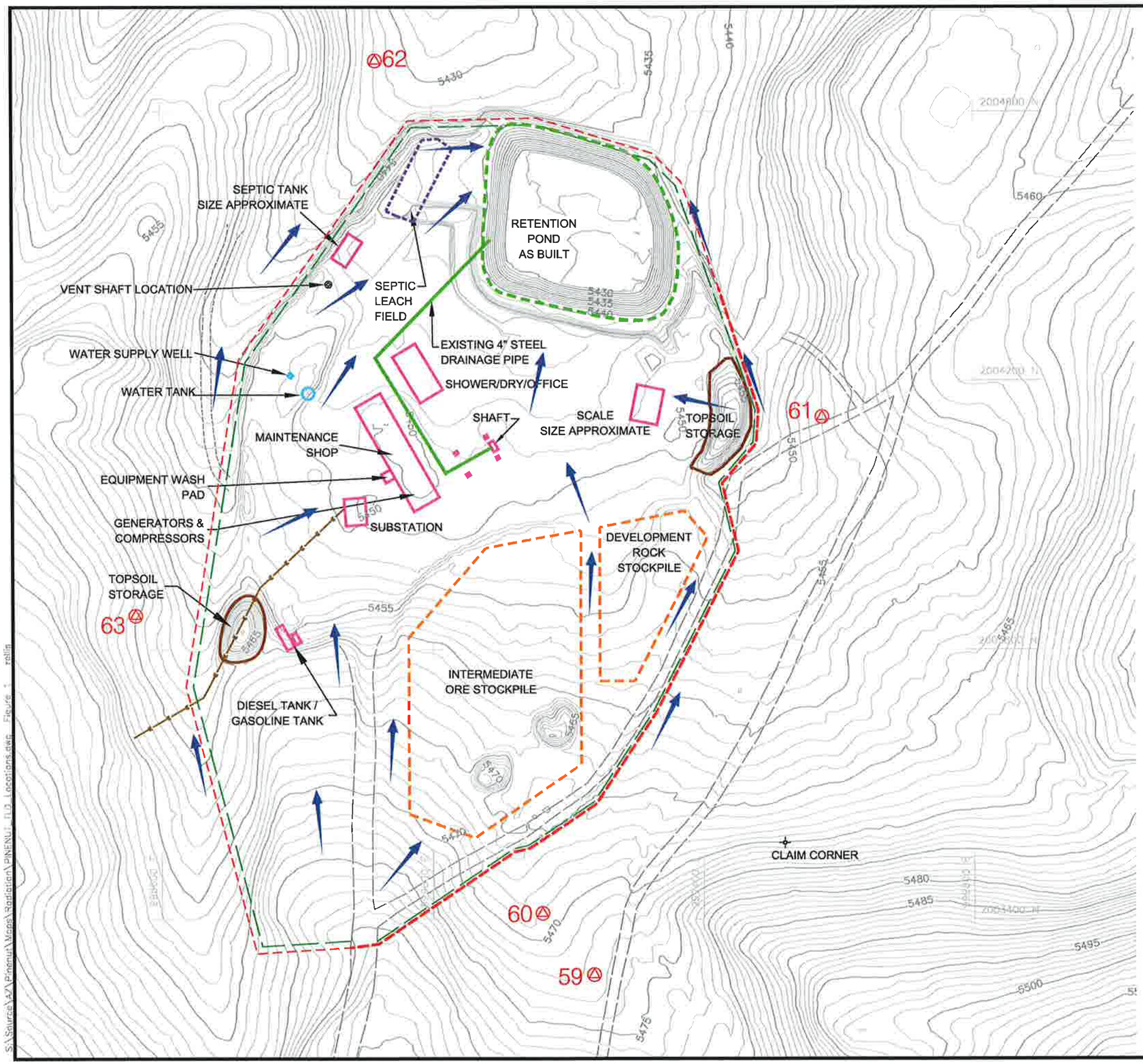
EFRI plans to do a more detailed analysis of background at the site, including an analysis of the depth of historic samples, and a review of other pertinent data. The results of that analysis will be included in the Report to be submitted within 60 days after the third quarter 2016 sampling event.

REFERENCES

Alpine, Andrea E., ed., 2010. Hydrological, Geological, and Biological Site Characterization of Breccia Pipe Uranium Deposits in Northern Arizona, U.S. Geological Survey Scientific Investigations Report 2010-5025, Reston, VA, August 2.

Table 1 PINENUT Summary of Soil Sample Results

Badge Number	Unat (mg/Kg) 2011	Radium 226 (pCi/g) 2011	Unat (mg/Kg) 2012	Radium 226 (pCi/g) 2012	4 X highest 2011 or 2012 Unat	4 X highest 2011 or 2012 Radium 226	Unat (mg/Kg) July 2015	Radium 226 (pCi/g) July 2015	Unat (mg/Kg) July 2015 Reanalysis	Radium 226 (pCi/g) October 2015	Unat (mg/Kg) October 2015 Resample
59 (SE)	0.48	1.40 ± 0.37	0.59	0.45 ± 0.21	2.36	5.6	1.72	1.3 ± 0.29	NS	NS	NS
60 (S)	1.19	1.80 ± 0.41	0.69	0.14 ± 0.18	4.76	7.2	5.33	3.6 ± 0.4	5.40	3 ± 0.33	8.52
61 (Ea)	1.82	2.00 ± 0.38	1.27	1.4 ± 0.21	7.28	8	6.93	4.6 ± 0.48	NS	NS	NS
62 (N)	2.65	3.50 ± 0.57	1.63	0.84 ± 0.2	10.6	14.0	4.39	2 ± 0.37	NS	NS	NS
63 (W)	0.79	0.76 ± 0.35	0.83	0.306 ± 0.15	3.32	3.04	1.07	1.3 ± 0.32	NS	NS	NS



LEGEND

- Existing Topographic Contours
- Impoundment Expansion Contours
- Property Boundary
- Fence
- Utility Line
- Road
- Building/structure
- Future Ore/development Rock Stockpile
- Surface Drainage
- Existing Drainage Pipe
- 63 Optically Stimulated Luminescence Dosimeter OSL)

N

75' 0 75' 150'

SCALE: 1" = 150'

AZ83-WF

Energy **Fuels** Resources (USA) Inc.

REVISIONS	
Date	By
3-11	GM
3-11	GM
3/12	BM
3/13	BM

Project: Pinenut

County: Mohave State: AZ

Location: T 36N, R 4 W, Sec. 21

PINENUT MINE
OSL / ANNUAL SOIL LOCATIONS
FIGURE 1

Author: RE Date: 03/2011 Drafted By: RE

S:\Source\4Z\Pinenut\Maps\Radiation\PINENUT_OSL_Locations.dgn Figure 1 relfin

ATTACHMENT 2

Energy Fuels Resources (USA) Inc.

Standard Operating Procedure for Soil Sampling

January 2015

Table of Contents

1.0 Purpose 3
2.0 Soil and Sediment Sample Collection 3
2.1 Health and Safety Considerations 3
2.1 Equipment and Supplies 4
2.2 Sampling Procedures 4
3.0 Laboratory Analysis and Analytical Quality Assurance 5

STANDARD OPERATING PROCEDURE FOR SOIL SAMPLING

1.0 Purpose

The purpose of this Standard Operating Procedure ("SOP") is to describe the field procedures, required documentation, and equipment to be used during soil sampling at Energy Fuels Resources (USA) Inc.'s ("EFRI's") Arizona mine sites (the "Mines").

The procedures discussed in this SOP will be used for routine and non-routine soil sampling at the Mines as required by Arizona Department of Environmental Quality ("ADEQ") operating permits. For site-specific details regarding soil sampling, please see the site-specific operating permits and/or plans which are housed on-site, in the Fredonia office, and in the EFRI Corporate office in Lakewood, CO.

2.0 Soil and Sediment Sample Collection

2.1 Health and Safety Considerations

General site conditions shall always be observed prior to the commencement of field activities. Any unsafe conditions shall be documented and reported to the Mine Superintendent as soon as possible. If safety concerns warrant, field activities will be delayed until such time as the concerns are adequately addressed and the safety of field personnel is assured.

A safety assessment will be completed at each site prior to the commencement of any field activities. A safety assessment includes but is not limited to:

- A review of weather conditions (for severe weather conditions which may pose a hazard such as lightning, snow, and ice),
- A review of any biological hazards present (bees, wasps, snakes, and animals),
- A review of slip, trip, and fall hazards (ice, snow, mud, and uneven ground),
- A review of ground conditions around the sampling locations for any signs of instability, and
- A review of electrical hazards (frayed cords).

As in all mine areas, appropriate Personal Protective Equipment ("PPE") and safety precautions will be followed when working at the Mines:

- Steel toed shoes will be worn at all times in the field;
- Safety goggles will be worn at all times in the field;
- Nitrile gloves will be worn at all times during sample collection; and
- Ear protection will be worn around surface fans and wherever posted.

2.1 Equipment and Supplies

The following is a list of supplies needed to collect soil and sediment samples:

- Hand trowel
- Nitrile gloves
- 1-gallon Ziploc® bags
- Sample paperwork and sample tags/labels
- Sample cooler or suitable shipping container
- GPS instrument
- Field notebook
- Camera

2.2 Sampling Procedures

A photograph will be taken of each sample location and a description of the material to be sampled (e.g., color, size) will be entered into the field notebook. Soil samples will be collected using a clean trowel to excavate a soil sample across a one square foot area at a depth of 1.0 to 5.0 centimeters. The excavation depth will be maintained by using a tape measure or other suitable calibrated measuring stick. As the soil is being collected, it will be placed directly into the sample container (i.e., Ziploc bag).

Sample Identification**:** Each sample will be labeled and all sample labels will be filled out in indelible ink and numbered. The following information will be contained on the label:

1. Project and facility
2. Company name
3. Date and time of sample collection
4. Sampler's initials
5. Sample location
6. Requested Analytical Parameters

Sample Chain-of-Custody ("COC"): During sampling activities, traceability of the sample must be maintained upon sample collection until the samples are delivered to the laboratory. Information on custody, handling, transfer, and shipment of the samples will be recorded on a COC form. The sampler will be responsible for filling out the COC form. The COC form will be signed by the sampler when the sampler relinquishes the samples to anyone else. A COC form is to be completed for each set of samples placed in a sample shipping container and is to include the following:

1. Sampler's name
2. Sample ID/number
3. Date and time of sample collection
4. Sample location/depth

5. Sample type
6. Analyses requested
7. Signature(s) of person(s) releasing custody and date(s)
8. Signature(s) of person(s) accepting custody, date(s), and time(s)

Copies of the COC forms and all custody documentation will be retained in appropriate files with EFRI.

3.0 Laboratory Analysis and Analytical Quality Assurance

The soil and sediment samples collected will be analyzed for the parameters listed in **Table 1** using the specified EPA-approved methods. The samples will be analyzed by an Arizona state certified laboratory. Laboratory analyses will be reviewed by the technical staff and any identifiable anomalies in results noted and investigated. Appropriate measures to confirm or disaffirm results will be pursued, such as laboratory conversation, analytical sample rerun, or trend analysis.

Table 1 Soil Sampling Parameters

Analyses	Reporting Limit	Units	EPA Method
Uranium (U-Nat)	0.05	mg/kg-dry	SW6020 or SW6010
Radium 226 (Ra-226)	0.5	pCi/g-dry	E903.1

The laboratory will prepare and retain a copy of all analytical and quality control documentation. The laboratory will provide hard copy information in each data package submitted in accordance with quality assurance objectives for the surface soil quality assurance project plan that is: COC forms, cover sheets with comments, narratives, samples analyzed, reporting limits and lower limit of detection values for parameters, and analytical results of quality control samples. The data reduction and laboratory review will be documented, signed, and dated by the analyst.

If necessary, corrective action will be taken for any deficiencies or deviations noted in the procedures or anomalous results, such as but not limited to additional sample collection, sample re-run, laboratory inquires, or other actions as appropriate.

Corrective actions for duplicate deviations shall first determine if the deviation is indicative of a systematic issue. If the deviation is limited in scope and nature, EFRI will:

1. Notify the laboratory,
2. Request the laboratory review all analytical results for transcription and calculation errors, and
3. If the samples are still within holding time, EFRI may request the laboratory re-analyze the affected samples.