

TECHNICAL REVIEW AND EVALUATION

OF APPLICATION FOR

AIR QUALITY PERMIT NO. 62877

I. INTRODUCTION

This Class II air quality control permit is for the operation of an underground uranium mine located on the Coconino Plateau in Coconino County, Arizona approximately 6.5 miles southeast of Tusayan. The facility is owned and operated by Energy Fuels Resources (USA) Inc. The facility will have an anticipated maximum annual production of approximately 109,500 tons of uranium ore.

Coconino County is an attainment or unclassified area for the National Ambient Air Quality Standards (NAAQS).

Company Information

Company Name:	Energy Fuels Resources (USA) Inc.
Facility Name:	Canyon Mine
Facility Location:	35° 52' 58"/112° 05' 46", 6,500 ft
Mailing Address:	225 Union Blvd., Suite 600 Lakewood, Colorado 80228

Background

This source is an underground uranium mine, located approximately 6.5 miles southeast of Tusayan, Arizona. This is a previously developed facility that is being reactivated.

II. PROCESS DESCRIPTION

A. Underground Uranium Mining

The proposed mine production rate is 109,500 tons per year (tpy) of uranium ore. No ore processing will be conducted on-site. The ore will be shipped to an off-site processing mill. If the ore cannot be shipped immediately to the mill, it will be placed on-site in stock piles within the Ore Stockpile Area (OSA). The OSA will encompass approximately 0.7 acre and can accommodate up to 13,100 tons of stockpile ore. The company also proposes to install an existing 455 kilowatt (kW) standby diesel-powered generator for use as backup power.

Rock from the mining operations with less than 0.03 percent uranium will be stored on the surface in the Development Rock Area (DRA) and in mined-out areas of the underground workings. The DRA will encompass approximately 1.54 acres.

III. RADIATION BACKGROUND¹

Energy Fuels Resources (USA) Inc.'s Canyon mine is a uranium mining operation and as such the potential radiation from the mine must be understood.

Radiation refers to energy emitted in the form of waves or particles. There are two main types of radiation which must be considered: Non-ionizing radiation and ionizing radiation.

Non-ionizing radiation occurs at the low frequency end of the electromagnetic spectrum. Examples of non-ionizing radiation include: microwaves, radio waves, radar, infrared and some ultraviolet radiation. This type of radiation in sufficient concentration can produce undesirable effects on humans through heating.

As the frequency increases through the ultraviolet region, the energy from the electromagnetic radiation becomes sufficient to release orbiting electrons from the surrounding matter. This form of radiation is ionizing radiation. Examples of ionizing radiation are x-rays, gamma rays, and cosmic rays. In addition to wave or frequency type radiation emissions, several particles are also included in this form of radiation. These particles are alpha particles and beta particles.

The form of radiation of concern at the Canyon Mine is ionizing radiation.

The negative health effects attributed to this type of radiation depend on many parameters including the amount of radiation received (dose), the rate at which the radiation is delivered (dose rate), and the type of ionizing radiation (alpha, beta, x-ray, gamma).

The ionizing radiation which will be present at the Canyon Mine site will include x-rays, gamma rays, alpha particles and beta particles. These types of radiation are emitted from the radioactive material found in and around the uranium ore body.

X-rays and gamma radiation have no mass or charge. They may be produced by x-ray machines, by ionization of atoms or molecules, or by the decay of radioactive atoms.

Beta particles have a very small mass and a negative charge. Basically, beta particles are electrons which have been released from inside an atom as that atom decays and seeks a more stable configuration.

Some radioactive materials may decay by releasing an alpha particle from its nucleus. The alpha particle has two positive charges and is identical to an ionized helium atom. Alpha particles are about 2,000 times larger and are ejected with about 10 times more kinetic energy than beta particles.

Now that the types of radiation have been identified it is helpful also to understand the natural radiation environment. The natural radiation environment consists of cosmic radiation and many radioactive elements including Hydrogen-3, Carbon-14, Potassium-40, Rubidium-87, Uranium-235, Uranium-238 and Thorium-232. Both Uranium-238 and Thorium-232 are ubiquitous in soil with average concentrations of a few parts per million. Each are parent elements of a radioactive decay series. The parents decay to daughters which are also radioactive. Natural uranium is about 99.3% U-238.

Radioactive materials are present in air, water and soil. Their concentrations are expressed in units of radioactivity per volume or mass. Typical concentrations of naturally occurring uranium and Radium-226 in normal soil are on the order of 1 pico-Curie per gram. A pico-Curie (pCi) is equivalent to 2.22

¹ Radiological Assessment of the Arizona 1 Project Prepared for EFNI by Dr. John W. McKlveen January 25, 1988

atoms of the radionuclide decaying each minute. These values may vary considerably depending on the extent of uranium mineralization in the area being examined.

When ionizing radiation deposits energy in living matter it produces a physical and biological effect which may be quantified in terms of dose. The dose to a particular receptor of radiation is expressed in radiological units, known as **rems** (roentgen equivalent man). However, because this unit is so large it is often useful to divide the value by 1,000 and call it **millirem** (mrem).

A progeny of U-238 is Radon-222. Radon is a colorless, odorless and inert gas which diffuses into the atmosphere from rocks, soil and building materials. All the radon progeny are particulates and many decay by emitting alpha particles. It is the alpha particle emitting progeny of Radon-222 that have been linked to negative effects on humans.

Airborne Radioactivity

Radon gas emanates from earthen materials containing uranium such as natural soil and the ore stockpiles. Once airborne, the gas will be transported by prevailing winds and will decay to its progeny. Uranium and its progeny will be present in dust from the mining operations.

The natural background radon gas concentration in the vicinity of the Canyon mine is on the order of 0.2 picocuries per liter (pCi/l) or 125 mrem/yr. Based upon previous evaluations of the Arizona I Mine project (McKleeven, 1988) the highest potential exposure projected from radon would be on the order of 106 mrem/year. The mine shaft vent emissions are subject to limitations set forth of 40 Code of Federal Regulations (CFR) part 61 subpart B at 10 mrem/year. Radiation exposure from dust associated with the mining operation is dependent on the concentrations of dust in the air and the activity of the compounds in the dust. Since these values are variable, it is not feasible to estimate the radiation impact from the dust.

Direct radiation from haul trucks will be about 2 mrem/hr at the truck bed, about 0.3 mrem/hr on the shoulder of the roadbed, and normal background at about 96 feet from the trailer. As a truck passes, individuals standing on the shoulder of the road would receive a dose of radiation too small to quantify.

These radiation concentrations can be put in perspective by comparing them to what naturally occurs in various locations. For example, naturally occurring radiation levels for a person living in the Colorado Plateau will receive 400-500 mrem/year based on EPA estimates. Thus, the estimated radiation exposure at the Canyon Mine site does not present a significant risk to human health.

IV. EMISSIONS

The PM_{10/2.5} emissions listed in Table 1 below account only for generator, vent shaft and ore/development rock unloading. Fugitive emissions are not included in calculations for determining major source status since this facility is not a listed category source as defined under A.A.C. R18-2-101.23. The fugitive emissions were, however, included in the air dispersion modeling analysis.

Table 1: Facility Emissions

Pollutant	Facility Potential to Emit (tons/year)
PM ₁₀	3.24
PM _{2.5}	1.76
NO _x	0.21
CO	0.21
SO ₂	0.00042

VOC	0.02
HAPs	0.0075
Radionuclides	0.007

V. APPLICABLE REGULATIONS

The applicable regulations were identified by the company as part of the application packet. If necessary, the source is required to list any additional regulations that may be applicable. Table 2 displays the applicable requirements for each piece of equipment under this proposed permit.

Table 2: Verification of Applicable Regulations

Unit	Control Device	Rule	Verification
Mine Vents	N/A	A.A.C. R18-2, Article 11 40 CFR 61 Subpart B A.A.C. R18-2-730	NESHAPs requirements for radon monitoring apply to the mine vents. These standards apply for Unclassified Sources
Internal Combustion Engine	None	A.A.C. R18-2-719 40 CFR 60 Subpart III	This standard applies to all stationary rotating machinery This standard applies for CI engines manufactured after April 6, 2006.
Fugitive dust sources	Water and other reasonable precautions.	A.A.C. R18-2, Article 6	These standards are applicable to all fugitive dust sources.
Mobile sources	Water Sprays/Water Truck for dust control	A.A.C. R18-2, Article 8	Opacity requirements for smoke and dust for mobile sources (construction equipment, etc.).

VI. MONITORING AND RECORDKEEPING REQUIREMENTS

A. Opacity Requirements

The permit specifies opacity limitations for the various emission sources found within the facility, including mine vents, and fugitive dust sources. The permit requires the source to perform bi-weekly (once every two weeks) observations (quarterly for the emergency generator) of the various point sources and non-point sources, and if emissions appears to exceed the opacity standard, a Method 9 observation is to be conducted.

The Permittee is to keep records of the date, time, and results of all visible surveys made, as well as the name of the observer who conducted the survey.

B. Particulate Matter Requirements

The permit specifies particulate matter limits for the fuel-burning equipment, mine vent emissions, and work practice standards for fugitive dust sources. The Permittee is required to

keep records of all activities that may produce fugitive dust emissions of particulate matter. In addition, the Permittee must use water or equivalent control to minimize fugitive dust emissions from storage piles and development rock areas.

C. Radiation Survey Plan

The Permittee is required to follow the most recently approved radiation survey plan. The purpose of the radiation plan is to ensure that there are no elevated readings of radiation near the mine site. If any elevated readings are discovered, the plan requires the facility to determine the source of the elevated readings and take corrective action as necessary. An elevated reading is any reading resulting in a level of radiation that is four times higher than the natural background levels. The radiation survey plan consists of the following:

- Quarterly thermoluminescent dosimeter (“TLD”) measurements; and
- Annual soil sampling at the locations of the four Mine site TLD monitors; and
- Soil sampling as necessary, to ensure clean-up of any accidental releases; and
- Establishment of a Trucking Emergency Response Plan.

Detectors will be placed at four points approximately 100 feet outside the mines property line. Additionally, detectors will also be placed on the ore haul road in 10 different locations. Soil samples at these locations will also be taken annually and analyzed at an off-site lab. If any elevated radiation readings are detected the facility will take the following actions:

- Take additional soil sample to confirm the detection; and
- Review dust control policies to determine if any additional measure can be taken to reduce windblown dust; and
- 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.

A copy of the radiation survey plan is included in this support document in Appendix A.

D. Radon NESHAPs Requirements

The permit specifies Radon (Rn-222) testing requirements. The permit specifies that Rn-222 concentration and flow rate measurements will be used to calculate the effective dose equivalent resulting from mine emissions. The permit specifies that compliance modeling will be reported each year to EPA and the Department by March 31st of the following year.

E. Internal Combustion Engines

The Permittee is required to keep records of the fuel supplier certification to demonstrate compliance with the sulfur limit.

VII. Compliance History

ADEQ conducted an announced inspection on the facility on June 18, 2013. Mine shaft drilling was underway but no ore extraction was taking place. The results of the inspection indicated no

deficiencies, and no action was taken. A copy of the inspection report is attached to this document in Appendix B.

VIII. Insignificant Activities

Table 3, below, lists the insignificant activities at the Energy Fuels Resources (USA) Inc. Canyon Mine.

Table 3: Insignificant Activities

Equipment Description	Number of Equipment Items	Maximum Size or Capacity	Verification of Insignificance
Diesel Storage Tanks	1	6,000 gallons	Size limitation for Diesel Fuel Storage Tanks (A.A.C. R18-2-101.57.c)

IX. Ambient Air Impact Analysis

A. Introduction

Energy Fuels Resources (USA) Inc. conducted an Ambient Air Impact Analysis as part of its initial permitting approval to demonstrate protection of the National Ambient Air Quality Standards (NAAQS) and visibility criteria. Modeling was completed using AERMOD for dispersion modeling of PM₁₀ and CALPUFF refined for the visibility analysis. Vent shaft emissions, road dust emissions from haul trucks traveling on unpaved roads, and neighboring source emissions were addressed in the modeling analysis. As part of the renewal process, the Department updated the modeling to ensure compliance with the new PM_{2.5} annual and 24 hour. Ambient air quality assessment for 1-hour NO₂ NAAQS was not addressed in the renewal as the only source of NO_x emissions is an emergency use engine. According to the EPA Memo titled “Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO₂ National Ambient Air Quality Standard” intermittent sources such as a back-up use engine which does not contribute significantly to the annual distribution of daily maximum 1-hour concentrations can be excluded from the modeling analysis.

B. Haul Truck Dust Emissions

Particulate matter emissions from vehicle traffic within the mine site and along the access road as well as fugitive emissions from haul trucks traveling from forest road 305A and forest road 305 to highway 64 were included in the modeling analysis. Fugitive emissions from off-site roads were modeled using the protocols developed by the Texas Commission on Environmental Quality, with ADEQ modifications. Haul road emissions will be controlled by limiting vehicle speeds to 25 miles per hour (mph).

C. Neighboring Source Emissions

A cumulative source analysis was evaluated as part of the permit application. The objective of the cumulative analysis was to determine if any nearby sources should be included in the modeling analysis. Based upon review of available data, no nearby sources were identified.

D. Regional Haze Analysis

To conduct a visibility analysis for the mine including impacts from haul road dust emissions a refined CALPUFF model was run. The visibility modeling was completed to evaluate potential visibility impacts at the Grand Canyon National Park resulting from the Canyon Mine

operations. The closest part of the Grand Canyon Nation Park to the Canyon Mine is 7.5 miles away. Model receptors at the Grand Canyon have been developed by the National Park Service for use in CALPUFF analysis.

CALPUFF is an advanced, integrated Gaussian puff modeling system for the simulation of atmospheric pollution dispersion. CALPUFF is designed to use comprehensive 3-dimensional windfield meteorological data to address complicated airflow patterns in the atmosphere. Calpuff was run in the refined model using the regulatory default options and CALMET wind field meteorological input data. The CALMET windfield data were developed by the Western Regional Air Partnership (WRAP).

E. NAAQS Dispersion Modeling Results

Dispersion modeling for the NAAQS was done using SCREEN3 for gaseous pollutants (CO, NO₂, and SO₂) and AERMOD dispersion modeling for PM_{10/2.5}. The results demonstrate that the Canyon Mine project is not expected to exceed the NAAQS. Table 4 on the following page presents the results of the modeling analysis, in addition to applicable background concentrations for comparison to the NAAQS.

**TABLE 4:
ENERGY FUELS RESOURCES (USA) INC. – CANYON MINE
NAAQS DISPERSION MODELING RESULTS**

Pollutant	Averaging Period	Year	Highest Modeled Cumulative Concentration ^a (µg/m ³) ^b	Background Concentration (µg/m ³) ^b	Total Cumulative Concentration (µg/m ³) ^b	NAAQS ^c (µg/m ³) ^b
¹ SO ₂	3-Hour	N/A	17.3	73	90.3	1300
	24-Hour	N/A	7.7	16	23.7	365
	Annual	N/A	1.5	3	4.5	80
¹ NO ₂	Annual	N/A	23.2	4	27.2	100
¹ CO	1-Hour	N/A	62.5	582	644.5	40,000
	8-Hour	N/A	43.8	582	625.8	10,000
¹ PM _{2.5}	24-Hour	N/A	18.1	12	20.1	35
	Annual	N/A	2.2	5.3	7.3	12
² PM ₁₀	24-Hour	2003	78.1	46	124.1	150
	Annual	2001	16.1	19	35.1	50

^aHigh-first-high modeled concentrations are presented for both short-term and annual averaging periods, per ADEQ request (ADEQ 2007).

^bMicrograms per cubic meter

¹Modeled Using SCREEN3

²Modeled Using AERMOD

F. CALPUFF Modeling Results

Output from the CALPUFF was compared to the 5 percent change in light extinction (Δb_{ext}) screening level. A change in Δb_{ext} from new sources that is less than 5 percent is generally considered acceptable.

Modeling results indicate that the predicted visibility impairment is below the 5 percent screening criteria for all days in the 3-year meteorological period modeled. The maximum predicted change in visibility impairment over the 3-year period was 0.63 percent.

**TABLE 5:
GRAND CANYON CUMULATIVE VISIBILITY IMPACT MODELING RESULTS**

Visibility Impacts (% degradation)					
Visibility Parameter	Averaging Period	Canyon Mine and Haul Road Traffic			Screening Threshold
Modeled Year:		2001	2002	2003	
Grand Canyon National Park					
Max ΔB_{ext} (%)	24-Hour	0.54	0.63	0.38	5%
# days > 5%	N/A	0	0	0	N/A
# days > 10%	N/A	0	0	0	N/A

The FLMs have identified a new approach to calculating modeled visibility impairment in their revised FLAG document (USFS, NPS, and USFWS 2008). This new approach uses a modified visibility algorithm, uses monthly relative humidity values rather than hourly values, and takes the 98th percentile value to screen out seven days of haze-type visibility impairment per year (USFS, NPS, and USFWS 2008). This new approach was also applied to the Canyon Mine for comparison purposes with the old Method 2 approach. The results of the new visibility impairment calculation approach are presented in Table 6. The highest value using the new FLAG approach is 0.45 percent. This high value visibility impairment value occurred along the northern Grand Canyon NP boundary, approximately 7.5 miles from the mine site.

**TABLE 6:
GRAND CANYON CUMULATIVE VISIBILITY IMPACT MODELING RESULTS
NEW FLAG APPROACH**

Visibility Impacts 98 th Percentile Values (% degradation)					
Visibility Parameter	Averaging Period	Canyon Mine and Haul Road Traffic			Screening Threshold
Modeled Year:		2001	2002	2003	
Grand Canyon National Park					
Max ΔB_{ext} (%)	24-Hour	0.45	0.42	0.32	5%
# days > 5%	N/A	0	0	0	N/A
# days > 10%	N/A	0	0	0	N/A

These model results indicate that operation of the Canyon Mine will not adversely impact visibility in the Grand Canyon National Park.

X. LIST OF ABBREVIATIONS

- A.A.C. Arizona Administrative Code
- CFR. Code of Federal Regulations
- CI..... Compression Ignition
- CO. Carbon Monoxide
- DRSP..... Development Rock Storage Pad
- DRA. Development Rock Area
- EPA. Environmental Protection Agency
- HAPs Hazardous Air Pollutants
- Lb/hr..... Pound per Hour

m.....	..... meters
mph.....	.....Miles per Hour
mrem.....	.....Millirem
NAAQS.....	..... National Ambient Air Quality Standards
NESHAP.....	.....National Emission Standards for Hazardous Air Pollutants
NPS.....	..... National Park Service
OSA.....	..... Ore Stockpile Area
pCi.....	.....pico-Curie
PM ₁₀.....	.....Particulate Matter with an Aerodynamic Diameter less than 10 Microns
NO _x.....	..... Nitrogen Oxide
SO ₂.....	..... Sulfur Dioxide
TPY.....	..... Tons per Year
μg/m ³.....	..... Microgram per Cubic Meter
USFS.....	..... United States Forest Service
VOC.....	..... Volatile Organic Compound
WRAP.....	..... Western Regional Air Partnership

DRAFT

Appendix A
Radiation Survey Plan for Canyon Mine

RADIATION SURVEY PLAN
ENERGY FUELS RESOURCES (USA) INC.



CANYON MINE
TOWNSHIP 29 NORTH, RANGE 3 EAST, SECTION 20
COCONINO COUNTY, ARIZONA

November 2015

PREPARED BY:
Energy Fuels Resources (USA) Inc.
225 Union Blvd., Suite 600
Lakewood, CO 80228
303-974-2140

Table of Contents

1.0	Introduction.....	3
2.0	Radiation Monitoring and Reporting.....	3
2.1	Gamma Radiation Monitoring.....	3
2.2	Soil Monitoring.....	3
2.3	Reporting.....	4
3.0	Corrective Action.....	4
3.1	Background Determination.....	4
3.2	Action Levels.....	5
3.2.1	Gamma Radiation Monitoring.....	5
3.2.2	Soil Monitoring.....	5
4.0	Transportation and Emergency Response.....	6

FIGURES

- Figure 1 Canyon Mine OSL Locations
Figure 2 Canyon Mine Haul Route

**Canyon Mine
Radiation Survey Plan
Air Quality Control Permit No. 52522**

1.0 Introduction

Energy Fuels Resources (USA) Inc. (“EFRI”) operates the Canyon Mine (the “Mine”), an underground uranium mine, located on the Coconino Plateau, approximately 5 miles south of Tusayan, in Coconino County, Arizona. The Mine site contains a mine shaft, an office building, a head-frame and associated hoist and maintenance building, a septic system, ore stockpiles, development rock stockpiles, topsoil stockpiles, and a lined non-stormwater impoundment. No ore processing is conducted on site. The ore is shipped to EFRI’s White Mesa Mill (the “Mill”) near Blanding, Utah.

This Radiation Survey Plan is prepared in compliance with Arizona Department of Environmental Quality (“ADEQ”), Air Quality Division, Air Quality Control Permit No.52522, Attachment B, Part I.I.C.

2.0 Radiation Monitoring and Reporting

Radiation surveys at the Mine will be conducted and reported to the ADEQ as described below.

2.1 Gamma Radiation Monitoring

Passive gamma radiation will be monitored at a total of four stations around the Mine. The four monitoring stations will be located approximately 100 feet outside of the disturbed area (fence line) at the four main compass points (i.e., north, south, east and west) of the Mine site. Passive gamma will be monitored using an optically stimulated luminescence device (“OSL”) that is exchanged and analyzed on a quarterly basis. The approximate locations of the four monitoring stations around the Mine site are shown in Figure 1.

Passive gamma radiation will also be monitored at a total of 8 locations (using OSLs) along the existing haul route from the Mine to the eastern edge of Kayenta, Arizona, and at 1 location along the alternate haul route which utilizes the SP Crater Road/Babbit Ranch Road and Forest Service 417 (see Figure 2). The OSLs on both haul routes will be exchanged and analyzed on a quarterly basis.

2.2 Soil Monitoring

Soil samples will be collected annually at each of the four monitoring stations around the Mine described in 2.1 above. The samples will be collected at the same location as previous years, as

field conditions allow. The samples will be collected by EFRI field personnel using standard sampling techniques, equipment and chain of custody procedures and analyzed for natural uranium (U-Nat) and radium-226 (Ra-226) using an Arizona state certified laboratory. EFRI's Standard Operating Procedure for Soil Sampling, which includes details on sample collection procedures and laboratory analysis, is included as Attachment A to this Plan.

2.3 Reporting

In accordance with Section I.D.2. of the Permit, the results of all gamma radiation and soil monitoring will be submitted to the ADEQ in the Annual Radiation Survey Report within 90 days after the end of the fourth quarter.

3.0 Corrective Action

This section provides a description of the actions to be taken if elevated levels of radiation are detected during routine gamma radiation and soil monitoring.

3.1 Background Determination

Gamma radiation monitoring stations have been established at 8 locations along the existing haulage route from the Mine to the eastern edge of Kayenta, Arizona, and at 1 location along the alternate haul route. One additional sampling device will be placed near Tusayan, Arizona, north of the Mine. The general locations of the haul roads monitoring stations are shown on Figure 2. EFRI will begin monitoring the haul road during the first quarter of 2016. The results from the first and second quarters of 2016 will be used to establish background gamma readings. These background results will be used to determine compliance in accordance with this Plan in the future.

For the Mine site stations, EFRI has been monitoring gamma radiation since 2013 using OSL badges at the 4 locations shown on Figure 1. The average of the gamma results from 2013 to the end of 2014 will be used to represent background for gamma radiation at the Mine. These data are shown in Table 1 below. EFRI will collect soil samples for U-Nat and Ra-226 during the first and second quarters of 2016 prior to the initiation of mining at the site. These results will be used to represent soil background, which will be used to determine any upward trends in radiation.

Table 1 – Gamma Background Readings

Badge Location	TLD Gamma Results Average mRem/week
Canyon (66)	3.04
Canyon (67)	3.11
Canyon (68)	3.03
Canyon (69)	3.05

3.2 Action Levels

3.2.1 Gamma Radiation Monitoring

The following actions will be taken if an upward trend (i.e., four times higher than background) of gamma radiation is detected in any one quarterly OSL result:

- 1) Continue to evaluate the quarterly OSL results; and
- 2) If the upward trend (i.e., four times higher than background) is confirmed through two consecutive quarterly OSL results, EFRI will:
 - a) Perform additional soil surveys to evaluate the potential for elevated levels of U-Nat and/or Ra-226 in soil using a combination of soil sampling and/or Micro-R monitoring using a Ludlum Model 19, or equivalent, meter; and
 - b) If the results of the additional soil surveys identify a trend (i.e., four times higher than background), EFRI will submit a Corrective Action Plan to ADEQ within 60 days of receipt of the additional soil survey data describing the results of the additional surveys and a plan and schedule for mitigation of the elevated levels of radiation.

3.2.2 Soil Monitoring

The following actions will be taken if an upward trend (i.e., four times higher than background as noted in Section 3.1 above.) of U-Nat or Ra-226 is detected in the annual soil samples:

- 1) EFRI will review the data to identify any anomalies that might be present in the laboratory results, and take appropriate measures to confirm or disaffirm the results.
- 2) If the laboratory results are confirmed with no quality assurance issues, additional soil samples will be taken from the station with potentially elevated levels of U-Nat and/or Ra-226 to confirm the existence of the trend; and
- 3) If the trend (i.e., four times higher than background) is confirmed, EFRI will:
 - a) Review its dust control policies and procedures:
 - i) To determine if additional dust control measures can be taken to reduce dust generated from any fugitive emission source within the property that could contribute to elevated levels of radiation in the vicinity of the Mine; and
 - ii) If a determination is made that additional dust control measures can be taken, a revised Dust Control Plan will be submitted to ADEQ within 30 days of receipt of the confirmation samples indicating the new dust control measures implemented.

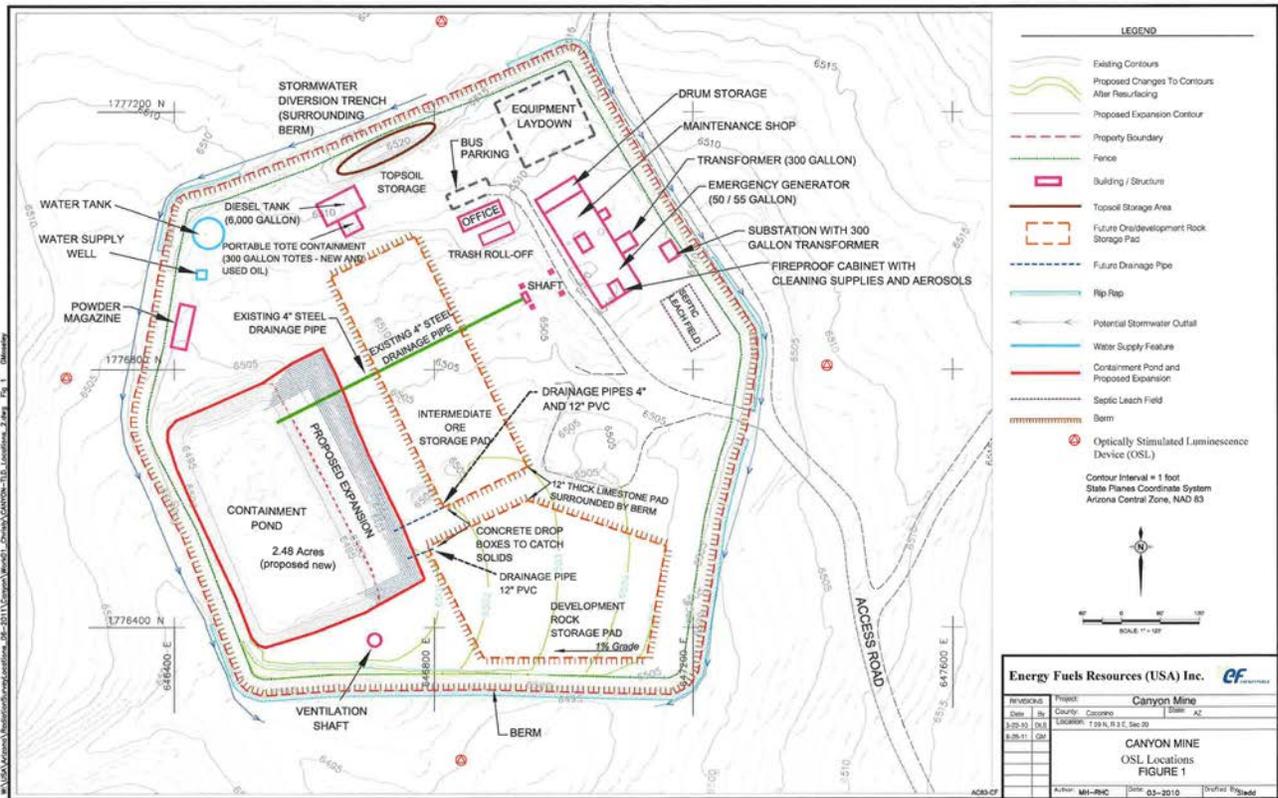
- b) Perform additional soil surveys to determine the areal extent of the area containing elevated levels of radiation. Such additional soil surveys may involve a combination of soil sampling and/or Micro-R monitoring using a Ludlum Model 19, or equivalent, meter; and
- c) Submit a Corrective Action Plan to ADEQ within 60 days of receipt of the additional soil survey data describing the results of the additional surveys and a plan and schedule for mitigation of the elevated levels of radiation.

4.0 Transportation and Emergency Response

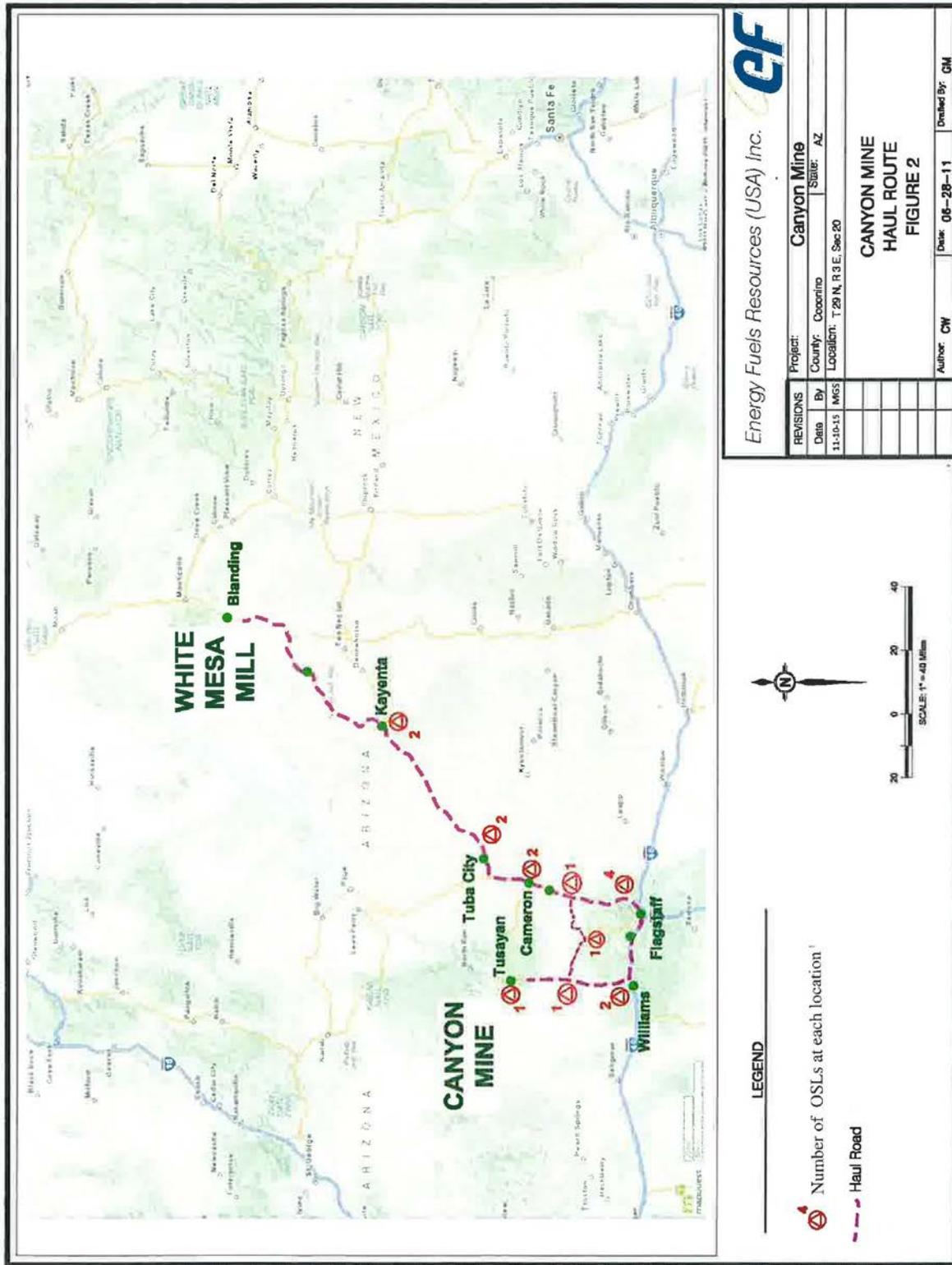
EFRI has an established transportation policy that requires trucking contractors to prepare an emergency response plan to manage truck accidents that result in ore spills along the haul route from the Mine to the Mill.

Each ore hauling contractor is provided a copy of the transportation policy and provides EFRI with a copy of the contractor's trucking emergency response plan. Each contractor has been instructed on the proper notification procedures relating to a trucking accident.

For any incident involving an ore hauling transport vehicle, a response team from the Mill near Blanding, Utah, will respond and supervise all cleanup activities. Those activities include the removal of the ore and cleanup of any potential contamination.



DRAFT



W:\USA\Arizona\RadiationSurvey\Locations_06-2011\Canyon\Work\02\Chitry\CANYON-Fig 2-Haul Route.dwg Fig 2 Chitry



Energy Fuels Resources (USA) Inc.

Project: Canyon Mine	
REVISIONS	State: AZ
Date	County: Coconino
11-10-15	Localitn: T 29 N, R 3 E, Sec 20
CANYON MINE HAUL ROUTE FIGURE 2	
Author: CW	Date: 06-28-11
Drawn By: GM	

Attachment A

Energy Fuels Resources (USA) Inc.'s Standard Operating Procedure for Soil Sampling

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.

Appendix B
Field Inspection Report for Canyon Mine

Pre-Inspection

Requirements		Comments
Are fees paid? <div style="text-align: right;">[Attachment A, Section V]</div>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Annual Emissions Inventory submitted? <div style="text-align: right;">[Attachment A, Section VI, Part A]</div>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Submitted 5/29/13
Compliance Certifications submitted? <div style="text-align: right;">[Attachment A, Section VII, Part A]</div>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Submitted 1/26/13
Any Excess Emission/ Permit Deviation Reports submitted? <div style="text-align: right;">[Attachment A, Section XI or XII, Part A]</div>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	None
Radiation Survey Submitted?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Submitted 3/26/13
Any recent NOV or NOC?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Not Applicable
Last performance test and rate of production (tph)	Date:	Not Applicable
Last Inspection	Date:	None
Any demolition or renovation performed since the issuance of the permit?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	