ADEQ Arizona Department of Environmental Quality

DRAFT TECHNICAL SUPPORT DOCUMENT

TECHNICAL REVIEW AND EVALUATION

OF APPLICATION FOR

AIR QUALITY PERMIT NO. 62876

I. INTRODUCTION

This Class II air quality control permit is for the operation of an underground uranium mine located 35 miles south of Fredonia, in Mohave County, Arizona. 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:	Pinenut Mine
Facility Location:	36° 30’ 11”/112° 43’ 56”, 5,449 ft
Mailing Address:	225 Union Blvd., Suite 600 Lakewood, Colorado, 80228

Background

This source is an underground uranium mine, located approximately 35 miles south of Fredonia, Arizona. This is a previously developed facility that is being reactivated.

II. PROCESS DESCRIPTION

A. Underground Uranium Mining

The proposed maximum 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 1.2 acres and can accommodate up to 67,230 tons of stockpile ore. The company also proposes to install an existing 500 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 0.4 acre.

III. RADIATION BACKGROUND[1]

Energy Fuels Resources)USA) Inc.'s Pinenut 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 Pinenut 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 Pinenut 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.

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

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 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 Pinenut 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 (McKleveen, 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 Pinenut 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}	3.0
$PM_{2.5}$	1.8
NO_X	1.2
CO	0.3
SO_2	0.08
VOC	0.10
HAPs	0.0089
Radionuclides	0.0083

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 IIII	This standard applies to all stationary rotating machinery This standard applies to the emergency CI generator since it was manufactured after April 1, 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. Additional TLD monitoring stations have been established at 13 locations along the existing haulage route from the Mine site to the eastern edge of Kanab, Utah. Soil samples will be taken annually at each of the four main compass point TLD locations at the Mine site. 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 July 22, 2014. 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. CO-LOCATION ANALYSIS

The Department conducted an analysis to determine if the Arizona I Mine and the Pinenut Mine should be considered as a single stationary source for air quality permitting purposes.

A.A.C. R18-2-101(113), defines "stationary source" to mean "any building, structure, facility or installation subject to regulations…which emits or may emit any air pollutant." The definition then states that "building, structure, facility, or instillation means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person or persons under common control." The Pinenut and Arizona I mines are classified in the same industrial grouping and they share a common owner.

The two mines are approximately 4 miles apart. The daily operations of the two sites will be independent of each other and either site could operate in the complete absence of the other. There are no interconnections between the facilities (i.e. no pipeline, conveyors, or channels), and neither mine will store ore onsite for the other mine. Additionally, as part of the Energy Fuels Resources (USA) Inc.'s business plan, the Arizona I Mine will be closed and reclaimed while the Pinenut Mine continues to operate. The ore excavated from both sites will be sent to Blanding, Utah for processing. Since both mines are located in a sparsely populated area with few roads, the route used by haul trucks to ship the ore to Blanding, Utah will be the same for both mines. Both mines will use the same contracted trucking company to haul the ore to Blanding, which means that any given haul truck could be used at either mine. However, the sharing of haul trucks does not demonstrate interdependency between the two mines since the mined ore will not be shipped between facilities.

Based on the discussion above, the Department has determined that these two facilities are not contiguous or adjacent and therefore are two separate stationary sources.

IX. Insignificant Activities

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

X. Ambient Air Impact Analysis

A. Introduction

Energy Fuels Resources (USA) Inc. conducted an Ambient Air Impact Analysis to demonstrate protection of the National Ambient Air Quality Standards (NAAQS) and visibility criteria. Modeling was completed using AERMOD for dispersion modeling of PM_{10} 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 NO_2 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 NO_2 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 1.4 mile access road as well as fugitive emissions from haul trucks traveling Mount Trumbull Road and the county road 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, the only source identified to be included in the cumulative modeling analysis was the Arizona 1 Mine.

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 Pinenut Mine operations. The closest part of the Grand Canyon Nation Park to the Pinenut Mine is 6.6 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, NO_2, and SO_2) and AERMOD dispersion modeling for PM_{10}. The results demonstrate that the Pinenut Mine project is not expected to exceed the Ambient Standards in Article 2 of the Arizona Administrative Code. 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. – PINENUT MINE
NAAQS DISPERSION MODELING RESULTS

Pollutant	Averaging Period	Year	Highest Modeled Cumulative Concentration[a] ($\mu g/m^3$)[b]	Background Concentration ($\mu g/m^3$)[b]	Total Cumulative Concentration ($\mu g/m^3$)[b]	NAAQS[c] ($\mu g/m^3$)[b]
[1]SO_2	3-Hour	N/A	36.5	73	109.5	1300
	24-Hour	N/A	16.2	16	32.2	365
	Annual	N/A	3.2	3	6.2	80
[1]NO2	Annual	N/A	49	4	53	100
[1]CO	1-Hour	N/A	131.9	582	713.9	40,000
	8-Hour	N/A	92.3	582	674.3	10,000
$PM_{2.5}$	24-Hour	N/A	7.9	12	19.9	35
	Annual	N/A	1.5	5.3	6.8	12
[2]PM_{10}	24-Hour	2002	65.9	46	111.9	150
	Annual	2001	12.5	19	31.5	50

[a]High-first-high modeled concentrations are presented for both short-term and annual averaging periods, per ADEQ request (ADEQ 2007).
[b]Micrograms per cubic meter
[1]Modeled Using SCREEN3
[2]Modeled Using AERMOD

F. CALPUFF Modeling Results

Cumulative visibility modeling was completed for the Pinenut Mine and included impacts from the Arizona I Mine, and all associated haul road activity. Output from the CALPUFF was compared to the 10 percent change in light extinction (Δbext) screening level that is used for cumulative analyses. A change in Δbext from the proposed source in combination with cumulative new source growth that is less than 10 percent is generally considered acceptable.

Cumulative modeling results indicate that the predicted visibility impairment is below the 10 percent screening criteria for all days in the 3-year meteorological period modeled.

TABLE 5:
GRAND CANYON CUMULATIVE VISIBILITY IMPACT MODELING RESULTS

Visibility Impacts (% degradation)					
Visibility Parameter	**Averaging Period**	**Pinenut 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 cumulative analysis 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 cumulative modeled value using the new FLAG approach is 5.76 percent. This visibility impairment value occurred along the northern Grand Canyon NP boundary, approximately 7 miles from the mine site.

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

Visibility Impacts 98th Percentile Values (% degradation)					
Visibility Parameter	**Averaging Period**	**Pinenut 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 Pinenut 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
$\mu g/m^3$ ..... Microgram per Cubic Meter
USFS. ..... United States Forest Service
VOC ..... Volatile Organic Compound
WRAP ..... Western Regional Air Partnership

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Appendix A

Radiation Survey Plan for Pinenut Mine

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RADIATION SURVEY PLAN

ENERGY FUELS RESOURCES (USA) INC.

PINENUT MINE
TOWNSHIP 36 NORTH, RANGE 4 WEST, SECTION 21
MOHAVE COUNTY, ARIZONA

July 7, 2011

Revised August 15, 2011

Revised November 18, 2015

PREPARED BY:
Energy Fuels Resources (USA) Inc.
225 Union Blvd. Suite 600
Lakewood, CO 80223
303-974-2140

Pinenut Mine
Air Quality Control Permit No.51803
Radiation Survey Plan

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 will be hauled to the White Mesa Mill, near Blanding, Utah for processing. No ore processing will occur on site. The 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, other facilities associated with the mine operation and a lined non-stormwater impoundment to contain runoff from the mine site and water that may seep into the underground workings.

This Radiation Survey Plan is prepared in compliance with Arizona Department of Environmental Quality ("ADEQ"), Air Quality Division, Air Quality Control Permit No.51803, Attachment B, Part II.C.

Background Determination

Background determination was previously performed for the Mine during a radiological assessment reported on January 25, 1988 for Energy Fuels Nuclear, Inc.

Radiation Survey Plan

The radiation Survey Plan will consist of the following:

1. Quarterly thermoluminescent dosimeter ("TLD") measurements.
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 four Mine site TLD monitors.
4. Soil sampling as necessary, to ensure clean-up of any accidental releases.
5. Establishment of a Trucking Emergency Response Plan.

TLD Monitoring

Prior to mining activities, background measurements were taken ¼ mile from the proposed fence line in each of the four compass directions from the site. In order to determine if an increase is detected as close to the property line as possible, TLDs will be placed at the four main compass points for the Mine site approximately 100 feet outside of the Mine disturbed area (fence line). If a rise in detector measurements close to the site occurs, then EFRI will conduct an investigation to determine the source of the increase in radiological readings, and take corrective

action as necessary to eliminate further contamination. The general locations of the Mine area TLD are shown on the attached Figure 1. The first readings will be received at the end of the 1st Quarter 2011.

Additional TLD monitoring stations have been established at 13 locations along the existing haulage route from the Mine site to the eastern edge of Kanab, Utah. The general locations of the haul road TLD are shown on the attached Figure 2. The monitoring program on the haulage route was initiated prior to ore haulage activities from the Arizona 1 Mine and the Pinenut Mine.

TLD results will be recorded quarterly. Results of all TLD monitors will be submitted to the ADEQ on an annual basis, within 90 days after the end of the 4th calendar quarter.

Radon Monitoring

Mine vent radon measurements will be taken and reported in compliance with EPA NESHAPS requirements as outlined in the ADEQ Air Permit.

Soil Sampling

Soil samples will be taken annually at each of the four main compass point TLD locations at the Mine site. Samples will be analyzed for uranium (Unat) and radium-226. Results of all soil sampling will be submitted to the ADEQ on an annual basis, within 90 days after the end of the 4th calendar quarter.

In the unlikely event of an accidental release, soil sampling will be used to ensure that the release has been cleaned up to background levels.

Soil sampling procedures will be consistent with current EPA, ADEQ, and Arizona Department of Health Services (ADHS) requirements. All sampling techniques, custody policies and equipment will be in accordance with the above referenced agencies' regulations and guidance.

Actions to be Taken if Elevated Levels of Radiation are Detected

Radiation detected at distance from the mine site is called "shine". Shine will make it more difficult to determine the levels of radiation from the nearby mine site and it is likely that the meter readings will be higher than if the shine radiation did not exist. Because of the shine affect, it is standard practice when conducting taking measurements to use 3 to 4 times background as a trigger number for cleanup. At this concentration, you have still the shine, but are actually starting to see definitive numbers that can be used for clean up. The following

actions will be taken if elevated levels of radiation (four times higher than background) are detected:

If a statistically significant upward trend in either uranium or radium in soils is detected then:

- Additional soil samples will be taken to confirm the existence of the 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.

If the Mine determines that additional dust control measures can be taken, then the Mine will submit a revised Dust Control Plan within 30 days indicating the new dust control measures implemented to decrease the uranium or radium levels in the soil at the affected soil sampling locations. If the Mine determines that no additional dust control measures can be taken to mitigate elevated uranium or radium levels, then EFRI shall determine other corrective actions that will be taken to decrease levels below significance levels. A Corrective Action Plan shall be submitted within 30 days of the elevated readings.

If there is a statistically significant upward trend in the results at any TLD location (four times higher than background as determined prior to the initiation of mining activities), then the following actions will be taken:

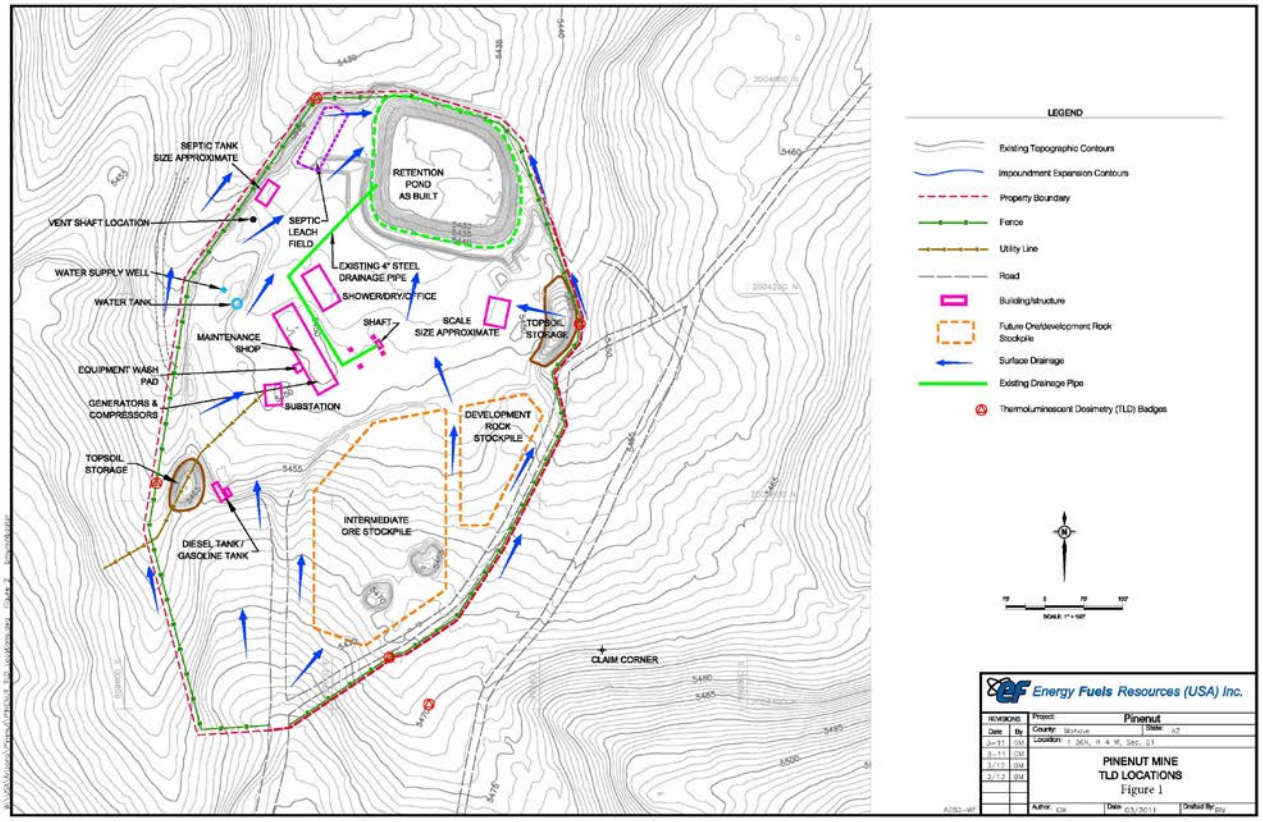
- At least two more TLDs will be added at locations that step out from the TLD location in question to confirm the existence of the trend and to delineate any area of increased gamma radiation; and
- If the trend is verified, the Mine will review the data to determine if any additional radiation safety procedures are required in light of the elevated gamma levels.

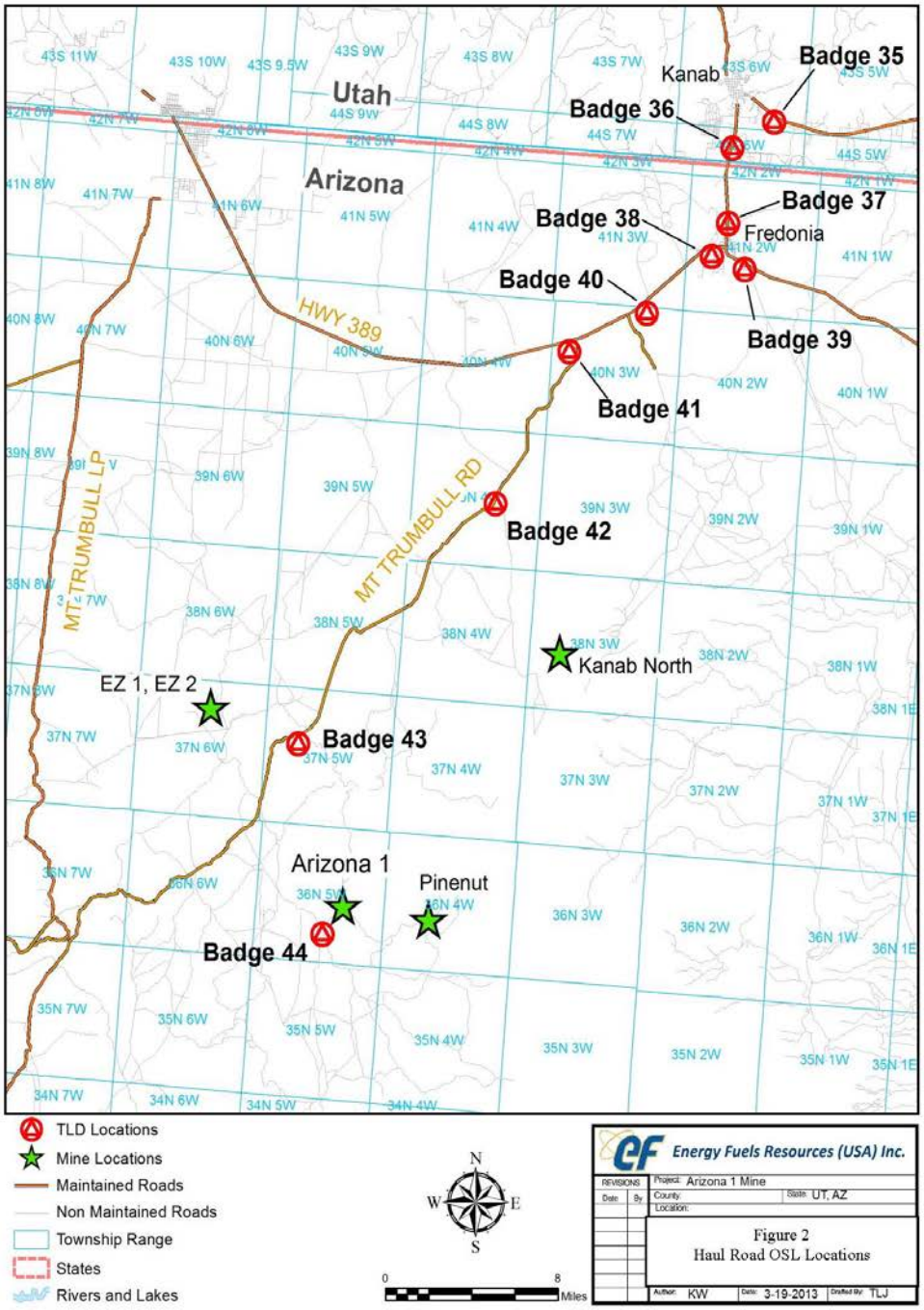
Transportation Policy and Trucking Emergency Response Plan

The Mine has an established Transportation Policy that requires it's trucking contractors to prepare an Emergency Response Plan to manage truck accidents that 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 their 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 also the remediation of any potential contamination.


SEPTIC TANK SIZE APPROXIMATE
RETENTION POND AS BUILT
VENT SHAFT LOCATION
SEPTIC LEACH FIELD
EXISTING 4" STEEL DRAINAGE PIPE
WATER SUPPLY WELL
WATER TANK
SHOWER/DRY/OFFICE
SHAFT
SCALE SIZE APPROXIMATE
TOPSOIL STORAGE
MAINTENANCE SHOP
EQUIPMENT WASH PAD
GENERATORS & COMPRESSORS
SUBSTATION
DEVELOPMENT ROCK STOCKPILE
TOPSOIL STORAGE
INTERMEDIATE ORE STOCKPILE
DIESEL TANK/ GASOLINE TANK
CLAIM CORNER
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
Thermoluminescent Dosimetry (TLD) Badges
Energy Fuels Resources (USA) Inc.
Project: Pinenut
PINENUT MINE
TLD LOCATIONS
Figure 1


Utah
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Badge 39
Badge 40
Badge 41
Badge 42
Badge 43
Badge 44
HWY 389
MT TRUMBULL LP
MT TRUMBULL RD
Kanab North
EZ 1, EZ 2
Arizona 1
Pinenut
TLD Locations
Mine Locations
Maintained Roads
Non Maintained Roads
Township Range
States
Rivers and Lakes
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Miles
Energy Fuels Resources (USA) Inc.
Project: Arizona 1 Mine
County:
State: UT, AZ
Location:
Figure 2
Haul Road OSL Locations
Author: KW
Date: 3-19-2013
Drafted By: TLJ

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Appendix B

Field Inspection Report for Pinenut Mine

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
1110 West Washington Street • Phoenix, Arizona 85007
(602) 771-2300 • www.azdeq.gov

Janice K. Brewer
Governor

Henry R. Darwin
Director

Air Quality Field Inspection Report

Company Name: Energy Fuels Resources (USA) Inc.	**Inspection Report No.:** 226537
Place Name: Pinenut Mine **Place ID No.:** 9673	**Inspector(s):** Rob Verville, Adam Bankhead, Travis Behrens
County: Mohave	**Arrival Date and Time:** 10/28/2014 9:50 AM
Physical Location: 36 miles south of Fredonia on Mt. Turmbull Road off Hwy 389	**Reason for Inspection:** ☐ Complaint Complaint No.: ☒ Routine Inspection ☐ Follow-Up Original Inspection Report No.:
Mailing Address: P.O. Box 809, Blanding, UT 84511	
Coordinates (for new locations): Latitude: Deg.: Min.: Sec.: Longitude: Deg.: Min.: Sec.:	
Permit No.: 51803 **Permit Expiration Date:** 3/9/2016	**Was Inspection Announced?** ☒ Yes ☐ No
Onsite Contact Person(s)/Title(s): Ty Fisher, Safety & Environment	**Operational Status:** Operating
	Type of Source: Class II underground uranium mine
Other Names for Site/Facility: formerly Energy Fuels Nuclear, Denison Mines	
Inspection Report Issued: ☐ Via hardcopy at facility ☒ Via e-mail at facility ☐ Via U.S. Mail from ADEQ office **Initial:** **Initial:**	

Results of Inspection:

☒ No deficiencies were noted during the course of the inspection. No ADEQ action will result from this inspection.

☐ Potential deficiencies were noted during the course of the inspection. Additional correspondence regarding this inspection may be forthcoming.

Comments:

Currently the mine is stockpiling ore in the Ore Stockpile Area (OSA). The last ore transport off-site from Pinenut Mine was on August 21, 2014. The ore will be placed in approximately 2ft high lifts. The lifts are wetted and compacted with the frontend loader.

The Pinenut Mine Dust Control Plan dated April 2011, Section 4.2 Storage Piles And Material Handling states the OSA will encompass 1.2 acres and can accommodate up to the permitted quantity of 67,230 tons of stockpiled ore. Currently the OSA has 7,789 tons of stockpiled ore. The air permit does not appear to have a permitted ore stockpile quantity, the permit application may contain the quantity indicated in the dust control plan.

The company surveyor provided documentation on the OSA size. The OSA is 26,381sq.ft. (0.606 acres).

Permit Attachment B, Section V.B.1.b.iii. Fugitive Dust Requirements states Ore storage piles must be covered or stabilized at all times to minimize fugitive dust emissions except when the piles are being actively worked. The facility uses wetting and compaction for controls on the ore storage pile.

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Pre-Inspection

Requirements		Comments
Are fees paid? [Attachment A, Section V]	Yes	
Annual Emissions Inventory submitted? [Attachment A, Section VI, Part A]	Yes	Submitted 6/2/14,CTS # 325835
Compliance Certifications submitted? [Attachment A, Section VII, Part A]	Yes	Submitted 1/16/14, CTS #320412
Any Excess Emission/ Permit Deviation Reports submitted? [Attachment A, Section XI or XII, Part A]	N/A	None recorded in the ADEQ database.
Any recent NOV or NOC?	No	
Last performance test and production rate	Date:	Production Rate: not required
Last Inspection	Date: 7/22/2014	Insp # 218076
Any demolition or renovation performed since the issuance of the permit?	N/A	No demolition or renovation

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ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
NOTICE OF INSPECTION RIGHTS

FACILITY INFORMATION	ADEQ INFORMATION
Facility Name (Customer): Pinenut Mine	**Date of Inspection:** 10/28/2014 9:50 AM
Facility Location (Place): 36 miles south of Fredonia on Mt. Turmbull Road off Hwy 389	**County:** Coconino
	Inspector: Rob Verville
Mailing Address: P.O. Box 809, Blanding, UT 84511	**Telephone:** (602) 771-4111
	Accompanied by: Adam Bankhead, Travis Behrens
Responsible Party: Energy Fuels Resources (USA)	
On-Site Representative: Ty Fisher	**ADEQ Follow-up Contact:** Pamela Nicola Air Quality Inspections & Field Services Unit
Telephone: 928.643.6185 x9	
Title: Safety & Environment	**Title:** Unit Supervisor
Email: tfisher@energyfuels.com	**Telephone:** (602) 771-4728

The ADEQ representative(s) identified above were present at the above address on the above listed date and time. Upon entry to the premises, the ADEQ representative(s) met with me, presented photo identification indicating that they are ADEQ employees and explained:

☒ **That the purpose of the inspection is to determine:**

☐ Compliance with Title 49 of the Arizona Revised Statutes, Title 18 of the Arizona Administrative Code* and/or:

Arizona Revised Statutes: Title 49, Chapter 3
Arizona Administrative Code: Title 18, Chapter 2
Permit/Agreement Number: 51803

☐ Qualification for a license issued pursuant to:
Arizona Revised Statutes: Title 49, Chapter 3
Arizona Administrative Code: Title 18, Chapter 2

☐ That this inspection is conducted pursuant to the authority granted in Arizona Revised Statutes § 49-104(B)(8) and/or:
Arizona Revised Statutes: § 41-1009
Arizona Administrative Code: Title 18, Chapter 2
Permit/Agreement Number: 51803

☐ **That the fee for this inspection is:** No fee for the inspection

*The Arizona Revised Statutes (A.R.S.) can be found on the internet: www.azleg.state.az.us/ArizonaRevisedStatutes.asp while the Arizona Administrative Code (A.A.C.) can be found at www.azsosaz.gov/public_services/Table_of_Contents.htm

While I have the right to refuse to sign this form, the ADEQ representatives may still proceed with the inspection

☒ I have read both sides of this notice and discussed any questions or concerns with the ADEQ representatives.

7/22/2014
Signature of Regulated Person or Authorized On-Site Representative

☐ The regulated person or authorized on-site representative refused to sign.

Name of Regulated Person or Authorized On-Site Representative Title

☐ The regulated person or an authorized on-site representative was not present at the facility.

7/22/2014
Signature of ADEQ Representative

INSPECTION RIGHTS

☒ I understand that I can accompany the ADEQ representative(s) on the premises, except during confidential interviews.

☒ I understand that I have right to, on request:

- Copies of any original documents taken during the inspection, and that ADEQ will provide copies of those documents at ADEQ's expense;
- A split of any samples taken during the inspection, if the split of the samples would not prohibit an analysis from being conducted or render an analysis inconclusive;
- Copies of any analysis performed on samples taken during the inspection and that ADEQ would provide copies of this analysis at ADEQ's expense;
- Copies of any documents to be relied on to determine compliance with licensure or regulatory requirements if the agency is otherwise permitted by law to do so.

☒ I also understand that:

- Each person interviewed during the inspection must be informed that statements made by the person may be included in the inspection report;
- Each person whose conversation is tape recorded during the inspection must be informed that the conversation is being tape recorded;
- If an administrative order is issued or a permit decision is made based on the results of the inspection, I have the right to appeal that administrative order or permit decision. I understand that my administrative hearing rights are set forth in Arizona Revised Statutes § 41-1092 *et seq.* and my rights relating to an appeal of a final agency decision are found in Arizona Revised Statutes § 12901 *et seq*;
- If I have any questions or concerns about this inspection, I may contact the person listed as the ADEQ Follow-up Contact on the front of this form; ADEQ's Ombudsman at (602) 771-4322 (toll free inside Arizona at (800) 2345677, extension, 771-4322); or the Arizona Ombudsman-Citizens' Aid office at (602) 277-7292 (toll free at (800) 872-2879);
- If I have any questions concerning my rights to appeal an administrative order or permit decision, I may contact ADEQ's Office of Special Counsel at (602) 771-2212 (toll free inside Arizona at (800) 234-5677, extension 771-2212).