

**DRAFT TECHNICAL REVIEW AND EVALUATION  
OF APPLICATION FOR  
AIR QUALITY PERMIT No. 102492**

**I. INTRODUCTION**

This Class II air quality permit is issued to Energy Fuels Resources (USA) Inc., the Permittee, for the continued operation of the Arizona 1 Mine. The facility is located 36 miles southwest of Fredonia, Mohave County, Arizona 86022. This permit renews and supersedes Permit No. 75725.

The Arizona 1 Mine is an underground uranium mine with a maximum production rate of 109,500 tons per year of uranium ore. No ore processing is conducted on-site. The ore is shipped to the White Mesa Mill near Blanding, Utah. If the ore cannot be shipped immediately to the mill, it is placed on-site in stockpiles within the Ore Stockpile Area (OSA) where it can accommodate up to 13,100 tons of stockpiled ore. The facility also operates an existing 400-kilowatt (kW) standby diesel-powered emergency generator. Development rock from the mining operations with less than approximately 0.03 percent uranium is stored on the surface in the Development Rock Area (DRA) and in mined-out areas of the underground workings. The facility's potential to emit (PTE) for all criteria air pollutants, without controls or operating limitations, is less than the major source thresholds. Thus, a Class II permit is required in accordance with Arizona Administrative Code (A.A.C.) R18-2-302.B.2.a.

**A. Company Information**

Facility Name: Arizona 1 Mine  
Mailing Address: 225 Union Blvd. Suite 600  
Lakewood, Colorado 80228  
Facility Location: 36 miles southwest of Fredonia  
Mohave County, Arizona 86022

**B. Attainment Classification**

The facility is located in Mohave County, an area that is designated as attainment for all criteria pollutants.

**II. PROCESS DESCRIPTION**

**A. Underground Uranium Mining**

The Arizona 1 Mine maximum production rate of 109,500 tons per year of uranium ore. Ore will be loaded using a front-end loader into 25-ton, over-the-road haul trucks for transportation to the off-site processing mill. If the ore cannot be shipped immediately to a mill, it is placed on-site in stockpiles within the OSA where it can accommodate up to 13,100 tons of stockpiled ore. Access to the ore deposit will be by a conventional, three-compartment vertical shaft located immediately north of the deposit.

Waste rock from the mining operations will initially be disposed of in the Waste Rock Area (WRA) and in mined-out areas of the underground workings. An existing topsoil pile will be present on the site, but will not be affected by resumption of operations. The pile has been seeded and will only produce minor emissions from wind erosion.

Development rock from the mining operations with less than approximately 0.03 percent uranium is stored on the surface in the Development Rock Area (DRA) and in mined-out areas of the underground workings.

## **B. Radiation Background**

### **1. Ionizing Radiation**

The ionizing radiation present at the Arizona 1 Mine site includes x-rays, gamma rays, alpha particles, and beta particles. This radiation originates from naturally occurring radioactive material found in and around the uranium ore body. The potential health effects or ionizing radiation depend on various factors, such as dose received, the rate at which the radiation is delivered (dose rate), and the type of ionizing radiation (alpha, beta, x-ray, or gamma).

When ionizing radiation interacts with living tissue, it deposits energy that can cause physical and biological effects. These effects are quantified using the concept of dose, typically expressed in radiological units called rems (roentgen equivalent man). However, because rems are large units, doses are often measured in millirem (mrem) for practical purposes.

### **2. Natural Radiation Environment**

Radioactive materials are naturally present in air, water and soil, with their concentrations measured in terms of radioactivity per unit volume or mass.

In typical soil, naturally occurring uranium and radium-226 concentrations are approximately 1 pico-Curie (pCi) per gram. A pCi represents 2.22 atoms of a radionuclide decaying per minute. These values may vary significantly depending on the level of uranium mineralization in the area under examination. Natural uranium is predominantly composed of uranium-238, accounting for about 99.3% of its total composition.

### **3. Airborne and Direct Radiation**

Radon-222, a product of uranium-238 decay, is a colorless, odorless and inert gas that diffuses into the atmosphere from rocks, soil and building materials. Radon progeny are particulate matter, many of which decay by emitting alpha particles. Exposure to this alpha-emitting progeny of radon-222 has been associated with adverse health effects in humans.

Radon gas is released from materials containing uranium, such as natural soil and ore stockpiles. In mining operations. Radon and its decay product can be present in dust generated during activities like ore extraction and transportation. Emissions from mine shafts must comply with 40 CFR Part 61, Subpart B, for underground

uranium mine, which limits emissions to 10 millirem (mrem) per year. Radiation exposure from dust depends on the concentration of radioactive particles in the air. As part of its permit renewal, Energy Fuels Resources Inc. must implement a dust control and soil sampling implementation plan, which includes radiation monitoring.

Individuals standing on the shoulder of the road would be exposed to radiation levels too low to measure accurately. Therefore, the estimated radiation exposure from this site is minimal and does not pose a significant risk to human health.

**C. Emergency Generator**

The facility owns a 400-kW standby diesel-powered emergency generator with the potential to emit fine particulate matter with diameters 10 micrometers or less (PM<sub>10</sub>), fine particulate matter with diameters 2.5 micrometers or less (PM<sub>2.5</sub>), volatile organic compounds (VOCs), nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO) and hazardous air pollutants (HAPs).

**III. COMPLIANCE HISTORY**

Arizona 1 Mine has undergone two (2) routine inspections during the previous permit term. Inspection dates were March 1, 2022 and January 30, 2024. No deficiencies were noted since the facility did not operate during the time of these inspections.

The facility has submitted eleven (11) semi-annual compliance certifications during the previous permit term. No deficiencies were noted during the course of these reviews due to mine inactivity. In addition to this, the facility has submitted eighteen (18) quarterly gamma (radiation) monitoring reports, five (5) annual soil sampling reports and four (4) annual 40 CFR Part 61 Subpart B reports. No deficiencies have been noted in these reports. No air quality cases or violations were issued during the previous permit term.

**IV. EMISSIONS**

**A. Vent Shaft**

The vent shaft has the potential to emit PM<sub>10</sub>, and PM<sub>2.5</sub> due to underground activities. It is assumed that 100% of the PM is PM<sub>2.5</sub>. The emissions are determined using the ventilation rate from the vent opening by an emission factor for particulate emissions from Mine Safety and Health Administration (MSHA). Calculation parameters for these estimates also include annual operating hours, control efficiencies, and ventilation rate.

**B. Ore Loading and Unloading**

A front-end loader is used to move ore and development rock. The PM<sub>10</sub> and PM<sub>2.5</sub> emissions from the material transfer of ore from the ore storage bins into haul trucks and the ore stockpile area are determined using the emission factors from AP-42, Section 13.2.4 for Aggregate Handling and Storage Piles. Calculation parameters for these estimates also include wind speed, material moisture content, annual productions rate and operating hours.

**C. Dust Emissions from Vehicle Traffic**

Particulate matter emissions for on-site vehicle traffic are calculated using the emission factor equation for unpaved roads outlined in AP-42, Section 13.2.2. This involves determining an emissions factor for each vehicle type, which is then multiplied by the calculated vehicle miles traveled (VMT) for that vehicle. Calculating VMT requires an examination of the typically unpaved, on-site roads. Nonroad vehicles, such as front-end loaders, travel within the Arizona 1 facility portal area. VMT is often determined by the frequency of use multiplied by the amount of material hauled, then divided by the vehicle's capacity. For vehicles not dependent on the material being hauled, the annual VMT is based on the average number of trips per year. Dust suppression measure, including watering and limiting travel speeds, are applied to all on-site roadways, while similar methods are implemented for off-site haul roads.

**D. Wind Erosion of Stockpiles**

The PM<sub>10</sub> and PM<sub>2.5</sub> emissions from wind erosion of stockpiles are determined using emission factors from AP-42, Section 13.2.5 for Industrial Wind Erosion. Calculation parameters for these estimates include mean wind speed, threshold velocity, the number of disturbances per year, the erosion potential, and particle size.

**E. Radionuclide Emissions**

The potential radon emissions released from ventilation are determined by the effluent flow rate and the radon concentration in the effluent. The potential radon emissions released from ore handling are a function of the amount of ore processed per year, concentration of RA-266 in the ore, and the percent released during ore handling operations. Estimates were obtained using the Regulatory Guide 3.59 Methods for Estimating Radioactive and Toxic Airborne Source Terms for Uranium Milling Operations.

**F. Emergency Generator**

Emissions from the 400-kW Cummins emergency generator are based on the power rate, permit limit of one-hundred and twenty (120) operating hours, emission factors provided by the manufacturer and the U.S Environmental Protection Agency (U.S. EPA) AP-42 Section 3.3, Table 1, for "Uncontrolled Gasoline and Diesel Industrial Engines." SO<sub>2</sub>, CO, NO<sub>x</sub>, and VOC emissions are calculated based on hourly emission averages, except for PM<sub>10</sub>, which was calculated based on a 24-hour average.

Arizona 1 mine is not a major source for PM or any other pollutant. Since the mine is not a categorical source pursuant to A.A.C. R18-2-101.23, fugitive emissions are not considered in major source applicability.

Table 1 provides the facility's potential to emit.

**Table 1: Potential to Emit (tpy)**

Pollutant	Previous PTE	Change in PTE	New PTE	Fugitive Emissions*	Significant Thresholds	Major/Minor NSR Triggered?
NO <sub>x</sub>	1.0	+0.00	1.0	-	40	No
PM	2.32	+0.00	2.32	21.4	-	No
PM <sub>10</sub>	1.86	+0.00	1.86	5.67	15	No
PM <sub>2.5</sub>	1.51	+0.00	1.51	0.57	10	No
CO	0.2	+0.00	0.2	-	100	No
SO <sub>2</sub>	0.07	+0.00	0.07	-	40	No
VOC	0.38	+0.00	0.38	-	40	No
Lead (Pb)	5.41E-06	+0.00	5.41E-06	2.04E-06	0.6	No
HAPs	3.46E-02	+0.00	3.50E-02	4.02E-04	10 (single) / 25 (combined)	No
Radionuclides	0.02	+0.00	0.02	-	-	No

**V. MINOR NEW SOURCE REVIEW (NSR)**

This renewal permit will not result in any increase in emissions as seen in Table 1 above. As a result, this renewal permit does not trigger minor NSR.

**VI. VOLUNTARILY ACCEPTED EMISSION LIMITATIONS AND STANDARDS**

The permit contains the following voluntary emission limitations and standards:

**A. Emergency Generator**

The facility has accepted a voluntary operating limit of 120 hours per year on a twelve (12) month rolling total for the emergency generator to avoid triggering new source review for minor modification. The limit was incorporated into Permit No. 46700 issued in 2009.

**B. Diesel Gasoline Tanks**

The facility has accepted a voluntary throughput limit of 10,000 hours per month on gasoline storage tanks to avoid triggering new source review for minor modification. The limit was incorporated into Permit No. 46700 issued in 2009.

**VII. APPLICABLE REGULATIONS**

Table 2 identifies applicable regulations and why such standards apply. The table also contains a discussion of any regulations that are exempted.

**Table 2: Applicable Regulations**

Unit	Control Device	A.A.C. / NSPS/ NESHAP	Discussion
Mine Vents	None	40 CFR 61 Subpart B  A.A.C. R18-2-730	The National Emission Standard for Hazardous Air Pollutants (NESHAP) Subpart B is applicable for radon monitoring mine vents.  These standards are applicable to Unclassified Sources.
Emergency Generator	None	A.A.C. R18-2- 719  40 CFR 63 Subpart ZZZZ	The emergency generator is subject to Standards of Performance for Existing Stationary Rotating Machinery.  The National Emission Standard for Hazardous Air Pollutants (NESHAP) Subpart ZZZZ is applicable to reciprocating internal combustion engines (RICE) located at major and area sources of HAPs.
Gasoline Storage Tanks	None	A.A.C. R18-2-710	The Standards of Performance for Existing Storage Vessels for Petroleum Liquids” -is applicable to gasoline storage tanks located at the facility.
Gasoline Dispensing Operations	None	40 CFR 63 Subpart CCCCC	This standard applies to each gasoline dispensing facility (GDF) located at the facility.
Fugitive Dust	Water Trucks, Dust Suppressants	A.A.C. R18-2 Article 6 A.A.C. R18-2-702	These standards are applicable to all fugitive dust sources at the facility.
Abrasive Blasting	Wet Blasting; Dust Collecting Equipment; Other Approved Methods	A.A.C. R18-2-702 A.A.C. R18-2-726	These standards are applicable to any abrasive blasting operation.
Spray Painting	Enclosures	A.A.C. R18-2-702 A.A.C. R18-2-727	These standards are applicable to any spray-painting operation.
Demolition and Renovation	N/A	A.A.C. R18-2- 1101.A.12	This standard is applicable to any asbestos related demolition or renovation operations.

### VIII. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 3 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with the emission limits in the permit. Records are required be kept for a minimum of five (5) years as outlined in Attachment “A” of the permit.

**Table 3: Permit No. 102492**

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Mine Vents	Radon-222	10 mrem/yr effective dose	40 CFR Part 61 appendix B, Method 115 Testing using COMPLY-R or equivalent upon approval	Annual report of the results and the input parameters used in making the calculations.	Submit this annual report to ADEQ and EPA by March 31st of the following year
	PM	20 % Opacity	Certified EPA Reference Method 9 observer conducts bi-weekly surveys of visible emissions	Maintain records of the name of the observer, the date on which the instantaneous survey was made, and the results of the instantaneous survey.	N/A
Emergency Internal Combustion Engine	PM	40% Opacity	Certified EPA Reference Method 9 observer conducts quarterly survey of visible emissions.	Maintain records of the name of the observer, the date on which the instantaneous survey was made, and the results of the instantaneous survey.	N/A
	SO <sub>2</sub>	0.8% wt sulfur fuel	Maintain current, valid sulfur content fuel records.	Maintain daily sulfur content and lower heating value of the fuel being fired	N/A
	HAPs	N/A	Change the oil and filters every 500 hours or annually. Inspect the spark plugs every 1000 hours or annually.	Keep records of any deviations from operation and maintenance requirements.	Report all deviations and compliance certifications.

Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			Inspect the hoses and belts every 500 hours or annually.		
Gasoline Storage Tanks	N/A	N/A	Maintain files of each type of petroleum liquid stored, the typical Reid vapor pressure of the petroleum liquid stored and the dates of storage. Dates on which the storage vessel is empty shall be shown.	Record average monthly storage temperature and true vapor pressure of the petroleum liquid stored. Record monthly log of storage tank throughput.	N/A
Fugitive Dust	PM	40% Opacity	N/A	Record of the dates and types of dust control measures employed, and if applicable, the results of any Method 9 observations, and any corrective action taken to lower the opacity of any excess emissions.	N/A
Abrasive Blasting	PM	20% Opacity	N/A	Record the date, duration and pollution control measures of any abrasive blasting project.	N/A
Spray Painting	VOCs	20% Opacity Control 96% of the Overspray	N/A	Maintain records of the date, duration, quantity of paint used, any applicable MSDS, and pollution control measures of any spray-painting project.	N/A
Demolition/ Renovation	Asbestos	N/A	N/A	Maintain records of all asbestos related demolition or renovation projects including the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents.	N/A



Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Dust from unpaved on-site haul roads, transfer of ore from stockpiles to haul trucks, disturbed areas within the property boundaries and other dust producing activities	Environmental Gamma	N/A	<p>Follow “Standard Operating Procedure for Environmental Gamma Monitoring”</p> <p>Optically stimulated luminescence (OSL) monitors</p>	<p>Maintain the following on site:</p> <p>(1) Current records of the action trigger levels for all sampling points;</p> <p>(2) Records of wind speeds from the facility anemometer;</p> <p>(3) Records of the date, time, and quantity that water is applied to the ore storage pile, on-site haul roads, and disturbed surface areas;</p> <p>(4) Daily records of the tons of ore contained in the ore stockpile;</p> <p>(5) Daily records of the approximate height of the ore stockpile;</p> <p>(6) Records of all haul truck operator trainings;</p> <p>(7) Records of all soil sampling and environmental gamma monitoring results; and</p> <p>(8) Copies of all corrective action plans if applicable.</p>	<p>Provide the results from the OSL monitors and soil samples to ADEQ within 30 calendar days of receiving the respective lab results.</p> <p>If the results of the OSL monitors or soil samples exceed the initial action trigger levels or a revised trigger level established at a specific sampling point, notify ADEQ within two business days of discovery of the exceedance. Within three business days of the above notification, submit a follow-up report.</p>
	Uranium (U-Nat) and Radium 226 (Ra-226) from soil samples	N/A	Conduct soil sampling in accordance with the facility’s Standard Operating Procedure for Soil Sampling.		
	Fugitive Dust	<p>13,100-ton storage</p> <p>20-foot pile height</p>	N/A		

**IX. ENVIRONMENTAL JUSTICE ANALYSIS**

The Environmental Protection Agency (EPA) defines Environmental Justice (EJ) to include the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. The goal of completing an EJ assessment in permitting is to provide an opportunity for overburdened populations or communities to allow for meaningful participation in the permitting process. Overburdened is used to describe the minority, low-income, tribal and indigenous populations or communities that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards.

This renewal permit will not result in any increase in emissions as seen in Table 1 above and thus, it will not result in any additional impacts.

**X. AMBIENT AIR IMPACT ANALYSIS**

In 2009 an Ambient Air Impact Analysis was conducted to demonstrate protection of the National Ambient Air Quality Standards (NAAQS) and visibility criteria. Dispersion modeling for the NAAQS was done using SCREEN3 for SO<sub>2</sub>, NO<sub>2</sub>, and CO while AERMOD dispersion modeling was used for PM<sub>10</sub>.

Table 4 presents the results of the modeling analysis, in addition to applicable background concentrations for comparison to the NAAQS. Modeling was conducted for Arizona 1 Mine for past Permit No. 46700. The results will not cause an exceedance of the NAAQS.

**Table 4: NAAQS Dispersion Modeling Results – Arizona 1 Mine (2009)**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Highest Modeled Concentration (µg/m<sup>3</sup>)<sup>a</sup></b>	<b>Background Concentration (µg/m<sup>3</sup>)</b>	<b>Total Cumulative Concentration (µg/m<sup>3</sup>)</b>	<b>NAAQS<sup>b</sup> (µg/m<sup>3</sup>)</b>
SO <sub>2</sub>	3-Hour	17.3	73	90.3	1300
	24-Hour	7.7	16	23.7	365
	Annual	1.5	3	4.5	80
NO <sub>2</sub>	Annual	23.2	4	27.2	100
CO	1-Hour	62.6	582	644.6	40,000
	8-Hour	43.8	582	625.8	10,000
PM <sub>10</sub>	24-Hour	20.1	47	67.1	150
	Annual	4.45	18	22.5	50

<sup>a</sup> Micrograms per cubic meter

<sup>b</sup> Short-term NAAQS allows limits to be exceeded once per calendar year.

**XI. LEARNING SITES EVALUATION**

In accordance with ADEQ’s Environmental Permits and Approvals Near Learning Sites Policy, an evaluation was conducted to determine if any nearby learning sites would be adversely impacted by the facility. Learning sites consist of all existing public schools, charter schools and private schools the K-12 level, and all planned sites for schools approved by the Arizona School Facilities Board. The learning sites policy was established to ensure that the protection of children at learning sites is considered before a permit approval is issued by ADEQ.

Upon review of ADEQ’s database, it was determined that there are no learning sites within two miles of the facility.

**XII. LIST OF ABBREVIATIONS**

A.A.C.	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
AERMOD	AMS/EPA Regulatory Model
A.R.S.	Arizona Revised Statutes
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
DRA	Development Rock Area
EPA	Environmental Protection Agency
°F	degrees Fahrenheit
ft	Feet
g	Gram
GDF	Gasoline Dispensing Facility
HAP	Hazardous Air Pollutant
hp	Horsepower
hr	Hour
kW	Kilowatt
MSDS	Material Safety Data Sheet
mrem	Millirem
NAAQS	National Ambient Air Quality Standard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO <sub>x</sub>	Nitrogen Oxides
NO <sub>2</sub>	Nitrogen Dioxide
NSPS	New Source Performance Standards
OSA	Ore Stockpile Area
pCi	pico-Curie
Pb	Lead
PM	Particulate Matter
PM <sub>10</sub>	Particulate Matter less than 10 µm nominal aerodynamic diameter
PM <sub>2.5</sub>	Particulate Matter less than 2.5 µm nominal aerodynamic diameter
PTE	Potential to Emit
sec	Seconds
SO <sub>2</sub>	Sulfur Dioxide Significant Impact Levels
TPY	Tons per Year
VOC	Volatile Organic Compound
yr	Year