

Katie Hobbs  
Governor

# Arizona Department of Environmental Quality



Karen Peters  
Cabinet Executive Officer  
Executive Deputy Director

## Report Review

**Inspection ID:** 445465

**Permit No:** 88788

**Place ID:** 827

**AZURITE Place Name:** ENERGY FUELS RESOURCES - PINYON PLAIN MINE

**Inspection Type:** Report Review

**Type of Report:** Annual Report 40 CFR Subpart B NESHAP

**Date Received:** 3/29/2024

**Date Reviewed:** 4/11/2024

**Reviewer:** Mariana Mendez Armendariz

### Results of Inspection:

Is the report certified for truth, accuracy, and completeness by a responsible official?

- ☒ Yes – David C. Frydenlund  
☐ No – Contact Permittee for proper signature.

Does the Permittee state they are in compliance?

- ☒ Yes – File report without contacting Permittee.  
☐ No – Request additional information or permit deviation report as necessary.

### Reviewer Comments:

In 2023, the facility reports that underground activities comprised of routine maintenance of the water rings. Mining activities resumed December 2023 and the facility commenced monitoring with EPA Method A-6 (12/3/2023). Prior to that, the monitoring was conducted using Method A-7.

The COMPLY-R modeling result was 0.0018 mrem/ year of Radon-222. This does not exceed the permit limit of 10 mrem/year.

The report includes all the necessary information as required by Condition II.A.2.b of Attachment “B” (40 CFR 61.24). No reporting deficiencies noted.

#### Main Office

1110 W. Washington St. | Phoenix, AZ 85007  
602-771-2300

#### Southern Regional Office

400 W. Congress St. | Suite 433 | Tucson, AZ 85701  
520-628-6733

azdeq.gov



CTS 434881

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

March 28, 2024

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



**Re: Annual Report for the Pinyon Plain Mine Under 40 Code of Federal Regulations (CFR)  
Part 61, Subpart B – National Emissions Standards for Hazardous Air Pollutants.**

Dear Mr. Czecholinski:

Energy Fuels Resources (USA) Inc. (“EFRI”) operates the Pinyon Plain Mine (the “Mine”) located in Coconino County, Arizona. EFRI submitted an Application for Approval of Construction or Modification of a New Source under 40 CFR 61.07 (the “Application”) on July 2, 2015, which was approved by the U.S. Environmental Protection Agency on September 21, 2015. An annual report is required under 40 CFR 61.24.

In 2023, underground activities included routine maintenance of water rings in the shaft to capture water infiltrating from the Coconino Formation and, to the extent water is available, from the Kaibab Formation. For most of 2023, fresh air was supplied during underground activities via ventilation tubing and a temporary fan. The air was exhausted up the production shaft. The shaft is offset from the breccia pipe and sunk through the Moenkopi Formation, Kaibab Limestone, Toroweap Formation, Coconino Sandstone, Hermit Shale and into the Upper Supai. As the shaft is in formations that do not contain uranium ore, no radon emissions of any significance were expected during 2023 activities prior to the commencement of mining activities. However, to be conservative, EFRI installed track-etch canisters to monitor for any potential radon emissions prior to the commencement of mining.

Mining activities resumed in December 2023 as noted in EFRI’s notification letters dated November 3, 2023 (anticipated startup) and December 3, 2023 (actual startup). Radon-222 monitoring using EPA Method A-6 commenced at the time of the actual startup on December 3, 2023. In anticipation of mining activities, EFRI began installation of the permanent ventilation shaft on August 7, 2023. The drilling of the permanent ventilation shaft was completed February 2, 2024. Testing and installation of the surface structures associated with the permanent ventilation system was completed in first quarter 2024. The system will be operated in accordance with the EPA-approved July 2, 2015 Application for Construction Approval of the Canyon Uranium Mine, Coconino County, Arizona (the “Application”).

Letter to Mr. Daniel Czecholinski  
March 28, 2024  
Page 2

EFRI has monitored using the methods specified in the EPA-approved Application for radon-222 monitoring regardless of which ventilation system is being used since the actual startup date of December 3, 2023.

Should you have any questions regarding this report, please contact me at (303) 389-4130.

Yours very truly,



**ENERGY FUELS RESOURCES (USA) INC.**  
Kathy Weinel  
Director, Regulatory Compliance

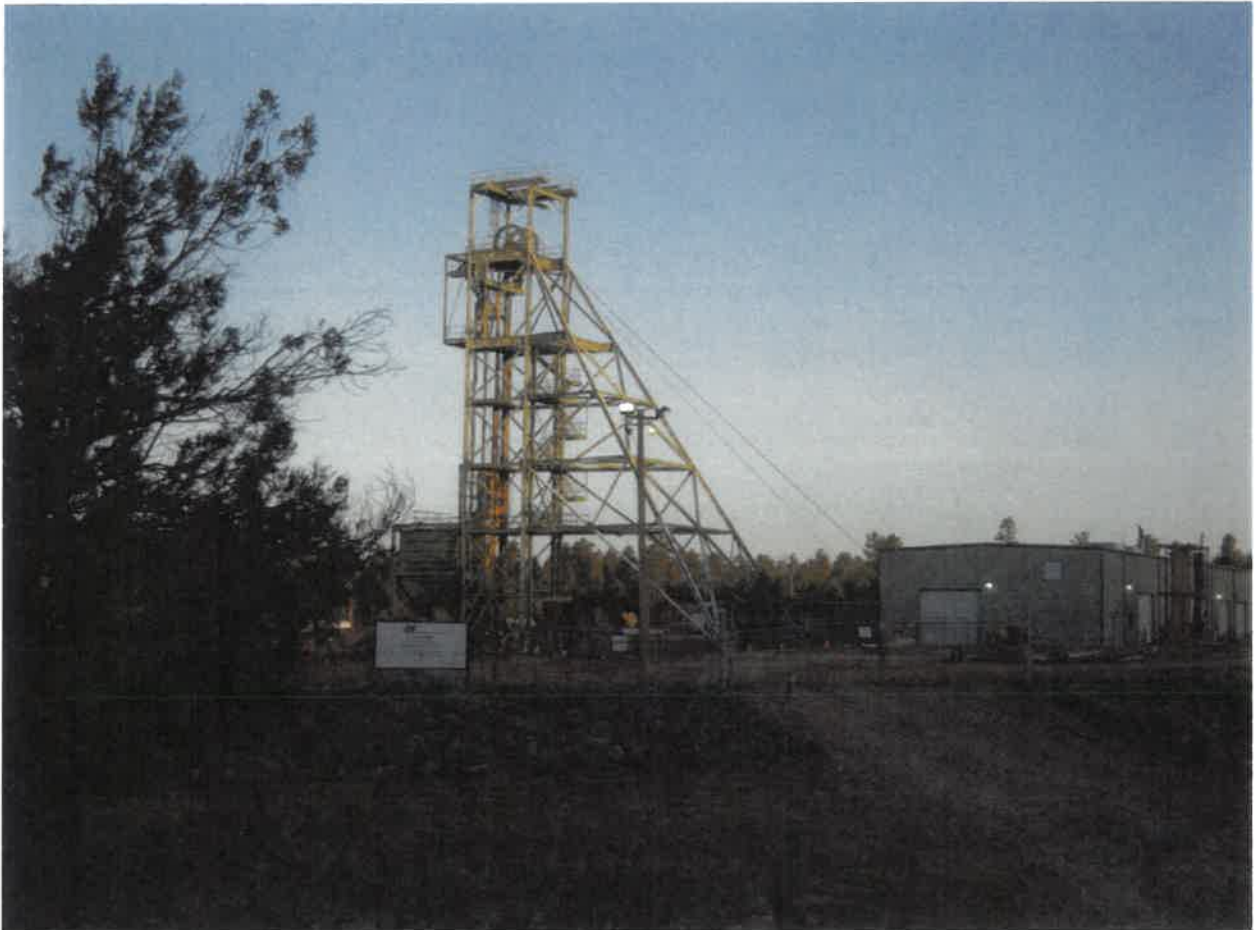
cc: S. Bakken, T. Chiotti, D. Frydenlund, M. Germansen, J. C. App, T. Martin, R. Fisher (EFRI)

**ENERGY FUELS RESOURCES (USA) INC.  
40 CODE OF FEDERAL REGULATIONS 61 SUBPART B**

**PINYON PLAIN MINE  
COCONINO COUNTY, ARIZONA**

**2023 ANNUAL COMPLIANCE REPORT**

**MARCH 2024**



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

**1) Name and Location of the Mine:**

Energy Fuels Resources (USA) Inc. (“EFRI”) operates the Pinyon Plain Mine (the “Mine”), in Coconino County, Arizona. The Mine site is located at the latitude/longitude coordinates 35°53’00”N, 112°05’48”W.

**2) Name of the Person Responsible for Operation and Preparer of Report:**

The owner of the unpatented mining claims at the Pinyon Plain Mine, which are located on public land managed by the USFS is:

EFR Arizona Strip LLC  
225 Union Blvd., Suite 600  
Lakewood, CO 80228  
303.974.2140 (phone)  
303.389.4125 (fax)

The operator is:

Energy Fuels Resources (USA) Inc.  
225 Union Blvd., Suite 600  
Lakewood, CO 80228  
303.974.2140 (phone)  
303.389.4125 (fax)

**3) Model Used to Determine Compliance with Emission Standards:**

Under 40 CFR 61.22, emissions of radon-222 to the ambient air from an underground uranium mine shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent (“dose”) of 10 millirem per year (“mrem/yr”). Further, 40 CFR 61.23(a) provides that compliance with this emission standard shall be determined, and the effective dose equivalent calculated by the EPA computer code COMPLY-R.

**4) Results of the Emissions Testing and Dose Calculation:**

EFRI used Method A-7 (alpha track radon-222 detectors) to continuously collect radon-222 emissions on a monthly basis during periods of underground access prior to ore production, as contemplated by the EPA-approved July 2, 2015 Application for Construction Approval of the Canyon Uranium Mine, Coconino County, Arizona (the “Application”). EFRI used Method A-6 (scintillation cell) to continuously collect radon-222 emissions during active mining operations, as contemplated by the Application.

The modeled results show a dose of 0.018 mrem/yr for the closest and most highly impacted potential receptor in the vicinity of the Mine. This dose is less than the 10 mrem/yr standard set out in 40 CFR 61.22. The COMPLY-R computer output results and the associated Arcadis Report are included as Attachment A.

## 5) List of Ventilation:

In 2023, underground activities included routine maintenance of water rings in the shaft to capture water infiltrating from the Coconino Formation and, to the extent water is available, from the Kaibab Formation. For most of 2023, fresh air was supplied during underground activities via ventilation tubing and a temporary fan. The air was exhausted up the production shaft. The shaft is offset from the breccia pipe and sunk through the Moenkopi Formation, Kaibab Limestone, Toroweap Formation, Coconino Sandstone, Hermit Shale and into the Upper Supai. As the shaft is in formations that do not contain uranium ore, no radon emissions of any significance were expected during 2023 activities prior to the commencement of mining activities. However, to be conservative, EFRI installed track-etch canisters to monitor for any potential radon emissions prior to the commencement of mining.

Mining activities resumed in December 2023 as noted in EFRI's notification letters dated November 3, 2023 (anticipated startup) and December 3, 2023 (actual startup). Radon-222 monitoring using EPA Method A-6 commenced at the time of the actual startup on December 3, 2023. In anticipation of mining activities, EFRI began installation of the permanent ventilation shaft on August 7, 2023. The drilling of the permanent ventilation shaft was completed February 2, 2024. Testing and installation of the surface structures associated with the permanent ventilation system was completed in first quarter 2024. The system will be operated in accordance with the EPA-approved July 2, 2015. Application for Construction Approval of the Canyon Uranium Mine, Coconino County, Arizona (the "Application").

EFRI has monitored using the methods specified in the EPA-approved Application for radon-222 monitoring regardless of which ventilation system is being used since the actual startup date of December 3, 2023.

## 6) Other Information:

### a) Description of Effluent Controls

Effluent control is based on the duration of work shifts and the hours of operation of the vent fan. Fans were operated prior to and during underground access and fan hours recorded by on-site staff. Operation fan hours were used to calculate the radon emissions from the Mine.

### b) Distances from Points of Release to the Nearest Residence, School, or Business or Office

Distance information is provided in the computer reports and on input tables for the model inputs. Distances are calculated based upon individual mine map coordinate systems. The nearest potential receptor is at a distance of 3,361 meters to the nearest exhaust source. The nearest potential receptor which could be exposed to the highest concentration due to wind direction is located 3,361 meters to the south. These distances and receptors are shown on the figure in Attachment B. It is important to note that this nearest potential receptor is an abandoned building and is not occupied at this time. The analysis in this report is therefore conservative, because the nearest actual receptor is located further from the Mine than the nearest potential receptor.

### c) Distances from nearest farm producing vegetables, milk, and meat

There are no farms producing vegetables or milk in the vicinity.

d) Values used for other user-supplied input parameters

In determining the most appropriate meteorological data to use in the COMPLY-R model, nine meteorological stations were identified within an approximate 50-mile radius of the Mine site, all of which were evaluated to determine if they provide meteorological data that is suitable for COMPLY-R modelling at the site.

Based on the determination presented in the Application, EFRI used the data collected at the Tusayan Airport Station at the Grand Canyon National Park (the “Grand Canyon Station”), which is located close to the site (approximately 5.6 miles) and meets all of the EPA criteria applicable for COMPLY-R modelling. None of the other eight meteorological stations satisfy all of the EPA criteria, and, as a result, none of the other stations were considered suitable for COMPLY-R modelling at the site.

*Determination of Receptors*

Potential receptors were determined during the application process based on a careful review of satellite imagery, in conjunction with EFRI’s knowledge of the surrounding areas. In identifying potential receptors, the evaluation erred on the side of inclusiveness. That is, unless EFRI had knowledge to the contrary, receptors that appeared as possible receptors were included based on a review of the satellite imagery, without verifying in each case the actual status of the possible receptor. In fact, EFRI confirmed that potential Receptor 11 currently consists of an uninhabited house and deserted airplane hangar on USFS managed land and is therefore not currently a receptor. However, personnel at the USFS have indicated that the house could still be permitted by the owner for future occupied use (although not likely during the life of the Mine). Accordingly, potential Receptor 11 was conservatively included in the dose analysis. Distance information is provided in the computer reports and on input tables for the model inputs. Distances are calculated based upon individual mine map coordinate systems. Potential Receptor 11 is at a distance of 3,361 meters to the nearest exhaust source. These distances and receptors are shown on the figure in Attachment B.

The potential receptors used in the attached COMPLY-R modeling contained in the 2015 Application are shown on the figure included in Attachment B. That modeling demonstrates that Receptor 11 constitutes the most highly impacted potential receptor. The COMPLY-R modeling results for 2023 for Receptor 11 are included with Attachment A.

Values used for other user supplied input parameters are provided in Table 2 of the Arcadis Report included as Attachment A.

### **Certification**

"I Certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See 18, U.S.C. 1001."

Signed: \_\_\_\_\_

David C. Frydenlund

Executive Vice President, Chief Legal Officer and Corporate Secretary

Date: \_\_\_\_\_

March 28, 2024



**ATTACHMENT A**  
**2023 Arcadis Report**

Jordan App  
Environmental Scientist  
Energy Fuels Resources (USA) Inc.  
225 Union Boulevard, Suite 600  
Lakewood, CO 80228  
Email: joapp@energyfuels.com  
Phone – 303-389-4131

Arcadis Canada Inc.  
8133 Warden Ave.  
Unit 300  
Markham, ON  
L6G 1B3  
Phone: 905 764 9380  
[www.arcadis.com](http://www.arcadis.com)

Date: 25 March 2024  
Our Ref: 30214886-02  
Subject: Pinyon Plain NESHAPs (2023)

Dear Ms. App,

Energy Fuels Resources (USA) Inc. (EFRI) submitted an application to the United States Environmental Protection Agency (US EPA) for approval of construction or modification of a new source under 40 CFR 61.07 at the Pinyon Plain Mine (formerly called the Canyon Mine) (the "Mine") located in Coconino County Arizona on July 2, 2015. EFRI voluntarily submitted an application for approval under 40 CFR 61.07 to produce in excess of 100,000 tons of ore (EFRI 2015). The application was granted approval based on a letter dated September 21, 2015, from the US EPA provided by EFRI to Arcadis Canada Inc. (ACI).

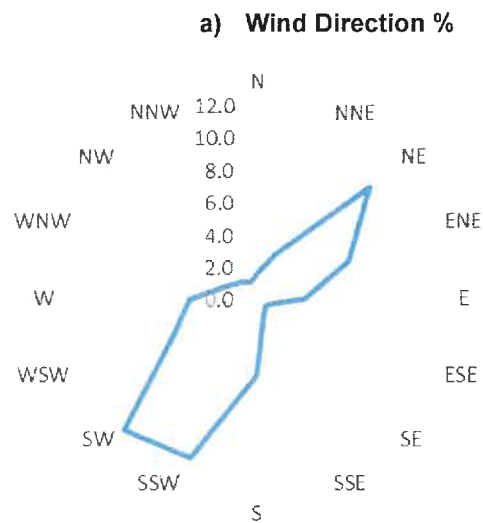
EFRI has requested ACI support the preparation of a National Emission Standards for Hazardous Air Pollutants (NESHAPs) radon submission for 2023. This letter report provides the COMPLY-R modelling results for the Mine for 2023.

### **Meteorology**

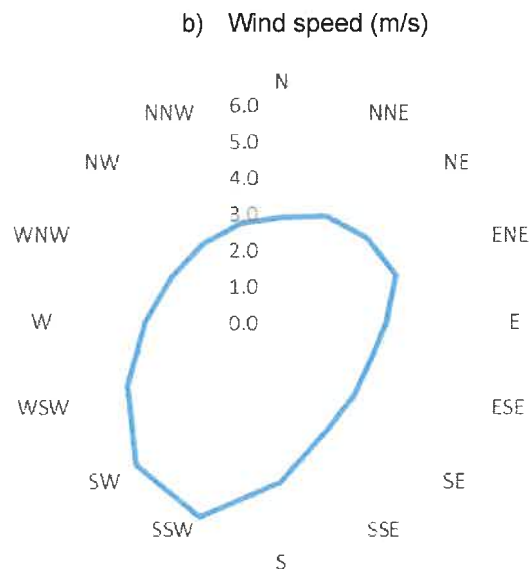
In a memorandum prepared by Arcadis US (AUS 2015), appropriate meteorological data to use in the COMPLY-R model was identified as the data for the Tusayan Airport Station at the Grand Canyon National Park (Grand Canyon Station) located at 35.94582 °N and 112.15538 °W which is approximately 5 miles from the Site.

The Grand Canyon Station meteorological data for the period of 5 years (2019-2023) is used to construct the wind rose for the 2023 Pinyon Plain COMPLY-R NESHAPs report as illustrated in Figure 1.

**Figure 1 Wind Rose Grand Canyon (2019-2023)**



Note: This is the direction wind blows **from**



Percentage Calms = 32.68%

Source: <http://mesowest.utah.edu/>. and <https://www.ncdc.noaa.gov/isd/>

### Radon Emissions

Radon emissions from the Mine in 2023 were monitored using Method A-7 in accordance with the EPA Construction Approval received by EFRI September 21, 2015. Table 1 presents the summary of the measured radon emissions for 2023.

**Table 1. 2022 Pinyon Plain Mine Radon Curie Totals**

	Collar (Curies)	Collar South (Curies)	Escapeway (Curies)	Vent (Curies)	
<b>Jan-23</b>	2.09	1.06	0.02	0.00	
<b>Feb-23</b>	2.41	0.97	0.02	0.00	
<b>Mar-23</b>	7.47	1.22	0.01	0.00	
<b>Apr-23</b>	1.89	0.34	0.01	0.00	
<b>May-23</b>	0.00	0.00	0.01	0.00	
<b>Jun-23</b>	0.00	0.00	0.01	0.00	
<b>Jul-23</b>	0.19	0.11	0.01	0.00	
<b>Aug-23</b>	0.23	0.14	0.01	0.00	
<b>Sep-23</b>	0.31	0.16	0.01	0.00	
<b>Oct-23</b>	0.63	0.22	0.01	0.00	
<b>Nov-23</b>	0.61	0.21	0.01	0.00	
<b>Dec-23</b>	0.97	0.74	0.02	0.00	Annual Total:
<b>TOTAL</b>	16.8	5.17	0.15	0.00	22.12

The annual total radon emission is taken as the input for the COMPLY-R modelling.

### COMPLY-R Modelling

The COMPLY- R modelling was performed using the wind rose for 2019-2023. The Mine has three contributions to its exhaust - Collar, Collar South and Escapeway, all of which are via a combined shaft and hence, for the COMPLY-R modelling, the radon was assumed to be released through a single surface vent. The source (surface vent) characteristics used for the COMPLY-R modelling are shown in Table 2.

**Table 2 Source Characteristics**

	Vent Diameter (m) <sup>a</sup>	Release Height (m) <sup>a</sup>	Vent Area (m <sup>2</sup> ) <sup>a</sup>	2023 Total Radon Released (Ci/y) <sup>b</sup>	Avg. Volumetric Flow Rate (m <sup>3</sup> /s) <sup>a</sup>
Pinyon Plain Mine Collar	1.68	2.37	2.21	22.12	12.38

a) EFRI 2023

Ms. Jordan App  
25 March 2024

As discussed in EFRI 2015, Potential Receptor 11<sup>1</sup> is conservatively included as the most highly impacted receptor and is to be included in the COMPLY-R modelling for the annual reports to the US EPA. Table 3 presents the source-to-receptor distance used to create the distance files for the COMPLY-R modelling.

**Table 3 Receptor Characteristics**

Receptor Name	Meters	Direction
Potential Receptor 11	3361	S

Source: EFRI 2015

The location of receptor and wind rose frequencies used for the COMPLY-R modelling are presented in COMPLY-R output in Attachment 1.

The predicted dose for the COMPLY-R modelling was **0.018 mrem/year** which is well below the US EPA's standard of 10 mrem/year.

We appreciate this opportunity to support EFRI and would be pleased to answer any questions that you have.

Sincerely,

**Arcadis Canada Inc.**



Douglas B. Chambers, Ph.D.  
Vice President; Senior Scientist Risk and Radioactivity;  
Director Technical Knowledge & Innovation – Radiation Services

Email: [Doug.Chambers@arcadis.com](mailto:Doug.Chambers@arcadis.com)  
Direct Line: 647-956-5375  
Mobile: 647-998-4984

<sup>1</sup> Potential Receptor 11 consists of an uninhabited house and deserted airplane hangar on United States Forest Service (USFS) managed land. However, the USFS indicated the house could be permitted by the owner for future occupied use (although not likely during the life of the mine).

Ms. Jordan App  
25 March 2024

## References

- Arcadis US Inc. (AUS). 2015. *Canyon Mine Meteorological Data*. Memorandum to Energy Fuels Resources \*USA) Inc. from Jo Ann Tischler. July 1, 2015.
- Energy Fuels Resources (USA) Inc. 2018. *Email to ACI Re: Pinyon Plain numbers for annual report*, from Kathy Weinel. March 15, 2018.
- Energy Fuels Resources (USA) Inc. 2015. *Application for Approval of Construction or Modification Energy Fuels Resources (USA) Inc. Canyon Mine, Coconino County, Arizona*. July.

## Attachments

- 1 COMPLY-R Output

Ms. Jordan App  
25 March 2024

**Attachment 1 COMPLY-R Output**

03/19/24 10:11

40 CFR Part 61  
National Emission Standards  
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH  
THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS  
FROM THE COMPLY-R CODE, VERSION 1.2

Prepared by:

Energy Fuels Resources(USA) Inc.  
Pinyon Mine  
225 Union Blvd., Suite 600, Lakewood CO 80228

Kathy Weinel  
303-389-4134

Prepared for:

U.S. Environmental Protection Agency  
Office of Radiation Programs  
Washington, D.C. 20460

Ms. Jordan App  
25 March 2024

03/19/24 10:11

Stack	Release Rate (curies/YEAR)
1	2.212E+01

Release Height 2.37 meters.

Vertical momentum NOT present for vent 1

Vent diameter 1.68 meters.

Volumetric flow rate is 12.380 cu m/sec.

STACK DISTANCES, FILE: S1CAN.DAT

DIR	Distance (meters)
N	3360.0
NNE	11800.0
NE	20700.0
ENE	31600.0
E	15100.0
ESE	10600.0
SE	23400.0
SSE	8760.0
S	13300.0
SSW	100000.0
SW	29400.0
WSW	48400.0
W	24500.0
WNW	19800.0
NW	28000.0
NNW	9270.0



Ms. Jordan App  
25 March 2024

03/19/24 10:11

WINDROSE DATA, FILE: WINDROSE.DAT

Source of wind rose data: Grand Canyon  
Dates of coverage: 19-23  
Wind rose location: Canyon  
Distance to facility: 5mi

Percent calm: 0.33

Wind FROM	Frequency	Speed (meters/s)
N	0.016	2.90
NNE	0.030	3.17
NE	0.095	3.29
ENE	0.057	3.39
E	0.029	2.86
ESE	0.011	2.67
SE	0.011	2.84
SSE	0.011	3.25
S	0.048	4.43
SSW	0.107	5.84
SW	0.115	5.58
WSW	0.055	4.55
W	0.042	3.71
WNW	0.020	3.25
NW	0.015	3.07
NNW	0.011	2.95

NOTES:

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Default air temperature used (55.0 degrees F).

Default vent temperature used (55.0 degrees F).

The receptor exposed to the highest concentration is located  
3360. meters to the N.

Input parameters outside the "normal" range:

Windrose wind frequency is unusually LOW.  
Distance from vent to receptor is unusually FAR.

Ms. Jordan App  
25 March 2024

03/19/24 10:11

RESULTS:

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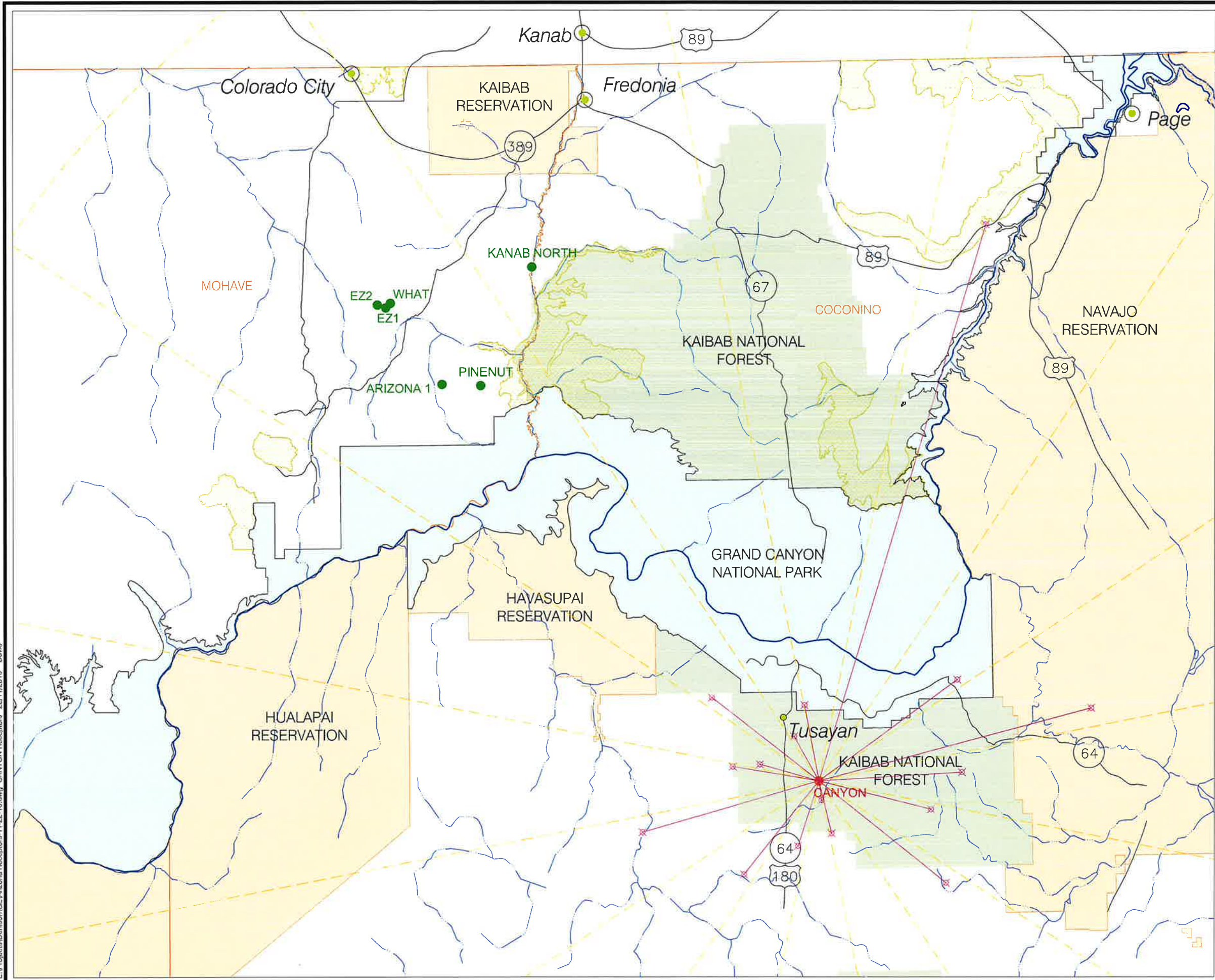
Effective dose equivalent: 1.8E-02 (mrem/year)

Complies with emission standards.

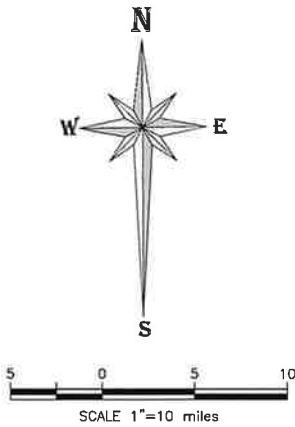
\*\*\* This facility is in COMPLIANCE \*\*\*

\*\*\*\*\* END OF COMPLIANCE REPORT \*\*\*\*\*

**ATTACHMENT B**  
**RECEPTOR LOCATIONS**



CANYON	Direction	FEET	METERS	MILES
GC Park Entrance 1	N	43587.27	13285.40	8.255
Possible Receptor 1	NNE	328575.39	100149.78	62.230
GC Park Entrance 2	NE	96600.22	29443.75	18.295
Possible Receptor 2	ENE	158677.10	48364.78	30.052
Possible Receptor 3	E	80459.40	24524.02	15.239
Airstrip Building	ESE	64960.26	19799.89	12.303
Possible Receptor 4	SE	91854.55	27997.27	17.397
Curley Wallace Tank	SSE	30429.22	9274.83	5.763
Possible Receptor 11	S	11028.21	3361.40	2.089
Possible Receptor 5	SSW	38658.11	11782.99	7.322
Possible Receptor 6	SW	67784.09	20660.59	12.838
Possible Receptor 7	WSW	103608.81	31579.96	19.623
Possible Receptor 8	W	49563.73	15107.02	9.387
Possible Receptor 9	WNW	34720.61	10582.84	6.576
Possible Receptor 10	NW	76846.65	23422.86	14.554
Grand Canyon NP Airport	NNW	28732.36	8757.62	5.442



Denison Mines (USA) Corp.		DENISON MINES	
REVISIONS		Project: Arizona Strip	
Date	By	County: Coconino/Mohave	State: Arizona
		Location:	
		CANYON MINE	
		RECEPTOR LOCATIONS	
		Author: unknown	Drafted By: Sledd