

Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

Air Quality Field Inspection Report

Company Name: Energy Fuels Resources (USA) Inc.	Inspection Report No.: 289633
Place Name: Canyon Mine Place ID No.: 827	Inspector(s): Rob Verville
County: Yavapai	Arrival Date and Time: 9/27/2017 8:00 AM
Physical Location: Hwy 64 to FR 305, Tusayan, AZ 86023	Reason for Inspection: <input type="checkbox"/> Complaint Complaint No.: <input checked="" type="checkbox"/> Routine Inspection <input type="checkbox"/> Follow-Up Original Inspection Report No.:
Mailing Address: P.O. Box Blanding, UT 84511	
Coordinates (for new locations): Latitude: Deg.: Min.: Sec.: Longitude: Deg.: Min.: Sec.:	
Permit No.: 62877 Permit Expiration Date: 10/13/2021	Was Inspection Announced? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Onsite Contact Person(s)/Title(s): David Turk, Compliance, H&S Manager Ty Fisher, Safety Director	Ops. Status: Shaft Development, No uranium Mining
	Type of Source: Class II, Underground Uranium Mine
Other Names: Energy Fuels Nuclear, Denison Mines	Last Inspection: March 20, 2017, Insp ID: 279724
Inspection Report Issued: Via email at facility	Facility Initial: <i>ms</i> ADEQ Initial: <i>AV</i>
Results of Inspection: <input type="checkbox"/> No deficiencies were noted during the course of the inspection. No ADEQ action will result from this inspection. <input checked="" type="checkbox"/> Potential deficiencies were noted during the course of the inspection. Additional correspondence regarding this inspection may be forthcoming. (contact ADEQ as indicated)	
Comments: The source is developing the mine shaft and they have not started uranium mining operations. GENERAL INFO – This Class II air quality control renewal 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 will have an anticipated maximum annual production of approximately 109,500 tons of uranium ore. 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. Coconino County is an attainment or unclassified area for the National Ambient Air Quality Standards (NAAQS). 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. 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 BACKGROUND - 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 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 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. EFRI is required by the permit to have a Dust Control and Soil Sampling Implementation Plan that will have a radiation monitoring component.

Direct radiation from haul trucks is estimated to be approximately 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 from the Canyon Mine site does not present a significant risk to human health.

EMISSIONS - The PM_{10/2.5} emissions 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.

CURRENT OPERATIONS – The ADEQ inspector met Mr. Turk at FR 305 & Hwy 64 and followed him to the mine site. During the inspection Ty Fisher also participated.

The source was issued a Notice of Opportunity to Correct Deficiencies (NOC) on 4/12/17 (Case ID: 169620). An NOC closure letter was issued by ADEQ on April 27, 2017.

EFRI representatives stated the Canyon Mine shaft is still being developed and no uranium ore mining is occurring. The shaft is at approximately 1430 feet deep. A vent shaft will be developed after the main shaft. The vent shaft is also an emergency escape shaft.

On March 24, 2017, the main shaft hoist had a catastrophic failure and has forced the shaft development to cease. MSHA is conducting an investigation of the hoist failure. The hoist was repaired onsite, additional safety systems were installed, and MSHA has not approved the repair. During the inspection, MSHA was onsite conducting an inspection and check of the repaired hoist.

Upon entering the site, the site roads appeared to have been wetted. As the ADEQ inspector entered the site, water spray was visible on the Developmental Rock Stockpile. Mr. Fisher stated they are conducting dust control using non-potable water from the shaft. During the physical inspection, the water sprays had stopped operating. Mr. Fisher stated the water sprays are interlocked with the shaft pump. If no water in the shaft, the pumps stops operating. The shaft pump pumps the water to the Development Rock Stockpile pad. The sprinklers appear to be landscape type sprinklers. The dust control water flows into a drop box and into the non-storm water impoundment. Source maintains daily records of amounts of water pumped to sprinklers.

The last load of non-potable water from the non-storm water impoundment was transported to the White Mesa Mill on May 18, 2017.

The source has not installed the anemometer for permit condition listed in Attachment D, Section III.B.2. the next permit condition states “The anemometer shall operate during periods of active mine operations and shall not be required if no ore is stored at the facility and no transfer of ore to haul trucks is taking place.” The mine is not actively mining.

An anemometer was installed to automatically shut off and prevent start up of the LandSharks from operating at predetermined wind speeds (13mph, unless wind from NW 3mph). Controller unit installed February 15, 2017. The LandSharks were not operating during the inspection. The source has only been operating two LandSharks, the permit equipment indicates the source can operate three LandSharks. Mr. Turk stated the have an additional LandShark in the equipment yard.

The source is constructing an engineered water tank pad to the north of the non-storm water impoundment. The tank will be approximately 440,000 gallons capacity.

Around the southeast perimeter corner of the non-storm water impoundment the source has water sprays/sprinkler spraying water into the impoundment. The sprinklers are continually recirculating water from the non-storm water impoundment during the day light hours to increase evaporation.

The source is conducting quarterly gamma and OSL badge monitoring and submitting reports to ADEQ.

The ADEQ Database indicates the following reports have been received by ADEQ:

Environmental Gamma Monitoring Report received by ADEQ 7/28/17 and reviewed (Insp ID: 287148).

Annual Report received by ADEQ 4/3/17 and reviewed (Insp ID: 281143).

Soil Monitoring Report received by ADEQ 2/23/17 and reviewed (Insp ID: 280075).

Semi-Annual Compliance Certification received by ADEQ 5/3/17 and reviewed (Insp ID: 283019).

Siting Plans for Anemometer Installation received 11/13/16 and reviewed (Insp ID: 271587).

Action Item(s):

Contact Naveen Savarirayan, Manager, Air Quality Permits at (602) 771-2285 to discuss using shaft water for dust control on the Development Rock Stockpile and the water sprinklers on the SW corner perimeter of the non-storm water impoundment. Are sprinkler systems included in PTE calculations and included in the Evaporative Water Spray System section of the permit.

Attachments: Notice of Inspection Rights, Photograph Log, Inspection Checklist

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

NOTICE OF INSPECTION RIGHTS

FACILITY INFORMATION	ADEQ INFORMATION
Facility Name (Customer): Canyon Mine	Date of Inspection: 9/27/2017 8:00 AM
Facility Location (Place): Hwy 64 to FR 305, Tusayan, AZ 86023	County: Mohave
	Inspector: Rob Verville
Mailing Address: P.O. Box Blanding, UT 84511	Telephone: (602) 771-4111
	Accompanied by:
Responsible Party: Energy Fuels Resources (USA) Inc.	ADEQ Follow-up Contact: Jamie Abbott Air Compliance Unit
On-Site Representative: David Turk	
Title: Env. Compliance, EH&S Manager	Title: Manager
Telephone: 435.678.4113	Telephone: (602) 771-4609
Email: dturk@energyfuels.com	

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: 62877

- ☐ 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: 62877

☐ That the state shall not be barred by the statutes of limitations of actions, according to A.R.S. § 12-510, except as provided in A.R.S. § 12-529 concerning certain claims based on navigability of watercourses. According to 28 U.S.C. § 2462, the U.S. government must commence an action within 5 years after the date the claim first accrued.

- ☐ Possible applicability of Small Business Bill of Rights pursuant to Arizona Revised Statutes § 41-1001(21)

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 this notice and discussed any questions or concerns with the ADEQ representatives and I have received the Small Business Bill of Rights

Signature of Regulated Person or Authorized On-Site Representative

9/27/2017

- ☐ 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.

Signature of ADEQ Representative

9/27/2017

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 who is interviewed by an ADEQ inspector during the inspection must be informed that:
 - participation in an interview is voluntary, unless legally compelled to participate;
 - they have the right to have an attorney or other experts in their field present during the interview to represent or advise the regulated person;
 - the ADEQ inspector may not take any adverse action or treat less favorably or draw any inference as a result of the regulated person's decision to be represented by an attorney or advised by any other experts in their field;
 - statements made by the person may be included in the inspection report; and
 - they have the right to 24 hours to review and revise any written witness statement drafted by the ADEQ inspector on which the ADEQ inspector requests that person's signature.
 - If the information and documents provided to the ADEQ inspector become a public record, trade secrets and proprietary and confidential information may be redacted, unless the information and documents are not confidential pursuant to statute.
 - 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 § 12-901 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) 234-5677, 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 Administrative Counsel at (602) 771-2212 (toll free inside Arizona at (800) 234-5677, extension 771-2212).

41-1001.01. Regulatory bill of rights; small businesses

A. To ensure fair and open regulation by state agencies, a person:

1. Is eligible for reimbursement of fees and other expenses if the person prevails by adjudication on the merits against an agency in a court proceeding regarding an agency decision as provided in section 12-348.
2. Is eligible for reimbursement of the person's costs and fees if the person prevails against any agency in an administrative hearing as provided in section 41-1007.
3. Is entitled to have an agency not charge the person a fee unless the fee for the specific activity is expressly authorized as provided in section 41-1008.
4. Is entitled to receive the information and notice regarding inspections and audits prescribed in section 41-1009.
5. May review the full text or summary of all rulemaking activity, the summary of substantive policy statements and the full text of executive orders in the register as provided in article 2 of this chapter.
6. May participate in the rulemaking process as provided in articles 3, 4, 4.1 and 5 of this chapter, including:
 - (a) Providing written comments or testimony on proposed rules to an agency as provided in section 41-1023 and having the agency adequately address those comments as provided in section 41-1052, subsection D, including comments or testimony concerning the information contained in the economic, small business and consumer impact statement.
 - (b) Filing an early review petition with the governor's regulatory review council as provided in article 5 of this chapter.
 - (c) Providing written comments or testimony on rules to the governor's regulatory review council during the mandatory sixty-day comment period as provided in article 5 of this chapter.
7. Is entitled to have an agency not base a licensing decision in whole or in part on licensing conditions or requirements that are not specifically authorized by statute, rule or state tribal gaming compact as provided in section 41-1030, subsection B.
8. Is entitled to have an agency not make a rule under a specific grant of rulemaking authority that exceeds the subject matter areas listed in the specific statute or not make a rule under a general grant of rulemaking authority to supplement a more specific grant of rulemaking authority as provided in section 41-1030, subsection C.
9. May allege that an existing agency practice or substantive policy statement constitutes a rule and have that agency practice or substantive policy statement declared void because the practice or substantive policy statement constitutes a rule as provided in section 41-1033.
10. May file a complaint with the administrative rules oversight committee concerning:
 - (a) A rule's, practice's or substantive policy statement's lack of conformity with statute or legislative intent as provided in section 41-1047.
 - (b) An existing statute, rule, practice alleged to constitute a rule or substantive policy statement that is alleged to be duplicative or onerous as provided in section 41-1048.
11. May have the person's administrative hearing on contested cases and appealable agency actions heard by an independent administrative law judge as provided in articles 6 and 10 of this chapter.
12. May have administrative hearings governed by uniform administrative appeal procedures as provided in articles 6 and 10 of this chapter and may appeal a final administrative decision by filing a notice of appeal pursuant to title 12, chapter 7, article 6.
13. May have an agency approve or deny the person's license application within a predetermined period of time as provided in article 7.1 of this chapter.
14. Is entitled to receive written notice from an agency on denial of a license application:
 - (a) That justifies the denial with references to the statutes or rules on which the denial is based as provided in section 41-1076.
 - (b) That explains the applicant's right to appeal the denial as provided in section 41-1076.
15. Is entitled to receive information regarding the license application process before or at the time the person obtains an application for a license as provided in sections 41-1001.02 and 41-1079.
16. May receive public notice and participate in the adoption or amendment of agreements to delegate agency functions, powers or duties to political subdivisions as provided in section 41-1026.01 and article 8 of this chapter.
17. May inspect all rules and substantive policy statements of an agency, including a directory of documents, in the office of the agency director as provided in section 41-1091.
18. May file a complaint with the office of the ombudsman-citizens aide to investigate administrative acts of agencies as provided in chapter 8, article 5 of this title.
19. Unless specifically authorized by statute, may expect state agencies to avoid duplication of other laws that do not enhance regulatory clarity and to avoid dual permitting to the extent practicable as prescribed in section 41-1002.
20. May have the person's administrative hearing on contested cases pursuant to title 23, chapter 2 or 4 heard by an independent administrative law judge as prescribed by title 23, chapter 2 or 4.

B. The enumeration of the rights listed in subsection A of this section does not grant any additional rights that are not prescribed in the sections referenced in subsection A of this section.

C. Each state agency that conducts audits, inspections or other regulatory enforcement actions pursuant to section 41-1009 shall create and clearly post on the agency's website a small business bill of rights. The agency shall create the small business bill of rights by selecting the applicable rights prescribed in this section and section 41-1009 and any other agency-specific statutes and rules. At the request of an authorized on-site representative of the regulated small business, the agency shall provide a written document of the small business bill of rights. In addition to the rights listed in this section and section 41-1009, the agency notice of the small business bill of rights shall include the process by which a small business may file a complaint with the agency employees who are designated to assist members of the public or regulated community pursuant to section 41-1006. The notice must provide the contact information of the agency's designated employees. The agency notice must also state that if the regulated person has already made a reasonable effort with the agency to resolve the problem and still has not been successful, the regulated person may contact the office of ombudsman-citizens aide.

Air Quality Field Inspection Photograph Log


Site Location: Canyon Mine - Hwy 64 to FR 305, Tusayan, AZ 86023		Photographer: Rob Verville	Camera: Hp XP Elite
Weather: clear			
Photo No. 1	Date: 9/27/2017		
Direction Photo Taken: Northeast			
Photo Description: Entrance to Canyon Mine.			

Photo No. 2	Date: 9/27/2017	
Direction Photo Taken: North		
Photo Description: Evidence of wetting around office trailers and parking area..		

Photo No. 3	Date: 9/27/2017
Direction Photo Taken: South	
Photo Description: Evidence of wetting around headworks.	


A wide-angle photograph of a construction site. In the background, there is a large, complex metal structure, possibly a conveyor system or part of a mill. The ground is a vast, flat expanse of reddish-brown dirt. To the right, there are some yellow and blue equipment or materials. The sky is overcast.

Photo No. 4	Date: 9/27/2017
Direction Photo Taken: North	
Photo Description: Two LandSharks and non-storm water impoundment. LandSharks not operating.	

A photograph of a construction site. In the foreground, there is a large, reddish-brown dirt area with some rocks. A long, curved, light-colored pipe or hose lies on the ground. In the middle ground, there is a large, rectangular pond or impoundment. The pond is lined with a dark, possibly plastic, material. The water in the pond is calm, reflecting the sky. In the background, there is a line of trees. Two blue objects, possibly LandSharks, are visible near the pond.

Photo No. 5	Date: 9/27/2017	
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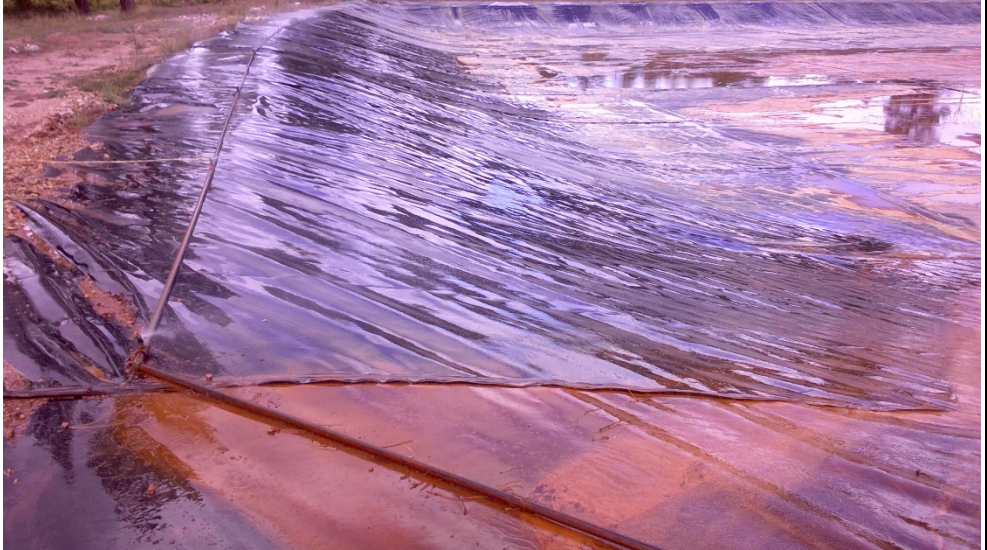
Direction Photo Taken: West	
Photo Description: Sprinklers spraying into impoundment.	


Photo No. 6	Date: 9/27/2017	
Direction Photo Taken: Down		
Photo Description: Water flowing into impoundment from Development Stockpile dust control through pipe.		

Photo No. 7	Date: 9/27/2017	
Direction Photo Taken: North		

Photo Description:
Sprinklers spraying into
impoundment.



Photo No.
8

Date:
9/27/2017

Direction Photo Taken:
Southeast

Photo Description:
Development Rock Pad. The
water sprinklers are not
operating. The sprinklers
are located at the top edge
of the material pile in
background.



Photo No.
9

Date:
9/27/2017

Direction Photo Taken:
West



Photo Description:

Engineered pad for water tank being constructed.

